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SUMMARY

The election of Donald Trump, slower-than-expected interest rate reductions and low-cost Chinese competition drove sentiment and earnings for sustainable energy lower in 2024. The solar, wind, battery and EV industries all reached record deployment levels, as did global clean energy investment, while a rapid uptake in AI querying and data centre demand promises more pressure on global power grids and power generation. Renewables remain at the bottom of the cost curve and we expect investment to grow, helping sentiment to recover, and for 2024 to be seen as a cyclical low. A high level of M&A in 2024 shows that there is value in the long-term growth opportunity. Our portfolio, which offers broad exposure to companies that are well placed to benefit from the energy transition, now trades at a 26% one-year forward discount to the MSCI World Index despite offering greater earnings growth potential.

Sentiment towards sustainable energy globally, especially in the **United States**, was dominated by the US election cycle in 2024. The outcome was a backward step for the energy transition, and uncertainty persists in early 2025 around President-elect Trump's plans to unwind components of the Inflation Reduction Act. As a result, IRA-led investment was less than expected, but Republican desire to retain the manufacturing jobs and investment associated with it appears strong.

In contrast, **China** reaped benefits in 2024 from decades of investment in sustainable energy technologies, building nearly twice as much wind and solar capacity as the rest of the world combined, delivering the lowest clean energy costs globally and manufacturing over 60% of the world's electric vehicles. Despite rapid renewables growth, Chinese added around 80 GW of new coal-fired power capacity in 2024. In contrast, there seemed to be little real progress from **Europe** around commitment and investment as part of the Net Zero Industrial Act while COP29 passed with less progress than hoped.

Global **investment** in clean technologies grew and is likely to have hit nearly \$2trn in 2024 (up from \$1.7trn in 2023, almost twice the spend on coal, oil and gas in the year) reflecting that fact that renewable electricity is the cheapest form of new electricity supply in most situations. This came despite the broader macro-economic backdrop being less supportive than initially expected, with only three US interest rate cuts in the year. Despite this, there was a clear trend of **M&A activity** in the sustainable energy space which suggests that acquirers, especially privately owned and private equity companies, see the weakness in the sector as merely a cyclical slowdown, meaning that public market business valuations are attractive.

Around 690 GW of new **renewable generation capacity** was installed in 2024, 170 GW higher than the record installations seen in 2023 and more than triple the 194 GW installed pre-COVID in 2019. Solar was dominant (at around 460 GW) with wind in second place (around 110 GW) followed by hydropower, then bioenergy. A rebound in hydro meant that renewable electricity generation in 2024 increased around 13%, outpacing global electricity demand (estimated 3% growth in 2024). Lower energy prices reduced the desire for efficiency, with investment in energy efficiency falling by around 3%.

Electric vehicles (EVs) saw continued adoption in 2024. After growing at over 50% and 35% in 2022 and 2023, sales of plug-in vehicles grew by around 20% to around 17 million units, reaching a 20% penetration rate in 2024, one year earlier than our long-held forecast. Global **lithium-ion battery** demand grew by 29% and prices (across all applications) fell a further 20% to \$115/kWh in 2024 due to rapid growth of lower-cost Chinese manufacturing based on lithium iron phosphate chemistry. EV penetration surpassed 50% in China in the second half of the year and 60% of all Chinese EVs were cheaper than their internal combustion engine (ICE) equivalents in 2024. Tariff tensions rose as President Biden more than tripled tariffs on Chinese imports of batteries and EVs.

Solar deployments grew rapidly in 2024, with installations of around 600 GW, up around four times (40% per annum) since 2020. Module costs fell to just 9 cents per watt, below the cash cost of manufacturing, pressuring margins for manufacturers.

The **wind** industry delivered record installations of around 124 GW as manufacturers continued to recover from supply chain bottlenecks as well as raw material and labour cost inflation.

Rapid uptake of AI querying and growth in data centres brought **strong renewable power demand** and put pressure on developed world power grids, causing shortages for key products like transformers. Renewable power prices increased, and we saw a renaissance for nuclear power in the United States.

Against this backdrop, the Guinness Sustainable Energy Fund delivered a total return (USD) of -11.8% in 2024 vs its benchmark the MSCI World Index (net return) of 18.7%. For comparison, the MSCI Alternative Energy Index delivered -32.3% and the iShares Clean Energy ETF delivered -25.7% reflecting the poor sentiment. Recent weakness has led some to view the clean energy equity sector as already discounting the IRA completely; the ICLN index is down 50% since August 2022 (when the Act was passed) with the number of shares outstanding having halved and the price/earnings (P/E) multiple down more than 50%.

At the end of 2024, the Guinness Sustainable Energy Fund traded on a one year forward P/E ratio of 14.1x (a 26% discount to the MSCI World Index at 19.1x) despite three-year forward consensus-derived earnings growth expectations for the fund being greater than the MSCI World Index. Since repositioning six years ago, the fund has delivered **a return in excess of its investment universe**, based on an equal weighted average calculation.

Looking ahead to 2025 and beyond, we expect the following:

President Trump will **struggle to make substantial reforms to the IRA** and will enjoy more success using his executive powers to promote fossil fuels. Republican support for the jobs and investment coming from the Act may restrain Trump's ability to repeal it and the final outcome may be that Trump's election is more positive for fossil fuels, via lower regulation and environmental protection, **than it is negative for clean energy directly**. Expect his focus to be on domestic content requirements for tax credits, Foreign Entity of Concern (FEOC) definitions and subsidies for offshore wind. Greater tariffs on clean energy imports, lower environmental restrictions, greater liquefied natural gas (LNG) exports and the departure of the United States from the Paris Agreement are possible in the short term.

Politics aside, **US electricity demand will continue to surge** due to AI querying, data centres, re-shoring and the broader trend of electrification. Significant grid upgrades, a record interconnection backlog and skilled worker and product shortages will keep this market – which has seen little growth in the last 20 years – very tight, benefiting equipment manufacturers and contractors. New nuclear is unlikely to impact before the mid-2030s, meaning that renewables and gas-fired power generation will be in demand. Globally, renewable power generation is expected to grow 7-8% in 2025.

Clarity from Trump and electricity supply/demand realities will allow the US industry to address its **substantial backlog of IRA-related investments** while Europe likely recoups some investment from the US as a result of the election-related hiatus. In stark contrast, we see further rapid growth in China as renewable energy was again listed among the “strategic industries” whose development is expected to receive long-term support from policymakers. Broadly speaking, investments requiring subsidy or consumer incentivisation will continue to be less well placed as a result of pressured government finances, meaning that economic competitiveness will likely be more important than decarbonisation.

Electric Vehicle sales will grow and likely reach around 20 million in 2025. If current adoption S-curves are followed, EVs will make up over 80% of new vehicle sales in China and Europe by 2030, with the US reaching that level by 2035, as they become cheaper to buy, cheaper to run and cheaper to maintain. Lithium-ion battery prices likely deflate further (down around 5% in 2025) and will reach \$70/kWh in 2030 if historic learning rates hold. Demand growth and increased industry concentration should allow battery manufacturers to increase utilisation and benefit from positive operating leverage.

Solar will remain at the bottom end of the renewable cost curve and installations will grow across all major geographies in 2025, reaching around 670 GW. China will be around half of the market with North America and Europe seeing demand increases due to the desire of hyperscalers for quick-to-market, zero-carbon electricity with long-term price visibility.

Wind installations will reach a record level of around 145 GW, with China being less than half of the market. Faster permitting and raw material cost deflation will support the outlook for growth and margins. Installations will continue to grow to around 200 GW by the end of the decade.

Guinness Sustainable Energy












The energy transition is generally progressing well and the multi-decade positive outlook remains. However, within this secular trend, there are cycles at play, some of which are in an ‘up’ phase (e.g. electrical equipment, building material, grid investment) and some in a ‘down’ phase (e.g. battery/EV supply chain; solar upstream). We are confident in the **structural growth offered by the transition** and believe that the challenged industries are at or close to a cyclical trough.

