

IMPACT REPORT 2022

GUINNESS SUSTAINABLE ENERGY FUND



For the year ending December 2021

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POSITIVELY DIFFERENT



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EXECUTIVE SUMMARY

The Guinness Sustainable Energy Fund invests in companies playing a key role in global decarbonisation, providing a vehicle for investors to align their capital with this positive impact. In this report, we disclose our estimates of the positive impact enabled by companies held by the fund at the end of 2021, based on calendar year 2021 data.

In the **first section**, starting on page 5, we discuss our sustainable energy universe construction and how the businesses we seek to invest in map to the UN Sustainable Development Goals (SDGs). We conclude that the portfolio holdings map closest to SDGs 7, 9, 11 and 13. To provide a balanced assessment, we also discuss the business activities of some portfolio companies that detract from the SDGs.

The **second section** of the report, starting on page 12, assesses the positive and negative decarbonisation impact of the fund’s holdings. Our estimate and conclusions are as follows:

- i.** The companies held in our portfolio, at the enterprise level, helped to deliver around 2,000 million kWh of energy savings, 20,000 million miles of electrified travel, 49,000 MW of clean energy generation capacity and 230,000 GWh of renewable energy generation in 2021.
- ii.** The companies in our portfolio sold products and services that help to displace 655 tonnes of CO2e per USD\$1m of portfolio assets. This figure is based on estimates for energy saved, electric miles travelled, and clean energy generated compared to the continued use of incumbent fossil fuel technologies. To put this into context, 655 tonnes of CO2e displaced would be equivalent to planting around 10,800 tree seedlings, providing energy for 83 homes for one year, avoiding driving 1.6 million miles or displacing the consumption of 1,500 barrels of oil.
- iii.** In delivering this positive impact, we estimate that the companies in our portfolio generated an annualised ‘carbon cost’ of 101 tonnes of CO2e. Our carbon cost figure is based on Scope 1 and 2 (S1+S2) emissions data adjusted for asset life where available to provide a comparable annualised negative impact figure. The aggregate improvement in positive impact of companies owned at the end of 2021 increased by +14% year-on-year.

The **third section**, starting on page 22, explains our engagement framework of Disclosure, Target Setting and Incentivisation with case studies of engagement activity over the last year to support our approach. We also address our engagement activities around negative material operational or ESG concerns and controversial business activity.

Within our **appendices**, starting on page 25, we provide historical and background information on impact alignment, our methodology on SDG and business activity mapping as well as discussion points around impact methodology.

We are mindful that impact reporting is still evolving and that there is room for discussion around the approaches adopted. Please note that the estimate for carbon displaced is a proprietary calculation using unaudited numbers and is not equivalent to a carbon offset to Guinness nor our clients. The figure illustrates the extent to which the fund is fulfilling its objective to invest in companies which help facilitate the low-carbon transition. The carbon cost figure is also illustrative and distinct from the fund’s weighted average carbon intensity. The positive impact is owned by the consumer who purchases the underlying products and services. Throughout the report we have provided detail on the methodologies we have used, including case studies.

INTRODUCTION FROM THE INVESTMENT TEAM

Energy security is back on the agenda. After years of global energy price deflation thanks to the growth in US shale, energy supply concerns have resurfaced, dramatically changing the pricing landscape and leading to meaningful government support for energy security.

Prices started rising in 2021 thanks to a stronger than expected post-pandemic recovery. China was a key driver, with power demand boosted by an economic rebound and an unusually hot summer, which led to higher demand for air conditioning. In China, over 80% of power is generated from either coal or hydro power. However, in the second half of 2021, supply from both sources was restricted, resulting in a power crunch. The authorities responded by curtailing demand and importing more liquified natural gas (LNG). Typically, excess LNG makes its way to Europe for power generation. The effect of China increasing its LNG shipments meant less was available on the global market, pushing European gas spot prices in September 2021 to nearly 6x (€116/MWh) the previous decade's average. Prices peaked again at over 9x (€180/MWh) in December 2021 when winter heating demand kicked in.

In February 2022, Russia invaded Ukraine. Prices raced higher once again on concerns over Russian hydrocarbon supply, hitting nearly 12x the 2010-20 average of €19.30/MWh. In response to the Russian invasion, the European Commission presented the REPowerEU Plan, a €300bn funding package to eliminate dependence on Russian gas before 2030. The plan focused on energy efficiency, diversifying energy suppliers, and scaling up renewable power generation. In August, the US passed its own energy security support package as part of the Inflation Reduction Act. The Act allocated \$369bn to energy security and climate change with the aim of lowering energy costs while incentivising clean energy production and promoting a 40% reduction in carbon emissions by 2030. At the time of writing, European gas prices are over 10x the average price seen over the last decade. This gas price inflation is permeating through to the cost of electricity, driving record Eurozone inflation. In 2021, the average baseload electricity price in Germany, France, and the UK was 2.3x higher than the average prices paid in 2010-20. So far, in 2022, prices are 6.8x higher, leading to vastly improved value propositions for efficiency and renewable energy projects.

Companies that sell products and services which reduce or displace conventional energy demand are set to capture an outsized share of future investment whilst helping to contribute towards energy security and decarbonisation goals. By delivering concentrated exposure to companies playing a key role in global decarbonisation, the Guinness Sustainable Energy Fund provides a vehicle for investors to align their capital with this positive impact.

Our report starts with an explanation of our philosophy, our thoughts on impact investing, and how we align our universe with climate solutions. We then describe our impact findings, focusing on CO2 emissions displaced by the products and services of our investee companies, before describing some of the areas of negative impact and controversy within our portfolio. Impact measurement and reporting is still relatively nascent. We rely on calculations made on a best-efforts basis and many of the figures we produce are proprietary and unaudited. We have included explanations of our methodologies in this report, in an effort to guide the reader through the assumptions we have taken.

Jonathan Waghorn

Will Riley

Jamie Melrose

PHILOSOPHY

The energy transition is happening

Over the next thirty years, the world will transition towards a sustainable energy system.

The transition will be driven by five key factors:

- **Population and GDP growth:** The UN projects that the world population will increase at a compound annual growth rate (CAGR) of 0.8% from 2020 to 2050, increasing to 9.8bn.
- **Climate change:** In 2021, NASA reported that average temperatures had increased by 1.1 degrees Celsius since 1880. The Paris Agreement, endorsed by 197 countries, set out a framework to limit global warming to well below 2.0 degrees. Action taken in this decade will be decisive in determining whether this target will be able to be met.
- **Pollution:** According to the World Health Organisation, 99% of the global population breathes air that exceeds air pollution limits. They estimate that 13 million people die annually from avoidable environmental causes, including more than 7 million from exposure to air pollution.
- **Energy security:** Russian President Vladimir Putin's weaponization of energy supplies in Europe has caused fears of shortages, sending prices of crude oil, natural gas, and energy soaring. In response, the US and EU have announced unprecedented funding support for energy efficiency and renewables to reduce their reliance on energy imports and exposure to global commodity prices.
- **Economics:** According to research from the University of Oxford, transitioning to a decarbonised energy system by 2050 is expected to save the world at least \$12 trillion compared to continuing our current levels of fossil fuel use.



WHAT WE INVEST IN

The Guinness Sustainable Energy Fund’s investment objective is to provide investors with long-term capital appreciation by investing in companies that contribute towards reduced global carbon emissions. Specifically, the fund invests in companies engaged in the generation and storage of sustainable energy, and the electrification and efficiency of energy demand.

Guinness Sustainable Energy Fund by theme (at 31 December 2021)		
Theme	Example Holdings	Model weight (%)
1 Electrification of the energy mix	TransAlta renewables, NEXTERA ENERGY, RESOURCES	19.4
2 Rise of the electric vehicle and auto efficiency	Sensata, APTIV	22.6
3 Battery manufacturing	SAMSUNG, SAMSUNG SDI	9.7
4 Expansion of the wind industry	SIEMENS Gamesa, Vestas	16.1
5 Expansion of the solar industry	CanadianSolar	16.1
6 Heating, lighting and power efficiency	NIBE INDUSTRIER	19.7
7 Geothermal and biomass	ORMAT, ALBIOMA	6.5

Source: Guinness Global Investors

WHAT WE DO NOT INVEST IN

The strategy excludes companies which:

- Are involved in the extraction of oil, natural gas or coal;
- Manufacture controversial weapons; or
- Derive over 30% of revenues from thermal coal power generation.

The Fund’s exclusions are also consistent with the Norwegian Council on Ethics (Norges Bank) exclusion list, which screens out some of the larger fossil fuel utilities, tobacco, and companies which breach globally accepted norms.

