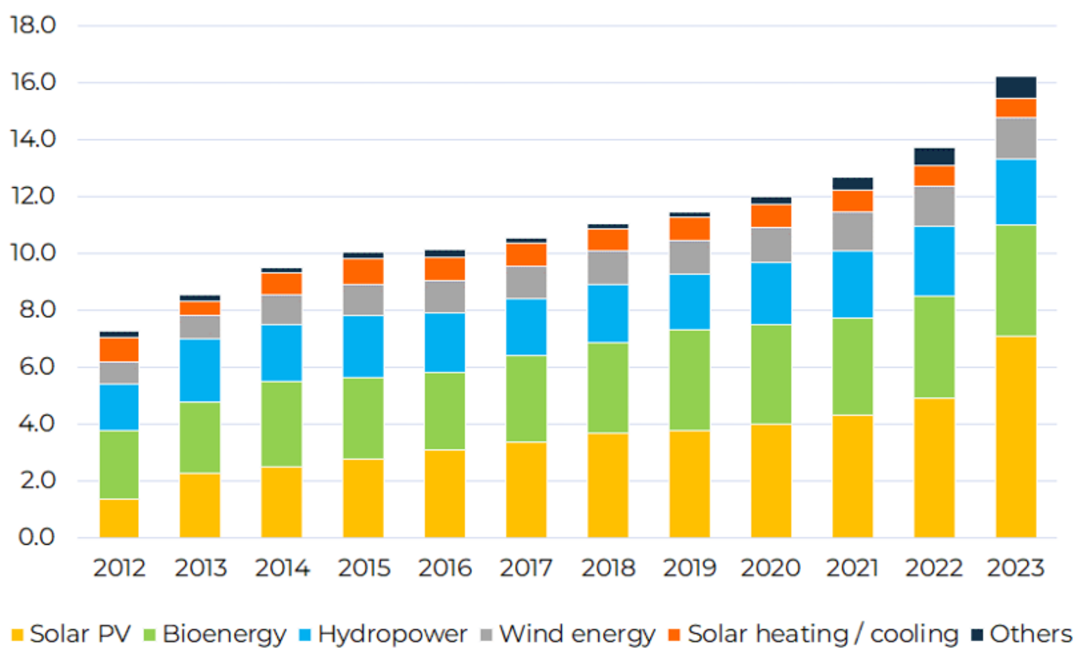
Chart of the Month: Clean Energy Employment

According to the 2024 edition of the International Renewable Energy Agency's (IRENA) Renewable Energy and Jobs report, 16.2 million people are employed directly and indirectly by the renewable energy industry worldwide, up 18% year on year from 13.7m in 2022. This underscores the growing role that clean technologies are playing in the global economy.

Global Renewable Energy Employment (million jobs)



Source: IRENA, Data as of September 2024.

News

- The levelized cost of electricity (LCOE) for onshore wind and solar photovoltaics (PV) fell to a record low in 2023 according to IRENA, down 12% and 3% respectively versus 2022 levels. Over the longer term, that decline has been even more dramatic, with the LCOE for solar having fallen by 90% since 2010 and onshore wind having fallen by 70%. For context, at current levels the agency believes these technologies are 56-67% cheaper than fossil fuel generation. We believe that these superior economics are the reason why renewables accounted for 85% of new power generation capacity in 2023, with 95% of renewable additions coming from solar PV and onshore wind.
- Britain's only remaining coal power plant was shut down in September, ending 140 years of coal-fired generation in the nation that sparked the Industrial Revolution. Even as recently as 1990, coal represented as much as 80% of Britain's electricity needs. However, a combination of government financial support, falling production costs, and technological improvements has seen renewables grow to around 40% of the electricity mix in 2023. The UK is the first G7 country to phase out coal.

