Guinness Sustainable Energy

Investment Commentary – October 2025

RISK

This is a marketing communication. Please refer to the Prospectus, Supplement and KID/KIID for the Funds (available on our website), which contain detailed information on their characteristics and objectives and full information on the risks, before making any final investment decisions. The Funds are equity funds. 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 Funds invest at least 80% in companies in the sustainable energy sector and can be volatile.

Past performance does not predict future returns.

ABOUT THE STRATEGY

Launch	19.12.2007
Index	MSCI World
Sector	IA Commodity/Natural Resources
Managers	Will Riley Jonathan Waghorn
EU Domiciled	Guinness Sustainable Energy Fund Guinness Sustainable Energy UCITS ETF
UK Domiciled	WS Guinness Sustainable Energy Fund

INVESTMENT POLICY

The Guinness Sustainable Energy Funds are managed for capital growth and invest 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 demand growth, improving economics and both public and private support, offering attractive investment opportunities. The Funds are actively managed and use the MSCI World Index as a comparator benchmark only.

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COMMENTARY

REVIEW OF THE THIRD QUARTER

The third quarter of 2025 saw broad-based positive performance in the fund, reflecting clarity around US policy, the start of an interest rate easing cycle and inflecting electricity demand for AI and data centres. The 13% valuation discount of the fund to the MSCI World looks increasingly attractive as positive earnings momentum returns.

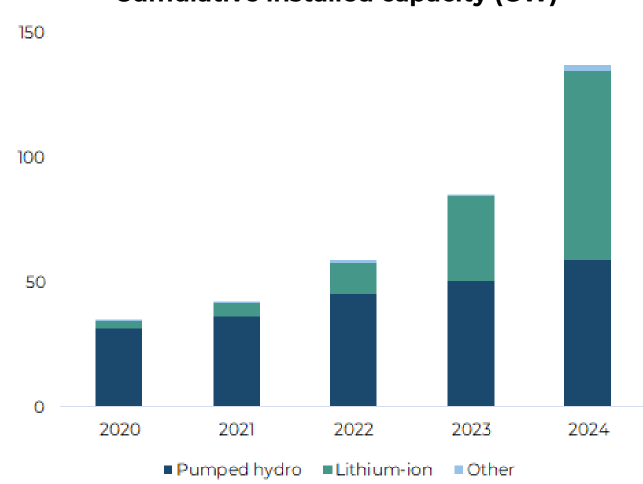
EQUITIES

The Guinness Sustainable Energy Fund (Class Y) delivered a return of 3.9% (in USD) in September, outperforming the MSCI World Index, which returned 3.2%. Among the fund's top performers were Canadian Solar and China Longyuan, which benefited from signs of a potential price recovery in China's solar sector. Among the fund's bottom performers were US building names such as Installed Building Products, Owens Corning, and Carlisle, which continue to be impacted by higher interest rates and a mixed outlook for US construction spending.

CHART OF THE MONTH: CHINA'S ENERGY STORAGE

China's energy storage capacity has surged in recent years, with the country more than tripling its installed base since 2021, according to Ember. China now has over 135 GW of capacity, with recent additions being primarily lithium-ion batteries. In 2024 alone, China commissioned a record 37 GW of battery storage, more than Europe and the US combined.

Cumulative installed capacity (GW)



Source: Ember, September 2025

SEPTEMBER 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
In September, PG&E and CenterPoint, two of the largest US utilities, announced capital spending plans of $73 bn and $65 bn respectively directed at strengthening grid infrastructure to meet surging electricity demand. Both point to data centres, AI, and wider electrification as the principal drivers of load growth. CenterPoint projects peak load rising by around 50% by 2031, with overall peak power demand set to double by 2035. The scale of these investment commitments points to the challenge facing utilities as they balance rising load growth with the twin pressures of reliability and affordability.	US Power Demand	↗
Despite recent political headwinds in the US, the outlook for the global wind industry remains strong, with Wood Mackenzie forecasting it to remain one of the fastest growing sources of power worldwide. The sector is set to add its second terawatt of capacity by 2030, only seven years after achieving the first in 2023. A record 170 GW of new capacity is expected in 2025, driven by China's rapid onshore expansion, while global capacity is projected to double from 2024 levels by the early 2030s. In the US, the scheduled expiry of tax credits after 2027 is expected to front-load installations and reshape the market outlook.	Global Wind Industry	↗
The outlook for US biofuels has become more uncertain as the Trump administration considers how to adjust the Renewable Fuel Standard (RFS). At the same time, biodiesel and renewable diesel imports have dropped to their lowest levels since 2012, as tax credit reforms now favour domestic production over imported fuels. The administration faces a delicate balancing act as it weighs increasing the burden on large refiners or angering domestic farmers who depend on robust demand for biofuel feedstocks.	US Biofuels	→
Nuclear generation continues to be the beneficiary of global power demand growth as governments and corporations rush to acquire low-carbon, base load electricity. In September, Eni signed a power purchase agreement worth more than $1 billion with Commonwealth Fusion Systems (CFS) for power from its planned 400 MW fusion plant in Virginia. Eni did not disclose the financial terms, but the plant is not expected to come online until the early 2030s, and the project costs remain unknown. Google entered a similar purchase deal earlier in the year for 200 MW of power, again for an undisclosed price. In the UK, Centrica backed a £10 billion plan with the US firm X-Energy to build up to 12 modular reactors with up to 6 GW of capacity.	Nuclear Power	↗
The Trump administration's energy pivot is accelerating consolidation across US solar and wind. Clean energy M&A has surged in 2025, with 63 deals worth $34 billion in the first half of the year, compared with just $7 billion in late 2024, as smaller developers come under pressure from cancelled federal funding and the rollback of tax credits. This backdrop has allowed larger utilities and private equity investors to acquire high-quality generation assets at attractive valuations, just as US power demand inflects for the first time in decades. Blackstone's acquisition of clean energy developer ClearGen is one of several deals this year that exemplifies this trend.	Sustainable energy M&A	↗

MANAGERS' COMMENTS

Past performance does not predict future returns

Review of 3Q 2025

The third quarter saw broad-based positive performance in the fund, reflecting clarity around US policy, the start of an interest rate easing cycle and inflecting electricity demand for AI and data centres. The 13% valuation discount of the fund to the MSCI World looks increasingly attractive as positive earnings momentum returns.

The Guinness Sustainable Energy Fund delivered a return of +11.0% during the third quarter of the year, outperforming the MSCI World Index, which finished the period up +7.3%. Within the portfolio our top-contributing segments were electrical equipment and electrification, while generation was the weakest contributor. All subsectors contributed positively in the quarter. This year, the fund has returned +24.0% versus the MSCI World's +17.4%.

Analysis of 3Q 2025 individual stock contribution

There was little in the way of thematic or geographic differentiation in the quarter, with all of our subsectors and regions represented in the top ten contributors. Key discussion points were as follows:

Our electrical equipment companies performed well, driven by an acceleration in global electrification activity, grid spending and, in certain cases (such as **Legrand**), exposure to the data centre subsector. Top contributor **Prysmian** announced a number of significant new power cable contract awards (taking its backlog to a record level, estimated at Eur17bn) and benefited from US steel tariffs as a result of its US domestic manufacturing activity.

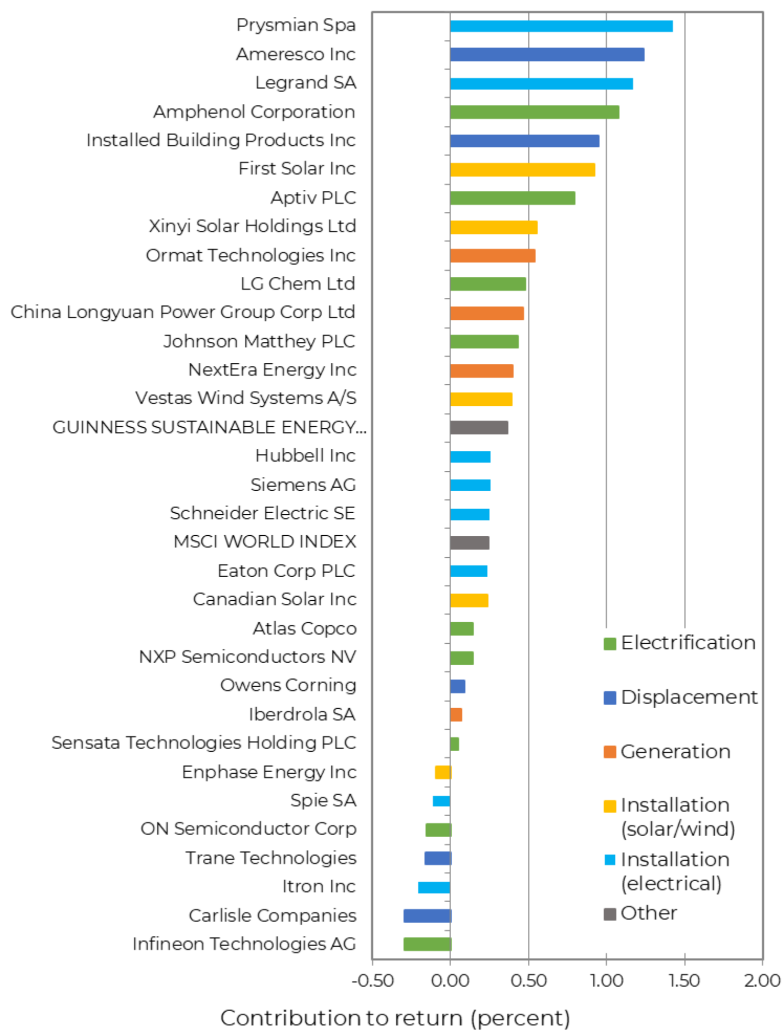
Shares in **Ameresco** performed strongly as the company benefited from improved clarity around US clean energy policy and demonstrated strong underlying demand for its energy solutions business in its 2Q results. Less pressure from the US Department of Government Efficiency (DOGE) helped to derisk Ameresco's project pipeline and give the market confidence in the company's growth outlook.

Amphenol shares performed strongly due to very strong 2Q results and robust forward guidance giving confidence in its AI-driven growth trajectory. These strong results followed similar strong delivery in 1Q 2025 and make Amphenol our second-greatest contributor over the year to date.

Installed Building Products demonstrated its superior positioning within the US construction market with strong 2Q earnings that reflected a shift towards commercial building, a focus on local (rather than national) builders and the sell-through of an expanding range of complementary products.

Poorer contributors covered various themes and end markets. Shares in **Enphase** continued to be weak as the elimination of the 25D US solar residential tax credit started to bring lower demand for US customer-owned residential solar systems. Shares in **Carlisle** underperformed as the outlook for US construction and residential spending slowed, causing management to lower organic growth and margin guidance for 2025. Despite a normalisation of inventory levels, power semiconductor manufacturers **Onsemi** and **Infineon** also delivered poorly as expectations for the speed of recovery in their markets proved to be too optimistic.

3Q 2025 contribution for Guinness Sustainable Energy Fund



Source: Bloomberg, Guinness Global Investors estimates; 30 September 2025

Performance in the third quarter reflected improving trends across a number of different subsectors and end markets within the sustainable energy industry. The Guinness Sustainable Energy portfolio is exposed to a range of different themes covering the supply of sustainable energy, the electrification of demand and the expansion and upgrading of global power grids.