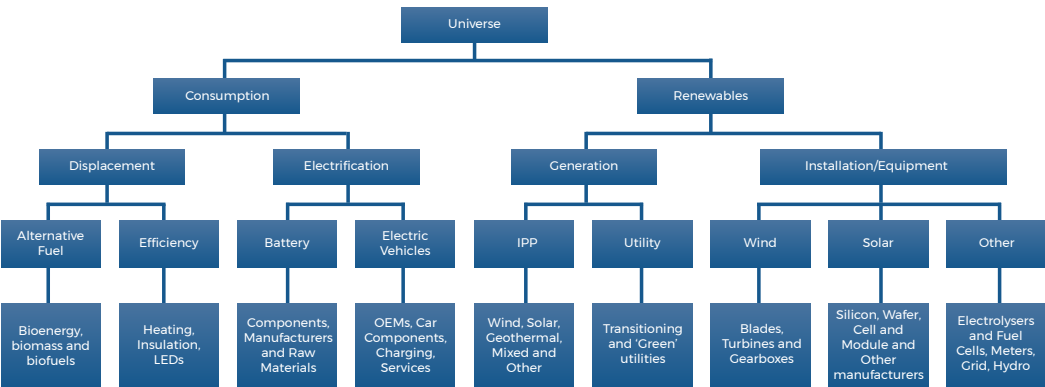
MAPPING TO THE SDGs – THE SUSTAINABLE ENERGY UNIVERSE

Universe construction

The Guinness Sustainable Energy Fund delivers concentrated exposure to companies in the sustainable energy sector, providing a positive environmental solution for investors’ portfolios.

Our investment universe is unique to Guinness. It was first created in 2018 by identifying c.600 companies associated with the energy transition. We screened out c.400 companies due to size, liquidity or relevance, leaving an investible universe of around 200 companies. This universe is updated annually and currently stands at around 250 companies at the end of 2021 (the reference point for this report). We apply our investment process and approach to portfolio construction, resulting in an equally weighted portfolio of 30 positions. We do not limit ourselves to ‘pure plays’, opening our universe up to some companies with existing conventional fuel exposure, but this must be allied with a commitment to transitioning their business models towards sustainable energy sources. Our universe, at the end of 2021, is summarised below:

Guinness Sustainable Energy Fund Investment Universe (at 31 December 2021)



Source: Guinness Global Investors

This model has four key sustainable energy subsectors:

- **Displacement:** companies selling products and services which displace energy consumed via improving energy efficiency or providing alternative fuels.
- **Electrification:** companies selling products and services which help to enable electrification of transportation and provide energy stationary storage for the grid.
- **Generation:** utilities and Independent Power Producers (IPPs) with a material proportion of business exposure to low-carbon electricity generation.
- **Installation:** companies involved in installing low-carbon infrastructure, manufacturing finished products (turbines), key components (solar glass), and services (grid connection).

We believe that the companies which fall into these business areas sell products and services which are vital to delivering the transition towards a low-carbon economy. As we can only invest in companies which fall into one of these four verticals, we believe that our portfolio is strongly aligned with the positive decarbonising impact associated with these products and services.


UNIVERSE ALIGNMENT WITH THE UN SDGs

The United Nations Sustainable Development Goals (SDGs) are 17 goals backed up with 169 targets, which act as a framework for “peace and prosperity for people and the planet, now and in the future”. They were adopted by all UN member states in 2015 as a blueprint for sustainable development to 2030. The SDGs have been widely adopted by the private sector as common language for communicating positive (and negative) impact.


The United Nations Sustainable Development Goals




We believe that there is strong alignment between our four sustainable energy subsectors and the following four SDGs:




Displacement companies provide energy efficiency solutions and services (Targets 7.1, 7.3). **Generation** companies provide low-carbon energy, helping to increase the share of renewable energy in the global grid mix (Target 7.2).



Installation companies install, upgrade, and service low-carbon energy infrastructure, enabling greater adoption of clean technologies (Target 9.4).



Electrification companies enable the electrification of mobility, facilitating the transition towards sustainable transport systems (Target 11.2).



Collectively, these companies provide the products, services and solutions which allow governments to integrate climate change measures into national policies, strategies and planning (Target 13.2).

Portfolio alignment with the UN SDGs

We have conducted an impact mapping exercise; matching up divisional business activity to relevant SDG targets to understand the impact our portfolio delivers beyond carbon displacement. Where a company’s divisional activity contributes to more than one impact area, we assign the most relevant SDG/target as the division’s “primary” impact and describe the overlapping / other impacts as “secondary” impact(s). We do not deliberately target these secondary impacts, yet the business activity of some of our portfolio companies also contributes towards the following SDGs:

- Target 3.9: Help reduce the number of deaths and illnesses from hazardous air pollution by enabling the electrification of transportation.
- Targets 8.4 & 11.6: Improve global resource efficiency and reduce the per capita impact of cities, through providing energy and water efficiency products and services.
- Target 12.5: Reduce waste by licensing efficient production processes and recycling batteries, helping to reduce waste generation.



The primary and secondary contributions of our investee companies are shown below:

Guinness Sustainable Energy Fund: SDG impact mapping (at 31 December 2021)

Company name		3 GOOD HEALTH AND WELL-BEING	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION
Displacement	Ameresco							
	Hubbell							
	Nibe Industrier							
Electrification	Johnson Matthey							
	LG Chem							
	Samsung SDI							
	Tianneng Power							
	Aptiv							
	Gentherm							
	Hella							
	Onsemi							
	Infineon							
	Sensata							
Generation	Albioma							
	China Longyuan							
	China Suntien							
	Iberdrola							
	NextEra Energy							
	Ormat							
	TransAlta Renewables							
Installation (Equipment)	Itron							
	Schneider Electric							
	Eaton							
	Canadian Solar							
	Enphase Energy							
	First Solar							
	SolarEdge							
	Xinyi Solar							
	Siemens Gamesa							
	TPI Composites							
	Vestas							

Primary impact >50% of business activity

Primary impact >10% - <50%

Primary impact >0% - <10%

Secondary impacts

No impact

Source: Guinness Global Investors

We are also aware that some of the business activity of companies in the portfolio detracts from the SDGs. When conducting due diligence, we attempt to consider both a company's positive and negative impact, seeking only to invest in companies which we view as having a net benefit to the energy transition. We detail below some of the adverse impacts our portfolio companies have.

Many of our displacement and installation names are manufacturing companies. Some of these companies are diversified with exposure to unfavourable end markets. Within the electrification sector, we consider companies involved in the battery and electric vehicle supply chains. Many companies supplying components for electric vehicles also generate revenues from supplying parts for internal combustion engine vehicles. Aptiv is the global leader in high-voltage power architectures for electric vehicles, but also derives revenues from low-voltage architectures for petrol and diesel vehicles.

We consider both utilities and independent power producers (IPPs) within our generation names. Many IPPs and utilities own legacy fossil fuel generation assets, contributing towards increased global carbon emissions and exacerbating the climate crisis. On average, our Utility and IPP holdings have 25% of their business activity exposed to fossil fuel generation & distribution. We will own these companies on the condition that a sizeable proportion of their business is already dedicated to renewable generation and a clear commitment has been made towards growing this further whilst phasing out fossil fuels. For example, NextEra Energy has grown its renewables capacity by over 5x from 2005-21, has eliminated coal from its Florida operations, and is targeting zero operational emissions by 2045 without offsets.

Case study: Iberdrola

Iberdrola claims to be the world's leading wind energy generation company with 20,700 megawatts (MW) in operation and an additional 4,000 MW under construction. In 2021, the company generated nearly 74 terawatt hours (TWh) in renewable energy (42 TWh onshore wind, 25 TWh hydro, 5 TWh offshore wind, 3 TWh solar and others). When combined with the company's nuclear generation of c.23 TWh, the company generates just over of 97 TWh of low-carbon energy. However, the company also generates around 67 TWh of energy from natural gas (60 TWh) and cogeneration (7 TWh) which releases carbon into the atmosphere, exacerbating the greenhouse gas effect and contributing to global warming.

Despite this, we believe Iberdrola is eligible for a place in our portfolio for three main reasons:

- **It is growing its renewable generation faster than its fossil generation:** Fossil generation grew from 62 TWh in 2016 to 67 TWh in 2021, whereas renewable generation has increased from 56 TWh to 74 TWh over the same period.
- **It is far less carbon intensive than its peers:** The company's carbon intensity of generation is nearly 90% lower than the MSCI ACWI IMI power generator peer average, and it is targeting a further 49% reduction in emissions intensity by 2030, followed by global carbon neutrality by 2050.
- **It has actively closed down fossil power plants:** The company completed the closure of its final coal power plant in 2020. This represented the culmination of a process initiated in 2001, leading to the closure of 17 coal and fuel oil thermal power facilities around the world with total production capacity of over 8,500 MW. Now, the company plans to invest €75bn across 2020-25 in deploying renewables, green hydrogen, and modernising its energy grids.

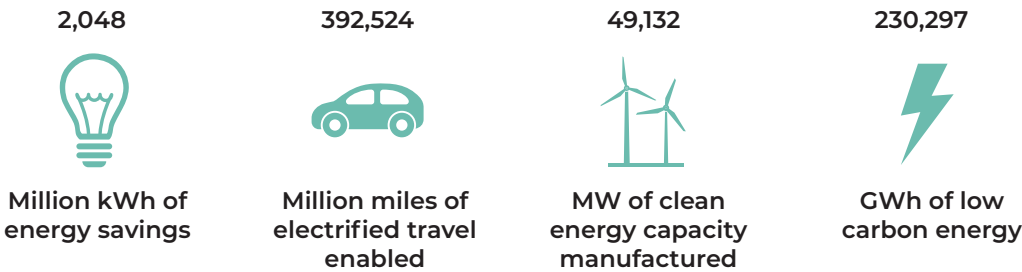
Despite some of our companies contributing toward negative impacts, we believe that the companies owned in the Guinness Sustainable Energy Fund deliver a net positive impact. Where companies derive less than 50% of sales, profits or cash flow from sustainable energy, we would look for substantially more than 50% of investment to be going into sustainable energy, meaning that the driver of future growth (and typically therefore the driver of equity value) over the coming years comes from sustainable energy.

