# **Guinness Atkinson Alternative Energy Fund (GAAEX)**

September 2024 Monthly Update



## Chart of the Month: US Clean Investment

Since the enactment of the IRA in late 2022, clean technologies have played a major role in driving investment in the US economy. In Q2 2024 alone, clean investment represented 5.5% of all investment in structures, equipment and durable consumer goods, up from 3.1% prior to the legislation.



#### Clean investment as a share of total US private investment

Source: Rhodium Group / MIT-CEEPR Clean Energy Monitor, Data as of August 2024.

#### News

- Analysis published by Rhodium Group in August gave an update on the economic impact of the Inflation Reduction Act (IRA) in the two years since it was enacted. According to the analysis, business and consumer investment since the IRA came into law totaled \$493bn, over 70% higher than the two-year period preceding the legislation. Of the \$78bn of federal funds invested to date, \$29bn has been spent on clean energy generation, \$16bn on advanced manufacturing, \$16bn on residential energy and efficiency projects, and \$13bn on zero emission vehicle credits.
- Last month, the International Energy Agency (IEA) published a report in collaboration with Tsinghua University suggesting that wider adoption of heat pumps could accelerate decarbonization of heating in China's carbonintensive buildings and light industry sectors. Heating accounts for almost 20% of energy use in industry and buildings globally, and about one-quarter of energy sector emissions. The report finds that heat pumps could help cut building and light industry emissions by 75% and 90% respectively by 2050, contributing to the nation's goal of carbon neutrality by 2060.
- According to Rystad Energy, global installed offshore wind capacity is set to exceed 520GW (gigawatts) by 2040, up over 10 times from today's level of 42GW. Fixed-bottom installations are expected to make up over 80% of capacity, while floating wind will make up the balance. The UK, Germany and the Netherlands are likely to emerge as the three dominant players thanks to their proximity to the North Sea. Their contribution is expected to help drive European installed fixed-bottom capacity to >280GW by 2040, more the rest of the world combined.
- In August, Rho Motion reported that year-to-date electric vehicle (EV) sales reached 8.4 million, up +21% year-onyear as at the end of July. In China, 887,000 EV sales were registered in the month, 33% higher than in 2023, with plug-ins making up the majority of vehicles sold for the first time in the country, reaching 51% share. Europe saw EV sales of 220,000 units, down 6% since last year, driven by the introduction of tariffs on Chinese EV imports and the removal of subsidies in Germany. Meanwhile, in the US, data from Wards Intelligence suggests that the share of electric and hybrid vehicles in the second quarter of 2024 increased sequentially from 17.8% to 18.7% in Q2

- 2024. Hybrid electric vehicles (HEVs) made up the largest share at 9.6% of sales, followed by battery electric vehicles (BEVs) at 7.1%, with an additional 2.0% from plug-in hybrids.
- South Korea has announced that it will require all international flights departing from its airports to use a mix of 1% sustainable aviation fuel (SAF) from 2027, with plans to increase the requirement to 3-5% by 2030. Government officials announced the "SAF Expansion Strategy" on August 30<sup>th</sup> which includes a longer-term target for South Korea to capture 30% of the global blended SAF export market. Demand for SAF is expected to grow to 18.35 million tonnes in 2030, up from 240,000 tonnes in 2022. According to the International Air Transport Association (IATA), SAF can cut carbon emissions from air travel by up to 80%.

#### "Back to School" for Sustainable Energy

Clarity around the US election and the pass-through of lower interest rates into the global economy should catalyze investments and normalize profitability for companies operating in the EV battery, solar, wind and auto supply chain industries. In this "back to school" piece we review the key sectors in the Guinness Atkinson Alternative Energy Fund and see an earnings growth outlook that sits at odds with the sector's depressed valuation levels.

Energy transition spending is continuing apace. According to the International Energy Agency (IEA), global investment in clean technologies remains on track to hit nearly \$2trn this year, up from \$1.7trn in 2023 and almost twice the spend on fossil fuels. However, inflation and higher borrowing costs have slowed progress in some sectors, notably the electric vehicle, battery, solar and wind supply chains. Other sectors, such as electrical equipment, buildings efficiency and grid expansion, have seen acceleration in near-term profitability and outlook.

This has been reflected in the valuation of the Guinness Atkinson Alternative Energy Fund, with the 12-month forward P/E compressing from 19.1x to 15.3x (-20%) since the start of 2023. In contrast, the 12-month forward P/E of the MSCI World Index has inflated from 15.5x to 18.9x (+22%), leaving the fund at forward P/E discount of 19%, the lowest level since early 2020.



