

This is a marketing communication. Please refer to the prospectus and KIID for the Fund, which contain detailed information on the Fund's characteristics and objectives, before making any final investment decisions. Past performance does not predict future returns.

September 2022

GUINNESS SUSTAINABLE ENERGY FUND

The Guinness Sustainable Energy Fund is managed for capital growth and invests in companies involved in the generation, storage, efficiency and consumption of sustainable energy sources (such as solar, wind, hydro, geothermal, biofuels and biomass). We believe that over the next twenty years the sustainable energy sector will benefit from the combined effects of strong demand growth, improving economics and both public and private support and that this will provide attractive equity investment opportunities.

The Fund is run by co-managers Will Riley and Jonathan Waghorn, supported by Jamie Melrose (analyst). The investment philosophy, methodology and style which characterise the Guinness approach have been applied to the management of various energy equity portfolios at Guinness since 1998.

RISK

The Guinness Sustainable Energy Fund is an equity fund. Investors should be willing and able to assume the risks of equity investing. The value of an investment and the income from it can fall as well as rise as a result of market and currency movement, and you may not get back the amount originally invested. 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.



The risk and reward indicator shows where the fund ranks in terms of its potential risk and return. The Fund has been classed as 6 because its volatility has been measured as above average to high. This is based on how investments have performed in the past and you should note that the fund may perform differently in the future and its rank may change. Historic data may not be a reliable indicator for the future.

'BACK TO SCHOOL' FOR SUSTAINABLE ENERGY

Over the past two months we have seen renewed focus on the sustainable energy sector with the surprise passing of the Inflation Reduction Act in the United States and the first signs of activity from the RepowerEU deal in Europe.

Energy security remains at the top of the policy agenda as European natural gas and electricity prices register greater than ten times price increases versus 2021. In our 'back to school' piece here, we consider these developments and the wider outlook for sustainable energy companies and equities.

EQUITIES

Sustainable energy equities outperformed global stock markets in August. The Guinness Sustainable Energy Fund (Class Y) delivered a return of -2.1% (in USD), ahead of the MSCI World at -4.2%. Year to date, the Guinness Sustainable Energy Fund (Class Y) has delivered -13.0% (in USD), versus the MSCI World at -17.8%.

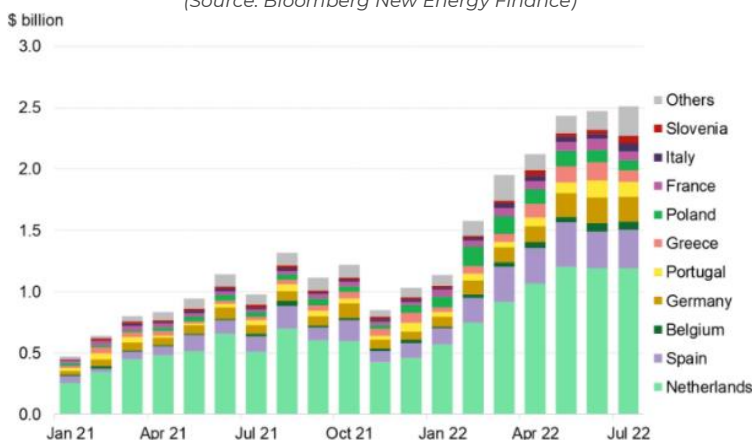
The Fund's performance in the month was led by the efficiency (+3.5%) and utility (-0.3%) sub sectors while electric vehicle and battery names were underperformers.

CHART OF THE MONTH

Data from China Customs shows that the country exported nearly 80GW of solar modules in the first half of 2022, double the exports over the same period in 2021. From January to July 2022, c54GW of solar PV exports (worth \$14.2bn) have been destined for Europe. This is significantly higher than BNEF's forecast of 41GW of solar installations for the region over the whole year. This either suggests that demand is running much hotter than expected, or that an inventory build is expected and could lead to downward pressure on module prices in Europe.

PV exports from China to Europe (USD bn)

(Source: Bloomberg New Energy Finance)



Signatory of:



The Guinness Sustainable Energy Report

Contents

1.	AUGUST NEWS AND EVENTS IN REVIEW.....	2
2.	MANAGER'S COMMENTS	3
3.	PERFORMANCE.....	5
4.	PORTFOLIO.....	6
5.	OUTLOOK - sustainable energy & the energy transition.....	10

1. AUGUST NEWS AND EVENTS IN REVIEW

In this section, we review the key news items and their impact on our various portfolio sub sectors over the last month.

News	Sub Sector	Impact
Water levels in China's Yangtze river hit a record low in August, weighting on hydroelectric power production. Power companies are looking to coal to make up the short fall, with daily consumption of the fuel up 15% in the first two weeks of August compared with the same period last year. The power crunch forced a string of companies in the Sichuan province including Toyota and CATL to suspend production and close factories.	Chinese hydro generation	
Lithium prices in China are near record highs, just shy of CNY500,000 per ton, having increased 80% so far this year on top of an over 400% increase in 2021. The recent power crunch in Sichuan, home to over one-fifth of China's lithium production, led to two weeks of electricity curtailments in August, adding further impetus to the rally. High prices prompted Tesla CEO Elon Musk to complain that lithium refiners were "minting money" and "making software-like margins".	Lithium prices	
In August, Joe Biden signed the Inflation Reduction Act, a sweeping \$750bn healthcare, tax and climate bill into law. The Act's \$369bn allocation to clean energy and energy security represents the largest federal investment in combating the climate crisis in US history. It contains 10-year extensions for renewable energy tax credits and provides up to \$7,500 of support for consumers to purchase an Electric Vehicle.	US Sustainable Energy investment	
This month saw 1 year ahead German power prices, the European benchmark, hit record levels of over €1,000/MWh for the first time as the region's energy crisis intensified. The surge in prices comes as Russia moves to constrict the supply of natural gas to the bloc. The European Commission is preparing a response involving curbing consumer demand and capping prices paid for non-gas sources of power generation.	European power prices	
Bloomberg New Energy Finance's (BNEF) reported that China recorded \$41bn of investments into large-scale solar alone in the first 6 months of the year, over 5x larger than the world's second largest solar market, the US, at \$7.5bn invested. In the first half of the year, BNEF reported that China made up 62% of the world's investment into utility scale solar and was "well on tack to hit its 1,200GW wind and solar capacity target by 2030".	Chinese Wind & Solar	

2. MANAGER'S COMMENTS

'Back to school' for sustainable energy

Over the past two months we have seen renewed focus on the sustainable energy sector with the surprise passing of the Inflation Reduction Act in the United States and the first signs of activity from the RePowerEU deal in Europe. Energy security remains at the top of the policy agenda as European natural gas and electricity prices register greater than ten times price increases versus 2021. In our 'back to school' piece here, we consider these developments and the wider outlook for sustainable energy companies and equities.

Several months after the proposed Build Back Better bill foundered, key Democratic hold-out Senator Joe Manchin surprised Senate Republicans (and his own party) by striking a deal with Senate majority leader, Chuck Schumer, to advance a package of clean energy incentives as part of the **Inflation Reduction Act (IRA)**. The \$369bn part of the package that targets climate and energy security focuses on reducing emissions from electricity generation, transport, industrial manufacturing, buildings, and agriculture. Support is provided via direct funding as well as simplified, extended 10-year tax credits which provide a higher level of certainty for investors compared to previous annually renewed tax credit schemes.

Although smaller than President Biden's initial BBB proposal, the size and breadth of the bill is significant. Simply speaking, nearly every aspect of the energy transition is likely to benefit from the proposals, but key beneficiaries are US-domiciled companies active in solar and wind manufacturing; residential and utility-scale battery storage; commercial building energy efficiency; green hydrogen; and, over the longer-term, carbon capture projects. According to Princeton University, the incentives may help increase US utility-scale annual solar installations by 5x and US wind installations by 2x over the next three or four years compared to 2020 levels. And in terms of carbon emissions, the IRA is estimated to help lower U.S. net greenhouse-gas emissions by 40-42% below 2005 levels by 2030 (a significant increase to the pre-IRA trajectory of 27-30% but still below Biden's target reduction of 50-52% by 2030).

The IRA followed a similar policy commitment from the European Union, the **REPowerEU** deal, designed to increase the resilience of the EU energy system following the Russian invasion of the Ukraine. The deal includes increasing domestic renewable energy capacity and improving energy efficiency while taking higher non-Russian LNG and pipeline gas imports together with larger volumes of biomethane and renewable hydrogen. The plan builds on the EU's 'Fit for 55' proposals which is designed to deliver a 55% reduction in GHG emissions by 2030 (vs 1990) and is expected to reduce Europe's reliance on natural gas by a further 12 bcf/d (30% of current European gas demand).

Both policy announcements reflect the fact that **energy security** has risen to the very top of the policy agenda. The issue is particularly critical for the EU, which imports 57% of its energy needs and relies on Russia for 41% of its natural gas, 27% of its crude oil/oil product and 47% of its coal imports. Within the EU, Germany imports nearly 64% of its energy consumption (up from 59% in 2000), with Russia representing one third of both its crude oil/oil product and natural gas demand in 2021. Reflecting its untenable energy position, Germany has announced the boldest moves, including the building of six new LNG import terminals and creating the Renewable Energy Sources Act which brings the 100% renewable power target forward to 2035 from 2040. Facing the threat of gas shortages this year, Germany is planning to restart some mothballed coal fired power generation capacity and is contemplating the restart of nuclear power facilities.