IMPACT OF THE COMPANIES IN THE GUINNESS SUSTAINABLE ENERGY FUND

Aggregate enterprise level impact figures

In this report, we present the positive impact associated with our investee companies by estimating the carbon dioxide emissions displaced and generated through use of their products and services. Please note that these are unaudited figures, which rely on internal estimates.

For 2021, we estimate that in aggregate, the companies in our portfolio achieved all of the following:

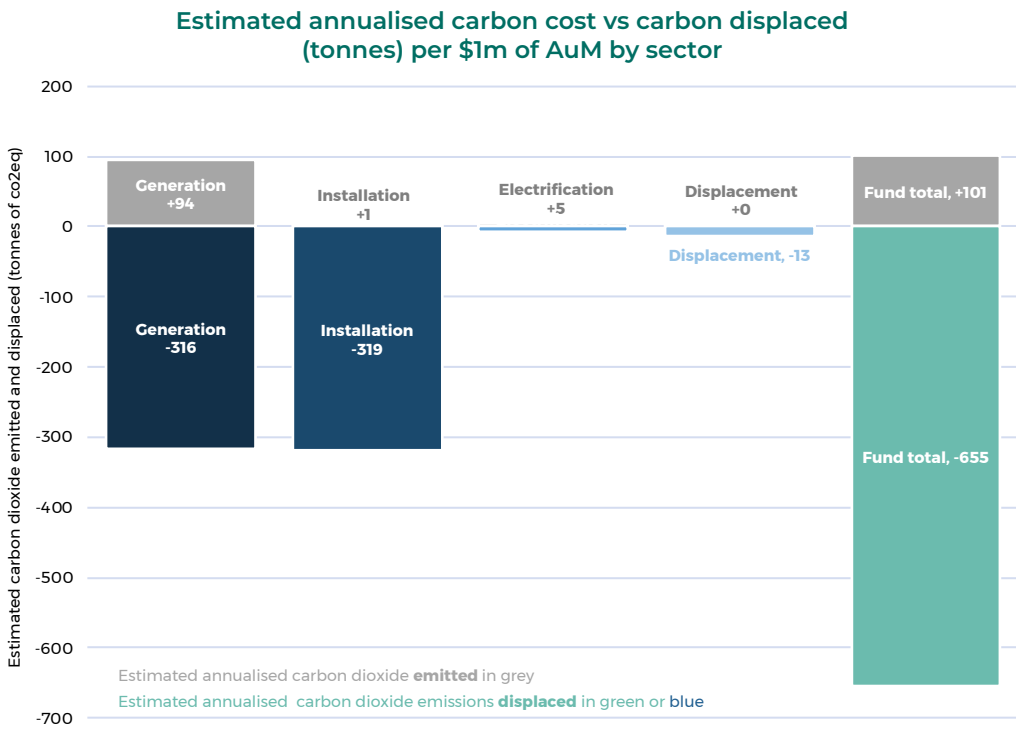


Source: EPA

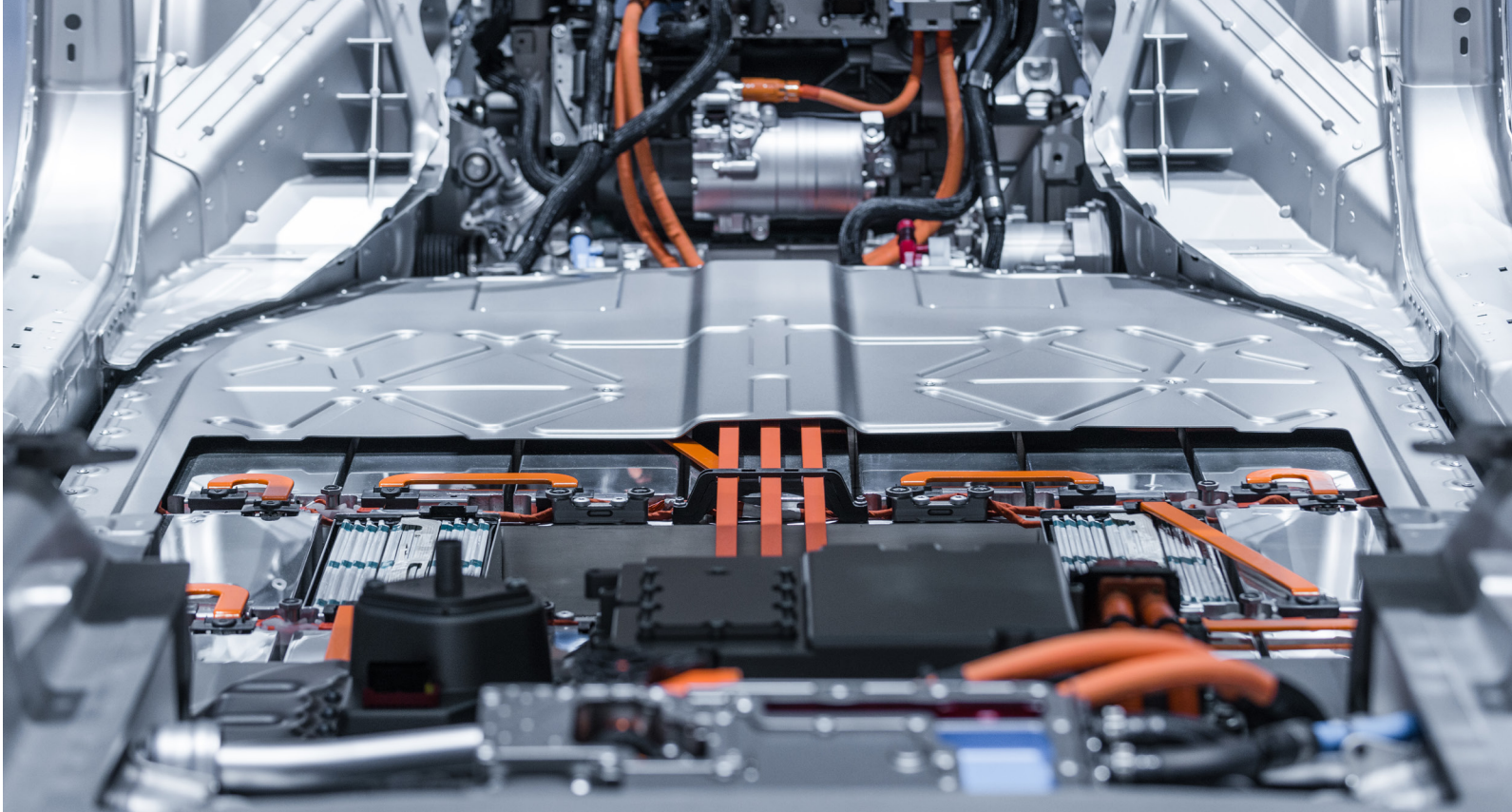
Annualised carbon displaced per \$1m of portfolio assets

In 2021, we estimate that:

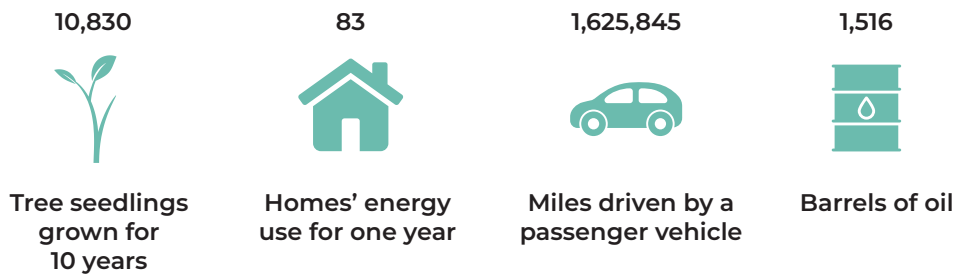
- The annualised carbon cost associated with our portfolio was 101 tCO2e/\$m portfolio assets.
- The annualised carbon displaced associated with our portfolio was 655 tCO2e/\$m portfolio assets.



Source: Guinness Global Investors



According to the Environmental Protection Agency (EPA), 655 tonnes of CO2 is equivalent to one of the following:



Source: EPA

We find it interesting to look behind our headline finding of 655 tCO2e displaced / \$1m of portfolio assets to understand what makes up this figure. In contrast to last year's results, the installation subsector (rather than generation) was the largest contributor, accounting for 49% of carbon displaced. Within the installation sector, Canadian Solar was a significant contributor. Canadian Solar is a leading solar photovoltaic module brand, provider of solar energy and battery storage solutions, and developer of utility-scale solar power and battery storage projects. Wind blade manufacturer TPI Composites was the second-largest contributor. We also own Xinyi Solar, a Chinese installation name in the solar module supply chain which also provided a good contribution. As Xinyi is fairly energy intensive, and as China's grid is still reliant on coal power generation, the company has relatively high Scope 1 and 2 emissions. We expect this to improve over time as China decarbonises its electricity grid.