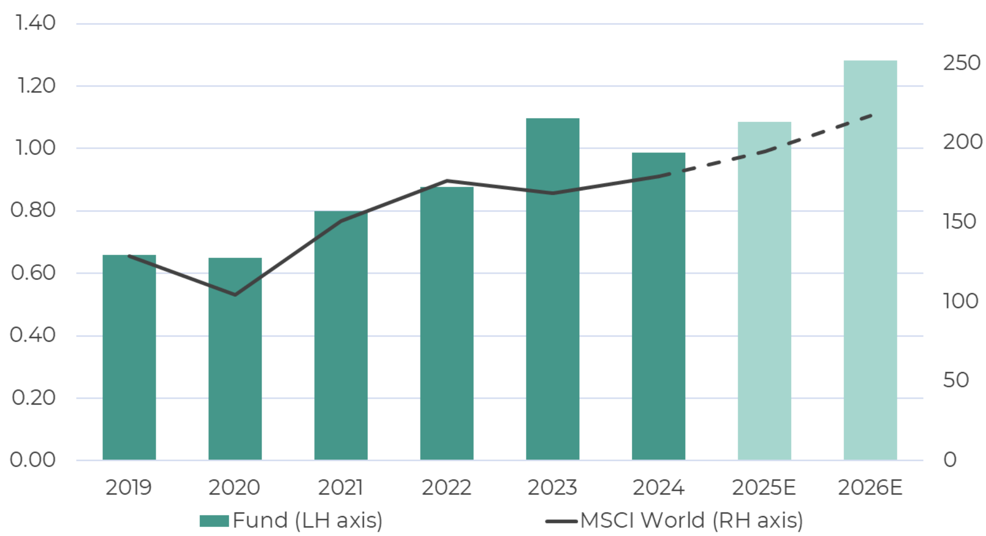
	Theme	Example holdings		Weighting (%)
1	Electrification of the energy mix	EATON	legrand	27.9%
2	Building and Industrial efficiency	TRANE TECHNOLOGIES	CARLISLE	14.2%
3	Modernising the power grid	Itron	HUBBELL	12.3%
4	Rise of the electric vehicle and auto efficiency	LG Chem	APTIV	11.3%
5	Power semiconductors	NXP	infineon	8.4%
6	Wind & solar: equipment manufacturing	Vestas	First Solar.	9.0%
7	Low carbon power generation: regulated producers	Iberdrola	NEXTera ENERGY	8.5%
8	Low carbon power generation: independent producers	龙源电力 LONGYUAN POWER	ORMAT	8.6%
9	Other (inc cash)			-0.1%

Source: Guinness Global Investors; 30 September 2025

Earnings expectations for the fund are improving

A clearer policy outlook, the expectation (and subsequent delivery) of the start of an interest rate easing cycle and the sharp uptick in electricity demand related to AI and data centres meant that 2025 and 2026 earnings expectations for the fund increased over the quarter. A return to positive earnings momentum is a key positive catalyst for the fund, which is projected on consensus estimates to deliver earnings growth in 2025 in excess of the MSCI World Index. Looking back, the fund has delivered earnings-per-share (EPS) growth in excess of the MSCI World (8.4% per annum from 2019-2024 versus the MSCI World at 6.8% per annum) and, based on current consensus expectations, it should return to that trend again. Including recent 2Q 2025 results, fund EPS is expected to grow at 14% per annum to 2026 (reflecting 10% growth in 2025 and 18% in 2026) while the MSCI World is expected to grow at 10.1% per annum to 2026 (reflecting 9% growth in 2025 and 11% in 2026).

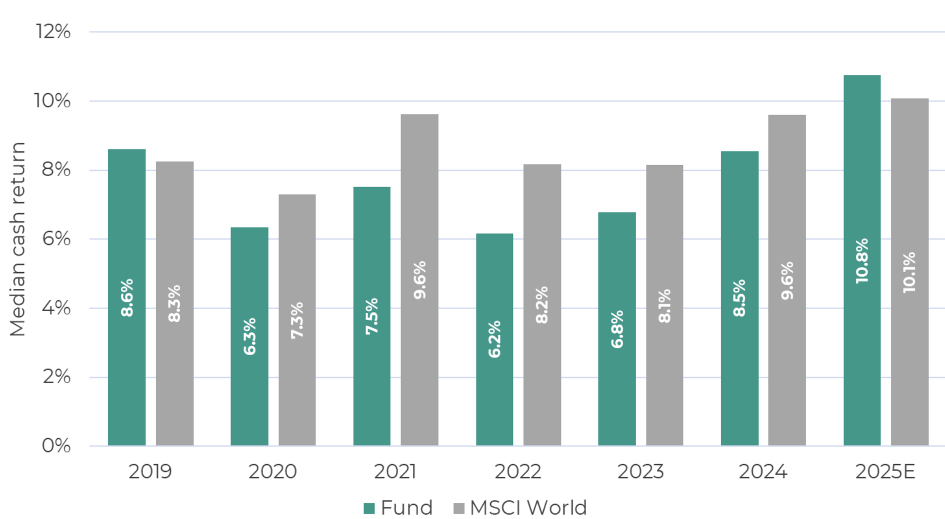
Earnings per share (US$) for the Guinness Sustainable Energy Fund and MSCI World index



Source: Company data, Guinness estimates, 30 September 2025

The cash return of the fund's holdings (a measure of real economic return on capital employed) has also moved higher over 2024 and 2025 and has now reached nearly 11%, for the median holding at the end of September 2025. This is the result of improvements in the cash returns of various existing investee companies, plus some high grading of the portfolio. Looking back over the fund's history, cash returns are now at a peak level and, for the first time since 2019, they are at a premium to the median cash return of the MSCI World index.

Cash returns for Guinness Sustainable Energy Fund and median MSCI World index



Source: Company data, Guinness estimates, 30 September 2025

Despite growth potential, valuation still at a discount to the MSCI World

The positive return in the quarter led to the 12-month forward price/earnings ratio of the fund increasing over the quarter from 16.9x to 17.7x (+5%) and the outperformance took the fund to a 12-month forward P/E discount of 13% versus the MSCI World (versus a 15% discount at the end of June). Since the end of 2022, the P/E of the fund has compressed by 8% (from 19.1x to 17.7x) while the MSCI World has inflated from 15.5x to 20.4x, an increase of 32%.

Valuation and earnings growth of the Guinness Sustainable Energy Fund

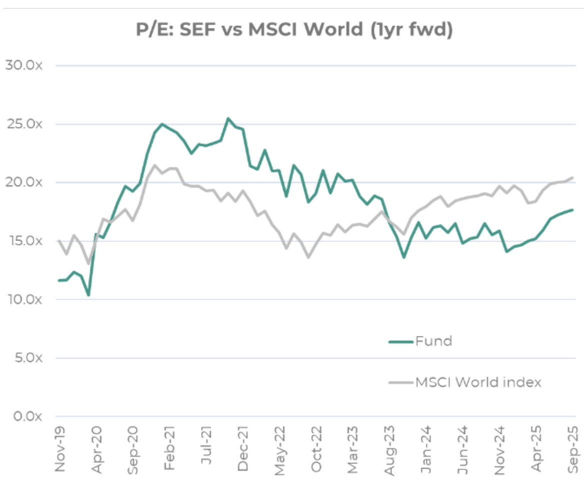
As at 30 September 2025	PE			EV/EBITDA			Dividend Yield		EPS Growth (%pa)		Cash return	
	2024	2025E	2026E	2024	2025E	2026E	2025E	2026E	2019-24	2024-27	2025E	2026E
Guinness Sustainable Energy Fund	21.8x	20.0x	16.9x	13.3x	12.2x	10.8x	1.5%	1.8%	7.7%	13.4%	10.5%	11.0%
MSCI World Index	24.1x	22.1x	19.8x	15.2x	14.0x	12.6x	1.7%	1.8%	6.7%	10.4%	9.8%	10.4%
Fund Premium/(Discount)	*-10%*	*-10%*	*-15%*	*-13%*	*-13%*	*-14%*						

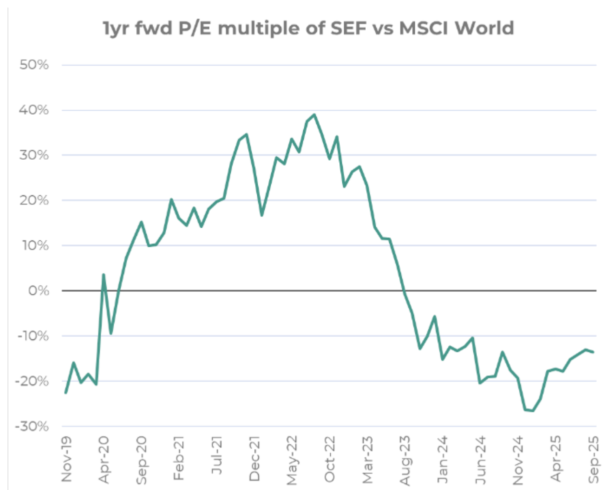
**2024 P/E = Latest month-end price/2024 earnings; Portfolio = median CFROI; Index data = HOLT MSCI World ETF median CFROI, EPS derived from consensus, adjusted for Canadian Solar*

This 13.4% annualised EPS growth implied by consensus today is lower than prior forecasts from 2021 and 2022 but comes from a more diversified end market exposure and from a group of higher quality companies. Should this earnings growth play out, we would expect the fund's 13% P/E valuation discount to the MSCI World index to close and, potentially, move back to a premium reflecting the forecast earnings growth premium to the MSCI World index.

Guinness Sustainable Energy Fund and MSCI World P/E (1yr fwd)

Absolute and relative





Source: Bloomberg, Guinness Global Investors, October 2025

We have seen further continued improvement in the sustainable energy sector in the third quarter of 2025 resulting from increasing global electricity demand, a better-than-expected resolution to US clean energy policy and supportive policy elsewhere in the world. This backdrop is better than anything that we have seen in the last 24 months. Improvements in quality and diversified exposure to better structured end markets should allow fund earnings to grow in 2025 and 2026 and bring greater confidence in the longer-term earning potential. We believe that our basket of sustainable energy equities provides attractive exposure to earnings growth in excess of the MSCI World at a valuation discount to the MSCI World.

PERFORMANCE

Past performance does not predict future returns.

The **Guinness Sustainable Energy Fund** (Class Y, 0.68% OCF) delivered a return of 3.9% in the month, while the MSCI World Index (net return) delivered 3.1% (all in USD terms).

Guinness Sustainable Energy Fund	Ytd	1 Yr	3 Yrs	5 Yrs	10 Yrs*
Fund (Class Y)	24.0%	3.7%	21.5%	46.2%	138.9%
MSCI World NR Index	17.4%	17.3%	89.4%	96.0%	222.6%
Out/Underperformance	*6.5%*	*-13.5%*	*-67.8%*	*-49.8%*	*-83.7%*

	2024	2023	2022	2021	2020
Fund (Class Y)	-11.8%	-0.4%	-12.5%	10.4%	84.1%
MSCI World NR Index	18.7%	23.8%	-18.1%	21.8%	15.9%
Out/Underperformance	*-30.4%*	*-24.2%*	*5.6%*	*-11.4%*	*68.2%*

	2019	2018*	2017*	2016*	2015*
Fund (Class Y)	31.4%	-15.2%	20.2%	-15.4%	-12.0%
MSCI World NR Index	27.7%	-8.7%	22.4%	7.5%	-0.9%
Out/Underperformance	*3.7%*	*-6.5%*	*-2.2%*	*-23.0%*	*-11.2%*

*The 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%. On 31/12/2018, the benchmark became the MSCI World NR. Prior to this, the benchmark was the Wilderhill Clean Energy Index (ECO Index).*

The **WS Guinness Sustainable Energy Fund** (Class Y, 0.67% OCF) delivered a return of 2.7% in the month in GBP, while the MSCI World Index (net return) delivered 3.6%.