- Britain's offshore wind sector got a boost last month from the best-funded renewables auction yet, with Orsted and Iberdrola emerging among the winners. The auction supported a total of 131 wind, solar and tidal projects capable of generating almost 10 gigawatts (GW) of capacity, including over 5GW of offshore wind projects. The auction's budget was the biggest yet at £1.5bn, up 50% year-over-year after last year's auction failed to secure any offshore bids. Germany also enjoyed a record auction for renewables, with the Federal Network Agency reporting that it had awarded almost 3GW of onshore wind energy, the highest volume ever.
- Global electric vehicle (EV) sales continued to grow in September and are now up 21% year to date according to SNE research. Cleantechnica reported that EV sales penetration in China reached 54% in the month of August. Meanwhile in Europe, the German government has agreed to a proposal for tax relief for EVs in order to promote sales, a welcome development as the sudden removal of subsidies in the country has contributed significantly to weaker European sales this year.
- After a period of falling prices and slowing demand growth, we saw signs that the electric vehicle supply chain may be bottoming out. Shares of lithium miners responded positively to news that Chinese battery manufacturer CATL had halted production at its high-cost lithium mine in Jiangxi. It is thought that the stoppage could cut Chinese lithium output by as much as 8%, helping to bring the market back into balance.

Review of Q3 2024

Lower interest rates were a catalyst for stronger sustainable energy performance in Q3 2024 with all sub sectors except electrification (EV related companies) staging a recovery. In this month's report, we review Q3 2024 macro developments and fund contribution.

The Guinness Atkinson Alternative Energy Fund delivered a return of 9.26% during the third quarter of the year, outperforming the MSCI World Index, which finished the period 6.36%. Within the portfolio, our top contributing segments were our electrical equipment, generation, and displacement sectors, while underperforming segments included our wind equipment and EV related sectors.

US treasuries fell from 4.4% to 3.8% over the quarter as cooler-than-expected US inflation data initially raised the hopes of interest rate reductions and ultimately catalyzed the start of an easing process in September. The expectation of easing, combined with a continued positive dynamic around AI and data center-led electricity demand growth, brought positive contribution for all our generation positions. Iberdrola, NextEra and Orsted were among the top five contributors in the fund. We note growing optimism around the long-term outlook for power demand and saw a number of private equity companies bid for various independent power producers (IPPs) over the summer.

As with previous quarters in 2024, the electrical equipment subsector delivered well, and all names were positive contributors in the quarter. Eaton, Hubbell, Schneider and Itron all performed strongly driven by an acceleration in global electrification activity which allowed them to pass on broader supply chain inflation and higher financing costs. They have also benefited from severe product shortages, such as the lack of high-voltage transformers in the US.

Similarly, our displacement companies were strong, with all but Owen Corning being in the top 10 contributors for the quarter. Trane Technologies and Installed Building Products (IBP) contributed positively with Trane helped by its positioning with respect to data centers as well as regulatory changes (which increase the need for better HVAC) while IBP benefitted together with the house building sector on hopes that lower mortgage rates will drive greater housing market activity.

After a number of poor quarters, our solar equipment companies saw an upturn in their fortunes this quarter. Like previous quarter, First Solar shares were the strongest (up 10.6%) as US utility solar companies continue to prioritize First Solar's modules, meaning that the company is now sold out until the end of 2027. Elsewhere in the sector, we note enthusiasm that a cyclical bottom has been achieved and that polysilicon, cell, and module prices are likely biased higher from here. Canadian Solar and Xinyi Solar were beneficiaries of this optimism while EnPhase benefitted from clear signs that the destocking of US solar inverters is now complete.