Within the generation group, our two Chinese wind names (China Suntien and China Longyuan) once again achieved some of the highest displacement per dollar invested, compared to European and North American generation exposure in the portfolio. This is not particularly surprising given the relatively low valuations of the Chinese names relative to the scale of their generation assets.

The electrification sector makes up only 1% of the CO2e displaced. In our calculation of an EV component company’s positive impact, we estimate the number of electric miles they have enabled and then apply a scaling factor based on the product’s contribution to the cost of a mid-range electric vehicle. Despite playing vital roles in electric drivetrains, EV components such as semiconductors (Infineon, Onsemi) and high voltage cabling (Aptiv) are typically responsible for just 2-3% of the overall cost of an electric vehicle. For a number of our EV names, this results in a relatively low positive impact contribution, however we expect this sector to make some of the biggest gains in positive impact over the next few years. We talk more about scaling factors in our worked example later on in this report.



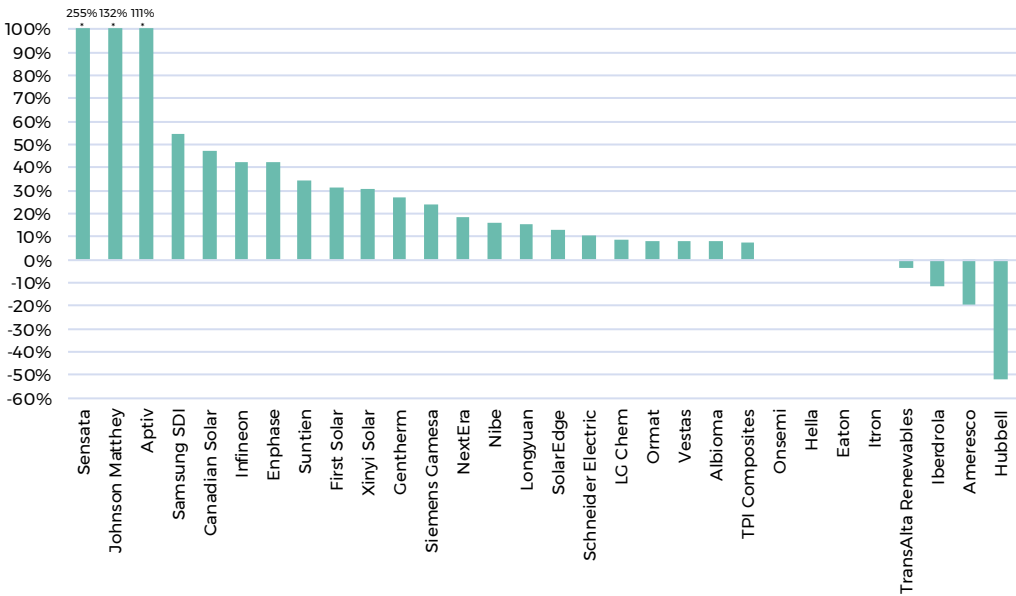
We note that our headline figure of 655 tCO2e displaced / \$1m of portfolio assets is lower than last year. The main drivers behind this were the changes in data availability and market capitalisations for our portfolio companies over calendar year 2021. Stripping out these effects the aggregate improvement in positive impact of companies owned at the end of 2021 increased by +14% year-on-year. Other factors which had less of an impact included portfolio switches and product life revisions.

We should point out that our calculations described here incorporate the Scope 1 (direct emissions from owned or controlled sources) and Scope 2 (indirect emissions from the purchased electricity, steam, and heat purchases) emissions of our investee companies, plus the estimated ‘Scope 4’ emissions displaced through the use of the products and services they deliver. This year, we also include some initial analysis of the Fund’s available Scope 3 (all other indirect emissions that occur in a company’s value chain) data.

CHANGE IN IMPACT VERSUS 2020

We use our own process of measuring and disclosing investee company impact as a way to identify companies to prioritise for engagement.

Percentage change in estimated annualised CO2 displaced by company, 2021 vs 2020 Aggregate portfolio improvement excluding market cap changes = +14%



Source: Guinness Global Investors

Assuming we owned 100% of the companies in our portfolio, the aggregate improvement in gross carbon emissions displaced increased by 14% year-on-year. Some of the companies which saw the biggest increases in positive impact were Sensata, Johnson Matthey, Aptiv, Enphase, and Samsung SDI.

- **Sensata** saw its gross CO2 displaced increase by over 250%.
 - The main driver was a c.200% increase in electrification sales thanks to expanded business with existing customers and a significant increase in new business wins.
 - The increase was aided by the increase in global electric vehicle sales in 2021, jumping from 3.2 million units (c.4% of passenger vehicle sales) in 2020 to 6.6 million units (c.9%) in 2021.
- **Johnson Matthey** saw its impact increase by 132%.
 - In Johnson Matthey’s 2021/22 annual report, the company stated that its technologies helped avoid 489,000 tCO2e entering the atmosphere compared to conventional technologies.
 - This year’s figure is more than double that of the previous year because the company sold more fuel cell components for distributed power systems this year versus 2020/21.

- **Samsung SDI** saw its estimated emissions displaced increase by 55%.
 - The company saw sales from its battery division sales increase by 25% year-on-year, largely owing to higher demand for electric vehicles.
 - Automotive and energy storage system (ESS) battery cell production rose by 36% and 37% respectively year-on-year.
- **Canadian Solar's** Scope 4 emissions displaced increased by over 40%.
 - In 2021, Canadian Solar delivered record revenue from shipping 13.9GW in modules and 896MWh in battery storage.
 - After delivering strong module shipment growth and ramping up battery shipments from zero to nearly 900MWh in just one year, the company is guiding to shipment growth of 45% for modules and 100% for battery storage in 2022.
- **Enphase's** positive impact grew by 85%.
 - The company sold approximately 10.4m microinverters in 2021 compared with 6.8m in 2020, bringing their cumulative shipments to more than 42m.
 - The company claims that approximately 12GW of Enphase microinverters have been installed in solar systems since inception, displacing 31m tonnes of carbon dioxide.

This year we identified four companies which saw their positive impact fall year-on-year: Hubbell, Ameresco, Iberdrola, and TransAlta Renewables. Iberdrola reported lower carbon emissions avoided due to a technicality. The company's emissions avoided by renewables depends on two factors: renewable energy production and the base emission factor of each country where the energy is produced. Declines in the base emissions factors for the countries in which it operates led to a decline in the estimated emissions avoided. Overall we remain reassured as Iberdrola's renewable energy production increased by 9% in the year, so we are satisfied that it continues to move in the right direction. TransAlta Renewables reported lower Canadian wind production due to lower wind resource and facility outages in Q4 2021. Hubbell sold its Commercial & Industrial lighting division for which it previously provided impact data. We are not concerned as we believe its Utility division's sales are more impactful (these grew from 2020 to 2021) but are far harder to translate into CO2e avoided. Ameresco took one of its biogas plants offline to transition it to a Renewable Natural Gas plant. This came back into operation in 2021 and will contribute a carbon benefit in their 2022 numbers.

In all cases, the observed decline in positive impact was due to temporary fluctuations, calculation changes, or one-offs rather than any deviation in corporate strategy. Overall, we are happy that our holdings are well aligned to deliver a positive environmental impact by growing revenues and profits from climate solutions. We will continue to monitor their progress in future reports.

METHODOLOGY

Data collection

We gather relevant operational and environmental metrics for all portfolio companies where data is available or can be reasonably estimated .

Calculation of company impact

We apply reasonable assumptions to translate the data into an estimate for annualised CO2e displaced (positive impact) in the current year. This is increasingly being described in the industry as Scope 4 emissions. We then apply a scaling factor to revise our impact estimates downwards to reflect the product's contribution to the final impactful product cost.

Case study: SolarEdge scaling factor

SolarEdge is a leading manufacturer of power optimizers and inverters which help to maximise power generation from residential solar panels. In the absence of clean energy technologies such as solar power, additional fossil capacity would have been added to generate this energy, leading to higher carbon emissions.

However, on their own, power optimizers and inverters cannot generate clean energy. They require other hardware (solar modules, cables, racking systems, wiring, etc) and soft costs (Installation labour, permitting, interconnection, margin). It would not be fair to award the solar generation that SolarEdge has enabled 100% of the emissions displaced by solar generation. We therefore apply a scaling factor.

According to the Solar Energy Industries Association (SEIA), in 2021 the cost of a residential solar PV system was \$3.04 per watt. According to PVInsights, the cost of a 1-10kW (1-phase) residential inverter at the end of 2021 was 10.3 cents per watt (c3%). For SolarEdge, 3% is our scaling factor.

Annualising

The S1+S2 emissions of a manufacturer of power optimisers and inverters represent the upfront carbon cost which has to be recognised in order to enable 25 years of carbon displacement through solar energy generation. One way of measuring impact would be to subtract the S1+S2 emissions from the emissions displaced by the solar farm over its 25-year operational life. However, we believe a better way of presenting this data is on an annualised basis. We divide both the carbon emitted to create the product (S1+S2 emissions) and the estimated lifetime carbon displaced, by the product's estimated useful product life. This provides an estimate for annualised carbon cost (S1+S2 emissions / product life) and an annualised carbon displaced (lifetime carbon displaced / product life).