WS Guinness Sustainable Energy Fund	Ytd	1 Yr
Fund (Class Y, 0.67% OCF)	15.0%	2.9%
MSCI World NR Index	9.3%	16.8%
Out/Underperformance	*5.8%*	*-13.9%*

	2024	2023
Fund (Class Y, 0.67% OCF)	-10.4%	-5.8%
MSCI World NR Index	20.8%	16.8%
Out/Underperformance	*-31.2%*	*-22.6%*

The Fund was launched on 30.12.2022.

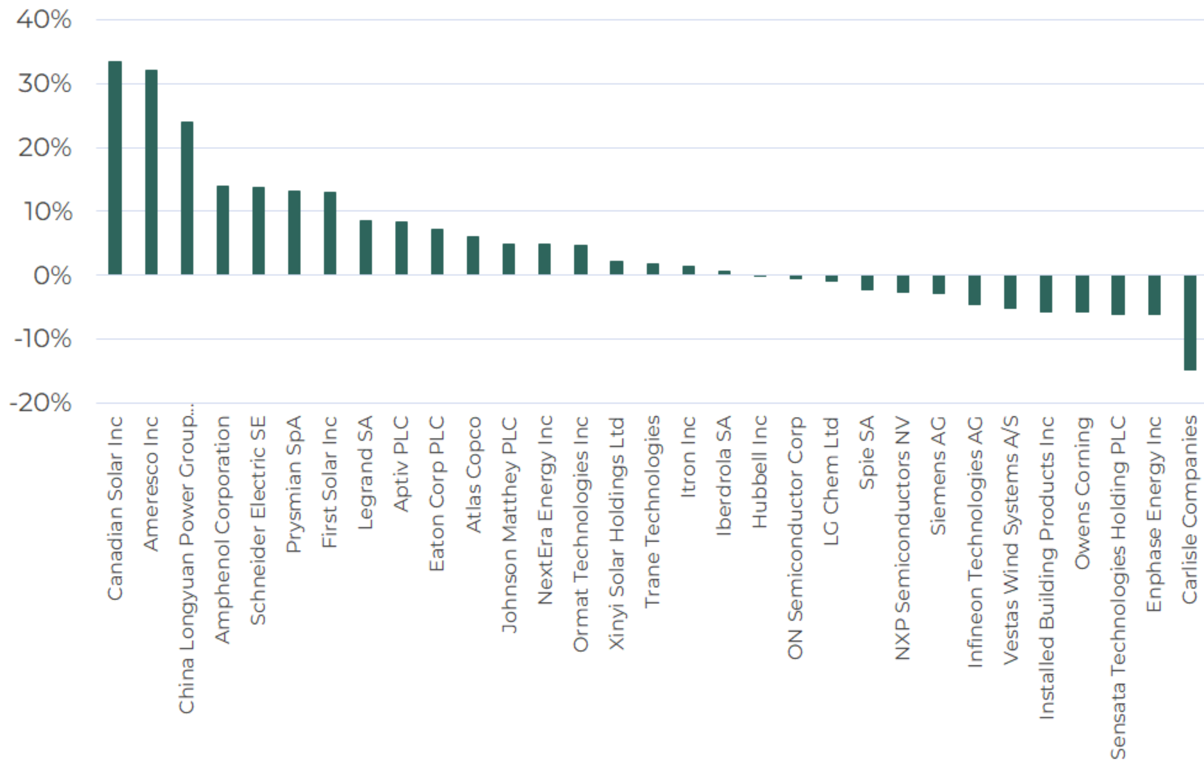
The **Guinness Sustainable Energy Fund UCITS ETF**, under our management since 25 July 2024, delivered a return of 3.8% in the month in USD, while the MSCI World Index (net return) delivered 3.2% (all in USD terms).

Total return in USD	Ytd	1 Yr
Fund (Class A Acc, 0.65% OCF)	23.8%	4.1%
MSCI World NR Index	17.4%	17.3%
Out/Underperformance	*6.4%*	*-13.2%*

Data as of 30.09.2025. Source: FE fundinfo, bid to bid, total return net of fees. Investors should note that fees and expenses are charged to the capital of the Funds. This reduces the return on your investment by an amount equivalent to the Ongoing Charges Figure (OCF). The performance shown has been reduced by the current OCF shown. Returns for share classes with different OCFs will vary accordingly. Transaction costs also apply and are incurred when a Fund buys or sells holdings.

Within the Fund, the strongest performers were Canadian Solar, Ameresco, China Longyuan, Amphenol Corporation and Schneider Electric, while the weakest performers were Carlisle Companies, Enphase, Sensata, Owens Corning and Installed Building Products.

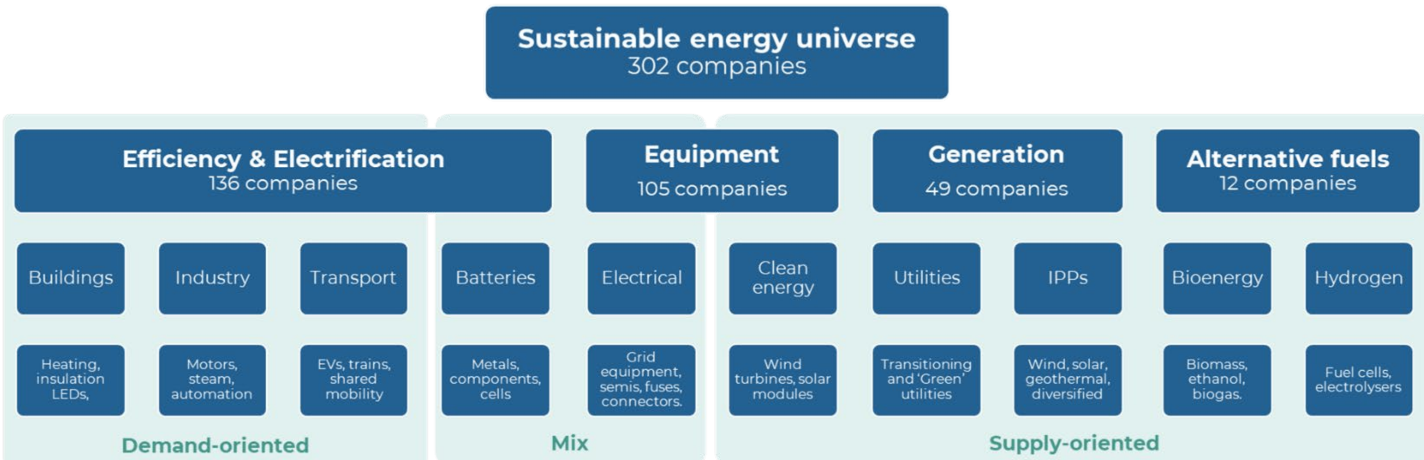
Stock by Stock performance over the month, in USD



Source: Bloomberg. As of 30th September 2025

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. We do not limit ourselves to 'pure plays', opening our universe up to some companies with existing hydrocarbon-based fuel exposure, but this must be allied with a commitment to transitioning their business models towards sustainable energy sources. Our investment universe comprises around 300 companies which are classified as follows:



Source: Guinness Global Investors; data as of 30 September 2025

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 a broadly equally weighted portfolio of 30 stocks. The portfolio is designed to create a balance between maintaining fund concentration and managing stock-specific risk.

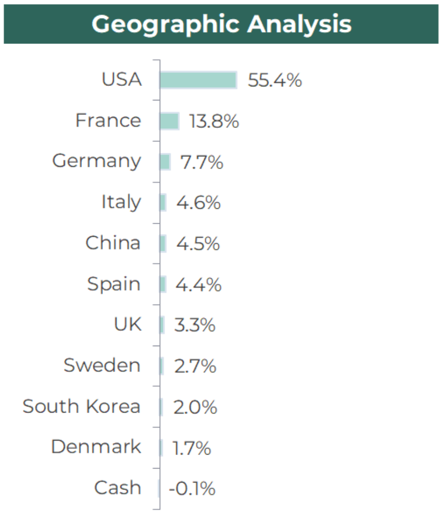
Guinness Global Investors is a signatory of the United Nations Principles for Responsible Investment. The Guinness Sustainable Energy Fund prioritises returns whilst delivering concentrated exposure to companies playing a key role in global decarbonisation. The Fund's holdings align most closely with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

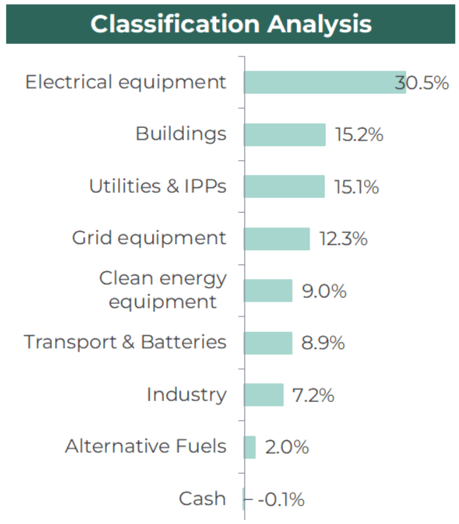
Signatory of:
PRI Principles for Responsible Investment

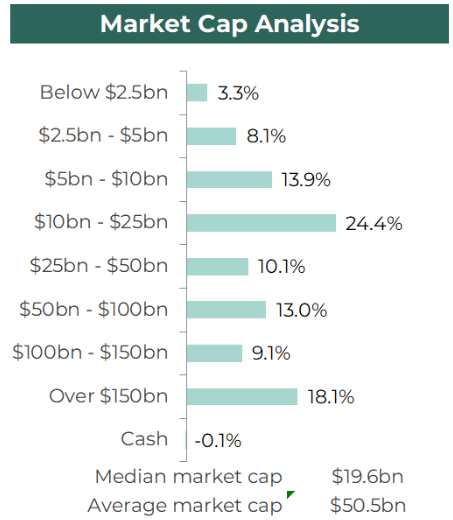
Buys/Sells

There were no buys/sells in the month, but the portfolio was actively rebalanced.

Portfolio structure analysis







Data as of 30.09.2025. Source: Guinness Global Investors. Portfolio holdings are subject to change.

Portfolio sector breakdown

The following table shows the asset allocation of the Fund at 30th September and at previous year ends.