With the US election behind us, we look to a reduction of financing costs (i.e. interest rate reductions feeding into consumer and project financing) to drive investments into the clean energy sector. Together with growing AI and data centre demand bringing higher renewable power prices, stricter energy efficiency requirements, massive grid upgrade programmes and the implicit operating leverage within our manufacturer investments, we believe that confidence in **portfolio earnings will start to improve** from a low level.

The consensus-derived earnings per share growth outlook for the fund (16.4% per annum for 2024-2027E) sits at a premium of nearly 6% pa vs the MSCI World index. We do not think that the 26% one year forward P/E discount of the fund reflects this earnings scenario but, instead, something that is worse than that implied by current interest rates and inflationary conditions. If valuations do not improve, we would expect to see continued **high levels of M&A activity** in the sector.

As such, investor interest in sustainable energy equities should start to improve from very poor levels as energy security grows in salience and individual, social and government pressure for consumers to become more energy efficient increases. We believe that the Guinness Sustainable Energy portfolio of 30 broadly equally weighted positions, chosen from our universe of around 250 companies, provides concentrated exposure to the theme at attractive valuation levels that are especially attractive relative to consensus earnings growth expectations.

Key themes in the Guinness Sustainable Energy Fund

| Theme | Example holdings | Weighting (%) |
|--|---|---------------|
| 1 Electrification of the energy mix |   | 36.9% |
| 2 Rise of the electric vehicle and auto efficiency |   | 9.8% |
| 3 Power semiconductors |   | 9.8% |
| 4 Battery manufacturing |  | 4.0% |
| 5 Expansion of the wind industry |  | 9.2% |
| 6 Expansion of the solar industry |  | 8.1% |
| 7 Heating, lighting and power efficiency |  | 17.9% |
| 8 Geothermal |  | 3.5% |
| 9 Other (inc cash) | | 0.7% |

Source: Guinness Global Investors (31 Dec 2024)

The Guinness Sustainable Energy 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. Further details on the risk factors are included in the Funds’ documentation, available on our website.

The Funds are 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). The Funds are actively managed and use the MSCI World Index as a comparator benchmark only.

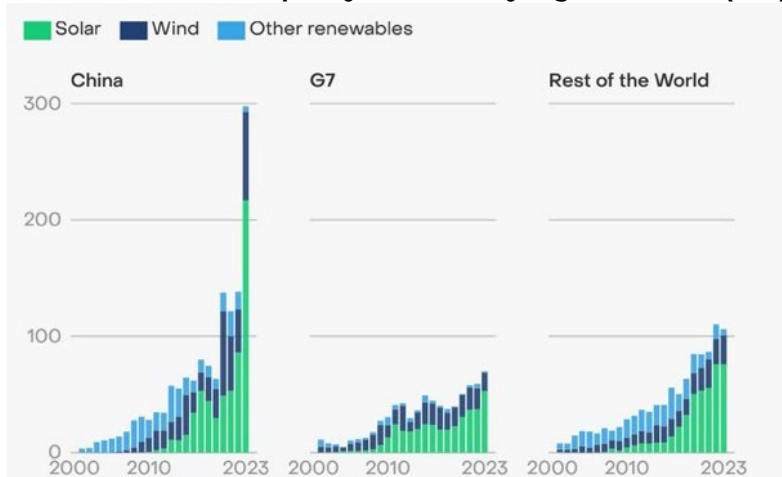
The threat of a second Trump presidency impacted sentiment globally for the sustainable energy industry throughout 2024. However, it is worth remembering that the US represents only c.7% of global solar installations, around 8% of global wind installations and around 11% of global EV sales. This is not to downplay what is an important growing market in the energy transition, but to put it into global context. We would also stress that the majority of tax credits provided by the IRA are helping to accelerate lower-carbon sectors that already compete successfully, on an unsubsidised basis, with fossil fuels. In short, regardless of the election result, the global energy transition continues, as does the US energy transition.

While the uncertainty around Trump's plans will persist in the first half of 2025, we ultimately expect investment under the IRA to pick up once again, since there is a substantial backlog of planned investments. According to the Financial Times, approximately 40% of major manufacturing projects funded by the IRA have been delayed or paused indefinitely in 2024, partly due to electoral uncertainty. Lifting the uncertainty around this investment would have a significant pro-growth multiplier effect on the US economy, and the growth would occur largely in Republican states.

Beyond the IRA, we would stress that the critical issue for the US is the fact that electricity demand is surging as a result of the growth of artificial intelligence querying and data centres as well as the wider trend of electrification. This is a critical energy issue for Trump to deal with if he is to win the 'AI arms race', requiring him to oversee significant grid upgrades and near-term growth in both renewable and natural gas-based power generation. With new nuclear projects likely 10 years away, there is a need for him to clarify his position around manufacturing and tax credits quickly and allow the US clean energy industry to reset and return to an investment mindset. There is an urgency required to resolve these issues, meaning that equipment providers, contractors and renewable power generators are likely well placed to benefit.

In contrast, **China** continued to reap benefits in 2024 from decades of investment in sustainable energy technologies, building nearly twice as much wind and solar capacity as the rest of the world combined, 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.

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



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. As such, China's stimulus announcements in September to bolster domestic production and support profitability gave a further boost to its clean technology industry. In November, the new Energy Law established a comprehensive regulatory framework for the energy sector providing long term clarity and addressing overcapacity in the solar photovoltaic (PV) manufacturing space.

Chinese electricity demand growth was likely around 7% in 2024, forcing the government to set more stringent broader energy intensity improvement targets (2.5% for 2024), especially after missing targets in 2023 (delivering only 0.5% vs a target of 2%). Despite its acceleration in renewable power, China still targeted bringing on around 80 GW on new coal-fired generation capacity in 2024. As of July 2024, China had 1,161 coal plants, over 50% of the world total, according to Statista.

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. As a sign of the difficulties being faced, Swedish battery manufacturing plant Northvolt filed for Chapter 11 bankruptcy protection in the United States in November after new orders were cancelled, new financing failed and Chinese competition increased.

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.

The **broader macro backdrop** in 2024 proved to be less supportive than initially expected. Predicted interest rate cuts did not occur and the 4.4% yield on 10-year US treasuries at the end of the year ended up being 40 basis points higher than it was at the start of the year, as only three US cuts were delivered (versus six expected at the start of the year). Trump's election has reduced the number of expected US rate cuts in 2025, with only 1-2 more cuts of 25bps expected by the end of 2025. Inflation trended the right way, but service costs remained higher than hoped, leading to some stickiness and continued raw material cost issues for many manufacturers.

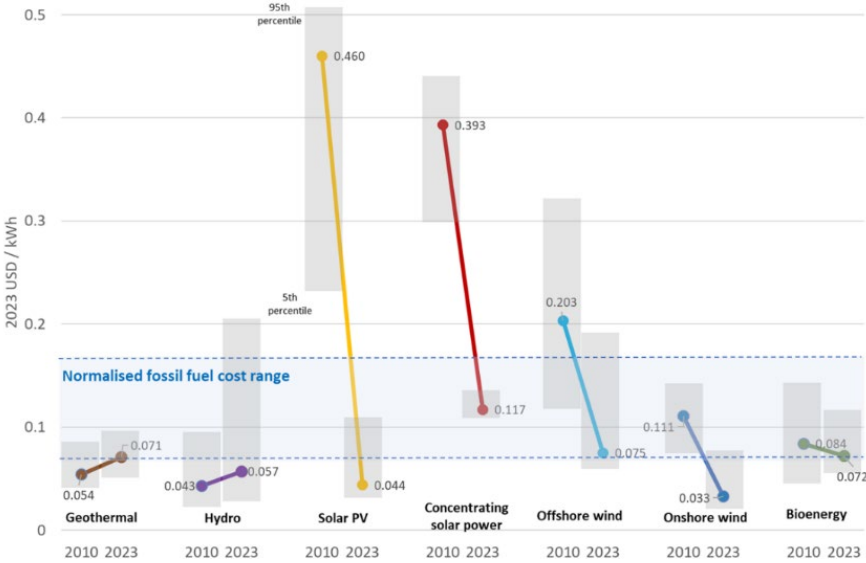
Against these near-term policy and macro pressures, there was a clear trend of **M&A activity** in the sustainable energy space suggesting that acquirers (predominantly private companies and private equity investors) see the weakness as merely a cyclical slowdown, with public market business valuations being attractive. In the fourth quarter, global miner Rio Tinto acquired Arcadium Lithium for a 90% premium in a deal worth \$6.7bn and KKR announced the intention to purchase a 25% stake in Eni's biofuel unit, Enilive, at a valuation of c.\$13bn, well above market expectations. TotalEnergies acquired German renewable developer VSB Group for c.€1.6bn, EQT and GIC announced that they would acquire a joint stake in Calisen (a UK smart metering company) in a deal that values the company at approximately £4bn, and Equinor purchased a c.10% stake in offshore wind developer Orsted, for c.\$2.5bn. These deals follow previously announced takeovers in the sustainable energy space in the year, including KKR's bid for Encavis, EQT acquiring OX2, and Brookfield's recent offer for Neoen.