The Guinness Sustainable Energy Report

While the United States is in a far stronger position than the EU, the IRA bill is clearly designed to improve energy security on a near-term and long-term basis via the development of domestic renewable energy and energy transition industries. The development of shale has transformed the US energy landscape and in the near term, it is likely that US shale oil production reaches a record level of over 10m b/day in 2023 (despite capital discipline from E&P companies) with the growth helping to offset Russian crude oil imports (0.7m b/day in 2021).

The US sits on abundant shale gas resources, and for the timebeing, is willing to share this resource with the rest of the world via LNG exports. A supply response in LNG (via shale gas) is likely to take around four to five years but it is possible that the US will eventually be exporting around 28 bcf/day of LNG, up from around 13 Bcf/day today. This proposed growth in US LNG exports of 15 bcf/day is broadly equivalent to all EU imports of Russian gas in 2021. However, Europe faces stiff competition from Asia and Latin America in securing the US's gas, meaning that Europe must also work fast on other energy transition measures (i.e. renewable power and efficiency).

Disruption to energy markets has brought **sharp energy price inflation** which is likely to be a key negative headwind for the global economy. Companies involved in the manufacturing of sustainable energy equipment are not immune to these inflationary pressures and energy inflation is now eclipsing the post-COVID raw material cost inflation and supply chain issues that are starting to abate. While energy price inflation will increase the cost of installing and generating renewable power in the near term, we are confident that **renewable energy generation continues to become relatively more economic** than fossil fuels as the year progresses. Improved relative economics as well as security of supply considerations will help to sustain strong demand for sustainable energy activities during any potential global recession.

The supportive backdrop helped **the Guinness Sustainable Energy Fund** to outperform the MSCI World (net return) by 8.4% in July and August, having been slightly behind in the first half of the year (-22.6% vs MSCI World net return -20.5%). Within the fund, stronger performers over the summer have been predominantly US-domiciled, equipment manufacturers that are best placed to benefit from the IRA.

Share price strength has resulted in elevated near-term multiples for some stocks, with the multi-year benefits from the IRA or RepowerEU deal not likely to impact much in 2022 or 2023 earnings. We typically have a value bias in our investment analysis, therefore equities that trade on high near-term earnings multiples give us pause for thought. However, in our modelling work for these stocks, we typically see the accelerated growth (some companies delivering over 30%pa EPS growth for a number of years) as justifying current valuation.

In the near term, our fund is forecast to deliver **over 19% p.a. consensus earnings per share growth** in 2021-2024, significantly ahead of the MSCI World's earnings growth of 8.7% p.a. This growth premium helps to justify the overall valuation multiples for the portfolio, at a P/E of 19x for 2023 (a 32% premium to the MSCI World) which compresses to just under 16x for 2024 (a 17% premium to the MSCI World). The energy transition is going to be a multi-decade growth opportunity and, while near-term multiples sit higher than the MSCI World, we see good industrial logic for valuations in the sector.

The Guinness Sustainable Energy Report

3. PERFORMANCE

Past performance does not predict future returns.

The Guinness Sustainable Energy Fund (Class Y, 0.68% OCF) delivered a return of -2.1% in the month, while the MSCI World Index (net return) delivered -4.2% (all in USD terms).

	Ytd	1 Yr	3 Yrs	5 Yrs*	10 Yrs*
Fund (Class Y)	-13.0%	-14.2%	103.4%	110.4%	185.0
MSCI World NR Index	-17.8%	-15.1%	28.7%	46.0%	147.0%
Out/Underperformance	4.7%	0.9%	74.7%	64.5%	-176.7%

Annual performance	2021	2020	2019	2018*	2017*
Fund (Class Y)	10.4%	84.1%	31.4%	-15.2%	20.2%
MSCI World NR Index	21.8%	15.9%	27.7%	-8.7%	22.4%
Out/Underperformance	-11.4%	68.2%	3.7%	-6.5%	-2.2%

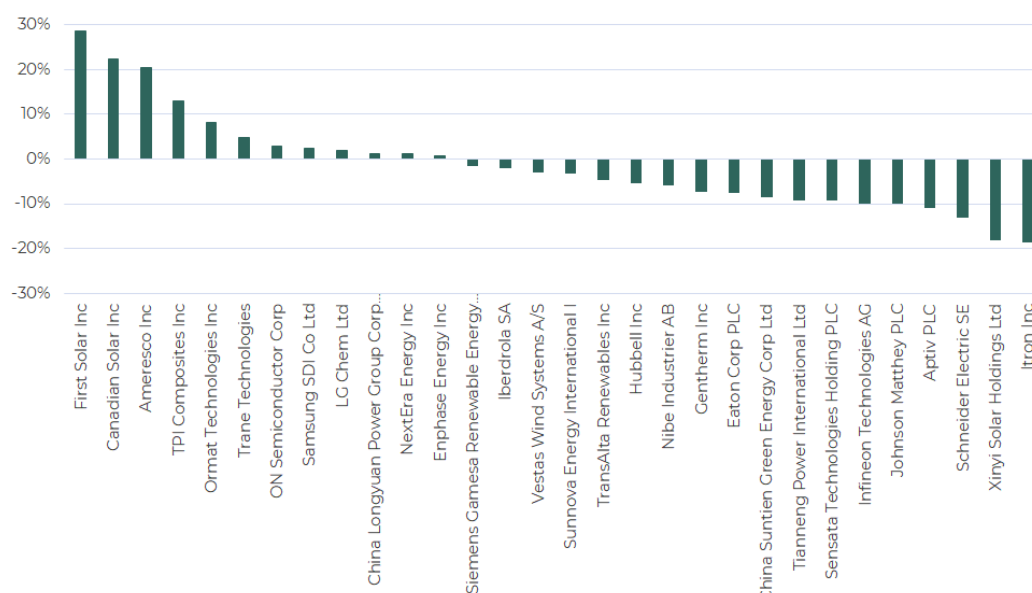
Annual performance	2016*	2015*	2014*	2013*	2012*
Fund (Class Y)	-15.4%	-12.0%	-12.1%	70.8%	-13.2%
MSCI World NR Index	7.5%	-0.9%	4.9%	26.7%	15.8%
Out/Underperformance	-23.0%	-11.2%	-17.0%	44.1%	-29.1%

The Guinness Sustainable Energy Fund was launched on 19/12/2007. *Simulated Past Performance prior to the launch of the Y class on 16/02/2018. The Performance shown is a composite simulation for Y class performance being based on the actual performance of the Fund's E class, which has an OCF of 1.24%. Source: Financial Express, bid to bid, total return.

Investors should note that fees and expenses are charged to the capital of the fund. This reduces the return on your investment by an amount equivalent to the Ongoing Charges Figure (OCF). The fund performance shown has been reduced by the current OCF of 0.68% per annum. Returns for share classes with different OCFs will vary accordingly. Performance returns do not reflect any initial charge; any such charge will also reduce the return.

Within the Fund, the strongest performers were First Solar, Enphase, Nibe, onsemi, and TPI Composites. The weakest performers were China Longyuan, China Suntien, Albioma, Siemens Gamesa, and Gentherm.

Stock by Stock performance over the month, in USD

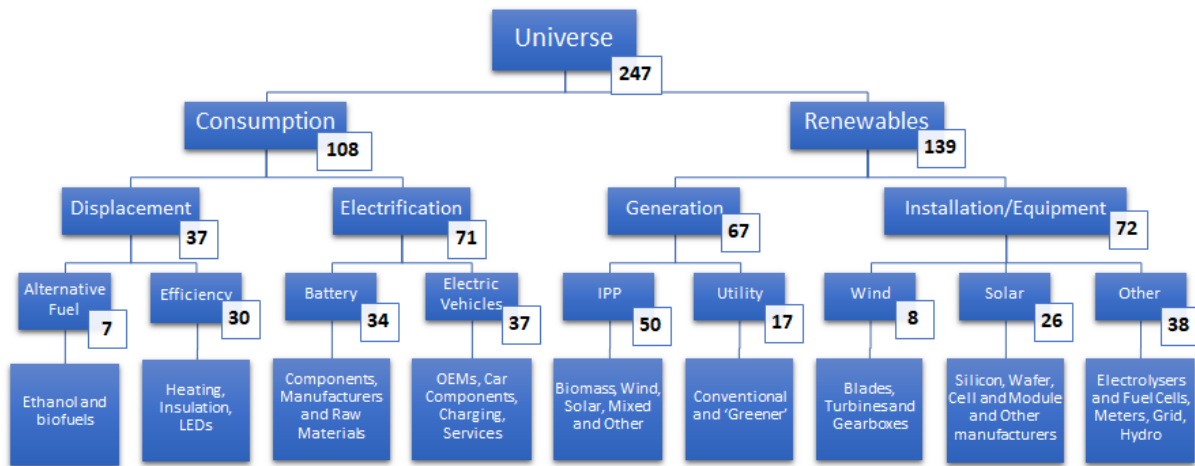


Source: Bloomberg. As of 31 August 2022

4. PORTFOLIO

The Guinness Sustainable Energy Fund is positioned to benefit from many of the long-term themes associated with the transition towards a lower-carbon economy and of sustainable energy generation via investment in companies with activities that are economic with limited or zero government subsidy and which are profitable. Our investment universe comprises around 250 companies which are classified into four key areas:

- **Generation** includes companies involved in the generation of sustainable energy, either pureplay companies or those transitioning from hydrocarbon-based fuels
- **Installation** includes companies involved in the manufacturing of equipment for the generation and consumption of sustainable energy
- **Displacement** includes companies involved in the displacement or improved efficient usage of existing hydrocarbon-based energy
- **Electrification** includes companies involved specifically in the switching of hydrocarbon-based fuel demand towards electricity, especially for electric vehicles



We monitor each of the industry areas very closely and hope that detailed top-down (macro) analysis of each (complemented with disciplined equity screening and stock valuation work) will allow us to deliver attractive fund performance via an equally weighted portfolio of 30 stocks. The portfolio is designed to create a balance between maintaining fund concentration and managing stock-specific risk.