Asset allocation as %NAV		Current	*Change*	Year end	Previous year ends				
		Sep-25		*Dec-24*	Dec-23	Dec-22	Dec-21	Dec-20	Dec-19
	Electrical equipment	30.5%	*3.7%*	26.8%	25.1%	20.3%	19.0%	10.0%	9.6%
	Buildings	15.2%	*0.4%*	14.8%	*9.6%*	*7.7%*	*4.2%*	*3.7%*	*10.2%*
	Utilities & IPPs	15.1%	*-5.4%*	20.5%	*19.5%*	*17.7%*	*23.1%*	*24.6%*	*22.2%*
	Grid equipment	12.3%	*3.3%*	9.0%	7.6%	7.3%	6.6%	6.1%	5.5%
	Clean energy equipment	9.0%	*-1.3%*	10.3%	15.8%	19.7%	18.7%	28.8%	23.5%
	Transport & Batteries	8.9%	*-2.5%*	11.3%	16.4%	18.5%	19.5%	20.4%	21.7%
	Industry	7.2%	*2.5%*	4.8%	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
	Alternative Fuels	2.0%	*0.2%*	1.8%	*1.8%*	*3.0%*	*3.7%*	*3.6%*	*3.2%*
Cash		-0.1%	*-0.9%*	0.7%	4.2%	5.8%	5.3%	3.0%	4.2%
	Total	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Guinness Global Investors

Valuation

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

As at 30 September 2025	PE			EV/EBITDA			Dividend Yield		EPS Growth (%pa)		Cash return	
	2024	2025E	2026E	2024	2025E	2026E	2025E	2026E	2019-24	2024-27	2025E	2026E
Guinness Sustainable Energy Fund	21.8x	20.0x	16.9x	13.3x	12.2x	10.8x	1.5%	1.8%	7.7%	13.4%	10.5%	11.0%
MSCI World Index	24.1x	22.1x	19.8x	15.2x	14.0x	12.6x	1.7%	1.8%	6.7%	10.4%	9.8%	10.4%
Fund Premium/(Discount)	*-10%*	*-10%*	*-15%*	*-13%*	*-13%*	*-14%*						

**2024 P/E = Latest month-end price / 2024 earnings; Portfolio = median CFROI; Index data = HOLT MSCI World ETF median CFROI, EPS derived from consensus, adjusted for Canadian Solar*
Source: Guinness Global Investors, Bloomberg

Portfolio holdings as at the end September 2025

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

A key theme in the portfolio (at around 43% weight) is that of **electrical equipment**, where we own a number of companies that facilitate the electrification of energy demand and the build-out of the electrical grid. Holdings such as Eaton, Schneider Electric, Amphenol and Legrand participate in various niches in the design, manufacturing and servicing of electrical products across low, medium and high voltage applications, for a wide range of end markets. Hubbell holds a particular specialism in high voltage grid equipment, especially in the United States, while Prysmian manufactures the cable used in high voltage interconnectors and connections to new supply sources. Lastly, Itron has a heritage in manufacturing smart meters and is increasingly providing services and consulting to utilities around this installed base to enable more efficient utilisation of the grid.

The electrification and efficiency of buildings, industrial activities and transportation represents a total weight of 31% and is split as follows:

- In terms of **transportation** exposure, the portfolio holds six 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, Infineon and NXP Semi are providers of power semiconductors and microcontrollers that are a necessity for higher-voltage electric vehicles to become competitive with ICE (internal combustion engine) vehicles, while Aptiv and Sensata are component manufacturers and service providers that should benefit from the ever-increasing amount of electronics present in electric vehicles. We hold one lithium-ion battery manufacturer, LG Chem, which is a Korean chemicals company and one of the largest lithium-ion battery manufacturers in the world.

- Our **buildings** exposure comes via pure-play quality exposure to heating and cooling industries (via commercial HVAC manufacturer Trane Technologies) as well as high quality roofing manufacturer Carlise Companies. We have two names focussed on insulation; Owens Corning as a manufacturer of insulation (and associated products) while Installed Building Products is an installer of insulation. Our final holding here in SPIE, a French electrical engineering company that provides services for the maintenance of buildings, predominantly in France and Germany.

- Our **industrial** efficiency and electrification exposure comes from two positions, in Siemens and Atlas Copco. Siemens gives us exposure to efficiency and electrification across a wide range of end markets while Atlas Copco gives exposure to the efficient use of air (often referred to as the fourth utility) in manufacturing processes, via compressors and vacuum technology.

In terms of the **generation** of sustainable energy, we hold a c.15% weight to utilities and independent power producers. China Longyuan is a pure-play Chinese wind power producer and represents one of our two IPP holdings. The remaining exposure comes in the form of geothermal via Ormat, the world's only integrated producer and equipment manufacturer for geothermal projects. We also have broad-based wind/solar renewable energy generation through NextEra Energy (the largest producer of renewable energy in the world) while Iberdrola is our one utility, with particular exposure to electricity networks.

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 Enphase manufactures 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, covering both the standard polysilicon manufacturing process (via Canadian Solar) as well as the specialist cadmium telluride process used by First Solar. Wind turbine manufacturer Vestas provides broad exposure to the strong growth that we expect in the onshore and offshore wind markets. Lastly, we have some exposure to bioenergy (and a broader range of energy efficiency projects) via Ameresco, a US listed clean energy project developer.

Portfolio themes as at end September 2025

	Theme	Example holdings		Weighting (%)
1	Electrification of the energy mix	EATON	legrand	27.9%
2	Building and Industrial efficiency	TRANE TECHNOLOGIES	CARLISLE	14.2%
3	Modernising the power grid	Itron	HUBBELL	12.3%
4	Rise of the electric vehicle and auto efficiency	LG Chem	APTIV	11.3%
5	Power semiconductors	NXP	infineon	8.4%
6	Wind & solar: equipment manufacturing	Vestas	First Solar.	9.0%
7	Low carbon power generation: regulated producers	Iberdrola	NEXTera ENERGY	8.5%
8	Low carbon power generation: independent producers	龙源电力 LONGYUAN POWER	ORMAT	8.6%
9	Other (inc cash)			-0.1%

Portfolio at end August 2025 (one month in arrears for compliance reasons)

Guinness Sustainable Energy Fund (31 August 2025)			P/E			EV/EBITDA			Price/Book			Dividend Yield		
Stock	ISIN	% of NAV	2024	2025E	2026E	2024	2025E	2026E	2024	2025E	2026E	2024	2025E	2026E
ALTERNATIVE FUELS														
Ameresco Inc	US02361E1082	1.5%	35.8x	31.3x	22.9x	17.1x	13.7x	11.6x	1.3x	1.2x	1.2x	0.0%	n.m.	n.m.
		1.5%												
EFFICIENCY & ELECTRIFICATION														
Carlisle Cos Inc	US1423391002	2.6%	21.1x	19.0x	16.7x	13.5x	14.4x	13.5x	7.0x	7.7x	6.1x	1.0%	1.0%	1.1%
Installed Building Products In	US45780R1014	3.4%	28.4x	26.0x	24.9x	14.7x	16.3x	16.0x	10.3x	9.1x	7.3x	1.1%	1.1%	1.1%
Owens Corning	US6907421019	2.3%	8.6x	10.9x	10.4x	6.6x	7.5x	7.4x	2.5x	2.4x	2.1x	1.7%	1.8%	1.9%
Spie SA	FR0012757854	3.9%	21.8x	17.0x	15.2x	11.0x	9.8x	9.2x	4.4x	3.6x	3.2x	2.0%	2.4%	2.7%
Trane Technologies PLC	IE00BK9ZQ967	4.2%	36.7x	31.7x	28.2x	23.6x	22.2x	20.1x	12.5x	11.1x	9.6x	0.8%	0.9%	1.0%
Siemens AG	DE0007236101	4.8%	25.8x	20.9x	20.9x	14.0x	12.2x	10.9x	3.8x	3.3x	3.0x	2.0%	2.2%	2.4%
Atlas Copco AB	SE0017486889	2.6%	27.4x	26.8x	24.7x	43.9x	41.9x	38.9x	7.6x	6.1x	5.5x	1.8%	2.2%	2.1%
Aptiv PLC	JE00BTDN8H13	3.3%	9.5x	10.6x	9.8x	7.9x	7.7x	7.4x	2.1x	1.8x	1.6x	0.0%	0.1%	0.1%
Johnson Matthey PLC	GB00BZ4BQC70	3.2%	125.4x	23.8x	11.7x	12.8x	6.9x	7.5x	1.6x	1.3x	1.4x	3.7%	4.1%	10.5%
LG Chem Ltd	KR7051910008	2.1%	n.m.	144.1x	15.3x	9.9x	7.7x	5.6x	0.6x	0.6x	0.6x	0.4%	0.4%	1.1%
		32.4%												
GENERATION														
Iberdrola SA	ES0144580Y14	4.5%	19.7x	17.1x	16.7x	12.3x	11.4x	10.9x	2.4x	1.9x	1.9x	3.0%	4.1%	4.3%
China Longyuan Power Group Cor	CNE100000HD4	2.3%	8.0x	8.0x	7.2x	10.8x	10.4x	9.6x	0.7x	0.7x	0.6x	3.7%	3.7%	4.2%
NextEra Energy Inc	US65339F1012	4.0%	22.3x	19.6x	18.4x	19.4x	14.8x	13.1x	3.0x	2.5x	2.3x	2.9%	3.1%	3.4%
Ormat Technologies Inc	US6866881021	3.7%	41.8x	41.0x	36.4x	18.5x	14.4x	12.8x	2.3x	2.1x	2.0x	0.5%	0.5%	0.5%
		14.5%												
EQUIPMENT														
Amphenol Corp	US0320951017	4.4%	54.7x	35.8x	31.7x	32.0x	21.9x	19.7x	13.4x	10.5x	8.4x	0.5%	0.6%	0.7%
Eaton Corp PLC	IE00B8KQN827	4.5%	35.0x	28.9x	25.5x	24.4x	22.4x	19.9x	7.4x	6.9x	6.3x	1.1%	1.2%	1.2%
Hubbell Inc	US4435106079	4.5%	28.8x	24.1x	22.3x	17.8x	17.4x	16.2x	7.1x	6.2x	5.4x	1.2%	1.2%	1.3%
Itron Inc	US4657411066	3.4%	23.4x	20.4x	19.6x	17.1x	16.5x	15.0x	4.0x	3.4x	2.9x	0.0%	n.m.	n.m.
Legrand SA	FR0010307819	5.3%	30.4x	25.1x	23.1x	19.3x	16.7x	15.6x	5.1x	4.2x	3.9x	1.5%	1.8%	2.0%
Prysmian SpA	IT0004176001	4.1%	26.5x	20.3x	17.0x	16.3x	11.7x	10.6x	4.8x	3.5x	3.1x	1.0%	1.2%	1.4%
Schneider Electric SE	FR0000121972	4.1%	29.0x	23.8x	21.1x	17.6x	15.7x	14.3x	4.5x	3.9x	3.6x	1.7%	2.0%	2.2%
Infineon Technologies AG	DE0006231004	3.4%	21.4x	24.4x	18.7x	11.2x	11.4x	9.8x	3.0x	2.6x	2.3x	0.9%	1.0%	1.0%
ON Semiconductor Corp	US6821891057	2.3%	12.6x	21.6x	16.9x	8.0x	13.3x	11.5x	2.4x	2.6x	2.5x	0.0%	0.0%	0.0%
NXP Semiconductors NV	NL0009538784	3.2%	20.5x	19.9x	16.6x	14.0x	14.6x	12.8x	6.5x	6.1x	5.4x	1.7%	1.8%	1.9%
Sensata Technologies Holding P	GB00BFMBMT84	2.6%	8.1x	9.7x	9.1x	6.1x	8.8x	8.3x	1.7x	1.6x	1.4x	1.5%	1.5%	1.5%
Canadian Solar Inc	CA1366351098	1.1%	3.8x	n.m.	7.5x	8.3x	8.5x	5.7x	0.2x	0.2x	0.2x	0.0%	0.0%	0.0%
Enphase Energy Inc	US29355A1079	0.8%	37.9x	14.1x	14.5x	23.1x	11.7x	11.8x	6.0x	5.2x	4.1x	0.0%	0.0%	0.0%
First Solar Inc	US3364331070	3.1%	15.4x	12.7x	8.4x	10.7x	9.1x	6.4x	2.6x	2.2x	1.8x	0.0%	0.0%	0.0%
Xinyi Solar Holdings Ltd	KYG9829N1025	1.7%	23.0x	25.4x	13.5x	9.9x	12.1x	9.1x	1.0x	1.0x	1.0x	3.0%	1.6%	2.8%
Vestas Wind Systems A/S	DK0061539921	1.9%	41.0x	23.3x	16.2x	11.7x	8.4x	6.9x	5.5x	4.3x	3.2x	3.0%	1.1%	1.7%
		50.3%												
Cash	Cash	**1.3%**												

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.