Calculating impact per \$1m of portfolio assets

A holding of \$1m in an equally weighted portfolio of 30 stocks, would result in an indicative \$33,333 holding in each company. We divide that holding by the company's market capitalisation to get a percentage share of ownership. We can then multiply this by the annual carbon displaced (positive impact) and annual carbon cost (negative impact) estimates to present an estimate for the investor's associated positive and negative impact per \$1m of portfolio assets. This is then aggregated across all of our portfolio holdings in order for us to present a figure for associated carbon displaced and associated carbon cost per \$1m of portfolio assets.



WORKED EXAMPLE: SOLAREEDGE (SEDG)

Positive Impact (estimated carbon displaced)

Data collection:
In 2021, SEDG disclosed that it shipped inverters and optimizers capable of supporting 7,159 MW of solar capacity, an increase of c17% from the 6,106 MW shipped in 2020. In its 2020 Sustainability Report, the company disclosed that the PV Inverter systems that it supplied in 2020 avoided an estimated 4.75m tCO2e of greenhouse gas emissions. At the time of writing, the company is yet published a Sustainability report with updated figures for 2021.

Calculation of company impact:
To estimate the emissions displaced in 2021, we take SEDG’s 2020 figure for emissions avoided (4.75m tCO2e) and scale it up to reflect the increase in shipments in 2021 (+17%), assuming emissions avoided per MW remains stable. In doing this, we arrive at an estimate of 5.57m tCO2e. As discussed earlier, inverters represent c3% of the cost of a residential solar PV system. If we apply a c3% scaling factor, we reach an estimate for annualised carbon displaced of 0.19m tCO2e.

Negative Impact (estimated carbon emissions generated)

Data collection:
In 2020, SEDG disclosed that it emitted Scope 1 + 2 emissions of 13,920 tCO2e to generate \$1,459m of revenue. At the time of writing, the company is yet to publish Scope 1 + 2 emissions for 2021.

Calculation of company impact:
We estimate SEDG’s 2021 Scope 1 + 2 emissions by calculating the company’s 2020 emissions intensity (13,920 / 1,459 = 9.5 tonnes of CO2e / \$1m sales) and applying it to the company’s 2021 sales of \$1,964m. By multiplying these figures together, we arrive at an estimate of 18,733 tCO2e.

Annualising
A solar system lasts for around 25 years. The positive impact data collected reflects annual data so no further work is required. The upfront carbon cost (S1+S2) which has been recognised to enable 25 years of solar generation is 0.019m tCO2e. The annualised carbon cost is 0.019m tCO2e divided by 25 = 0.0007 mtCO2e per year.

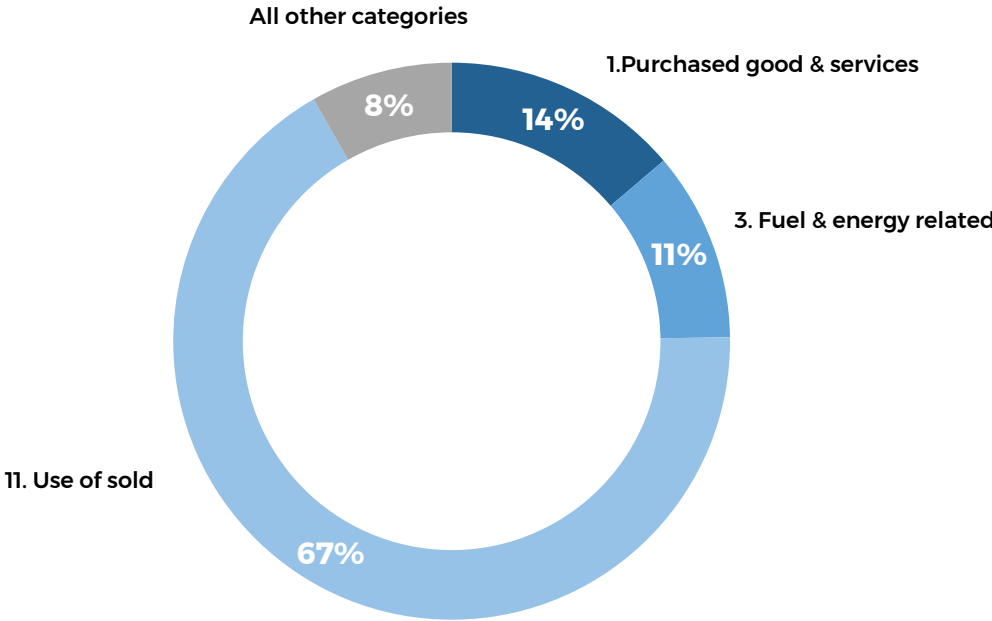
Impact per \$1m of portfolio assets
\$33,333 invested in SEDG (\$14.7bn market capitalisation as of 31st December 2021) leads to a 0.0002% ownership stake. If we multiply this stake by the positive and negative impacts, we reach an annualised carbon displaced (positive impact) figure

SCOPE 3 EMISSIONS

Last year, we said that we thought the two most relevant Scope 3 GHG Protocol categories for our portfolio were Category 1 (purchased goods & services) and Category 11 (use of products sold). After collecting the available data from CDP and company disclosures, we found that these two categories made up over 80% of the portfolio’s Scope 3 emissions.

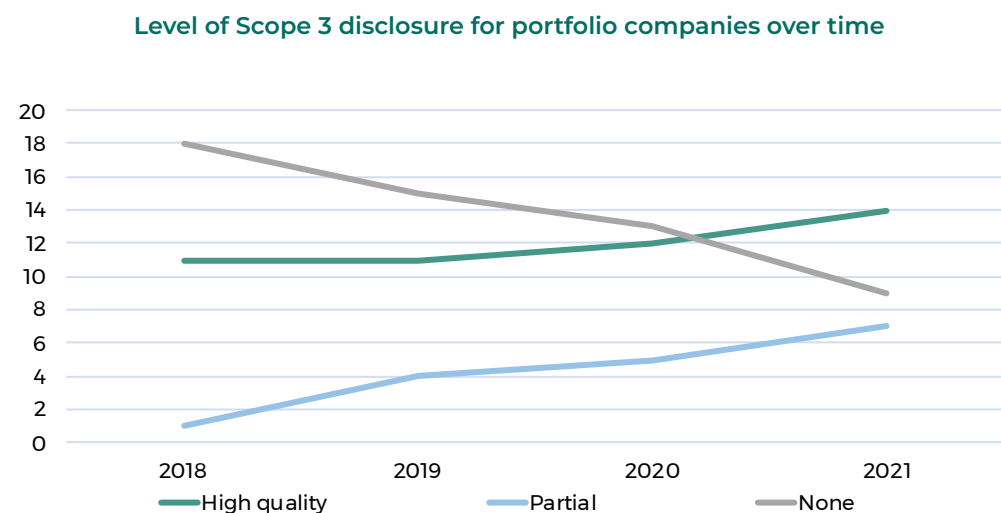
After collecting the data, we also discovered that Category 3 (Fuel & energy related) emissions made a material contribution. These are the upstream emissions associated with the fuel and energy purchased and consumed by the company in the year that are not included in Scope 1 or Scope 2. This includes: the upstream emissions of purchase fuels; upstream emissions of purchased electricity; transmission and distribution losses; and generation of purchased electricity that is sold to end users.

Scope 3 emissions breakdown by category



Scope 3 reporting is still developing, with many companies not reporting any information at all or producing partial disclosures covering 1 or 2 of the 15 categories (typically business travel and employee commuting), but not all of them. At present:

- 14 companies report high-quality Scope 3 data;
- 7 companies report partial Scope 3 data; and
- 9 companies do not report any Scope 3 data.



Disclosure is slowly improving, however, incomplete data makes quantitative Scope 3 analysis difficult at present. The quality of this data is also questionable:

- Some categories were relevant but not yet calculated;
- Different companies may use different methodologies for similar categories;
- Different companies rely to different extents on supply chain partner data;
- There can be significant swings in calculations from year to year; and
- Third party estimates can vary materially.