Guinness Global Investors is a signatory of the United Nations Principles for Responsible Investment. The Guinness Sustainable Energy Fund prioritises returns whilst delivering concentrated exposure to companies playing a key role in global decarbonisation. The Fund’s holdings align most closely with four of the UN’s sustainable development goals:

Signatory of:

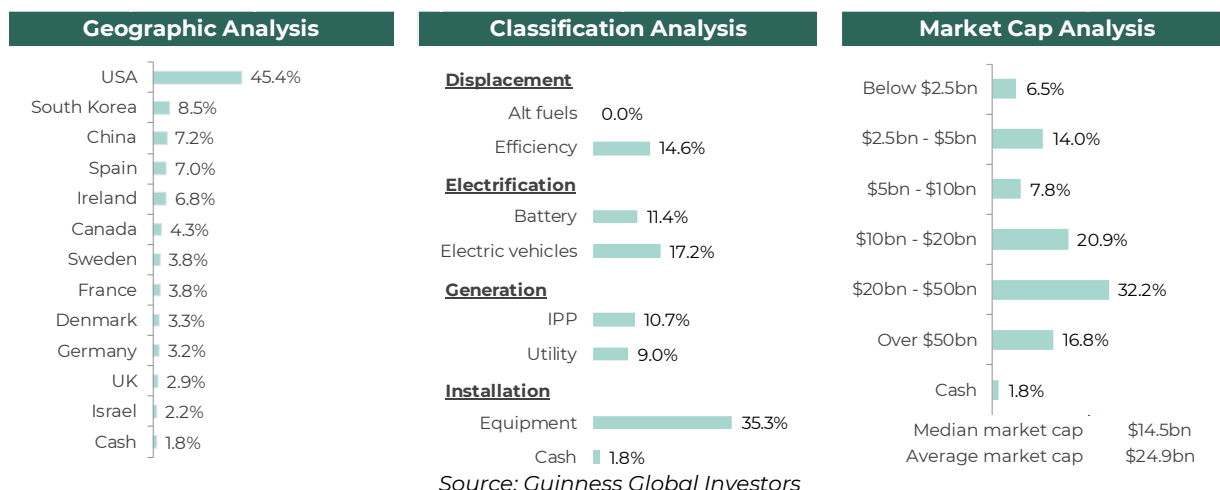


The Guinness Sustainable Energy Report

Buys/Sells

There were no stock switches during the month, but the portfolio was actively rebalanced.

Portfolio structure analysis



Portfolio sector breakdown

The following table shows the asset allocation of the Fund at month end and at previous year ends.

Asset allocation as %NAV	Current	Change	Year end	Year end	Previous year ends	
	Aug-22		Dec-21	Dec-20	Dec-19	Dec-18
Consumption	43.1%	-0.3%	43.4%	36.7%	41.7%	26.5%
Displacement	14.6%	2.8%	11.8%	9.9%	13.4%	16.4%
Alternative Fuel	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%
Efficiency	14.6%	2.8%	11.8%	9.9%	13.4%	12.5%
Electrification	28.6%	-3.1%	31.6%	26.8%	28.2%	10.1%
Batteries	11.4%	2.5%	8.9%	10.8%	12.6%	3.9%
Electric vehicles	17.2%	-5.6%	22.8%	16.0%	15.7%	6.2%
Renewables	55.1%	3.8%	51.3%	60.4%	54.1%	69.7%
Generation	19.7%	-3.4%	23.1%	24.6%	22.2%	27.3%
IPP	10.7%	-3.8%	14.5%	17.0%	18.9%	26.7%
Utility	9.0%	0.4%	8.6%	7.6%	3.2%	0.6%
Installation	35.3%	7.1%	28.2%	35.8%	32.0%	42.5%
Equipment	35.3%	7.1%	28.2%	35.8%	32.0%	42.5%
Cash	1.8%	-3.5%	5.3%	3.0%	4.2%	3.8%

Source: Guinness Global Investors

Valuation

At the month end, the Guinness Sustainable Energy portfolio traded on the following multiples:

As at 31 August 2022	P/E			EV/EBITDA			Dividend Yield		EPS Growth (%pa)		CFROI*	
	2022	2023E	2024E	2022	2023E	2024E	2023E	2024E	2014-21	2021-24	2022E	2023E
Guinness Sustainable Energy Fund	23.7x	19.2x	15.8x	14.1x	11.7x	9.9x	1.6%	1.8%	4.9%	19.3%	5.0%	6.6%
MSCI World Index	15.5x	14.6x	13.5x	10.6x	10.2x	9.7x	2.3%	2.5%	6.7%	8.7%	7.9%	8.3%
Fund Premium/(Discount)	53%	32%	17%	33%	15%	2%						

*Portfolio = median CFROI; Index data = Credit Suisse MSCI World ETF median CFROI

Source: Guinness Global Investors, Bloomberg

The Guinness Sustainable Energy Report

Portfolio holdings as at end August 2022

Our portfolio is typically allocated across 30 equally weighted equities providing exposure across the value chain of sustainable energy.

We hold c.43% weight to companies associated with the consumption (or demand) of sustainable energy. Our largest exposure here is to companies involved in the electrification of demand, either via the creation of new batteries (11%) or the electrification of transportation (17% weight) while we have an 15% weight to those companies involved in either displacing existing energy sources or improving overall energy efficiency.

We hold two lithium-ion battery manufacturers. LG Chem is a large Korean chemicals company that is the largest lithium-ion battery manufacturer in the world, while Samsung SDI is a pure play lithium-ion battery manufacturer, currently in the top 10 in the world.

The portfolio holds five names in the electric vehicle sub-category, giving it exposure to companies that provide semiconductors, electronics, components and software/services to the growing EV and autonomous vehicle industry. Onsemi and Infineon are providers of power semiconductors that are a necessity for higher-voltage electric vehicles to become competitive with ICE (internal combustion engine) vehicles, while Gentherm, Aptiv and Sensata are component manufacturers and service providers that should benefit from the ever-increasing amount of electronics present in electric vehicles.

Our displacement holdings provide pure play quality exposure to heating industries (Nibe Industrier, Trane Technologies), energy efficient electrical equipment and services (Hubbell) and energy efficiency projects (Ameresco), and the group as whole will benefit from the increasing industry focus on energy efficiency that is expected to be a very long-term trend.

In terms of the supply of sustainable energy, we hold a 19% weight to companies involved in the generation of sustainable energy and 36% weight to those exposed to the installation of or equipment used in the process of sustainable energy generation.

China Suntien and China Longyuan are our two pure play Chinese wind power producers and they represent around a third of our generation exposure. The remaining exposure comes in the form of geothermal (Ormat), residential solar (Sunnova) and then broad-based wind/solar renewable energy generation through TransAlta Renewables. and NextEra Energy (the largest producer of renewable energy in the world). Iberdrola is our one utility.

We hold exposure to the solar and wind equipment and manufacturing value chains. Xinyi Solar is the world's largest supplier of the glass used in solar cell modules and both EnPhase and SolarEdge manufacture the inverters required to convert DC solar power into consumable AC electricity. Canadian Solar and First Solar give integrated exposure to the solar cell and module manufacturing process. Vestas and Siemens Gamesa are both well placed providers of wind turbines in the world providing broad exposure to the strong growth that we expect in the onshore and offshore wind markets, while TPI Composites offers niche exposure to the high-skilled business of manufacturing wind turbine blades.

Our remaining exposure to Installation (Itron, Eaton and Schneider Electric) gives exposure to companies that provide equipment and services to improve the efficiency and metering of electricity transmission and consumption.