OUTLOOK - sustainable energy & the energy transition

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 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.

Policy support for decarbonisation

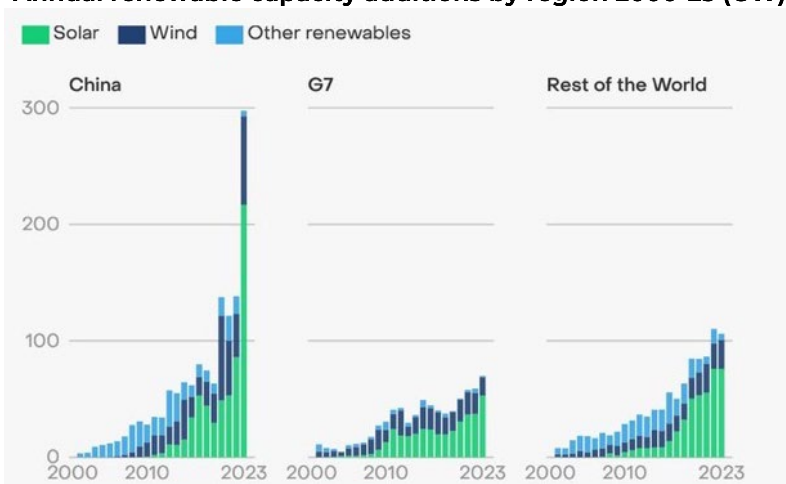
Sustainable energy policy in the **United States** has been dominated by the re-election of Donald Trump. His term will be a backward step for the energy transition and will bring a shift in US energy policy as he targets reduced energy costs, "energy dominance", and improved competitiveness for US industry via the removal of environmental regulations. The Inflation Reduction Act (IRA) – the key Democrat-led legislation providing $369bn of tax credits for clean energy investment – has been partially unwound as part of the President's plans to raise funds to support tax cuts elsewhere.

Trump's One Big Beautiful Bill eliminates electric vehicle and residential solar tax credits and speeds up the phasing out of utility solar and wind ITC and PTC tax credits, relative to initial IRA timelines. On the positive side, manufacturing tax credits for battery and solar equipment will last until 2032 (beyond previous expectations) with wind credits set to end in 2027. While the new bill is less favourable for clean energy, its passing will provide project developers with the certainty needed to plan and proceed. Our dialogue with OEMs and developers indicate that the planning scenario for many following the Trump election was for a full repeal of the IRA and that little activity would occur whilst the bill was under consideration. With this hurdle now cleared, we expect to see a resumption of activity in the US, from what we see as an encouraging base level of activity, unabated by recent policy headwinds.

Other areas of focus for Trump have included a broader reach of the Foreign Entity of Concern (FEOC) designation (beyond the electric vehicle industry), a slow down in the awards of new offshore wind permits (since there is federal involvement in offshore wind), a departure from the Paris Agreement, a removal of the liquefied natural gas (LNG) export pause and a roll back of environmental restrictions.

China continued to reap benefits from decades of investment in sustainable energy technologies, building nearly twice as much wind and solar capacity as the rest of the world combined in 2024, delivering the lowest clean energy costs globally (with onshore wind being the cheapest) and supplying over 60% of the world's demand for electric vehicles. We will likely look back and see that China achieved its target of 1,200 GW in wind and solar installations in mid-2024, around six years ahead of schedule. We view China's ability to offer comprehensive, long-term demand-side and supply-side policy support as a key differentiator, allowing it to increasingly dominate the global clean tech environment. We expect this rapid growth to continue as renewable energy (alongside grid modernisation) was again listed among the "strategic industries" whose development is expected to be supported by policymakers.

Annual renewable capacity additions by region 2000-23 (GW)



Source: Ember, 2024

In contrast, there seemed to be little real progress from **Europe** around commitment and investment as part of the Net Zero Industrial Act. Amendments to the European Climate Law (which targets net zero greenhouse emissions by 2050) were made to reduce the EU's net greenhouse gas emissions by 90% by 2040 (relative to 1990). This new interim target was designed to accelerate the transition and put the EU on a path towards a healthier and safer future, to avoid wasted investments in fossil fuels, boost the competitiveness of Europe's businesses and to make Europe more resilient.

As has often been the case in Europe, we found the bloc to be 'long' on targets but 'short' on actual support to help establish the supply chains and domestic manufacturing to allow the targets to be achieved. The Green Deal Industrial Plan, the Net Zero Industry Act and Critical Raw Materials Act (all passed in 2023) do not yet appear to be catalysing investment in the EU as little new central funding was announced to support these ambitions. However, we're optimistic that 2025 marks a shift in tone and substance, with the Clean Industrial Deal and Germany's debt brake reform offering substantial funding to enable Europe's green ambitions, unlocking up to €1 trn for broader defense, infrastructure and energy transition projects over the coming decade.

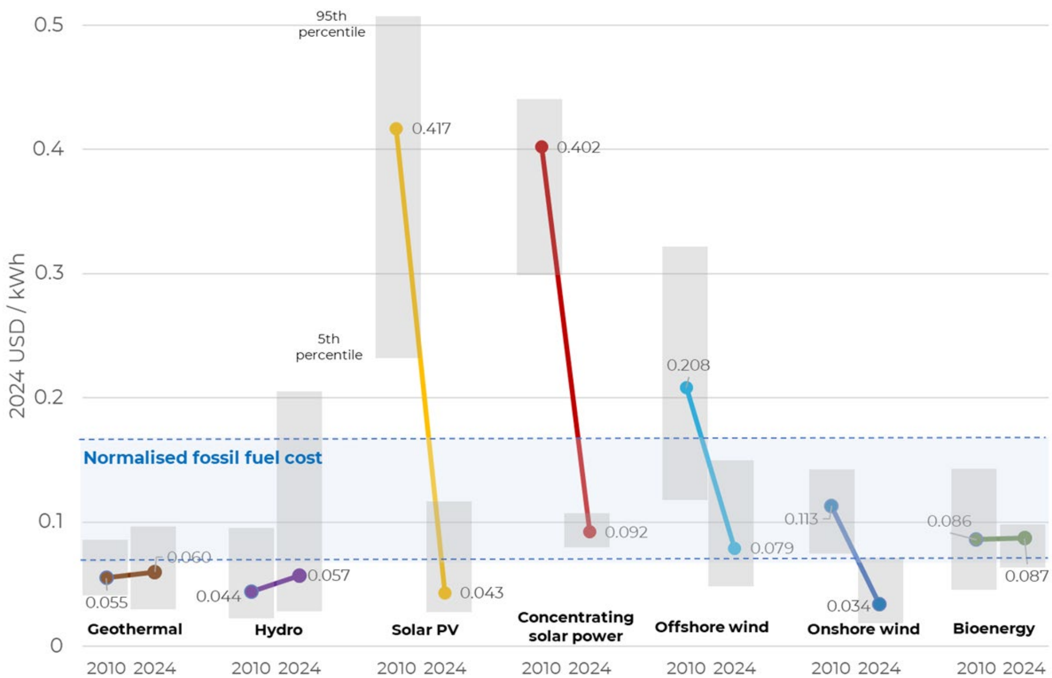
Compared with previous events, **COP 29** in November in Azerbaijan was lightly attended and appeared to do little to progress broader decarbonisation goals. Notable wins included Mexico setting a 2050 net zero target, Indonesia (operator of the fifth largest coal fleet in the world) announcing a 2040 coal phase-out target (16 years earlier than the prior target) and progress was also made towards a global carbon credit platform. The COP was billed in advance as having a particular focus on climate finance, but the ultimate agreement that developed nations pay $300bn per year to developing nations was seen by many as being insufficient.

On a positive note, **global investment in clean technologies** grew, reaching $2 trn in 2024 according to the IEA – almost twice the spend on coal, oil and gas in the year, and up from $1.7 trn in 2023. Higher-than-anticipated borrowing costs have been offset by easing supply chain pressures and falling prices, especially for solar PV and battery technologies. The greater investment means that clean energy is becoming a greater share of global GDP growth (having averaged 10% in 2023) with the number of clean energy jobs growing and accounting for more than half of employment in the global energy sector

Renewable electricity is the cheapest form of new electricity supply in most situations. According to Levelized Cost of Electricity (LCOE) estimates from the International Renewable Energy Agency (IRENA), the cost of wind and solar projects commissioned in 2023 ranged from $0.03-0.11/kWh, well below the fossil fuel cost range of $0.08-0.17/kWh. Despite increases in project financing costs and inflation across the broader economy, the LCOE of solar and onshore wind projects fell by 12% and 3% respectively, vs 2022. This illustrates that renewables remain cost competitive and this keeps the long-term driver of renewables adoption intact.

Global LCOE of newly commissioned utility-scale renewable power generation technologies (2010–2024)

LCOE = levelized cost of electricity



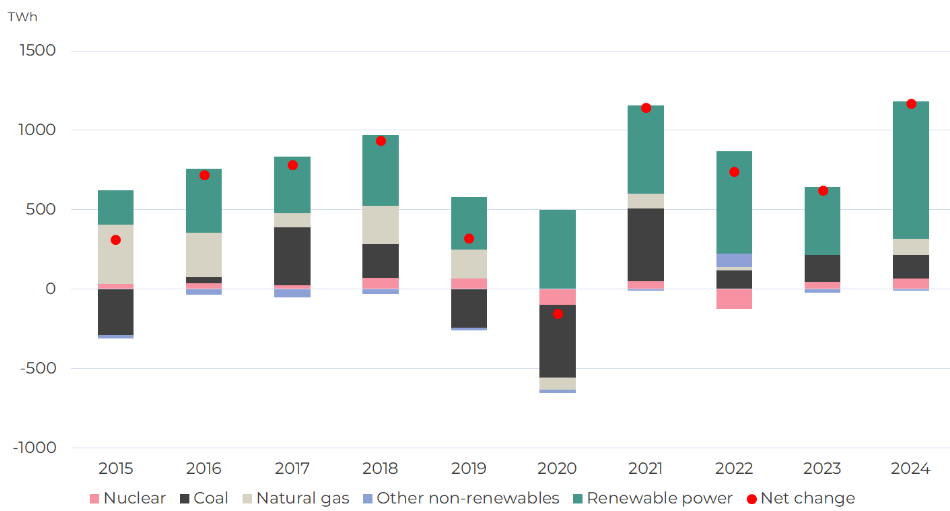
Source: IRENA; Guinness Global Investors, December 2024

Installations and power generation

Around 580 GW of **new renewable generation capacity** was installed in 2024, 100 GW higher than the record installations in 2023 and more than triple the 185 GW installed pre-COVID in 2019. At over 400 GW, solar represented around three quarters of the new capacity additions. Wind came next, at just over 100 GW, followed by hydropower, then bioenergy.