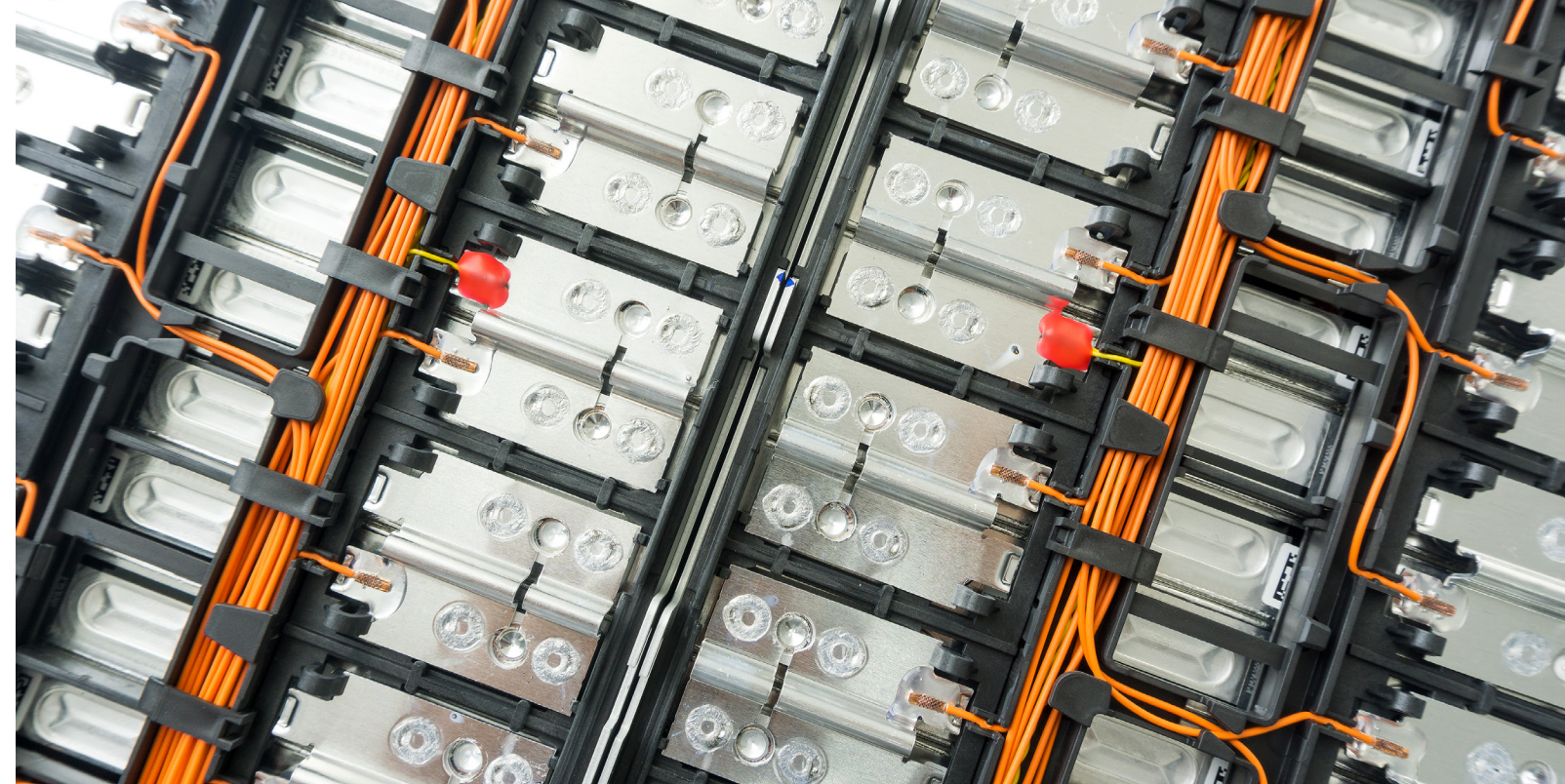
However, some data is better than no data. Previously, we conducted qualitative Scope 3 analysis to assess the impact of a significantly higher carbon price. We provide an updated summary of this work below.

Category 1: Purchased goods & service

A number of the companies we own use carbon or energy intensive raw materials in their production processes. In the event of a significantly higher carbon price, the cost of manufacturing these materials would increase, potentially impacting profitability. We believe this would impact the cost of steel and cement for wind turbines, polysilicon and glass for solar modules, and the metals used in battery manufacturing. However, in the event of a significantly higher carbon price, we believe that demand for wind, solar and batteries would materially increase, resulting in a net benefit to these companies.

Category 3: Fuel & Energy related

All of the companies we own will purchase energy in the form of fuel or electricity. A significantly higher carbon price would likely increase the cost of purchasing that energy for all of our companies, incentivising energy efficiency initiatives and a switch to greater renewable energy use.



Category 11: Emissions associated with product use

Biofuels and biomass are generally considered to be greener alternatives to incumbent fossil fuel-based technologies as they are made from waste or plant-based ingredients which have absorbed carbon whilst being grown. Despite this, they are typically blended with existing hydrocarbons, requiring combustion to release energy and thus generating carbon emissions. Because of this, rising carbon costs could dampen demand for the blended fuel. On the other hand, as batteries and hydrogen are still nascent within airlines, shipping & heavy freight; biofuels would likely see a boost from these end markets as they try to decarbonise their operations. The outlooks for these technologies are a little less certain in the event of a higher carbon price.

As discussed earlier, a number of our electric vehicle suppliers also supply components to petrol and diesel vehicles. In the event of a higher cost on carbon we believe that the ICE to EV transition occurs faster, boosting EV component demand. It is also likely that a combination of higher power prices and higher battery prices (due to higher raw material costs, and higher manufacturing costs; batteries are very energy intensive to manufacture) lead to higher upfront and running costs for EVs. This is likely to be offset by higher running costs for ICE vehicles also, but the picture is somewhat mixed.

Emissions associated with product use are also released by utilities with gas distribution businesses and electricals manufacturers whose products require power from the grid to work. We believe that higher carbon prices would incentivise greater switching to fossil-free heating systems (e.g. heat pumps), and higher electricity prices could support to purchases of more energy efficient electrical devices.

Our ambition is to continue to improve our Scope 3 reporting and analysis as disclosure improves.

ENGAGEMENT BY THE GUINNESS SUSTAINABLE ENERGY INVESTMENT TEAM

As a minority shareholder in public equities, we recognise that our engagement 'clout' is likely to be limited compared, say, to that of a private equity firm which takes majority stakes in its investee companies. However, we believe that successful long-term engagement shares parallels with Richard Thaler's nudge theory; the idea that behaviour and decision making can be influenced through positive reinforcement and suggestions for improvement. We are but one actor trying to nudge the company in the right direction. However, when multiple actors, either independently or collectively, nudge in the same direction of positive change, it is far harder for management, industries and governments to ignore.

Engagement framework

In our engagement efforts, we seek to ensure that the strategies of our portfolio companies are aligned with our goal of owning companies helping to deliver the low carbon transition. Our engagement framework has three key pillars: disclosure, target setting, and incentivisation.

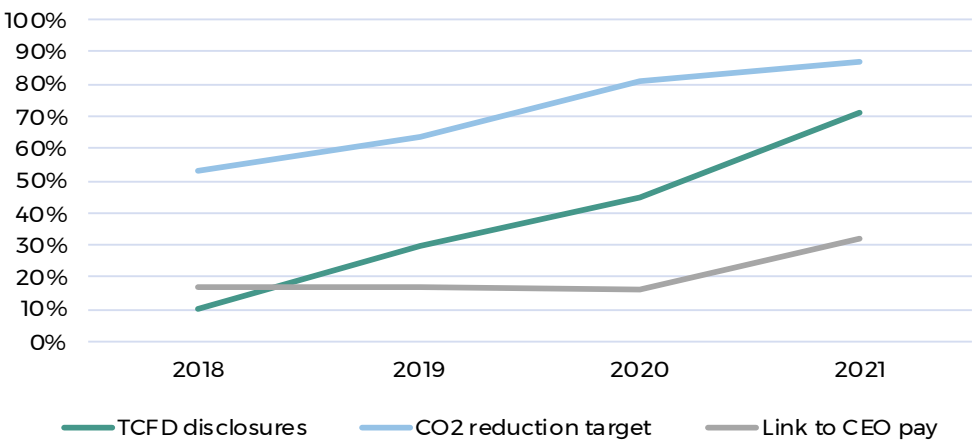
- Disclosure: Once a risk is measured, it can be managed through target setting.
- Target setting: Once a target has been set, it can be incentivised through remuneration.
- Incentivisation: Once a target is incentivised, it is more likely to be achieved.

When we engage on disclosure, we commonly ask companies to produce an ESG report, produce TCFD-aligned disclosures, disclose their emissions, complete the CDP climate survey, disclose green product revenues, or estimate the carbon emissions avoided thanks to customers using their products.

When we engage on target setting, we often ask companies to set carbon reduction targets, register carbon reduction targets with the Science Based Targets initiative (SBTi), set targets to phase out fossil fuels from their generation mix, or set a target for green product sales.

When we engage on incentivisation, we might ask companies to disclose which metrics are used to incentivise management, simplify their remuneration plans, allow shareholders to vote on the frequency of say on pay votes, switch away from using Total Shareholder Return (TSR), consider linking pay to sensible ESG targets, or align company pay to sustainable growth (ROIC), growing its positive impact (green sales / reducing customer CO2 emissions) or reducing negative impact (CO2 emissions reduction).

Proportion of portfolio companies with TCFD-aligned disclosures, carbon reduction targets, and a link to positive impact growth / negative impact reduction in CEO pay



Over time, we have seen a steady increase in portfolio companies producing TCFD-aligned disclosures, setting corporate carbon reduction targets, and linking impact to CEO pay.

Escalation

We often engage and interact with our companies via email, calls and face-to-face meetings. These interactions typically start with a member of investor relations or the management team. Where we have highlighted an issue which we do not think has been given sufficient attention or consideration, we reserve the right to escalate the engagement through voting against management and writing directly to members of the board and the chair. Ultimately, if the issue remains unresolved after repeated engagement attempts, we reserve the right to divest.