On a similar positive note, **global investment in clean technologies** grew and is likely to have hit nearly \$2trn in 2024 according to the IEA – almost twice the spend on coal, oil and gas in the year, and up from \$1.7trn 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 (most recent data) 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 (2010–2023)

LCOE = levelized cost of electricity

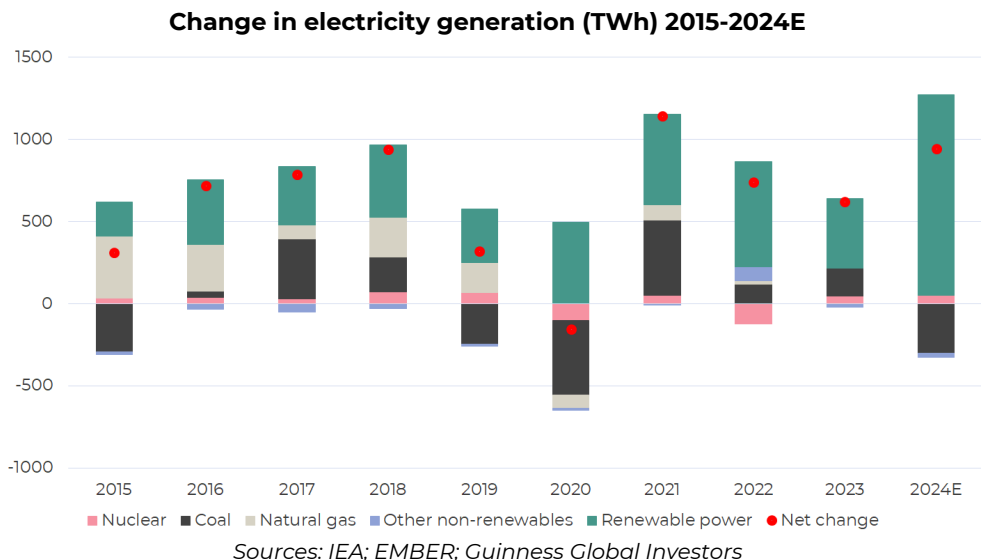


Source: IRENA; Guinness Global Investors, December 2024

RENEWABLE INSTALLATIONS and POWER GENERATION

Around 690 GW of **new renewable generation capacity** was installed in 2024, 170 GW higher than the record installations in 2023 and more than triple the 194 GW installed pre-COVID in 2019. At around 460 GW, solar represented around three quarters of the new capacity additions. Wind came next, at around 110 GW, followed by hydropower, then bioenergy.

Renewable electricity generation in 2024 is likely to have increased by 1,300 TWh (around 13%), reaching over 10,600 TWh and outpacing global electricity demand (estimated 970 TWh or 3% 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. The growth in renewable power generation implies a 2% fall in global fossil fuel generation (-330 TWh). At the end of 2024, nearly 700 million people in the world were estimated to have no access to electricity at all.

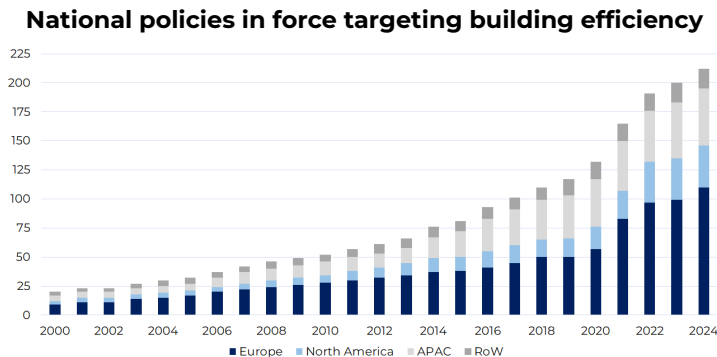


More than half of the electricity demand growth in 2024 came from five technologies: electric vehicles (EVs), heat pumps, electrolysers, air conditioning and data centres. The spread of these technologies is accelerating the growth in electricity demand, but overall energy demand is not growing as fast,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

Fossil fuel emissions in the power sector are forecast to have fallen around 3% in 2024, led by a resurgent hydro sector reducing the need for coal burn. Looking into 2025, renewable power is expected to grow at around 7-8%, further displacing coal and gas power, which would result in another year of the electricity sector's CO2 emissions declining.

ENERGY DISPLACEMENT: EFFICIENCY and ALTERNATIVE FUELS

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. This resulted in a 60% increase in building efficiency standards globally between 2020 and 2024.

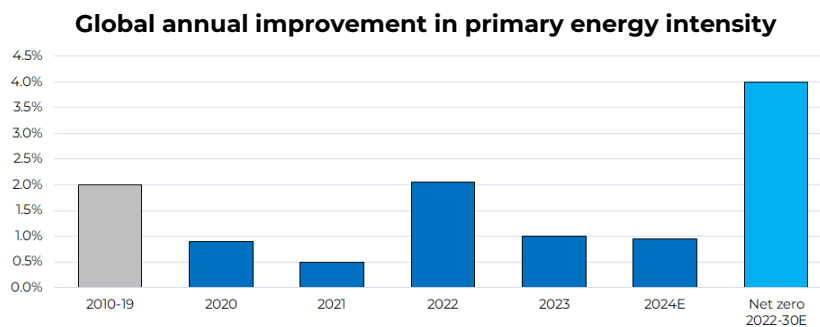


Source: IEA, Guinness Global Investors, December 2024

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.

In the near term, 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 is expected to remain 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

In the context of an improvement of around 1% in 2023 and 2024, we are cognizant of the scale of this challenge. However, 2025 represents the 10-year anniversary of the signing of the Paris Agreement, requiring governments to update their quinquennial Nationally Determined Contributions (NDCs). Whereas renewable energy deployments have played a starring role in climate efforts over the past decade, we would argue that the greater awareness offered to efficiency at COP28 could make it more prominent in international climate efforts over the next decade.