Renewable electricity generation in 2024 increased by 858 TWh (around 10%), reaching over 9,800 TWh and outpacing global electricity demand (1,170 TWh or 4% growth in 2024). Most of the rise in renewable power generation can be attributed to the increase in installed solar and wind capacity, although it was also boosted by a strong recovery in hydro output after drought conditions in various regions the year before.

Change in electricity generation (TWh) 2015-2024E



Sources: IEA; Ember; Guinness Global Investors, September 2025

More than half of the electricity demand growth in 2024 came from five technologies: electric vehicles (EVs), heat pumps, electrolysers, air conditioning and datacentres. The spread of these technologies is accelerating the growth in electricity demand, but overall energy demand is not growing as fast, since electrification is more efficient than fossil fuels.

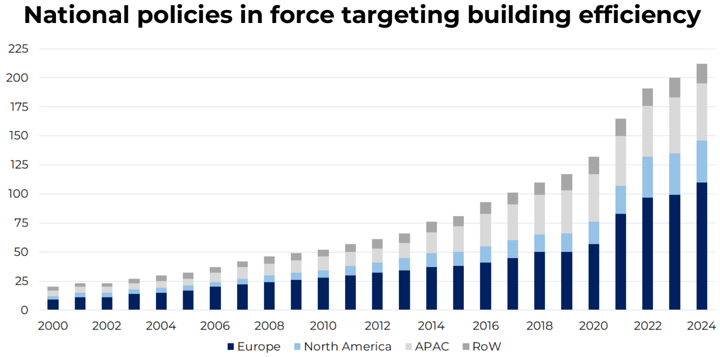
Energy displacement: efficiency and alternative fuels

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 decarbonisation. 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 30 years of around 1% pa. This assumes significant efficiency improvements relative to an historical energy demand growth rate of around 2% pa. Within the energy displacement sector, the key areas of focus are **efficiency** and **alternative fuels**.

Energy efficiency

It is hard to understate the importance of **energy efficiency**. Energy efficiency and energy security raced up the political agenda following the spike in energy prices following the Russian invasion of Ukraine in 2022.

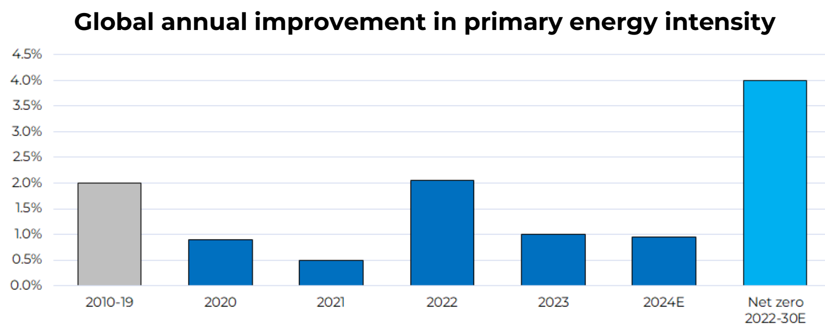


Source: IEA, Guinness Global Investors, December 2024

The increase was most pronounced in Europe, where the REPower EU plan aimed to rapidly reduce dependence on Russian natural gas imports and fast-track the green transition. In 2024, the EU set new goals to achieve 100% zero-emission buildings by 2050, adding to existing targets to install 10 million heat pumps by 2027 and reduce final energy consumption by 13% by 2030.

Elevated energy prices drove three years of double-digit growth in global efficiency spending from 2020 to 2022. Investment then retreated 7% in 2023 as higher interest rates weighed on housebuilders and renovation activity and a 16% decline in Chinese construction significantly impacting the delivery of green buildings globally. In 2024, despite continued headwinds, spending remained resilient, falling just 3% to $270bn, 35-40% higher than 2019 levels.

We believe that Europe's decision to end its reliance on Russian gas is likely to lead to structurally higher natural gas (and therefore electricity) prices in Europe and Asia. Higher energy prices should support efficiency project economics, ultimately providing a tailwind to the COP28 goal to double the global average annual rate of energy efficiency improvements from around 2% to over 4% every year until 2030.



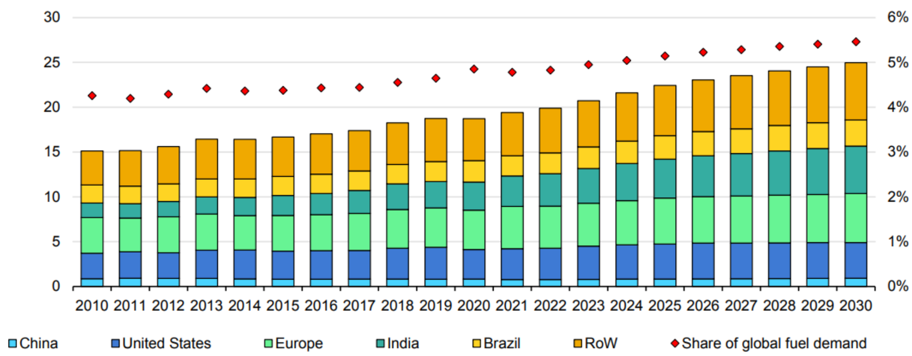
Source: IEA, Guinness Global Investors, December 2024

Alternative Fuels

Alternative (or renewable) fuels are set to play an important role in tackling emissions in carbon-intensive, hard-to-abate sectors. Global demand for these fuels in 2024 was around 21.5 exajoules (EJ) across industry, buildings and transportation, satisfying around 5% of their energy needs. Solid biofuels were the most prominent, making up 75% of alternative fuel consumption globally, followed by liquid biofuels at 20%, and biogas trailing at 5%. Four countries – the United States, India, Brazil, and China – represented over 50% of global demand.

Alternative fuel consumption is expected to grow steadily at around 2.5% per year out to 2030, reaching 25EJ, with over 65% of demand growth coming from India, China, Brazil, the US and Europe. Solid bioenergy contributes over 60% of the total demand growth with liquid biofuels, used predominantly in transportation, representing around 25% of the total growth.

Global renewable fuel demand (EJ)



Source: IEA (incl. estimates), December 2024

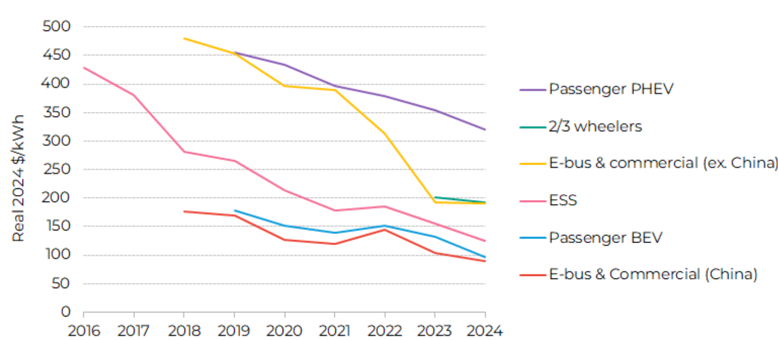
It is important to remember that alternative fuels broadly remain more expensive than their fossil fuel counterparts, meaning that policy support is key to underpinning future growth. For example, the $2/litre cost of producing biojet (often known as Sustainable Aviation Fuel, SAF) is nearly three times as much as the $0.75/litre cost of producing traditional jet fuel. Blending targets will still be needed to encourage the uptake of liquid biofuels while limiting the financial impact to consumers.

Electrification: batteries and electric vehicles

Global **battery demand** reached 1.2TWh in 2024, up 25% year-on-year and up nearly 500% since 2020. Battery prices (across all applications) fell a further 20% to $115/kWh in 2024, due to rapid growth of lower-cost Chinese manufacturing. Assuming a continuation of the 18% historic learning rate, Bloomberg New Energy Finance forecasts battery prices could fall to around $70/kWh by 2030.

The battery market is primarily driven by passenger electric vehicles (EVs), representing 70% of demand, with energy stationary storage (ESS) a distant second at 14%. Looking ahead, we expect passenger vehicles to remain the dominant driver, with emergent demand from commercial vehicles acting as a tailwind, resulting in an average annual growth in battery demand of around 20% per year out to 2030. The price of batteries for EVs fell below $100/kWh for the first time in 2024, driven by economies of scale and an increase in the adoption of lithium iron phosphate (LFP) chemistries. Thanks to its greater stability and lower cost, LFP's share of the global cathode mix has grown from 17% in 2020 to 44% in 2024. China now boasts the lowest battery pack prices globally at $94/kWh, 20-30% lower than the US and Europe, and is the only region to see average prices below $100/kWh.

Historical volume-weighted average pack prices by sector

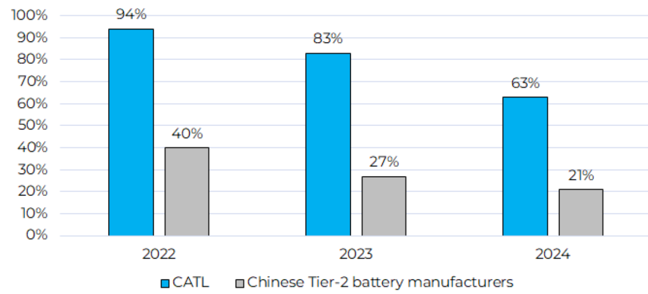


Source: BNEF, Guinness Global Investors, December 2024

Weaker-than-expected EV demand in 2024 led to falling battery manufacturing utilisation rates across the industry, falling as low as 21% for tier 2 manufacturers in China compared to 63% for industry leader CATL. Smaller players facing persistently low utilization and weak profitability are starting to respond by curtailing investment or exiting the industry entirely.

Benchmark Minerals noted that at least 25 gigafactory projects across China and Europe were cancelled or postponed in 2024, leading to downward revisions to long-term supply estimates. With EV penetration due to accelerate across the West in 2025 and 2026, we expect utilization rates at tier 1 manufacturers to inflect positively, helping to boost margins and profitability.

Chinese battery capacity utilization

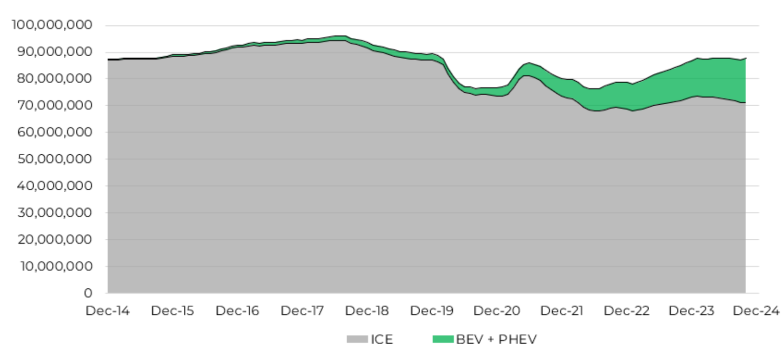


Source: Bernstein, Guinness Global Investors, December 2024

2024 saw rising trade tensions after the Biden administration more than tripled tariffs on Chinese imports of lithium-ion batteries (7.5% to 25%) and quadrupled tariffs on Chinese EVs (25% to 100%) in an attempt to shield domestic manufacturers from China's "unfair economic practices". Since taking office, President Trump has signed a flurry of executive orders, including the revocation of President Biden's 2021 EV targets, and implemented tariffs with key trade partners. Although uncertainty around auto tariffs persists, the announcement of a temporary pause provided markets with some near-term clarity. Subsequently, attention shifted towards the Republican's first budget (the One Big Beautiful Bill) and its implications for the scaling back of the Inflation Reduction Act. As had been widely expected, the revised bill eliminated electric vehicle tax credits post 2025, but crucially, support for battery manufacturing in the US is set to last until 2032, a positive development that was beyond previous expectations.