Case Study: Disclosure

Itron provides advanced metering infrastructure (including smart meters) and associated software, services and analytics to electricity, gas, and water utilities worldwide to assist them in optimising the delivery and use of energy and water. When we first invested, the company provided case studies outlining the “proven benefits of the smart grid”. These included examples of customer projects where its solutions had helped to reduce energy consumption, reduce truck rolls, and displace carbon emissions. We believed that the case studies were indicative of the company's positive impact, but quantification of their impact was not disclosed.

We engaged with the company on this topic, seeking an annual company level estimate for energy or emissions saved by Itron's products and services. Estimation of emissions avoided thanks to low-carbon products and services has recently been added to the CDP climate survey. We believed that disclosure of such a metric would help give the market a better understanding of the company's positive impact whilst bringing its disclosures more in line with Installation peers.

In June 2022, the company released its 2021 ESG report, disclosing its estimate for the greenhouse gas emissions avoided thanks to customers using its products. This data is now in a similar format to other companies in the portfolio and has been fed into our impact calculation process.

Case Study: Target setting

NextEra Energy is one of the cleanest utilities in the USA with 53% carbon-free generation (25% wind, 21% nuclear, 7% solar) in 2021. This results in an emissions intensity 51% lower than the industry average. Despite its strong relative performance, in our ESG review, we identified that NextEra lacked meaningful longer-term (2030/2050) climate targets (emissions intensity and renewable generation targets).

We reported on our progress with NextEra last year. We started our engagement with NextEra Energy in September 2020 by encouraging the company to report on its climate risk by producing TCFD-aligned disclosures. In July 2021, we wrote to the company suggesting that it set a new long-term environmental target and have it validated by the Science Based Targets initiative (SBTi). In August 2021, we held a meeting with the company where we were reassured that a longer-term target and SBTi verification were being discussed internally.

Since last year's report, we are pleased to see that positive steps have been taken by the company. In June 2022, NextEra set an industry leading “Real Zero” goal to eliminate carbon emissions from its operations by no later than 2045 without the use of offsets.

Case Study: Incentivisation

Gentherm is a world leader in thermoelectrics for the automotive industry. We have engaged with the company on a number of topics since early 2020. In January 2022, however, Investor Relations contacted us, requesting a call as part of the company's shareholder outreach programme. Specifically, they asked for our insights on key trends in executive compensation and governance.

We explained that we do not like remuneration plans that link long-term incentives (LTI) to share price performance or TSR. At the time, Gentherm linked 50% of its LTI to Return on Invested Capital (ROIC) and 50% to TSR. We explained that we prefer to see remuneration plans that incentivise sustainable growth (return on capital), growing positive impact (increasing positive impact product sales) or reducing negative impact (emissions reduction).

After the call, we followed up with the company, explaining why we believed that return on capital was a superior incentive metric to TSR. In April 2022, the company released its proxy materials with the long-term incentive linked 40% to ROIC, 40% to cumulative adjusted EBITDA, and only 20% to relative TSR. The company also introduced a performance modifier for Named Executive Officers (NEOs) other than the CEO with a link to new technology wins.

We had a follow-up call in May 2022 where we congratulated the company on this positive step away from TSR and towards incentivising the growth of its positive impact (represented by new technology wins). We were also told that the reduction in the LTI's link to TSR was thanks to our feedback.

Beyond engaging to maximise a company's product-based impact, we also engage with our companies on material operational or ESG concerns and controversial business activity. A continuing area of focus in 2021 was forced labour in the solar supply chain.

Case study: Solar supply chain

Over the past two years, a number of allegations have been made about the involvement of forced Uyghur labour in the Chinese solar supply chain. In response to these forced labour concerns, the US has implemented a Withhold and Release Order (WRO), giving customs officials the authority to seize imports from China until the importer proves that no forced labour was involved in their manufacture. As at 31st December 2021, we held one company potentially affected by this issue: Canadian Solar.

In last year's report, we reported how we sought to understand how Canadian Solar would deal with a potential WRO before it was enacted, encouraging the company to sign up to the Solar Industry Forced Labour Pledge, and asking it to provide the market with reassurance that there is no involvement of forced labour in its supply chain.

In the last 12 months, the engagement has progressed. In April 2022 we received a letter from a shareholder advocacy group explaining how they had attempted to submit a shareholder proposal calling for a third-party assessment of the company's policies and procedures in protecting against forced labour. They explained that the proposal had been blocked.

In May 2022 we wrote to the company urging them to include the resolution at the upcoming AGM to help restore shareholder confidence. In a follow-up call, the CFO told us that the advocacy group had not followed the proper procedure, but that management was planning to submit their own equivalent resolution. Since then, the company has provided us with reassurance that modules being shipped to the US were Xinjiang supply chain-free. In June 2022, we were informed that the management resolution had passed and that the company is looking for supply chain auditors, naming two reputable parties they were pursuing. We continue to monitor the engagement.

APPENDICES

1. Impact alignment
2. SDG mapping methodology
3. Business activity mapping
4. Discussion points around impact methodology

APPENDIX 1: IMPACT ALIGNMENT

History of Impact

Impact investing traces its roots back to Socially Responsible Investing, the practice of avoiding "sin" stocks through screening out companies based on the impact of a company's products. In the 1960s, the Ford Foundation created program-related investing (PRIs), shifting away from using grants and towards making low-interest loans to finance programs such as urban redevelopment or affordable housing. PRI established the practice of positively screening for investments based on the perceived societal impact of a company's products, whilst delivering a return of capital. In 2007, the Rockefeller foundation coined the term "impact investing", defining it as an activity which seeks to generate social or environmental benefits while delivering a financial return. They stated that two key elements should be present: intentionality and measurement. To date, impact investment has typically involved private market-based project financing. As it has matured, it has started to migrate into public markets, accessing deeper pockets of capital.

Impact investing in public markets

The discussion of whether a public equities fund can be designated as impactful is fraught with controversy, often centring on the concept of additionality: the extent to which desired outcomes would have occurred without the investor's intervention. Opponents say that 'true' impact investing can only occur in primary markets, where the measured positive externality would not have occurred without the new and additive financial resource. Proponents say that ownership matters: additionality can be achieved through engaging with companies and policy makers to raise standards.

We have sympathy for both views. The investor's contribution towards the impact may be less intense in secondary markets and delivered primarily through engagement rather than through new capital. But just because the form of additionality is different does not necessarily mean it should be dismissed. As a fractional owner of a company, it is nearly impossible to draw a causal link between engaging with a company and behavioural change. However, if a mindful investor contributes to a broader trend or group engagement for positive change, it becomes far harder for management, industries and policymakers to ignore.

Impact alignment

The Guinness Sustainable Energy Fund intentionally screens for companies selling the products and services which will help to deliver the transition towards a low-carbon economy. When companies and consumers purchase and use these solutions (heat pumps, electric vehicles, renewable energy) over incumbent technologies (gas boilers, internal combustion engines, fossil fuel generation) they contribute towards the global effort to reduce greenhouse gas emissions and combat climate change.

By investing in the companies that produce these products and services, we believe that the fund's success is closely aligned with this positive environmental impact. This alignment flows through our universe construction, where we deliberately target companies delivering climate solutions; through our reporting, where we measure and report on the carbon avoided and carbon cost of our portfolio; and through our engagement, where the overwhelming focus is on climate action.

APPENDIX 2: SDG MAPPING METHODOLOGY

Where companies have positive exposure to more than one target or goal, we assign the company’s revenues first to the goal which we believe is most relevant to them. We describe this as the company’s “primary impact”, which on our schematic is represented in a green colour. We grade the level of primary impact by the proportion that the relevant activity comprises of the company’s overall business activity. We then record other, or ‘secondary’ areas of positive impact, represented by a light blue colour.

Case Study: First Solar

Primary impact

We believe that First Solar’s solar modules help to deliver SDG target 7.2: “By 2030, increase substantially the share of renewable energy in the global energy mix”. In 2021, 100% of its revenues came from solar modules and systems, so we assign 100% of business activity to Goal 7. We believe that this goal and target are most relevant to the division’s activity, so it is designated as a primary impact.

Secondary impact

We believe that products and services which upgrade and decarbonise energy infrastructure also align with SDG target 9.4: “By 2030, upgrade infrastructure and retrofit industries to make them sustainable...”. We consider this to be secondary in relevance to SDG 7, so it is designated as a secondary impact for First Solar.

SDG 13: Climate Action

Our mapping work produces the outcome of no primary exposure to SDG 13, ‘Climate Action’, which appears out of place for a Sustainable Energy Fund. This is because we map business activity to the underlying targets, and the targets for SDG 13 appear to be more aimed at governments, rather than private sector companies. As we believe that all the companies in our universe will contribute “to limit[ing] global temperature rise to well below 2 degrees centigrade”, we recognise their contribution as a secondary impact only.