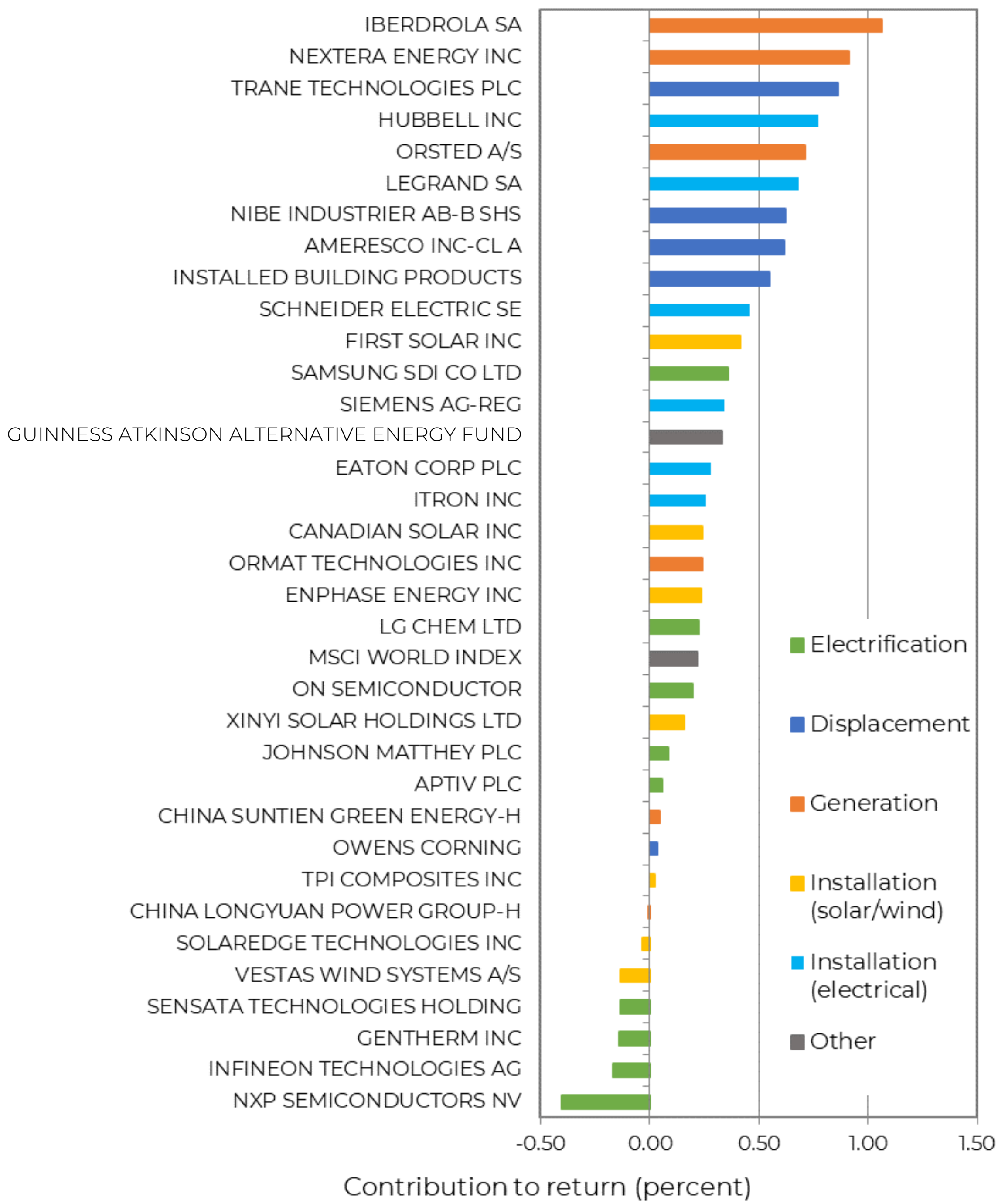
The electrification of transportation sub sector was the weakest in the third quarter, with EV component and lithium-ion battery manufacturers suffering from a weak auto market compounded by delays in EV launch schedules, margin pressure, and the threat of increasing Chinese competition. Portfolio holdings such as Gentherm, Infineon, Sensata and NXP delivered negative contribution as they were not immune to the sector weakness that caused a number of large automotive original equipment manufacturers (OEMs) (including Stellantis, Volkswagen, BMW and Mercedes-Benz) to announce guidance cuts and profit warnings in the quarter.

Our two South Korean battery manufacturers (Samsung SDI and LG Chem) were a brighter spot with electrification sector with both delivering positive contribution. In August, Samsung SDI announced that it expected earnings to sequentially improve in Q4 2024 and that major EU clients were looking to increase battery procurement to prepare for new EV model launches in 2025 that achieve EU emissions requirements.

Across the EV chain in general, our investee companies suffered from underutilization of manufacturing facilities. With EV penetration due to accelerate across the West in 2025 and 2026, we expect margins and earnings to inflect positively as fixed costs are spread over greater levels of production, hopefully driving some positive contribution. Clarity on tax credits post the US election in November and the delivery of further interest rate cuts into lower financing costs should help in this respect.

The only other negative contributor in the quarter 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 (ahead of solar) with the industry-level book to bill ratio (a ratio of new orders to existing sales) reaching 1.5x on a trailing 12-month basis, suggesting a very healthy outlook for industry growth.