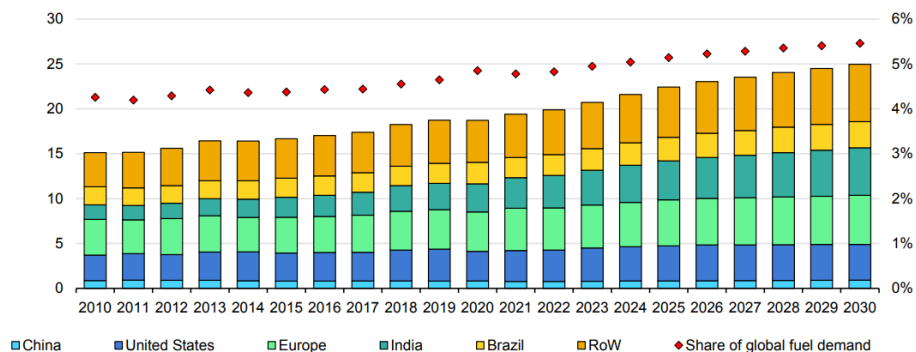
Alternative (or renewable) fuels are set to play an important role in tackling emissions in carbon-intensive, hard-to-abate sectors. Global demand for these fuels in 2024 was around 21.5 exajoules (EJ) across industry, buildings and transportation,

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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

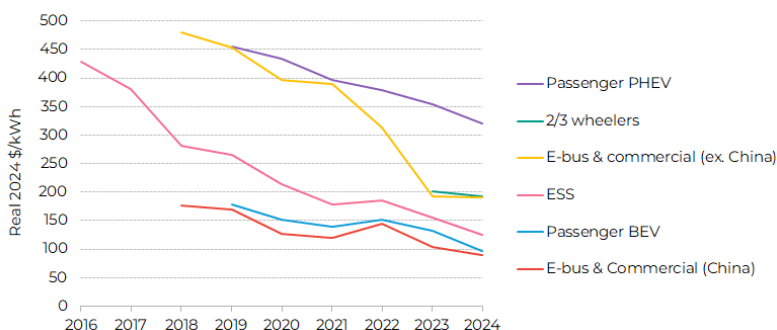
It is important to remember that alternative fuels broadly remain more expensive than their fossil fuel counterparts, meaning that policy support is key to underpinning future growth. For example, the \$2/litre cost of producing biojet (often known as Sustainable Aviation Fuel, SAF) is nearly three times 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** is expected to have reached 1.2TWh in 2024, up 29% 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.

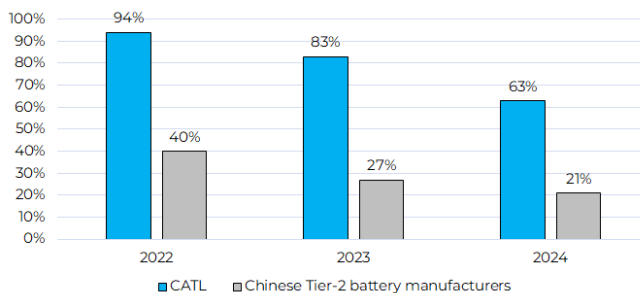
Historical volume-weighted average pack prices by sector



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. Northvolt's bankruptcy served as a fresh reminder of how scale and incumbency act as fierce barriers to entry in this industry, which is why just six companies supply over 80% of EV battery volumes worldwide. 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



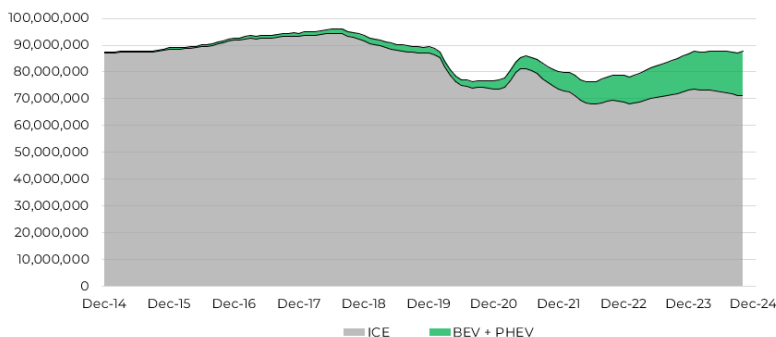
Source: Bernstein, Guinness Global Investors, December 2024

Last year also 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”. With the election of Donald Trump, trade barriers look set to rise further in 2025 and beyond. Given Trump’s hostile stance towards China, we see it as highly likely that the US will incentivise ‘friendly’ countries to bring their technology and build battery manufacturing capacity in the US, presenting an opportunity for Japanese and South Korean manufacturers.

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

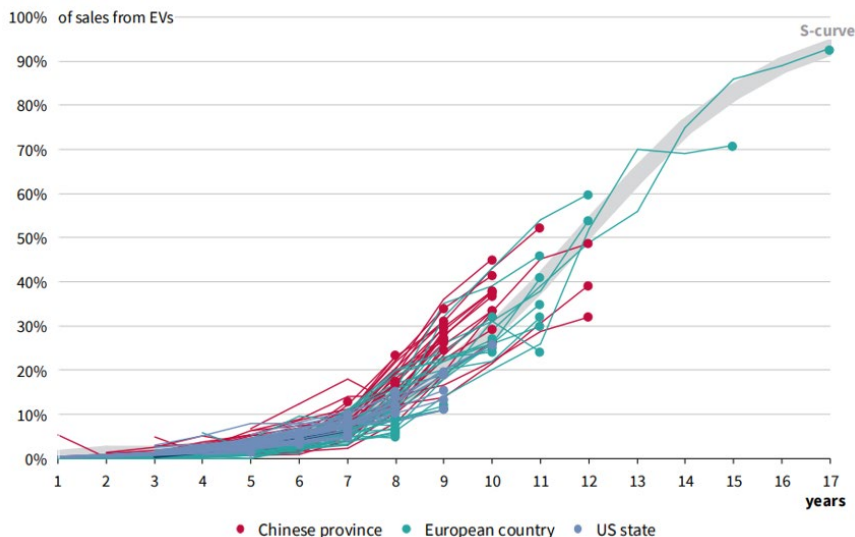


Source: LMC, Cleantechica, Guinness Global Investors, December 2024

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 manufacturer CATL has developed a lithium iron phosphate battery with a 1,000km range), 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 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.

Looking to 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 |
| <i>Change</i> | 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 |
| <i>Change</i> | 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 |
| <i>Change</i> | 11 | 10 | 2 | 11 | 4 | 10 | 19 | 26 | 5 | 12 | 32 | 32 | 76 | 192 | 347 | 223 |

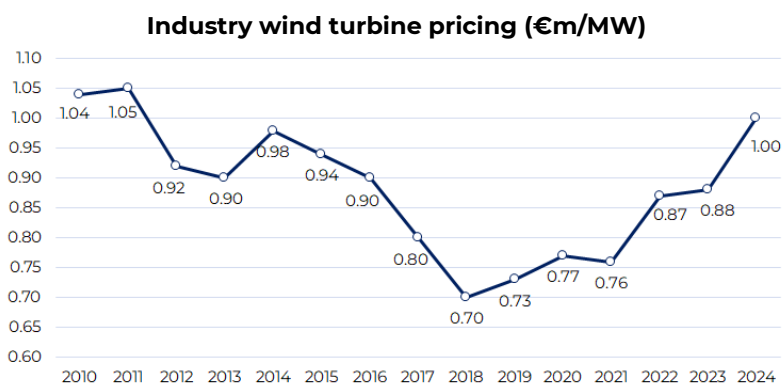
Source: BP, BNEF, PV InfoLink, IEA and Guinness Global Investors estimates, December 2024

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 89% between 2010 and 2023 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.

Turning to the **wind industry**, manufacturing capacity grew by 21 GW in 2024, vs 12 GW in 2023. Total installations grew to a record 124 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 (\$65/MWh in Q3 2024 according to Levelten) and remain near all-time highs in Europe (€89/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.

For wind operators in 2025, we expect faster permitting and development of onshore projects, driven by new European policy. Policies such as the German “Overriding Public Interest” veto on local planning objections has facilitated permitting increases, while the UK’s de-localisation of large wind farm approval (announced in December 2024) and the proposed German Transport Streamlining (to ease the overland transport of large wind turbine blades) should have a meaningful impact on installations in 2025. For wind equipment manufacturers (OEMs) the 2025 outlook for margins is attractive as the pricing of new order intake remains elevated, even as raw materials, namely steel, have broadly dis-inflated in 2024. Further, 2024 saw execution of the bulk of the remaining legacy backlog, meaning that 2025 has potential to deliver a strong inflection in gross margin.