The Guinness Sustainable Energy Report

Portfolio themes as at end August 2022

Theme	Example holdings	Weighting (%)
1 Electrification of the energy mix		19.8%
2 Rise of the electric vehicle and auto efficiency		20.0%
3 Battery manufacturing		8.5%
4 Expansion of the wind industry		11.5%
5 Expansion of the solar industry		19.4%
6 Heating, lighting and power efficiency		14.6%
7 Geothermal		4.4%
8 Other (inc cash)		1.8%

Portfolio at end July 2022 (one month in arrears for compliance reasons)

Guinness Sustainable Energy Fund (31 July 2022)			P/E			EV/EBITDA			Price/Book			Dividend Yield		
Stock	% of NAV	Market Cap USD	2021	2022E	2023E	2021	2022E	2023E	2021	2022E	2023E	2021	2022E	2023E
Displacement/Efficiency														
Hubbell Inc	4.7%	11,757	26.0x	22.7x	21.1x	17.5x	16.0x	14.8x	5.4x	5.1x	4.7x	1.8%	2.0%	2.1%
Nibe Industrier AB	3.7%	20,153	56.5x	55.2x	47.6x	32.9x	32.4x	28.4x	9.0x	8.5x	7.5x	0.5%	0.5%	0.6%
Ameresco Inc	2.7%	2,965	40.2x	30.7x	28.4x	24.9x	18.2x	16.7x	4.4x	3.8x	3.3x	n/a	n/a	n/a
	11.1%													
Electrification/Battery														
LG Chem Ltd	3.8%	32,580	10.8x	17.8x	14.0x	5.6x	6.6x	5.5x	1.9x	1.5x	1.4x	2.0%	1.7%	1.9%
Samsung SDI Co Ltd	4.0%	29,947	30.1x	23.4x	19.6x	15.6x	13.3x	10.7x	2.5x	2.4x	2.1x	0.2%	0.2%	0.2%
Johnson Matthey PLC	3.0%	4,762	10.6x	9.9x	10.4x	5.9x	6.1x	6.5x	1.2x	1.5x	1.5x	3.1%	3.7%	3.7%
Tianneng Power International Ltd	0.1%	1,321	4.8x	3.8x	3.3x	1.5x	1.2x	1.1x	0.6x	0.6x	0.5x	4.3%	5.4%	5.9%
	10.8%													
Electrification/Electric Vehicles														
Aptiv PLC	3.5%	28,418	40.1x	27.2x	18.2x	14.7x	12.3x	9.5x	3.5x	3.1x	2.8x	0.1%	0.0%	0.3%
ON Semiconductor Corp	4.6%	29,016	23.6x	13.1x	13.3x	14.8x	8.8x	9.1x	6.3x	4.5x	3.6x	n/a	n/a	n/a
Infineon Technologies AG	3.3%	35,355	20.9x	14.9x	14.4x	10.5x	8.6x	8.2x	2.8x	2.6x	2.3x	1.1%	1.2%	1.4%
Sensata Technologies Holding PLC	3.5%	6,978	12.7x	13.0x	11.7x	10.3x	10.6x	9.6x	2.3x	2.2x	1.9x	n/a	0.7%	1.0%
Gentherm Inc	3.0%	2,139	24.2x	24.6x	16.6x	13.2x	12.9x	9.4x	3.1x	n/a	n/a	n/a	n/a	n/a
	17.9%													
Generation/IPP														
China Longyuan Power Group Corp Ltd	2.5%	21,065	13.4x	12.0x	10.1x	11.7x	11.0x	9.5x	1.4x	1.3x	1.2x	1.4%	1.6%	1.9%
Ormat Technologies Inc	3.8%	4,852	70.2x	67.9x	45.7x	17.0x	15.4x	13.1x	2.4x	2.4x	2.3x	0.6%	0.6%	0.6%
TransAlta Renewables Inc	1.1%	3,724	29.2x	25.6x	21.2x	12.2x	11.1x	10.7x	2.3x	2.6x	2.6x	5.3%	5.2%	5.2%
Albioma SA	1.0%	1,646	25.9x	28.2x	23.7x	10.6x	11.5x	10.5x	3.0x	3.0x	2.7x	1.9%	1.8%	2.0%
NextEra Energy Inc	4.7%	166,004	33.4x	29.5x	27.4x	23.3x	19.7x	17.1x	3.9x	4.0x	3.7x	1.8%	2.0%	2.2%
China Suntien Green Energy Corp Ltd	1.8%	5,497	5.5x	6.0x	5.1x	12.4x	12.3x	10.9x	0.7x	0.6x	0.6x	6.5%	5.5%	6.3%
	14.9%													
Generation/Utility														
Iberdrola SA	3.8%	66,365	16.0x	16.0x	14.7x	10.0x	10.1x	9.7x	1.5x	1.5x	1.4x	4.7%	4.4%	4.7%
	3.8%													
Installation/Equipment														
Schneider Electric SE	4.0%	78,105	20.5x	19.1x	17.6x	12.4x	11.8x	11.0x	3.1x	2.9x	2.7x	2.3%	2.3%	2.5%
Eaton Corp PLC	4.1%	59,208	22.4x	19.8x	18.0x	18.7x	16.1x	14.7x	3.7x	3.4x	3.3x	2.1%	2.2%	2.3%
Itron Inc	3.1%	2,632	48.3x	45.0x	21.0x	20.9x	22.3x	12.8x	2.2x	2.2x	2.1x	n/a	n/a	n/a
Xinyi Solar Holdings Ltd	3.2%	15,117	21.5x	23.0x	17.3x	16.4x	15.8x	12.0x	3.9x	3.5x	3.1x	2.1%	2.1%	2.6%
SolarEdge Technologies Inc	2.6%	19,947	71.7x	53.4x	36.7x	59.1x	43.0x	28.8x	15.1x	8.9x	7.3x	n/a	n/a	n/a
Enphase Energy Inc	3.5%	38,494	123.0x	71.9x	59.2x	108.7x	58.4x	45.2x	57.2x	52.3x	27.5x	n/a	n/a	n/a
First Solar Inc	4.9%	10,571	23.8x	n/a	48.9x	16.7x	49.9x	20.5x	1.8x	1.8x	1.7x	n/a	n/a	n/a
Canadian Solar Inc	3.1%	2,367	25.7x	12.1x	8.5x	7.9x	6.0x	4.5x	1.1x	1.1x	1.0x	n/a	n/a	n/a
Vestas Wind Systems A/S	3.2%	26,215	60.5x	n/a	54.6x	16.9x	47.9x	16.0x	4.8x	6.3x	5.4x	0.5%	0.1%	0.6%
Siemens Gamesa Renewable Energy SA	3.1%	12,453	n/a	n/a	457.1x	26.7x	763.2x	19.9x	2.4x	3.2x	3.3x	n/a	n/a	0.0%
TPI Composites Inc	0.7%	614	n/a	n/a	n/a	24.7x	17.9x	8.6x	2.2x	2.9x	2.8x	n/a	n/a	n/a
	35.5%													
Cash	6.0%													

The Fund's portfolio may change significantly over a short period of time; no recommendation is made for the purchase or sale of any particular stock.

5. OUTLOOK - sustainable energy & the energy transition

Sustainable energy: the long-term outlook

Over the next thirty years, the world will continue its transition to a sustainable energy system. The key factors driving the transition are:

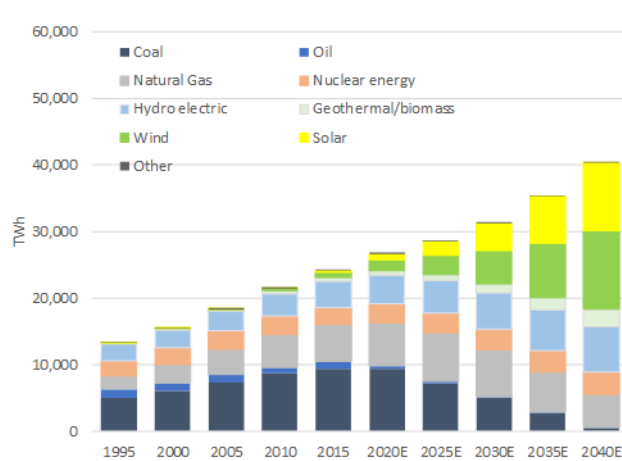
- **Population and GDP growth** putting a significant strain on today’s energy supply
- **Economics** as sustainable sources of energy will be cheaper than the incumbents
- **Climate change** leading the world to reduce carbon emissions via cleaner energy
- **Pollution** forcing governments to drive air pollution out of cities via cleaner energy
- **Energy security** as sustainable energy sources, which are more evenly spread across all countries, facilitate lower reliance on energy imports.

The outcomes of the energy transition will of course be wide-ranging. On the **supply** side, we see a sustained shift towards renewable power generation, fulfilling global power generation needs which are set to double by 2050. On the **demand** side, we believe that improved energy efficiency will be key to limiting energy consumption growth to a manageable level so that it can be increasingly satisfied by renewable sources.

The long term direction is clear and is driven by economics, in our opinion, while near term geopolitical issues (such as the invasion of Ukraine in February 2022) could potentially have an effect on the speed of the transition and the relative importance of the factors stated above.

Within the power generation industry, we expect a radical change in energy mix. Today, the global power mix is predominantly driven by coal and natural gas (35% and 24% respectively), whilst variable renewable generation (wind and solar) have less than a 10% share. By 2035, we expect wind and solar to have grown to around 40% of the generation mix, increasing to around 60% by 2050.