Q3 2024 Contribution to Alternative Energy Fund



Source: Bloomberg, Guinness Atkinson Funds estimates. Data as of September 30, 2024

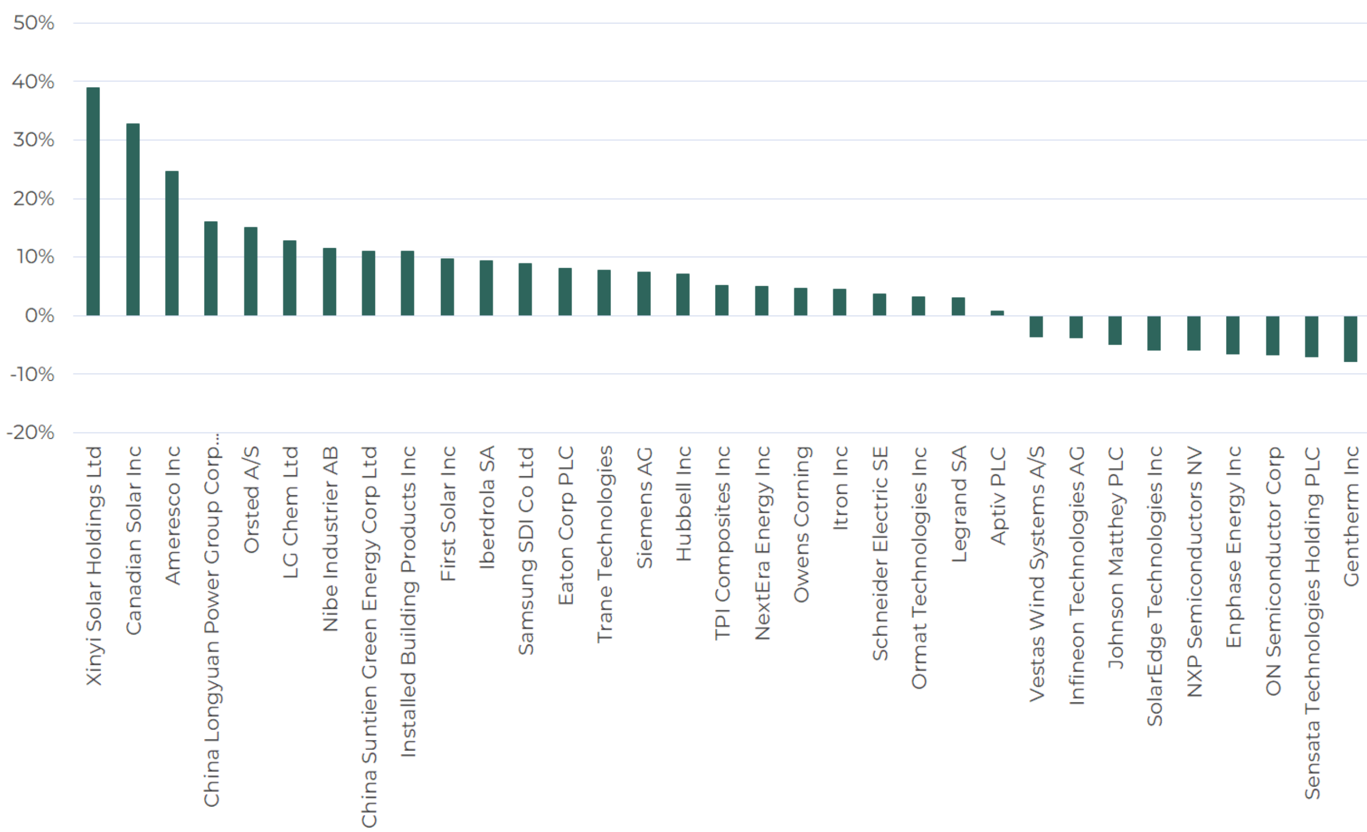
The stronger performance is consistent with the positive progression of the energy transition and the attractive multi-decade outlook. As our contribution analysis shows, there are cycles at play within this structural trend, some of which remain in an “up” phase (e.g. electrical equipment, building 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 both these challenged industries, which appear to be at or close to a cyclical trough.

A reduction of financing costs (i.e. further interest rate reductions by central governments feeding into consumer and project financing) and the passage of the US election will provide clarity on investment tax credits and project economics. Together with growing AI and data center demand, stricter energy efficiency requirements, massive grid upgrade programs, and the implicit operating leverage within our manufacturer investments, we are confident that portfolio earnings growth will start to improve.