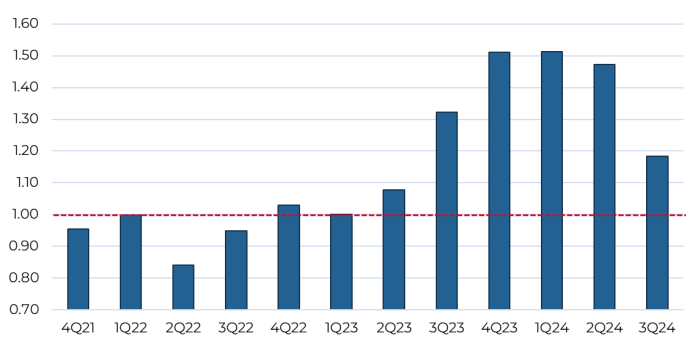
Source: Company data, BNEF, Guinness Global Investors estimates, December 2024

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) at c.1.2x on a trailing 12-month basis as of Q3'24, comfortably above 1.0x. This suggests that the industry has a strong pipeline of work.

Protectionist policy in the US in 2023 promoted the building of a local supply chain for the OEMs and installation companies while protectionism in Europe in 2024 gives us further encouragement, particularly in a market more prone to incursion from the Chinese OEMs who have a 30% cost advantage. The EU Commission is currently investigating competitive distortions in the wind industry, with anti-dumping measures a potential antidote, a solution heavily advocated for by the German Economy and Energy Ministry (BMWK).

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



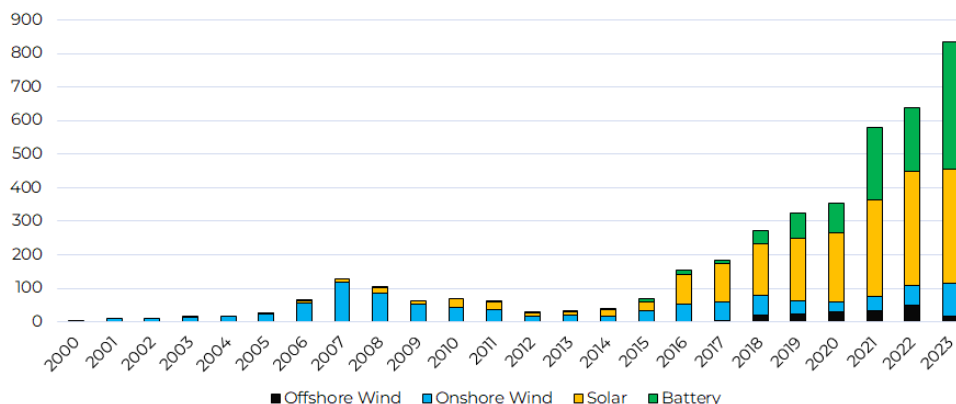
Source: company data, Guinness Global Investors estimates, December 2024

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 data centres, AI querying, reindustrialization and electrification. Political support will be required to make this happen and we stress that the outlook here is very robust regardless of what President-elect Trump achieves with 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 Berkeley 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.

US cumulative interconnection queue



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.

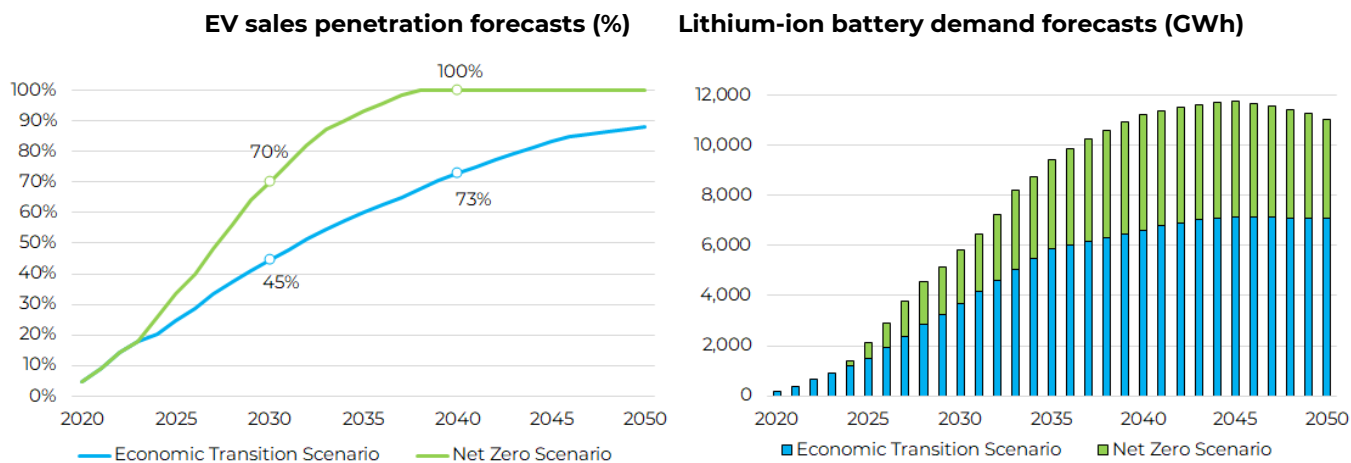
A key focus remains SMRs, which are frequently touted as a solution to provide baseload low-carbon power generation. However, as far as we are aware, only two SMRs are currently in operation globally: one in Russia (in a maritime setup) and the other in China. With limited information about either, the 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.



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.

THE GUINNESS SUSTAINABLE ENERGY FUND

Past performance does not predict future returns.

The Guinness Sustainable Energy Fund delivered a return of -11.8% in 2024, underperforming the MSCI World Index, which finished the year +18.7%, but well ahead of the widely followed iShares Clean Energy ETF (-25.7%) and the MSCI Alternative Energy Index (-32.3%), neither of which is a benchmark of the fund but each a commonly used measure of performance of sustainable energy equities. Within our portfolio, the top contributing segments were our electrical equipment and generation sectors, while underperforming segments included our solar/wind equipment and electrification sectors.

The **electrical equipment** subsector held four of the top five contributors. In 2024, the sector benefited from a growing realisation that investment in power grids is behind where it needs to be, especially in the face of surging growth of data centres and AI querying. Our electrical equipment names Eaton, Hubbell, Schneider and Itron all performed strongly, driven by an acceleration in global electrification activity, the re-industrialisation of the United States and the resolution of supply chain issues which allowed them to pass on inflationary pressures and therefore maintain operating margins. We grew our exposure to this subsector, which saw the best earnings upgrades in the portfolio, with the addition of Siemens mid year.

Trane Technologies was the individual strongest contributor in the portfolio, helped by its positioning with respect to data centres as well as regulatory changes (which increase the need for better HVAC). Elsewhere in the **displacement** subsector, Installed Building Products (IBP) and Owens Corning benefited in the first half of the year on hopes that lower mortgage rates will drive greater housing market activity. At the other end of the spectrum, Nibe shares were under pressure as weak demand meant that the heat pump market remained overstocked at the distributor level as lower-cost Asian competition intensified. We exited the position in Nibe towards the end of the year.

Within the renewable power **generation** sector, we own a number of utilities and independent power producers (IPP) that have seen only small changes to cash returns and earnings forecasts over the year. This sector has a higher interest rate sensitivity due to higher debt burdens, so with the yield on the US 10-year treasury starting the year at c.4% and ending the year at around 4.4%, it is not surprising that the expectations for generation companies have not really changed. Sector contribution was neutral but NextEra bucked this trend, delivering an upbeat Renewables Development Day for investors. Both of our Chinese wind power producers delivered growing volumes and benefited from the market rally in China.

Orsted shares stabilised after management announced a reset to the business in February, cutting the dividend and focussing the company on profitable growth, but its contribution turned negative in the second half. We exited our position in Sunnova, reflecting the company's higher financing costs which has pressured the roll-out of residential solar in the US.