Global power generation by type (TWh, 1995-2040E)



Sources: BP Statistical Review; IEA: Guinness Global Investors estimates; as of 31.12.2020

Policy support for decarbonisation

Policy commitment in recent years has been particularly supportive. However, the path has not always been smooth and it is unlikely to be a smooth ride from here. The most significant policy milestones in the recent period include:

- **President Biden returning the US to the Paris Agreement** and announcing significantly increased 2030 GHG reduction targets. The new target - a 52% reduction in emissions by 2030 (vs 2005 levels) - was substantially ahead of the old target of a 28%

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reduction by 2025.

- **The 2021 IPCC climate report.** The Intergovernmental Panel on Climate Change (IPCC) published its sixth assessment report on the physical science of climate change and the physical impacts of various carbon emission and warming scenarios
- **COP26 climate conference.** In November 2021, the COP26 climate conference was held in Glasgow. The conference produced results which we considered to be better than feared, but not as good as hoped. Key headlines included new net zero targets, additional country pledges and some 'alliances of the willing' to reduce coal usage and methane emissions.
- **Carbon pricing.** Developments in carbon pricing remain hopeful with momentum towards the introduction of emissions trading schemes (ETS) as a tool for decarbonisation. At the start of 2021, China commenced a new national ETS scheme which immediately became the world's largest carbon market (covering around 2,225 entities in the power generation industry with annual emissions of around 4,000 MtCO₂e) while Canada introduced a federal carbon tax that will increase by 2030 to around US\$130/tonne.

While policy towards stimulus plans continues to be positive, the passage of actual investment into the energy transition has been slower than expected and still remains a positive catalyst from here. The influential US "Build Back Better" (BBB) infrastructure package is the clearest example of the delay between policy announcement and actual investment. After it passed the House of Representatives in November, Democrat Senator Joe Manchin announced on December 19th that he would not be supporting the \$1.75trn BBB bill (as currently written) thus delaying the passage of the bill through the House of Congress. A compromise bill is likely, in our opinion, but probably not until the end of 2022. In addition, the REPowerEU deal that was announced in March 2022 is unlikely to yield new investments until 2023/2024 and well into the second half of this decade.

Energy displacement

It is a common misconception that achieving rapid growth in renewable power generation will be enough to deliver government targets for pollution, energy security and de-carbonisation. Renewable power generation is a key part of the solution, but we see the displacement and more efficient use of existing energy sources as just as critical, and arguably more urgent, in achieving these goals. The IEA refers to the theme of energy efficiency as being the 'first fuel' that should be considered in delivering the energy transition. It is the one energy source that every country can access in abundance today.

In our base case, we assume global energy demand growth over the next thirty years of around 1%pa. This assumes significant efficiency improvements relative to an historical energy demand growth rate of around 2%pa. For our base case scenario to be achieved, per capita energy demand over the next thirty years needs to stay broadly flat, whilst the energy intensity of global GDP needs to fall by around 40%.

Within the energy displacement sector, key areas of focus are **efficiency** and **alternative fuels**.

Energy efficiency

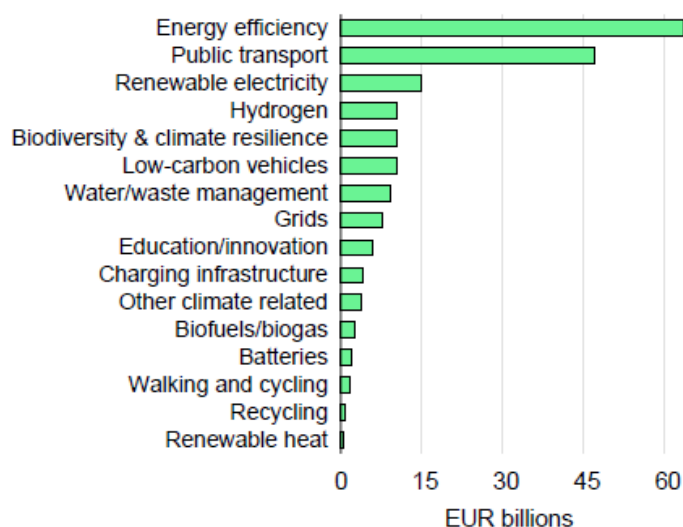
Energy efficiency measures were negatively impacted by Covid in 2020, as projects and investments were disrupted, but it appears that governments are turning their attention to efficiency measures as part of post-Covid stimulus measures. There is urgency to do this as current government policies imply that annual energy efficiency improvements need to increase by around 50% from a long-term historic 1.5%pa to a forecast level of 2.3%pa.

Energy efficiency measures are typically employment-intensive and offer a cheap form of carbon abatement. These factors help explain why the efficiency sector has received around US\$144bn of stimulus spending since the start of Covid, the largest allocation within clean energy spending globally. The renovation of public and private buildings and energy efficiency investment in the industrial sector are the largest beneficiaries of the allocated spending.

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Despite the acceleration of energy efficiency spending for buildings, current spending plans will only be enough to keep total building heat consumption flat over the next few years, as per square foot efficiency gains are offset by an expanding stock of buildings.

EU Recovery and Resilience Facility (RRF) fund allocation



source: IEA World Energy Outlook 2022

Based on current government policies, the IEA estimates that energy efficiency spending needs to increase this decade from around \$250bn pa to around \$375bn pa, rising to \$550bn in the 2030s. Within REPowerEU, the European Commission recognises that energy efficiency is the cheapest, cleanest, and quickest way to reduce the bloc's reliance on fossil fuel imports and reduce energy bills and the EU has increased energy efficiency targets from 9% to 13% accordingly.

However, current activity, plus recent subsidy announcements, are not sufficient to deliver even the IEA's base case, which is far from net zero.

Alternative fuels

Alternative fuels such as ethanol (which displaces gasoline), biodiesel and renewable diesel (which displace conventional diesel) and Sustainable Aviation Fuels (SAF, which displace conventional jet fuel) serve a role in displacing existing fossil fuel demand, predominantly in transportation. In 2021, the global alternative fuel demand was nearly 160bn litres (over 2.5m b/day), representing nearly 3% of world oil transportation demand. The US has the largest alternative fuel market, at around 60bn litres (40% of the global market) where around 10% of all road fuel consumed is classified as alternative.

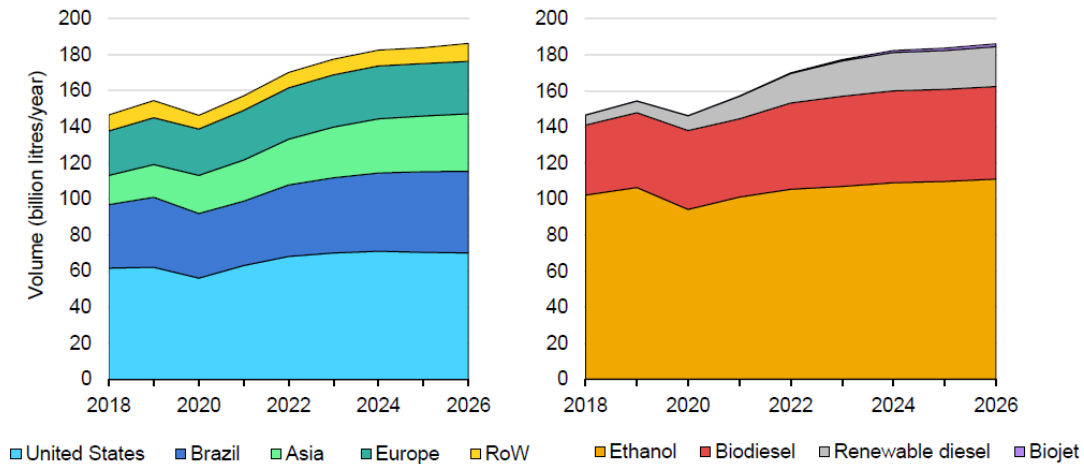
Alternative fuels consumption in 2021 grew by 10% versus 2020 and 3% versus 2019. Demand growth was significantly stronger than the underlying 6% increase in global oil demand, underlining the policy support for increased blending of alternative fuels in the transportation mix. Renewable diesel demand in the US and biodiesel demand in Asia were the biggest growth drivers. Over the next five years, alternative fuel demand is likely to grow at around 4%pa, reaching 186bn litres and continuing to outgrow global oil demand growth.

With regard to product mix, we see ethanol having the largest absolute demand growth, but its market share recedes to around 60% as demand for renewable diesel (using feedstocks such as used cooking oil, corn oil or rendered animal fats) accelerates and overtakes the current leading biodiesel technology. Combined, ethanol and renewable diesel satisfy 80% of the demand growth over the next five years.

We expect Asia to be the fastest growing market, driven for example by India's 20% ethanol blending target for 2025. However, North America will remain the largest market (40% market share) followed by Latin America (27% market share, driven by ethanol in markets like Brazil) and Asia (17% market share) and overtaking Europe (<15%).