Electric vehicles continued to gain popularity in 2024, growing 20% year-over-year to 17 million units (a 20% penetration rate). Meanwhile, internal combustion engines (ICEs) continue to lose share, with sales having fallen by around 25% since their peak in 2017.

Rolling 12-month light vehicle sales by drivetrain

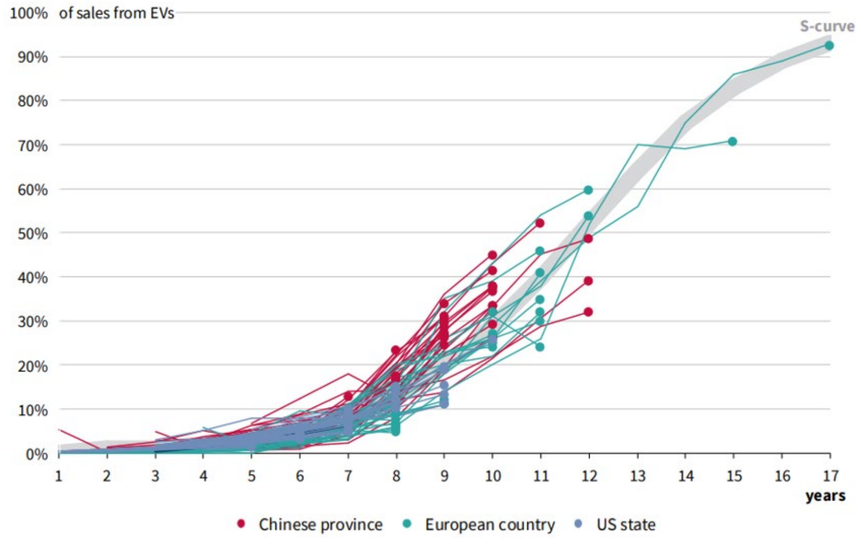


Source: LMC, Cleantechnica, Guinness Global Investors, December 2024

Slowing EV sales growth was largely attributable to higher financing costs, a post-COVID inflationary spike in vehicle prices and a weakening macroeconomic environment. Lower interest rates and cheaper batteries will improve EV affordability and should act as further positive catalysts for the sector.

We take confidence from Norway, which has banned ICE vehicle sales this year after seeing EV penetration rise from just 10% in 2013 to over 90% in 2024. While Norway is a small high-income country, it is interesting that its EV adoption curve is being tracked very closely by China, which achieved EV penetration rates of over 50% in the second half of 2024. Indeed, RMI analysis covering over 110 countries, states, and provinces across Europe, the US, and China found a universal S-curve pattern in EV deployment, with EV sales taking six years to get to 5%, and only another six years to get to 50%. If growth continues along these S-curves, RMI estimates that electric vehicles will make up over 80% of new vehicle sales in China and Europe by 2030 with the United States reaching that level by 2035.

EV share of car sales



Source: RMI, December 2024

Ultimately, we believe EVs will be cheaper to buy, cheaper to run and cheaper to maintain, driving the journey towards 50% global EV sales penetration in 2030 and over 90% sales penetration in 2040. Whilst regulatory and policy-based initiatives have been necessary to grow the EV industry to critical size, EVs can ultimately offer better technology (Chinese battery manufacturers CATL and BYD have both developed batteries capable of offering ~500km range on just a 5-minute charge), better efficiency (EVs convert over 85% of energy stored into motion, compared to less than 40% for ICE vehicles) and better economics (60% of all EVs sold in China in 2023 were cheaper than the ICE equivalent) that will allow them to dominate.

Renewable installations: solar, wind, power grids and nuclear

Solar

Solar deployments grew significantly again in 2024, with global installations of around 600 GW, up around four times (40% per year) since 2020 and nearly double the 22% annual growth achieved between 2014 and 2019. The rapid uptake is undoubtedly due to the vast improvements in both solar technology and solar economics, with module prices continuing to tumble, falling by 90% over the past 10 years to a record low of just 9 cents per watt in 2024. The profitability of module manufacturers suffered as oversupply caused modules prices to fall below the cash cost of manufacturing at times.

Solar continues to become more efficient. Around 20 years ago, solar modules were 5% efficient, 10 years ago they were 15% efficient, current modules are around 25% efficient and current research suggests that we may achieve 50% efficiency over the longer term. This could open the door to solar power costs falling 50-75% to as little as 1-3 cents per kilowatt hour (c/kWh), thereby cementing its position at the bottom of the electricity cost curve.

In 2025, we expect growth across all major geographies to result in full-year global installations of around 670 GW. China will continue to dominate, making up approximately 50% of the global market as it attempts to decarbonize its power grid and achieve peak emissions before 2030. Growth should remain robust in North America driven by hyperscalers looking to lock in solar power purchase agreements which offer zero-carbon electricity with long-term price visibility and one of the fastest times to power. Datacentres also provide a tailwind in Europe, which is expected to grow at a more restrained pace after more than doubling over the previous three years.

Global solar module installations, 2010-2025E (GW)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025E
OECD solar installations (annual)																
North America	1	2	4	6	7	8	15	12	12	15	22	26	26	40	48	53
Germany	7	7	8	3	2	1	1	2	4	4	5	6	7	15	15	16
Spain	0	0	0	0	0	0	0	0	0	5	4	6	9	9	8	9
Rest of Europe	3	4	5	5	5	8	5	7	9	14	15	21	28	46	55	56
Australia	0	1	1	1	1	1	1	1	4	3	4	6	4	6	4	5
South Korea	0	0	0	1	1	1	1	1	2	4	6	4	3	3	3	4
Japan	1	1	2	7	10	11	8	7	7	7	9	6	6	5	4	5
Total OECD	**17**	**23**	**24**	**24**	**25**	**31**	**32**	**31**	**39**	**53**	**65**	**75**	**86**	**128**	**141**	**152**
Change	*10*	*7*	*0*	*0*	*2*	*5*	*1*	*0*	*7*	*14*	*12*	*10*	*18*	*42*	*55*	*25*
Non-OECD solar installations (annual)																
China	0	3	3	14	13	19	30	53	44	33	52	69	107	260	309	330
India	0	0	1	1	1	2	5	10	11	11	4	13	19	14	27	29
Rest of non-OECD	1	3	3	4	6	4	8	7	12	21	29	26	40	42	123	156
Total Non-OECD	**2**	**5**	**8**	**18**	**21**	**27**	**46**	**72**	**67**	**65**	**85**	**107**	**172**	**316**	**458**	**515**
Change	*1*	*3*	*2*	*11*	*2*	*6*	*19*	*26*	*-5*	*-2*	*20*	*22*	*58*	*144*	*286*	*198*
Total solar installations (annual)	**19**	**29**	**31**	**42**	**46**	**56**	**75**	**101**	**106**	**118**	**150**	**182**	**252**	**444**	**599**	**667**
Change	*11*	*10*	*2*	*11*	*4*	*10*	*19*	*26*	*5*	*12*	*32*	*32*	*76*	*192*	*347*	*223*

Source: BP, BloombergNEF, PV InfoLink, IEA and Guinness Global Investors estimates, December 2024

Thinking longer-term, solar power sits at the bottom end of the power generation cost curve, and significant increases in solar power generation are inevitable and necessary in a low-carbon energy system. Record-low module prices will only improve the volume outlook and the down cycle in pricing will end, providing opportunities for manufacturers to regain normalised profitability levels. To offset the intermittency, we will need to see solar & storage projects being more broadly economic in order to displace new build fossil fuel power generation. Storage project costs have dropped by around 90% since 2010 meaning that, over the last couple of years, the cheapest solar & storage projects (LCOEs in the range of 4.6-6.0 c/kWh) are already competitive with the cheapest new gas/coal-fired power projects (LCOEs in the range of 3.9-4.5 c/kWh and 6.8-6.9 c/kWh respectively). Higher-cost projects still require subsidy and incentives but costs are likely to fall.

Wind

Turning to the **wind industry**, manufacturing capacity grew by 21 GW in 2024, vs 12 GW in 2023. Total installations grew to a record 122 GW as manufacturers continued to recover from supply chain bottlenecks, raw material and labour market cost inflation and onerous non-profitable contracts that were priced before inflationary conditions hit in 2021. Wind operators also saw greater stabilisation in 2024 with no new significant project cancellations as the interest rate easing cycle started to improve project economics. In addition, power purchase agreements (PPAs) for wind reached record highs in the US ($68/MWh in Q4 2024 according to Levelten) and remain near all-time highs in Europe (€90/MWh). This sustained pricing, as interest rates started to decline, shored up new project economics and provided much-needed certainty to operators who have sat on the sidelines for the last two or three years.

Looking into 2025, we estimate a record level around 145 GW of new installations, an increase of around 21 GW versus 2024. Encouragingly, well over half of that increase is ex-China, suggesting a material ramp in growth in the sector in the key North American and European regions.

Global wind installations, 2010-2025E (GW)

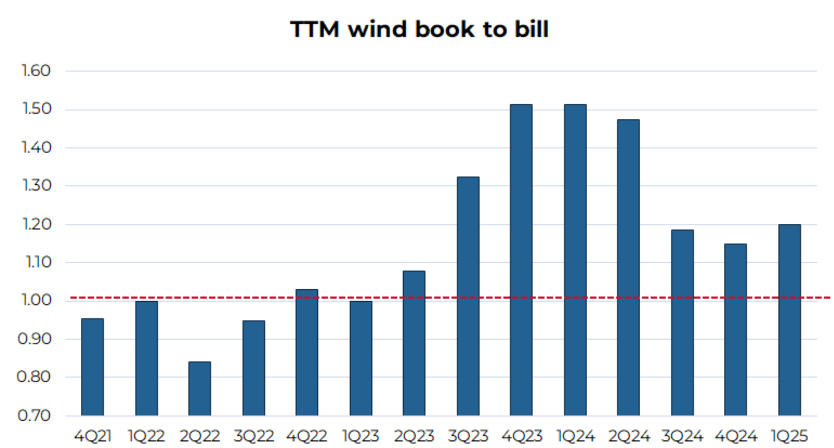
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025E
Onshore wind installations (annual)																
North America	6	8	15	2	7	10	9	8	8	10	17	14	10	8	8	10
Latin America	0	0	0	0	5	3	3	3	4	3	3	6	4	6	6	4
Europe	9	10	12	11	11	11	12	13	8	9	14	14	15	16	11	18
China	17	18	14	15	21	29	22	17	19	26	54	42	44	54	77	81
India	1	1	2	2	2	3	4	4	2	2	1	2	2	3	3	5
RoW	3	4	4	3	4	5	5	5	4	4	4	8	5	4	5	8
Total onshore	**35**	**40**	**46**	**33**	**49**	**61**	**55**	**49**	**46**	**55**	**93**	**84**	**79**	**91**	**110**	**126**
Change	*-3*	*5*	*6*	*-14*	*17*	*11*	*-6*	*-6*	*-3*	*9*	*38*	*-9*	*-5*	*12*	*19*	*16*
World ex China	*18*	*22*	*32*	*18*	*29*	*32*	*33*	*32*	*27*	*29*	*40*	*43*	*36*	*38*	*33*	*45*
Offshore wind installations (annual)																
China	0	0	0	0	0	1	1	1	2	3	4	14	5	8	7	12
UK	1	0	1	1	0	1	0	1	2	2	1	1	3	1	0	3
Germany	0	0	0	0	0	2	0	2	0	2	0	1	0	1	1	1
RoW	0	0	0	1	0	0	0	1	0	1	2	1	1	2	6	3
Total offshore	**1**	**0**	**2**	**2**	**1**	**4**	**1**	**4**	**4**	**8**	**7**	**17**	**9**	**12**	**14**	**19**
Change	*1*	*-1*	*1*	*1*	*-1*	*4*	*-4*	*3*	*0*	*3*	*-1*	*10*	*-8*	*3*	*2*	*5*
World ex China	1	0	1	2	1	3	0	4	3	5	3	3	4	4	7	6
Total wind installations	**36**	**40**	**48**	**35**	**50**	**65**	**56**	**53**	**50**	**63**	**100**	**101**	**88**	**103**	**124**	**145**
Change	*-2*	*4*	*8*	*-13*	*16*	*15*	*-9*	*-3*	*-2*	*12*	*38*	*1*	*-13*	*15*	*21*	*21*

Source: BP, IEA, BNEF, Guinness Global Investors estimates, December 2024

We see a near 60% increase in installations to around 200 GW by the end of the decade, with onshore growing at 6% pa and offshore growing at 20% pa. The starting point for the industry is healthy, with industry-level book to bill (the ratio of new orders to existing sales) having been comfortably above 1.0x on a trailing 12-month basis for the last eight quarters. This suggests that the industry has a strong pipeline of work.