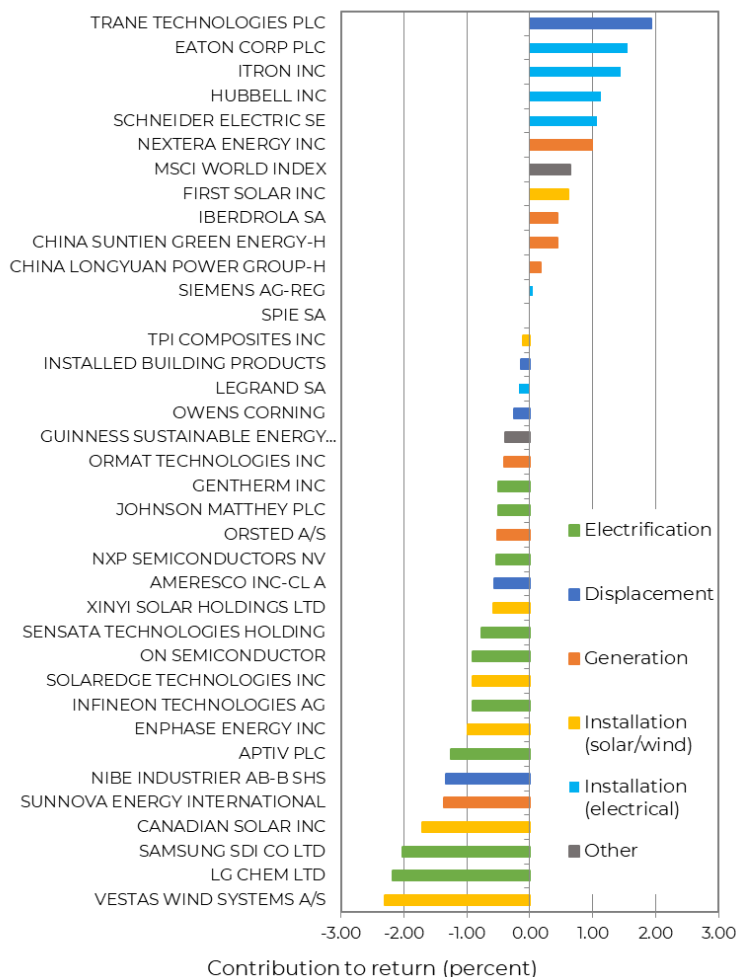
Turning to the more pressured parts of the portfolio, within **electrification** we hold a number of companies that sell components into the EV supply chain and that also have exposure to the ICE vehicle supply chain. Earnings expectations over the last 12 months have soured for all except Aptiv as global auto sales and EV penetration growth have slowed (relative to start of year expectations), EV launch schedules have been delayed, margins have been pressured and Chinese competition has increased. All companies here suffered negative contribution. The slower pace of EV penetration in the US and Europe caused LG Chem and Samsung SDI to be among the largest negative contributors. Both companies are critical to US plans to build large-scale battery plants as part of the EV supply chain but both are operating at below 60% utilisation, which is weighing on operating margins and earnings per share.

Solar and wind installation companies sit at the heart of the energy transition, but in the recent period, our solar and wind equipment manufacturers have seen mixed earnings growth expectations. In solar, the rapid growth of Chinese solar module supply has led to a market share battle among low-cost Chinese polysilicon and module manufacturers. In our portfolio, this has impacted Xinyi Solar (solar glass manufacturer) and Canadian Solar (solar cell and module manufacturer). Calling the cyclical bottom is never easy, but we do note many polysilicon and solar module manufacturers are now selling products below cash cost. In the downstream, solar inverter manufacturers EnPhase and SolarEdge have indicated that the inventory destocking cycle has ended in the United States and is close to ending in Europe. We see that signs of a "bottom to the cycle" are therefore appearing. The sole positive contributor was First Solar, the US's leading domestic module manufacturer. The company is a beneficiary of the IRA and finds its modules in high demand from US utility solar players who are drawn to the security of delivery of its products. First Solar's modules are now sold out until the end of 2027.

Guinness Sustainable Energy

The largest individual negative contributor in the year was Vestas, which announced a negative change to the accounting approach it uses for its service contracts. Beyond this specific accounting issue for Vestas, the wind industry continued to recover from its cyclical trough but negative sentiment around Trump's election caused weakness into the end of the year.

2024 individual stock contribution, in USD



Source: Bloomberg, Guinness Global Investors. Data as of 31.12.2024

The fund slightly outperformed the Guinness sustainable energy universe (on an equally weighted basis) over the year as positive subsector allocation was offset by weaker individual stock selection. Positive attribution from overweight positions in efficiency and electrical equipment companies was offset by negative attribution from our overweight position in solar equipment manufacturers. Underweight positions in battery companies and IPPs were supportive over the year. Individual stock selection within electrical equipment manufacturers, efficiency companies, IPPs and utilities helped to offset weaker stock selection across wind equipment manufacturers, battery companies and EV component companies.

The Guinness Sustainable Energy Fund was repositioned at the start of 2019 and, over the last six years, there has been some substantial volatility across various sustainable energy sectors. Over the entire period, the fund has on average been correctly positioned (overweight or underweight) to all subsectors except wind equipment and other equipment manufacturers. In terms of stock selection, our fundamental value-oriented approach has facilitated good stock selection within the efficiency, EV, IPP, utility and solar equipment subsectors while stock selection has been negative within batteries, wind and other equipment manufacturers. Over the six-year period, the Guinness Sustainable Energy Fund (post fees) has delivered a return that has been in excess of its investment universe, based on an equal weighted average calculation.

Attribution of Guinness Sustainable Energy Fund versus the universe (2019-2024)

| Subsector | Average weight | | | Indicative attribution | |
|-------------------|----------------|-------|-------------|------------------------|-----------------|
| | Universe | Fund | Relative | Sector allocation | Stock selection |
| Alternative Fuel | 3.8% | 0.0% | Underweight | Positive | Neutral |
| Efficiency | 10.1% | 14.3% | Overweight | Positive | Positive |
| Battery | 14.3% | 11.5% | Underweight | Positive | Negative |
| Electric Vehicles | 20.2% | 18.7% | Underweight | Positive | Positive |
| IPP | 16.4% | 13.9% | Underweight | Positive | Positive |
| Utility | 10.7% | 7.7% | Underweight | Positive | Positive |
| Equipment - solar | 8.6% | 15.6% | Overweight | Positive | Positive |
| Equipment - wind | 2.6% | 7.4% | Overweight | Negative | Negative |
| Equipment - other | 13.2% | 11.2% | Underweight | Negative | Negative |

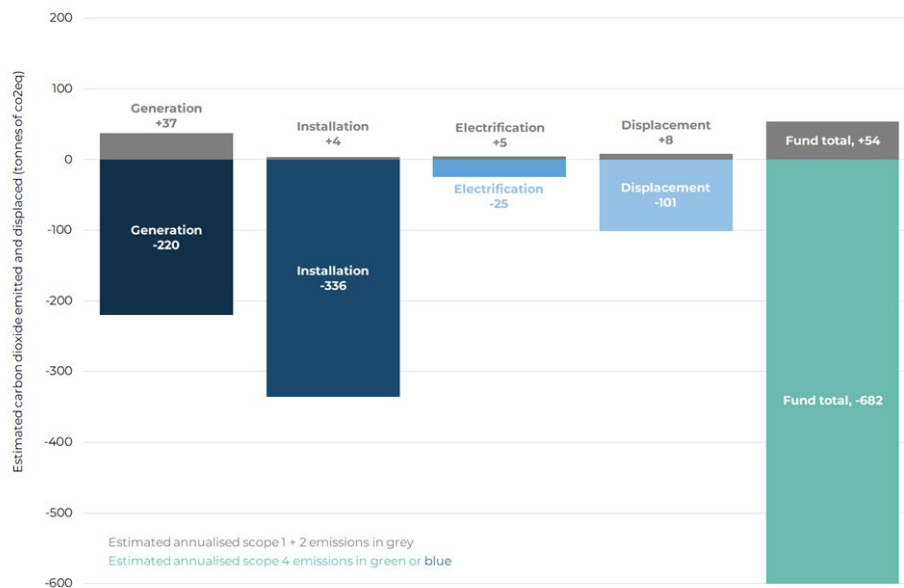
Source: Guinness Global Investors estimates, Bloomberg, December 2024

POSITIVE DECARBONISATION IMPACT OF PORTFOLIO COMPANIES

The Guinness Sustainable Energy Fund invests in companies playing a key role in global decarbonisation, providing a vehicle for investors to align their capital with this positive impact.