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Alternative fuel demand by region (left) and fuel (right) (2018-2026)



On an unsubsidised basis, alternative fuels typically look expensive. Reliance on government subsidies increases the risk around the medium-term growth outlook. For example, in the US, there was significant uncertainty in 2021 around the Renewable Volume Obligation (RVO), a volume-driven subsidy. Various price-related subsidies in the US have also been volatile. In October 2021, the aggregate value of the subsidies, including Renewable Identification Numbers (RINs), Low Carbon Fuel Standards credits (LCFS) and the biodiesel Blenders Tax Credit (BTC), was around \$4/gallon. With wholesale conventional diesel prices at around \$2.50/gallon, it is clear how important subsidy is in delivering the growth of the biodiesel and renewable diesel industry in the US.

Electrification

The energy transition is seeing energy demand being 'electrified' as it moves away from predominantly hydrocarbon fuels and gases towards the consumption of electricity. Our 'electrification' sector includes some key enablers of this transition: the lithium-ion battery and the electric vehicle industries. The battery industry is critical here in that it will serve electric vehicles and also provide a stationary energy storage solution in electricity grids, allowing variable renewable energy (i.e. solar & wind) to play an expanding role in the global power stack.

Batteries

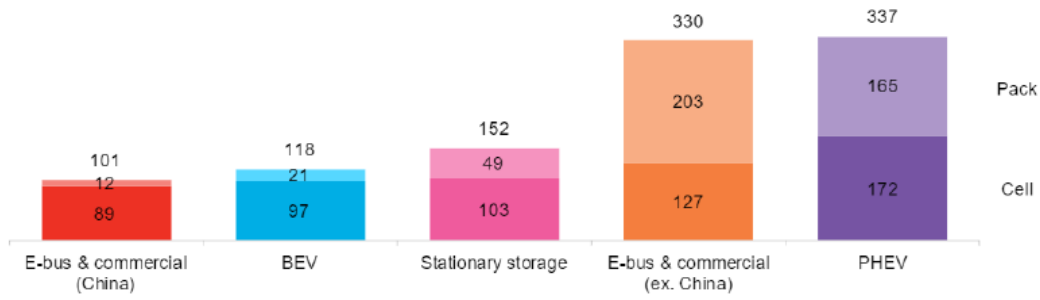
The catalyst for greater **lithium-ion battery** use has been sharp falls in the cost of manufacturing. According to BNEF, battery pack costs are down 89% over the period 2010 to 2021 (an implied 'learning rate' of around 18%) with the average cost being \$132/kWh in 2021 (split \$101/kWh for the cell itself and an additional \$31/kWh for the pack).

The \$132/kWh survey outcome for 2021 is an average calculated across a wide range of uses and regions. China was typically the lowest-cost manufacturer with some individual passenger EV battery packs at below \$100/kWh (and e-bus and commercial vehicle packs at \$101/kWh on average) while BNEF calculated that Tesla's estimated average pack price in 2021 was around \$112/kWh. The survey also includes stationary storage solutions which saw a fall in cost of around 16% in 2021, to \$152/kWh, as manufacturers turned to simple and cheaper battery chemistries, such as lithium-ion phosphate, to offset raw material inflation.

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BNEF lithium-ion battery survey 2021 (\$/kWh)

source: BNEF



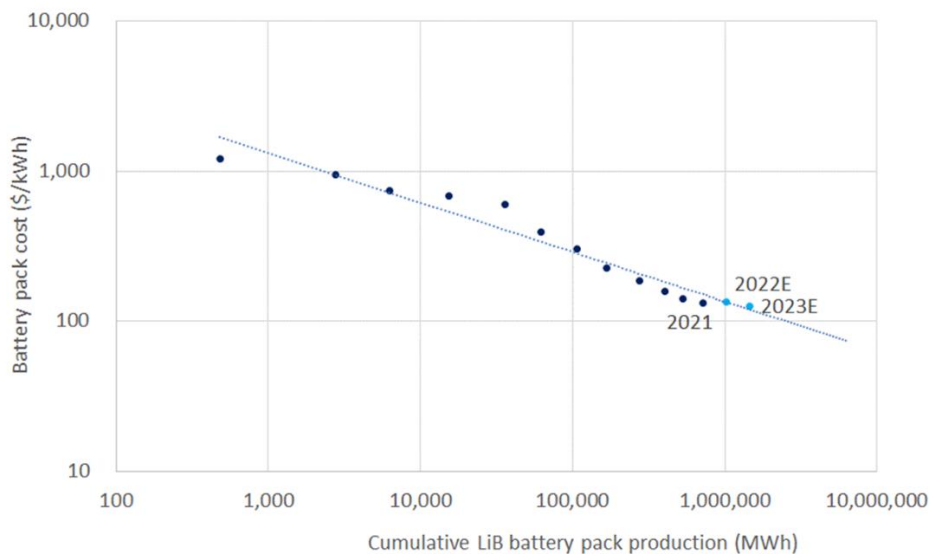
Raw materials make up around 50% of the cost of a lithium-ion battery pack, with cathode materials alone representing around 30% of the total cost. The key catalyst material is lithium carbonate, whose price in China rose by 270% in 2021. While battery manufacturers have long-term contracts and approaches in place to mitigate such inflation, they ultimately have little choice but to pass on the costs to consumers. In Q4 2021, BYD increased its battery prices by 20%.

Raw material cost inflation will continue to have an impact in 2022 and we see the likelihood that the cost of manufacturing may exceed levels seen in 2020. Rapidly increasing manufacturing capacity, (bringing further efficiencies of scale) together with reduced supply chain disruptions should help to alleviate the cost pressures in subsequent years and allow the average cost of producing a lithium-ion battery for an EV is likely to fall towards \$100/kWh in the mid-2020s, somewhat later than we previously expected.

While the \$100/kWh cost level is a key target, we note that in 2021 the battery and EV industry started focusing on manufacturing costs well below \$100/kWh. EV manufacturers started to vertically integrate with battery manufacturers and form battery manufacturing JVs such as BlueOvalSK (Ford/SK) and Ultium Cells (GM/LG Energy Solutions) in efforts to improve manufacturing efficiencies with \$60/kWh targets discussed for the end of the decade. The US Department of Energy also set \$60/kWh as its 'stretch' goal, a level would be achieved by 2030 if the current 18% learning rate is maintained.

Cumulative demand for LiB packs (MWh) vs Battery pack price (\$/kWh)

source: Bloomberg, Guinness Global Investors



Electric Vehicles

Strong momentum in EV sales growth continued through 2021 and so far in 2022. On our estimates, nearly 6.5m new EVs were sold in 2021, more than double the sales in the same period 12 months earlier (affected by Covid) and 178% higher than the same period in 2019. Electric vehicle (EV) sales have seen a strong start to 2022 with 3.2m units sold to the end of May, up 65%

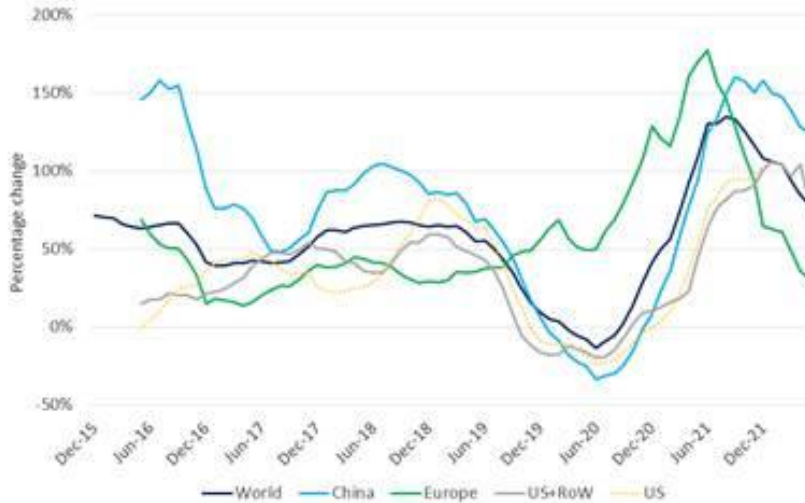
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on the same period last year. This growth continues to compare favourably against broader passenger vehicle sales (down 4% over the same period). We estimate that the 12-month rolling EV sales penetration rate at the end of May 2022 stood at 9.2% versus 5.0% and 2.4% at the end of May 2021 and May 2020. We forecast 20% of global passenger vehicle sales will be electric by 2025 and 50% by 2030.

To the end of May 2022, China has extended its dominance as the largest plug-in vehicle market in the world, selling 1.8m units (more than the 965k for Europe and 480k for the rest of the world combined). China's turbocharged rate of adoption drove monthly penetration rates to 31% in May 2022 compared to 12% in May 2021 and 4% in May 2020.