Performance

Within the Fund, the strongest performers were Xinyi Solar, Canadian Solar, Ameresco, China Longyuan, and Orsted while the weakest performers were Gentherm, Sensata, Onsemi, Enphase and NXP Semi.

Stock by Stock Performance Over the Month, in USD



Source: Bloomberg. Data as of September 30, 2024

GUINNESS ATKINSON FUNDS

Performance

as of 09/30/2024	YTD	1 Year	3 Years	5 Years	10 Years
GAAEX	5.24%	13.80%	-2.77%	15.33%	4.21%
MSCI World Index NR	18.86%	32.43%	9.07%	13.03%	10.07%

All returns after 1 year annualized.

Inception 03.31.2006 Expense ratio* 1.10% (net); 1.79% (gross)

Performance data quoted represents past performance; past performance does not guarantee future results. The investment return and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. Current performance of the Fund may be lower or higher than the performance quoted. Performance data current to the most recent month end may be obtained by visiting www.gafunds.com or calling 800-915-6566.

* The Advisor has contractually agreed to reduce its fees and/or pay Fund expenses (excluding Acquired Fund Fees and Expenses, interest, taxes, dividends on short positions and extraordinary expenses) in order to limit the Fund's Total Annual Operating Expenses to 1.10% through June 30, 2027. To the extent that the Advisor absorbs expenses to satisfy this cap, it may recoup a portion or all of such amounts absorbed at any time within three fiscal years after the fiscal year in which such amounts were waived or absorbed, subject to the expense cap in place at the time recoupment is sought, which cannot exceed the expense cap at the time of the waiver. The expense limitation agreement may be terminated by the Board of the Fund at any time without penalty upon 60 days' notice.

MSCI World Index captures large and mid cap representation across 23 Developed Markets countries. With 1,546 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

Cash Flow Return on Investment (CFROI) is a valuation metric that acts as a proxy for a company's economic return. This return is compared to the cost of capital, or discount rate, to determine value-added potential. CFROI is defined as the average economic return on all a company's investment projects in a given year.

Price-to-Earnings (P/E) Ratio is the ratio for valuing a company that measures its current share price relative to its earnings per share.

Earnings Per Share (EPS) is a company's net profit divided by the number of common shares it has outstanding.

Earnings Growth is the annual compound annual growth rate of earnings from investments.

Group of Seven (G7) is an intergovernmental organization made up of the world's largest developed economies: France, Germany, Italy, Japan, the United States, the United Kingdom, and Canada. Government leaders of these countries meet periodically to address international economic and monetary issues, with each member taking over the presidency on a rotating basis.

Clean Investments refer to financial decisions supporting environmentally friendly and sustainable projects or companies.

Fund holdings and/or sector allocations are subject to change at any time and are not recommendations to buy or sell any security.

One cannot invest directly in an index.

Earnings Growth is not a measure of future performance.

Opinions expressed are subject to change, are not guaranteed and should not be considered investment advice.

The Guinness Atkinson Alternative Energy Fund's investment objectives, risks, charges and expenses must be considered carefully before investing. The statutory and summary prospectuses contain this and other important information and can be obtained by calling 800- 915-6565 or visiting www.gafunds.com. Read and consider it carefully before investing.

The Fund invests in foreign securities which will involve greater volatility and political, economic and currency risks and difference in accounting methods. The risks are greater for investments in emerging markets. The Fund also invests in smaller and mid-cap companies, which will involve additional risks such as limited liquidity and greater volatility than larger companies. The Fund's focus on the energy sector to the exclusion of other sectors exposes the Fund to greater market risk and potential monetary losses than if the Fund's assets were diversified among various sectors.

Top 10 Holdings as of 09/30/2024:

1.	Trane Technologies PLC	4.77%
2.	Iberdrola SA	4.77%
3.	Nextera Energy Inc	4.50%
4.	Hubbell Inc	4.49%
5.	Schneider Electric SE	4.36%
6.	Legrand SA	4.30%
7.	Eaton Corp PLC	4.15%
8.	Siemens AG	4.01%
9.	First Solar Inc	3.65%
10.	Installed Building Products	3.44%

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