In September 2024, we published our latest Impact Report which detailed the positive decarbonising impact of the companies held in the portfolio at the end of 2023 (based on calendar year 2023 data). Our headline finding was that the companies in our portfolio sold products and services that helped to displace 682 tonnes of CO₂e per USD\$1m of portfolio assets. This figure is based on estimates for energy saved, electric miles travelled and clean energy generated compared to the continued use of incumbent fossil fuel technologies. In delivering this positive impact, we estimate that the companies in our portfolio generated an annualised ‘carbon cost’ of around 54 tonnes of CO₂e per USD\$1m of portfolio assets, based on scope 1 and 2 emissions data.

Estimated annualised carbon cost vs carbon displaced (tonnes) per US\$1m of AuM by sector



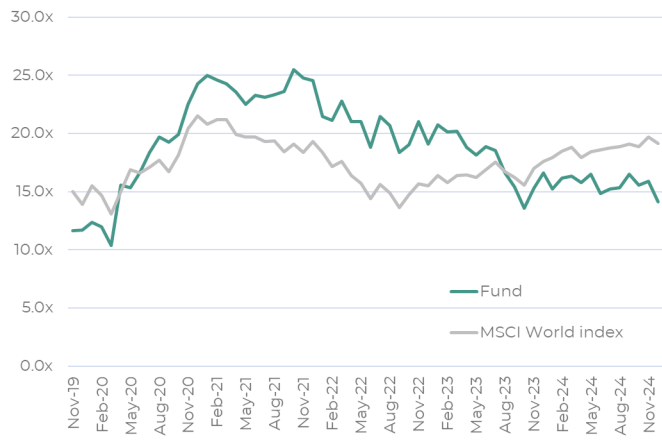
Source: Guinness Global Investors estimates; data as of 31.12.2023

The full Impact Report 2024, which also discusses portfolio alignment with UN Sustainable Development Goals and our engagement activities, can be viewed [here](#).

VALUATION

At 31 December 2024, the Guinness Sustainable Energy Fund traded on a one-year forward price/earnings (P/E) ratio of 14.1x, around 15% lower than the 16.6x one year forward metric at December 2023. In contrast, the 12-month forward P/E of the MSCI World Index has inflated from 17.6x to 19.1x (+9%), leaving the fund at forward P/E discount of 26%, below the trough levels seen in early 2020 and down from 6% at the start of the year. The 'round trip' of absolute and relative valuation multiples is reflective of the cycle that the sector has seen and is reflective of currently very poor sentiment.

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



Guinness Sustainable Energy Fund P/E premium/discount vs MSCI World (1yr fwd)



Source: Bloomberg, Guinness Global Investors estimates, 31.12.2024

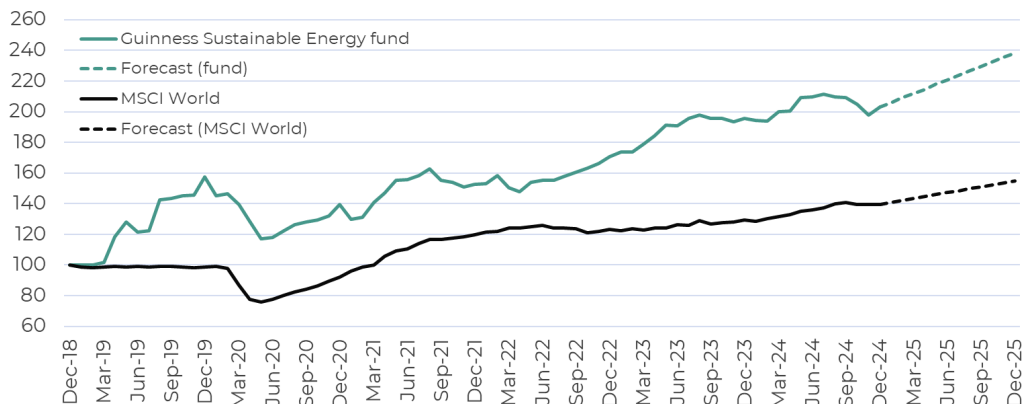
We believe that a continuation of earnings growth (and confidence in earnings growth in excess of the MSCI World Index) should allow the fund's relative P/E to re-rate. Since early 2020, three-year forward consensus-derived earnings growth expectations for the fund have always been greater than those for the MSCI World index. The difference between the current three-year forward earnings per share (EPS) growth for the fund (16.4% per year) and the MSCI World (10.5% per year) is close to historic lows, reflecting the 'wash out' in earnings expectations for various parts of the portfolio.

What should the earnings growth be for our basket of sustainable energy companies? We currently see the normalised earnings growth expectation for our companies at around 12-13% per annum, a level that is maybe twice that of an estimated normalised MSCI World EPS growth of around 6% per year. Since the end of 2018, consensus 12-month forward earnings expectations for the fund have consistently exceeded those of the MSCI World and the long-term trends behind this excess growth remain in place today. The backdrop for further earnings growth versus the MSCI World Index looks robust.

Guinness Sustainable Energy

Progression of 12-month forward consensus earnings expectations

(Rebased to 100 as of December 2018. Forecasts assume current consensus earnings estimates for 2024 and 2025 remain unchanged until end 2025)



Source: Bloomberg, Guinness Global Investors, January 2025

And what is a sensible premium for that earnings growth? Theoretically speaking, the net present value (discounted at 10% over 10 years) of the fund's earnings would be nearly 35% higher than those of the MSCI World in this scenario of 6-7% annual excess growth. Thus, the current 26% P/E discount for 2025, growing to a 30% P/E discount for 2026, looks pretty pessimistic relative to the growth outlook and relative to the fund P/E premium of 10-35% witnessed in 2021-2023.

Guinness Sustainable Energy Fund key financial and valuation metrics

As at 31 December 2024

| | PE | | | EV/EBITDA | | | Dividend Yield | | EPS Growth (%pa) | | CFROI | |
|----------------------------------|-------|-------|-------|-----------|-------|-------|----------------|-------|------------------|---------|-------|-------|
| | 2024E | 2025E | 2026E | 2024E | 2025E | 2026E | 2025E | 2026E | 2019-24 | 2024-27 | 2024E | 2025E |
| Guinness Sustainable Energy Fund | 16.9x | 14.1x | 12.0x | 10.8x | 9.3x | 8.0x | 1.9% | 2.2% | 6.3% | 16.4% | 7.4% | 9.7% |
| MSCI World Index | 20.9x | 19.1x | 17.2x | 14.3x | 12.8x | 11.3x | 1.9% | 2.0% | 6.6% | 10.5% | 9.3% | 9.9% |
| Fund Premium/(Discount) | -19% | -26% | -30% | -24% | -28% | -29% | | | | | | |












*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 Sola

Source: Bloomberg, UBS HOLT, Guinness Global Investors

KEY THEMES IN THE PORTFOLIO

Within the portfolio, the weighting to consumption (i.e. the demand side of the energy transition) fell from 43.9% at the end of 2023 to 41.6% at the end of December 2024 while the weighting to renewables (i.e. supply side) grew from 51.9% to 57.7% and cash reduced from 4.2% to 0.7%. We currently reflect the consumption (i.e. displacement and electrification subsectors) and renewables (i.e. installation and generation subsectors) by combining them into the following investment themes:

Key themes in the Guinness Sustainable Energy Fund

| Theme | Example holdings | Weighting (%) |
|--|---|---------------|
| 1 Electrification of the energy mix |   | 36.9% |
| 2 Rise of the electric vehicle and auto efficiency |   | 9.8% |
| 3 Power semiconductors |   | 9.8% |
| 4 Battery manufacturing |  | 4.0% |
| 5 Expansion of the wind industry |  | 9.2% |
| 6 Expansion of the solar industry |  | 8.1% |
| 7 Heating, lighting and power efficiency |  | 17.9% |
| 8 Geothermal |  | 3.5% |
| 9 Other (inc cash) | | 0.7% |

Source: Guinness Global Investors, 31.12.2024

CONCLUSION

The energy transition is generally progressing well and the multi-decade positive outlook remains. However, within this secular trend, there are cycles at play, some of which have been in an ‘up’ phase (e.g. electrical equipment, building materials, grid investment) and some in a ‘down’ phase (e.g. battery/EV supply chain; solar upstream). We are confident in the structural growth offered by both these challenged industries, which appear to be at or close to a cyclical trough.