Global EV sales growth (rolling 12-month basis up to May 2022)

Source: Guinness Global Investors, EV-Sales, Cleantechnica

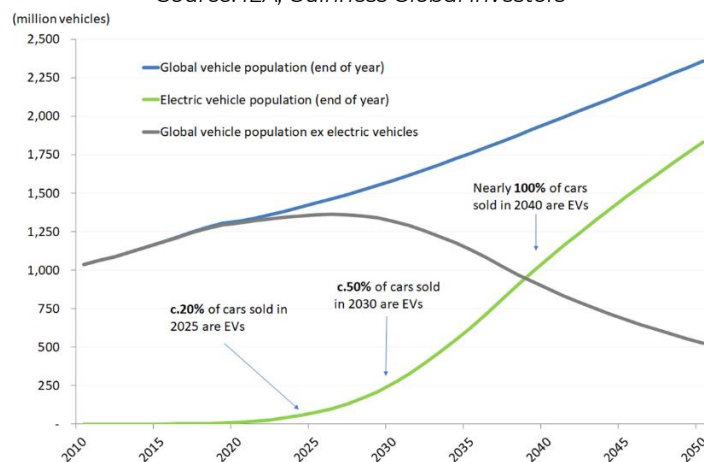


Government support for EVs is reducing in 2022. Europe will continue rolling back its EV 'super-credits', and China plans to reduce EV subsidies further. Despite this, we expect global EV sales to exceed 10 million in 2022, representing around 10% of total passenger vehicle sales, taking the global EV stock from 16m vehicles to over 25m vehicles.

On a global basis, we expect EVs will represent around 20% of new vehicle sales in 2025 (concurrent with the cost of EV lithium-ion batteries falling to around \$100/kWh), 50% of new vehicle sales in 2030 and nearly all new vehicle sales by 2040. At that point, it implies an overall EV population of around 1bn vehicles, over sixty-five times greater than the global population of around 15m EVs at the end of 2021. With EVs using roughly one third of the energy of a typical internal combustion engine vehicle, this transition alone will have substantial impact on global energy efficiency and global decarbonisation.

Global EV population (to 2050)

Source: IEA; Guinness Global Investors



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Despite these rapid EV growth assumptions, we calculate that oil demand from passenger vehicles will not peak until around 2024/25 and that, even by 2030, passenger vehicle oil demand will be similar to 2021 levels. With transportation generating just over 7bn tonnes of carbon emissions in 2020, accelerating the transition and reducing associated oil demand is critical to achieving a net zero 2050 scenario.

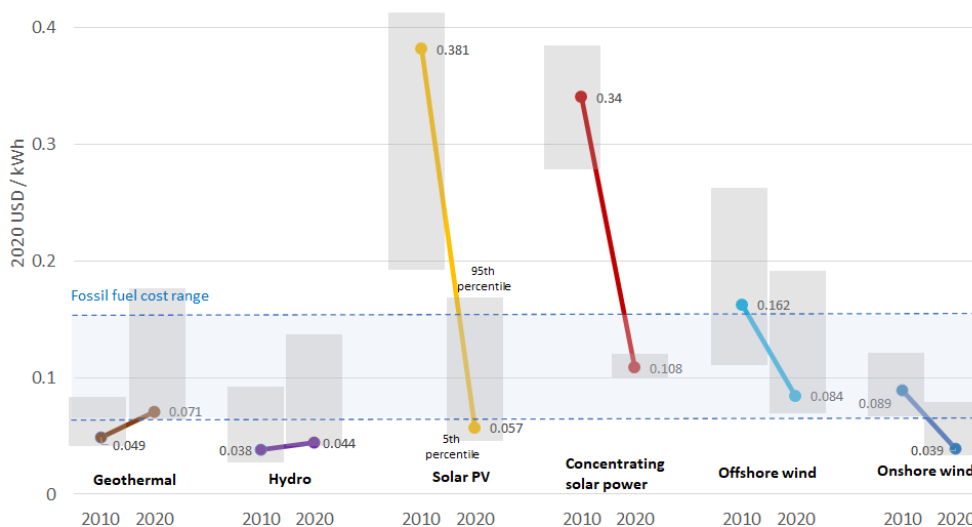
Generation & installation (equipment)

Before considering the detailed dynamics of key renewable power generation markets of wind and solar, it is worth considering the significant changes that have occurred to the economics of various renewable power generation technologies since 2010. Onshore wind and solar PV have joined hydro and geothermal power to sit at the lower end of, or below, the cost range for new fossil fuel power generation.

The structural story of cost reduction that we have witnessed for a number of years has recently been complicated by cyclical raw material, energy and logistics cost inflation. However, while the cost of renewable power generation is likely biased upwards short-term, the **relative economics of renewables versus hydrocarbons** continue to improve thanks to fossil fuel generation inflation.

Global LCOE of utility-scale renewable power generation technologies (2010–2020)

source: IRENA, Guinness Global Investors estimates



The solar sector

2021 was a year of record installations, but one that also witnessed a tick-up in the cost of solar module manufacturing as a result of raw material, power and logistics inflation. These issues slowed installation growth in the fourth quarter and led to installations of 184 GW for the year. In 2020, the IEA described solar power as “now the cheapest electricity in history” and, despite near-term headwinds and cyclical cost inflationary factors, large-scale solar remains at the bottom of the cost curve.

Market estimates for global solar installations were for around 215 GW in 2022 but a strong start end to 2021 and start to 2022 leads us to expect installations will now be more like 250 GW (up 66 GW vs 2021). The growth has come from Asia and Europe and is likely to be achieved despite regulatory issues (for example the withhold release order (WRO) as well as anti-dumping/ countervailing duty (AD/CVD) investigations) that almost made US utility solar installations grind to a halt in the first half of the year).

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Global solar module installations, 2010-2022E (GW)

Source: BP, BNEF, IEA and Guinness Global Investors estimates

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022E
OECD solar installations (annual)													
North America	1	2	4	6	7	8	14	11	10	11	19	30	20
Germany	7	7	8	3	2	1	2	2	4	4	5	5	8
Spain	0	0	0	0	0	0	0	0	0	5	3	4	6
Rest of Europe	3	4	5	5	5	6	4	3	4	6	8	15	26
Australia	0	1	1	1	1	1	1	2	4	4	4	5	6
South Korea	0	0	0	1	1	1	1	1	2	3	4	4	5
Japan	1	1	2	7	10	11	8	8	7	7	9	7	9
Total OECD	17	23	24	24	25	29	29	26	31	40	51	70	80
<i>Change in OECD annual installations</i>	<i>10</i>	<i>7</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>4</i>	<i>0</i>	<i>-3</i>	<i>5</i>	<i>9</i>	<i>11</i>	<i>19</i>	<i>10</i>
Non-OECD solar installations (annual)													
China	0	3	3	14	13	19	30	53	44	33	52	65	95
India	0	0	1	1	1	2	5	10	11	12	4	12	19
Rest of non-OECD	1	3	3	4	6	6	11	9	22	34	37	37	56
Total Non-OECD	2	5	8	18	21	27	46	72	77	78	93	114	170
<i>Change in non-OECD annual installations</i>	<i>1</i>	<i>3</i>	<i>2</i>	<i>11</i>	<i>2</i>	<i>6</i>	<i>19</i>	<i>26</i>	<i>5</i>	<i>1</i>	<i>15</i>	<i>21</i>	<i>56</i>
Total solar installations (annual)	19	29	31	42	46	56	75	98	108	118	144	184	250
<i>Change in world annual installations</i>	<i>11</i>	<i>10</i>	<i>2</i>	<i>11</i>	<i>4</i>	<i>10</i>	<i>19</i>	<i>23</i>	<i>10</i>	<i>10</i>	<i>26</i>	<i>40</i>	<i>66</i>

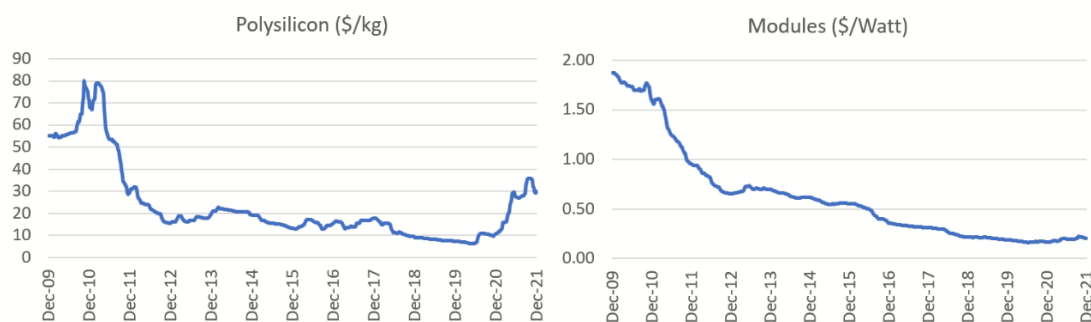
Supply solar supply chain

Most parts of the solar module manufacturing chain were oversupplied in 2021 and will likely remain so in 2022 as new capacity is added across the breadth of the chain, including polysilicon, wafers, cells and modules.