APPENDIX 3: BUSINESS ACTIVITY MAPPING

SDG	TARGET	RELEVANT BUSINESS ACTIVITIES	COMPANIES
3. GOOD HEALTH & WELL-BEING	3.4. By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.	Manufacturing diabetes drugs, generic active ingredients (e.g. for opioid addiction therapy)	LG Chem
	3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents.	Manufacturing systems and components which contribute towards autonomous mobility and advanced safety, such as driver assist, sensors, semiconductors, electronics and software.	Aptiv, Hella, Onsemi, Infineon, Sensata
	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	Companies playing an active role in the supply chain for cleaner transport (EVs, e-bikes, e-buses, FCEVs) including: batteries and cathode material, thermal management, components for hybrids (e.g. 12V, 48V) and fuel cells, auto-catalysts, electronics for EVs, lightweight materials for e-buses.	Johnson Matthey, LG Chem, Samsung SDI, Aptiv, Gentherm, Hella, Onsemi, Infineon, Sensata, Eaton, SolarEdge, TPI Composites
7. AFFORDABLE & CLEAN ENERGY	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	Involved in the construction, installation, operation and maintenance of hydro, wind, solar, geothermal and biomass energy, including supply chain contributors, companies which provide grid connection equipment, electricity distribution, smart meters and ESS.	Ameresco, Hubbell, Johnson Matthey, LG Chem, Samsung SDI, Infineon, Itron, Schneider, Eaton, Canadian Solar, Enphase, First Solar, SolarEdge, Xinyi, Siemens Gamesa, Vestas, Iberdrola, Ormat
	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	Companies involved in hydro, wind, solar, geothermal, biomass generation, ESS, energy networks, or other renewable energy technology and their respective supply chains.	Ameresco, Hubbell, Nibe, LG Chem, Samsung SDI, Infineon, Itron, Schneider, Eaton, Canadian Solar, Enphase, First Solar, SolarEdge, Xinyi, Siemens Gamesa, TPI Composites, Vestas, Albioma, China Longyuan, China Suntien, Iberdrola, NextEra, Ormat, TransAlta Renewables
	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	Companies involved in hydro, wind, solar, geothermal, biomass generation, ESS, energy networks, or other renewable energy technology and their respective supply chains.	Ameresco, Hubbell, Nibe, LG Chem, Samsung SDI, Infineon, Itron, Schneider, Eaton, Canadian Solar, Enphase, First Solar, SolarEdge, Xinyi, Siemens Gamesa, TPI Composites, Vestas, Albioma, China Longyuan, China Suntien, Iberdrola, NextEra, Ormat, TransAlta Renewables
	7.2 By 2030, double the global rate of improvement in energy efficiency	Companies involved in selling energy efficiency products and services such as insulation, LEDs, heat pumps, ESS, smart meters or energy management.	Ameresco, Hubbell, Nibe, LG Chem, Samsung SDI, Johnson Matthey, Infineon, Itron, Schneider, Eaton, Enphase, SolarEdge, Ormat
	7.8 By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	Businesses with significant business activity outside of developed markets (North America, W. Europe, Australia, Japan, S. Korea), or businesses with a significant presence on island territories which deliver hydro, wind, solar, geothermal and biomass energy, including supply chain contributors, smart grid services, and grid storage	Xinyi, Albioma, China Longyuan, China Suntien, Ormat

APPENDIX 4: DISCUSSION POINTS AROUND
IMPACT METHODOLOGY

1. Impact reporting is subjective

This document outlines how the Sustainable Energy team thinks about impact investment. By the nature of the topic, these views can be highly subjective. We debate our own impact methodology internally and with others in the impact community and expect our methodology to evolve as more data becomes available, and as industry standards emerge.

2. Does a company need to have good ESG to be an impact investment?

We believe that impact is about the “what”, whereas ESG is more about the “how”. That said, we take ESG into account in our investment process. We take a holistic view of our investments, assessing strategy, financials, valuation, ESG and impact. If a company has a compelling strategy, which is attractively valued, and has a product with a strong positive impact, we are willing to tolerate some ESG issues and use these as a catalyst for engagement. We would then track the company’s ESG behaviour, looking for improvement over time.

3. How do you account for the impact of the fund changing over time?

The impact of our fund is likely to change over time as a result of changing allocations across our four subsectors (efficiency, electrification, installation, generation), depending on where we think the most attractive returns are available. Changes in company market capitalisations will also have an effect on the impact relative to a specific amount of fund assets. Over time, we are more focused on the impact trajectories of the individual investee companies than the overall portfolio outcome. A material change in strategy at an investee company, leading to a de-emphasis on the division(s) which generate positive impact, would cause us to re-visit our investment thesis, and engage with the company to understand the shift.

SDG	TARGET	RELEVANT BUSINESS ACTIVITIES	COMPANIES
8. DECENT WORK & ECONOMIC GROWTH	8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead	Licencing technology / processes to industry which enable greater resource efficiency, lower emissions and less waste, energy efficiency projects and equipment, resource measurement and management (meters), recycling, repair and maintainance, projects to improve energy and resource efficiency of industry.	Ameresco, Hubbell, Nibe, Johnson Matthey, Hella, Itron, Schneider, Eaton
9. INDUSTRY, INNOVATION & INFRASTRUCTURE	9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	Upgrading, maintaining, and operating the grid to enable greater uptake of renewable energy, energy efficiency projects and equipment, resource measurement and measurement, recycling, manufacturing clean energy infrastructure such as wind turbines and solar farms along with their respective supply chains.	Ameresco, Hubbell, Nibe, Johnson Matthey, Itron, Schneider, Eaton, Canadian Solar, Enphase, First Solar, SolarEdge, Xinyi, Siemens Gamesa TPI Composites, Vestas, Albioma, China Longyuan, China Suntien, Iberdrola, Nextera, Ormat, TransAlta Renewables
11. SUSTAINABLE CITIES & COMMUNITIES	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	Electric transportation / batteries for electrified transoport and their supply chains, electrical systems and semi-conductors which support electrification of transport, battery thermal management, hybrid systems, light weight composite marterials for electric buses	Johnson Matthey, LG Chem, Samsung SDI, Aptiv, Gentherm, Hella, Onsemi, Infineon, Sensata, Eaton, SolarEdge, TPI Composites
	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	Sales of energy efficiency products which can make homes and offices more aware of consumption (meters) or resource efficient such as insulation, LEDs, heat pumps, etc and companies which deliver such projects. Products which help improve air quality including EVs, e-bikes, E-buses, batteries, auto catalysts.	Ameresco, Hubbell, Nibe, Johnson Matthey, LG Chem, Samsung SDI, Itron, TPI Composites
12. RESPONSIBLE CONSUMPTION & PRODUCTION	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	Manufacture of products using less energy / fewer raw materials, water and gas metering, battery recycling, waste to energy (bagasse biomass). Repair and maintenance services which avoid scrappage of higher value items.	Hubbell, Johnson Matthey, Hella, Itron, Albioma
13. CLIMATE ACTION	13.2 Integrate climate change measures into national policies, strategies and planning.	Displacement Reducing energy consumption via energy efficiency and alternative fuels	Ameresco, Hubbell, Nibe.
		Electrification Reducing transport emissions by transitioning towards battery electric vehicles	Johnson Matthey, LG Chem, Samsung SDI, Aptiv, Gentherm, Hella, Onsemi, Infineon, Sensata
		Installation Manufacturing and installing the equipment and infrastructure required to enable low carbon energy generation	Itron, Schneider, Eaton, Canadian Solar, Enphase, First Solar, SolarEdge, Xinyi, Siemens Gamesa, TPI Composites, Vestas
		Generation Increasing the percentage of energy generated from renewable and alternative sources.	Albioma, China Longyuan, China Suntien, Iberdrola, Nextera, Ormat, TransAlta Renewables

IMPORTANT INFORMATION

The Guinness Sustainable Energy Fund is an equity fund. Investors should be willing and able to assume the risks of equity investing. The Fund invests only in companies involved in the energy sector; it is therefore susceptible to the performance of that one sector, and can be volatile. Details on the risk factors are included in the Fund's documentation, available on our website.

Past performance is not a guide to the future. The value of this investment and any income arising from it can fall as well as rise. This will be as a result of market, currency and exchange rate fluctuations as well as other factors both directly and indirectly related to the stocks in which it is invested.

Shareholders should note that all or part of the fees and expenses will be charged to the capital of the Fund. This will have the effect of lowering the capital value of your investment.

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The full Fund documentation contains more complete and detailed information of risk, fees, charges and expenses that are to be borne by an investor. The documentation should be read carefully before investing. The full documentation needed to make an investment, including the Prospectus, the KIID and the Application Form are available, free of charge, from the Manager: Link Fund Manager Solutions (Ireland) Ltd, 2 Grand Canal Square, Grand Canal Harbour, Dublin 2, Ireland or the Promoter and Investment Manager: Guinness Asset Management Ltd, 18 Smith Square, London SW1P 3HZ. Documentation is also available from the website guinnessgi.com.

LFMSI, as UCITS Man Co, has the right to terminate the arrangements made for the marketing of funds in accordance with the UCITS Directive

THIS INVESTMENT IS NOT FOR SALE TO U.S. PERSONS.

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The prospectus for Switzerland, the KIID for Switzerland, the articles of association, the annual and semi-annual reports, as well as the list of the buying and selling transactions can be obtained free of charge from the representative in Switzerland, Carnegie Fund Services S.A., 11, rue du Général-Dufour, 1204 Geneva, Switzerland, Tel. +41 22 705 11 77, Fax: + 41 22 705 11 79, www.carnegie-fund-services.ch. The paying agent is Banque Cantonale de Genève, 17 Quai de l'Île, 1204 Geneva, Switzerland

Telephone calls to Guinness Global Investors will be recorded.





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