With the US election behind us, we look to a reduction of financing costs (i.e. interest rate reductions by central governments feeding into consumer and project financing) to drive investments into the clean energy sector. Together with growing AI and data centre demand, stricter energy efficiency requirements, massive grid upgrade programmes and the implicit operating leverage within our manufacturer investments, we think that confidence in portfolio earnings should start to improve. The sector’s depressed valuation levels currently sit very much at odds with this potential earnings outlook.

As such, investor interest in sustainable energy equities should start to improve from very poor levels as energy security grows in salience and individual, social and government pressure for consumers to become more energy efficient increases. We believe that the Guinness Sustainable Energy portfolio of 30 broadly equally weighted positions, chosen from our universe of around 250 companies, provides concentrated exposure to the theme at attractive valuation levels that are especially attractive relative to consensus earnings growth expectations.

Jonathan Waghorn, Will Riley, Jamie Melrose, Jordan Patel and Charlie Hogg

January 2025

PERFORMANCE

Past performance does not predict future returns.

Guinness Sustainable Energy Fund

| Guinness Sustainable Energy Fund | 1 Yr | 3 Yrs | 5 Yrs | 10 Yrs* |
|----------------------------------|--------|--------|--------|---------|
| Fund (Class Y, 0.74%) | -11.8% | -23.1% | 56.3% | 55.7% |
| MSCI World NR Index | 18.7% | 20.3% | 69.8% | 158.1% |
| Out/Underperformance | -30.4% | -43.4% | -13.5% | -102.5% |

| | 2024 | 2023 | 2022 | 2021 | 2020 |
|-----------------------|--------|--------|--------|--------|-------|
| Fund (Class Y, 0.74%) | -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, 0.74%) | 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).

WS Guinness Sustainable Energy Fund

| WS Guinness Sustainable Energy Fund | 1 Yr |
|-------------------------------------|--------|
| Fund (Class Y, 0.67% OCF) | -10.4% |
| MSCI World NR Index | 20.8% |
| Out/Underperformance | -31.2% |

| | 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.

Data as of 31.12.2024. Source: FE fundinfo, bid to bid, total return. 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. Performance returns do not reflect any initial charge; any such charge will also reduce the return.

Guinness Sustainable Energy Fund UCITS ETF

Guinness Global Investors has been the investment manager of the Guinness Sustainable Energy Fund UCITS ETF since July 2024. We will include performance data for this vehicle in due course.

IMPORTANT INFORMATION

Issued by Guinness Global Investors which is a trading name of Guinness Asset Management Limited which is authorised and regulated by the Financial Conduct Authority.

This report is primarily designed to inform you about the Guinness Sustainable Energy Fund and the WS Guinness Sustainable Energy Fund. It may provide information about the Funds' portfolios, including recent activity and performance. It contains facts relating to the equity markets and our own interpretation. Any investment decision should take account of the subjectivity of the comments contained in the report.

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 should not be taken as a recommendation to make an investment in the Funds or to buy or sell individual securities, nor does it constitute an offer for sale. OCFs for all share classes are available on www.guinnessgi.com.

GUINNESS SUSTAINABLE ENERGY FUND

Documentation

The documentation needed to make an investment, including the Prospectus, the Key Investor Information Document (KIID), Key Information Document (KID) and the Application Form, is available in English from www.guinnessgi.com or free of charge from the Manager: Waystone Management Company (IE) Limited 2nd Floor 35 Shelbourne Road, Ballsbridge, Dublin D04 A4E0, Ireland; or the Promoter and Investment Manager: Guinness Asset Management Ltd, 18 Smith Square, London SW1P 3HZ.

Waystone IE is a company incorporated under the laws of Ireland having its registered office at 35 Shelbourne Rd, Ballsbridge, Dublin, D04 A4E0 Ireland, which is authorised by the Central Bank of Ireland, has appointed Guinness Asset Management Ltd as Investment Manager to this fund, and as Manager has the right to terminate the arrangements made for the marketing of funds in accordance with the UCITS Directive.

Investor Rights

A summary of investor rights in English is available here: <https://www.waystone.com/waystone-policies/>

Residency

In countries where the Fund is not registered for sale or in any other circumstances where its distribution is not authorised or is unlawful, the Fund should not be distributed to resident Retail Clients. **NOTE: THIS INVESTMENT IS NOT FOR SALE TO U.S. PERSONS.**

Structure & regulation

The Fund is a sub-fund of Guinness Asset Management Funds PLC (the "Company"), an open-ended umbrella-type investment company, incorporated in Ireland and authorised and supervised by the Central Bank of Ireland, which operates under EU legislation. If you are in any doubt about the suitability of investing in this Fund, please consult your investment or other professional adviser.

Switzerland

This is an advertising document. The prospectus and KID for Switzerland, the articles of association, and the annual and semi-annual reports can be obtained free of charge from the representative in Switzerland, REYL & Cie S.A., Rue du Rhône 4, 1204 Geneva. The paying agent is Banque Cantonale de Genève, 17 Quai de l'Île, 1204 Geneva.

Singapore

The Fund is not authorised or recognised by the Monetary Authority of Singapore ("MAS") and shares are not allowed to be offered to the retail public. The Fund is registered with the MAS as a Restricted Foreign Scheme. Shares of the Fund may only be offered to institutional and accredited investors (as defined in the Securities and Futures Act (Cap.289)) ("SFA") and this material is limited to the investors in those categories.

Australia

For professional investors only.

WS GUINNESS SUSTAINABLE ENERGY FUND

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.waystone.com/our-funds/waystone-fund-services-uk-limited/ or free of charge from Waystone Management (UK) Limited, PO Box 389, Darlington DL1 9UF.

General Enquiries: 0345 922 0044

E-Mail: iwtas-investorservices@waystone.com.

Waystone Fund Services (UK) Limited is authorised and regulated by the Financial Conduct Authority.

Residency

In countries where the Fund is not registered for sale or in any other circumstances where its distribution is not authorised or is unlawful, the Fund should not be distributed to resident Retail Clients.

Structure & regulation

The Fund is a sub-fund of WS Guinness Investment Funds, an investment company with variable capital incorporated with limited liability and registered by the Financial Conduct Authority.

GUINNESS SUSTAINABLE ENERGY UCITS ETF

Documentation

The documentation needed to make an investment, including the Prospectus, the Key Investor Information Document (KIID), Key Information Document (KID) and the Application Form, is available in English from www.guinnessgi.com, www.hanetf.com or free of charge from the Administrator: J.P Morgan Administration Services (Ireland) Limited, 200 Capital Dock, 79 Sir John Rogerson's Quay, Dublin 2 DO2 F985; or the Investment Manager: Guinness Asset Management Ltd, 18 Smith Square, London SW1P 3HZ.

Residency

In countries where the Fund is not registered for sale or in any other circumstances where its distribution is not authorised or is unlawful, the Fund should not be distributed to resident Retail Clients. **NOTE: THIS INVESTMENT IS NOT FOR SALE TO U.S. PERSONS.**

Structure & regulation

The Fund is a sub-fund of HANetf ICAV, an Irish collective asset management vehicle umbrella fund with segregated liability between sub-funds which is registered in Ireland by the Central Bank of and authorised under the UCITS Regulations.

Telephone calls will be recorded and monitored.