- **Polysilicon** is a key raw material for a solar wafer. This was the tightest part of the solar market in 2021, evidenced by polysilicon prices nearly trebling over the year to end the year at around US\$30/kg. The price strength allowed polysilicon manufacturers to realise super normal profits and is incentivising a supply response. Capacity averaged around 460 MT in 2021 and while it has grown further in the first half of 2022, a further 150% increase in capacity is planned for 2023 vs 2Q 2022.
- **Wafer and solar cell** manufacturing capacity increased by over 60% in 2021 while mono wafer prices have increased by around 75%. The increase in capacity leaves this part of the value chain as oversupplied in 2022 as it was in 2021 although 78% of 2022 wafer capacity is in the hands of the five largest producers.
- **Solar module** prices increased around 25% during 2021 (to around US\$0.28/Watt according to BNEF) – back to where they were in mid-2018 – and have maintained these levels so far in 2022. Module manufacturing continues to be significantly oversupplied with around 470 GW of available capacity in 2022, of which around 310 GW is newer 'Tier 1' capacity with lower costs resulting from the scale of manufacturing and new technologies.

Polysilicon and solar module pricing

source: Bloomberg



Rapid growth in solar installations is likely in the years ahead. European growth will accelerate sharply and sustain through to 2030 (partly as a result of RePowerEU) while the US solar industry is likely to return to growth in the second half of the year. We note a new optimism in the US following President Biden's Executive Order to overrule import tariffs for 24 months. Legal

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challenges to the EO, implementation of the new Uyghur human rights rules and the result of net metering discussions (at the end of 2022) could provide bumps in the road but demand for solar in the United States appears to be robust and supported by policy.

The wind sector

The long-term outlook for the wind industry remains very positive as wind power will play a critical role in global decarbonisation and the energy transition. Global wind generation capacity today is around 700GW with annual installations in 2022 expected to be around 105GW.

However, the wind industry is suffering short-term pressures as recent sharp peaks in installation demand (a 50% increase to 98GW in 2020, driven by tax incentives and policy changes) have moderated and have been compounded by Covid-related project delays, raw material cost inflation, logistics issues and permitting constraints.

Wind turbine manufacturing is raw material intensive. According to Vestas in December 2021, steel plate prices were up 2x and resin up 2.5x versus the start of 2020. In terms of logistics, the cost of shipping containers was up 4x and the cost of delivery vessels was up 2x in 3Q 2021 vs 2020. While these cost increases are significant, they were compounded by supply chain issues, such as a 4x increase in the average time that equipment spent waiting in Chinese ports and a 50% reduction in the reliability of scheduling.

Below, we consider the key factors for the onshore and offshore wind markets in 2021 and beyond, concluding that the near-term issues are likely a bump in the road on the journey to delivering wind as the second most significant renewable power generation source.

Annual onshore and offshore wind installations (GW)

source: BP, IEA, BNEF, Guinness Global Investors estimates

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022E
Onshore wind installations (annual)															
North America	9	11	6	8	15	2	7	10	9	8	8	10	17	16	10
Latin America	0	0	0	0	0	0	5	3	3	3	4	4	2	5	3
Europe	6	9	9	10	12	11	11	11	12	13	8	9	12	15	19
China	6	14	17	18	14	15	21	29	22	17	19	26	54	41	48
India	2	1	1	1	2	2	2	3	4	4	2	2	1	3	4
RoW	3	3	3	4	4	3	4	5	5	5	4	4	5	3	8
Total onshore	27	38	35	40	46	33	49	61	55	49	46	55	91	83	92
<i>Change in onshore annual installations</i>		12	-3	5	6	-14	17	11	-6	-6	-3	9	36	-8	9
<i>World ex China</i>	21	24	18	22	32	18	29	32	33	32	27	29	37	42	44
Offshore wind installations (annual)															
China	0	0	0	0	0	0	0	1	1	1	2	3	4	14	6
UK	0	0	1	0	1	1	0	1	0	1	2	2	1	1	2
Germany	0	0	0	0	0	0	0	2	0	2	0	2	0	1	2
RoW	0	0	0	0	0	1	0	0	0	1	0	1	2	1	3
Total offshore	0	0	1	0	2	2	1	4	1	4	4	8	7	17	13
<i>Change in onshore annual installations</i>		0	1	-1	1	1	-1	4	-4	3	0	3	-1	11	-4
<i>World ex China</i>	0	0	1	0	1	2	1	3	0	4	3	5	3	3	7
Total wind installations (annual)	27	38	36	40	48	35	50	65	56	53	50	63	98	100	105
<i>Change in world annual installations</i>		12	-2	4	8	-13	16	15	-9	-3	-2	12	35	3	5

Onshore wind

Global onshore wind installations in 2021 were around 83 GW, down 8 GW from the record level seen in 2020 but still up 28 GW on the pre-pandemic installation level of 55 GW in 2019.

Onshore wind installations had been growing very steadily since 2008, averaging an increase of around 3 GW pa, with China representing around 70% of the annual growth. Chinese demand peaked sharply in 2020 and we expect installations to moderate to the longer-term trend resulting in around 41 GW of installations in 2022.

Outside China, onshore installations reached a new high in 2021, averaging 42 GW, up 5 GW on 2020 levels. Onshore installations outside China are expected to be slightly higher again in 2022, achieving a new record level of around 44 GW.

Combined with underlying new project increases, we note that by 2030 around one third of the world's total installed capacity will be more than 13 years old and will be strong candidates for refurbishing.

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Offshore wind

Offshore wind remains a nascent industry, at only 17% of the size of onshore (by annual installations in 2021), but one where the growth trajectory is becoming increasingly visible.

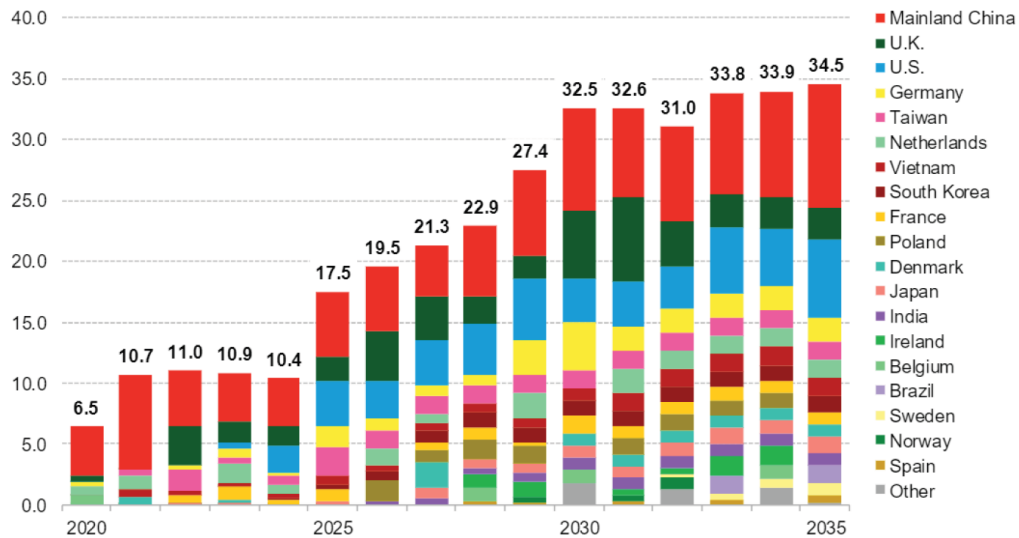
Annual installations of offshore wind capacity have increased from 0.9GW in 2010 to a new high of 17 GW in 2021. Chinese offshore installations reached 14 GW in 2021 while ex-China installations are likely to grow from 3 GW in 2021 to a new high of 7 GW in 2022.

The economics of offshore wind continue to improve and there was further constructive cost data in 2021 suggesting that the LCOE for the median offshore wind project halved between 2010 and 2020, and now sits at the bottom end of the competing fossil fuel generation cost range. The growing interest underlines the significant potential of the offshore industry which benefits from better operational (higher and more reliable wind speed) and visual characteristics as well as being close to key demand areas which are often coastal.

In the later part of this decade, we expect annual offshore wind installations to represent around 20% of the total wind market with cumulative installations in offshore between 2020 and 2030 likely to be around 140 GW. A broader spread of countries including the United States, Chinese Taipei, Korea, Vietnam and Japan means that cumulative installations will be split around 30 GW in the Americas, 90 GW in Europe, Middle East and North Africa and around 20 GW in Asia Pacific. The current European market will continue to grow, as excess offshore wind generation will be utilised for the generation of green hydrogen via electrolyzers, and while the Chinese market will also grow it will not be as dominant globally as it is in the onshore market.

The outlook for offshore wind installations

source: BNEF



The Guinness Sustainable Energy Report

IMPORTANT INFORMATION

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This report is primarily designed to inform you about recent developments in the energy markets invested in by the Guinness Sustainable Energy Fund. It also provides information about the Fund's portfolio, including recent activity and performance. This document is provided for information only and all the information contained in it is believed to be reliable but may be inaccurate or incomplete; any opinions stated are honestly held at the time of writing, but are not guaranteed. The contents of the document should not therefore be relied upon. It is not an invitation to make an investment nor does it constitute an offer for sale.

Documentation

The documentation needed to make an investment, including the Prospectus, the Key Investor Information Document (KIID) and the Application Form, is available in English from www.guinnessgi.com or free of charge from:-

- the Manager: Link Fund Manager Solutions (Ireland) Ltd (LFMSI), 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.

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A summary of investor rights in English is available here:

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Telephone calls will be recorded and monitored.