We finally remain encouraged by the potential of the Offshore sector to drive growth in the wind industry, as we enter the second half of the decade. Within Europe alone, there is c.26 GW of awarded and approved capacity set to come on-stream by 2030, the equivalent of 2-3 years of onshore growth globally. We would expect this to grow and note that there are 9.2 GW of projects tendered offshore France in November 2024 that will soon join this backlog.

Trailing 12-month European wind book to bill



Source: company data, Guinness Global Investors estimates, June 2025

Global power grids

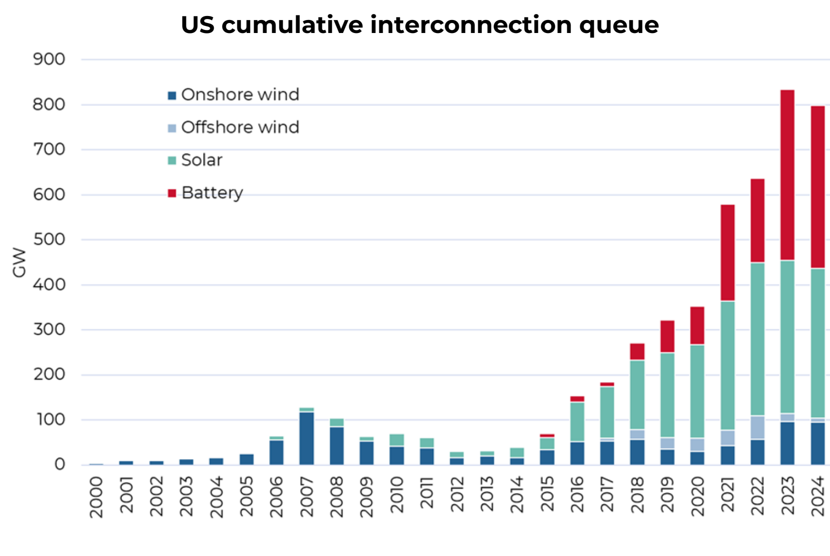
Global power grids will have to be substantially upgraded and extended to cope with higher wind and solar generation as electricity demand inflects upwards. This includes high-voltage transmission (covering large distances), medium-voltage distribution (covering shorter distances) and low-voltage equipment (used within buildings). Within high and medium-voltage applications, we continue to see strong growth in transmission and distribution (T&D) spending. The Edison Electric Institute calculated US T&D investment at $95bn in 2024, up 9% versus 2023. We expect a healthy outlook for US grid investment, averaging 8-10% growth per year to 2030, as network owners and operators look to replace and upgrade ageing infrastructure (typically 30-50 years old or over), harden the grid against extreme weather and build out new capacity.

After 20 years of flat electricity consumption, we see demand growth of around 2-3% per year due to datacentres, AI querying, reindustrialization and electrification. Political support will be required to make this happen and we stress that the outlook here is very robust despite President Trump's cuts to the IRA. The inflection started in 2024 in the US, but we expect pressure in Europe as well, where – despite the region being 12-24 months behind the US – data centre capacity is still forecast to grow at 20% per year to reach 35 GW in 2030. Three meaningful bottlenecks to this growth exist, relevant both in a US and a global context, and provide opportunities for companies to make superior margins:

- **Labour:** Bernstein estimates that the US will need 50% more linemen by 2035, forecasting a 12,000-worker shortage if the industry continues to grow at its historic rate. Experienced engineers are in short supply.

- **Transformers:** The average US transformer is 35-40 years old and the US imports around 80% of its large transformers. Supply chains are stretched with prices up 60-80% since early 2020 and lead times tripling to c.150 weeks since 2021. Electrical equipment manufacturers, especially US domestic manufacturers, are well placed.

- **Permitting:** The Lawrence Berkley National Laboratory sees the US interconnection queue at its highest level on record, while WoodMac expects that permit applications from as far back as 2020 will not be approved until later this decade. The opportunity for superior margins could last for a few years.



Source: Generation, Lawrence Berkeley National Laboratory, December 2024

These are long-term trends that will require multi-year investment programmes and it is therefore not surprising that **nuclear power** came back into consideration in the US as concerns grew about grid stability. While not necessarily considered to be a 'renewable' power source, and despite its chequered past, nuclear power will play a role in the global energy transition and there is no credible net zero scenario which doesn't forecast growth in 'carbon-free' nuclear. The 2024 nuclear renaissance saw hyperscalers sign deals to restart old reactors, support small modular reactors (SMRs) and invest in start-up companies developing nuclear fusion technologies.

A key focus remains SMRs, which are frequently touted as a solution to provide baseload low-carbon power generation. However, as far as we are aware, only two SMRs are currently in operation globally: one in Russia (in a maritime setup) and the other in China. With limited information about either, the development schedule and the underlying economics of both are unclear. From what we know, we think SMRs in the US will not be cheaper than gas or renewables-based power generation. In late 2023, NuScale cancelled its planned SMR Carbon Free Power Project (CFPP) in Utah as its costs escalated (requiring 9 c/kWh to be economic, after a 3 c/kWh IRA subsidy) and its start date slipped (back to 2029, from an original plan of 2026). While carbon-free baseload power at $9 c/kWh could certainly be considered 'economic', we would expect project delays and cost overruns to take this substantially higher.

So, beyond restarting idled nuclear plants, nuclear power does not appear to be set for meaningful growth. We expect the first power from new SMR facilities to come after 2032, but even then, it is unlikely that SMRs have any meaningful impact until the late 2030s, in our opinion. This leads to a situation where global power grids will need to be extended and strengthened in order to cope with higher levels of variable renewable power.

IMPLICATIONS OF A NET ZERO SCENARIO

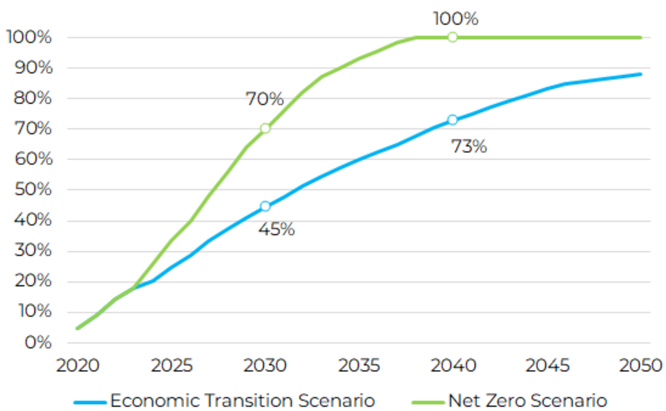
Throughout this document, we refer to our base-case energy transition scenario that reflects our understanding of the industry's current capacity and plans to provide decarbonisation solutions. This scenario is not consistent with net zero and we highlight the following changes across our subsectors that would be required to deliver a net zero transition:

- Within **efficiency**, annual improvements in energy intensity would need to quadruple from 1% in 2024 to average 4% per year out to 2030 globally. For buildings, this translates into efficiency, electrification and end-use investment increasing to around $850bn per year this decade (from $340bn today). For industry, investment must step up from $50bn in 2024 to $125bn per year out to 2030. It is worth noting that our base case scenario already assumes significant energy efficiency gains with world energy demand forecast to grow at 1% per year, half the historic rate of 2% per year.

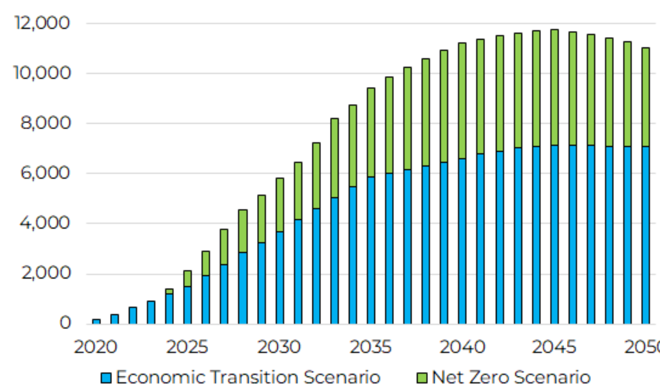
- **Alternative fuel** production growth would need to more than double by 2030 from 2023 levels (implying 11% per year growth) and then double again by 2050. SAF would have to grow from 0.3% of global jet fuel in 2024 to around 10% in 2030 (substantially higher than our base case 2030 estimate of around 2%).

- For **electric vehicles** and **batteries**, BNEF estimate that in a net zero scenario, global EV penetration rates must hit 70% by 2030 with 100% of vehicles sold being electric by 2040 (versus their current 'base case' economic transition estimates of 45% and 73% respectively). This translates into global battery demand of 5.8 TWh in 2030 compared to 1.2 TWh today, almost 60% higher than their base case assumptions, which themselves imply an annual growth rate of 20% per year from current levels.

EV sales penetration forecasts (%)



Lithium-ion battery demand forecasts (GWh)



Source: BNEF, Guinness Global Investors, December 2024

- **Solar** and **wind** generation by 2050 would need to be more than double the levels anticipated under our base case scenario, which already assumes a 4x increase in the wind generation base and a 10x increase in the solar base.

- For **power grids**, net zero would require global grid investment to grow at around 14% per year to the end of the decade, more than doubling from around $370bn today to over $800bn by 2030, 50% higher than our base case estimate.

- Under a net zero scenario, **nuclear** power capacity needs to expand by around 15 GW every year to the end of the decade, reaching 545 GW by 2030. Despite this only constituting 30% growth from current levels, new installations must outpace a wall of retirements from power plants installed in the 1970s and 1980s which are now coming to the end of their useful lives.

- According to McKinsey, annual **investment** on low-emissions technologies would need to increase from about $1.5trn to around $7trn over the next three decades, while annual investment in renewable capacity in 2025-2030 would need to be triple the 2023 levels in order to achieve 16%pa renewable growth required near term to achieve a NZE trajectory.

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General Enquiries: 0345 922 0044
E-Mail: wtas-investorservices@waystone.com.

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GUINNESS SUSTAINABLE ENERGY UCITS ETF

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