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

Source: Bloomberg, Guinness Atkinson Funds, September 2024

In this piece, we consider each of the key subsectors in the fund, assessing how each cycle is progressing in the short term, and how the longer-term drivers are shaping up. That work leads us to the overall earnings progression of the portfolio, and how it compares today to the MSCI World.

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#### Electrical equipment manufacturing (26% of portfolio)

Within the portfolio, our electrical equipment manufacturers have seen the strongest positive earnings revisions so far this year. The addition of Siemens AG in May boosted our exposure. The sector has benefitted from a growing realization that investment in power grids is behind where it needs to be. And this year, the issue has become more acute thanks to the surging growth of data centers.

As a group, our electrical equipment companies have been able 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.

Our holdings in this sector all benefit from exposure to the US data center market, which has doubled in the last four years and where existing units are nearly fully utilized. Data center rents are reaching new highs (up around 25% year-over-year), and construction of new units is booming, up sevenfold in the last two years. On average, each new data center requires a grid connection equivalent in size to that of a typical airport. Today, US data centers are thought to consume around 2.5% of US power supply, rising as early as 2027 to 7.5% of US power. It is a significant new opportunity which our investee companies will be selling into.

More broadly, we keep in our minds that much of the energy transition, whether it be the rise of electric vehicles, penetration of renewable power or improvements in energy efficiency, relies on the bedrock of a larger and more robust power grid. By our estimates, electricity will increase from 44% of the global energy mix in 2022 to 63% in 2050, with demand growing at around 2.7% annually and more than doubling from c.28TWh (terawatt hours) to c.60TWh over that period. Much of the West's power grids are 40-50 years old, meaning investment in the global power grid will broadly need to double by 2030 to allow for expansion, reconnection and digitalization. This is a substantial inflection relative to historically flat investment levels. We look to maintain good exposure in the portfolio to this attractive investment outlook.



#### US annual grid investment (\$bn)

Source: BNEF, 2024



#### **Buildings efficiency (15% of portfolio)**

Our group of buildings efficiency companies (including companies providing heating, cooling and energy efficient building products and services) has also seen a broadly positive earnings trend over the past six months.

Energy efficiency is often overlooked, but we note that buildings account for around 30% of global emissions, with space heating, water heating, and space cooling accounting for 60% of a typical building's energy use. The IEA refers to energy efficiency as being the "first fuel" that should be considered in delivering the energy transition and we are seeing global governments tightening building and appliance codes to help improve energy efficiency.

In the US, for example, there has been good progress this year on the level of building insulation required in residential newbuilds. By late 2025, it looks likely that around 80% of new housing units in the US will need to be constructed to the 2021 International Energy Conservation Codes, which implies around 10% greater use of insulation materials.

Much more broadly, the Chinese government has set stringent energy intensity targets for 2024, targeting a 2.5% reduction this year after the country delivered only 0.5% improvement in 2023.

In our base case for the energy transition, we assume global energy demand growth over the next twenty years of around 1% per annum (p.a.). This assumes significant efficiency improvements relative to a historical energy demand growth rate of around 2% p.a. Achieving energy demand growth of only 1% p.a. requires substantial investment. We see spending on building efficiency and electrification increasing from \$340bn in 2023 to around \$600bn p.a. from 2026-30 (a growth rate of around 12% p.a. versus an historic rate of around 4% p.a.).



#### Global building efficiency and electrification investments (\$bn)

## Electric vehicle (EV) supply chains (19% of portfolio)

Turning to the more pressured parts of the portfolio, we have a number of investee companies that sell components into the electric vehicle supply chain, and also have exposure to the internal combustion engine (ICE) supply chain. Earnings expectations over the last six months have soured for all except Aptiv as global auto sales and EV penetration growth have slowed relative to expectations at the start of the year.

Global light auto sales remain stuck in the range of 75-80m annually and are now expected to be down 2-3% versus last year, while remaining stubbornly below the pre-COVID peak of around 90m. Higher financing costs and a post-COVID inflationary spike in vehicle prices have been at play. Large Western auto manufacturers such as Stellantis and GM see



9% volumes declines this year and, as an illustration of how acute the slowdown has been, VW is threatening – for the first time in nine decades – to close a manufacturing plant in Germany.

In the US, EV penetration has stalled in 2024 at 9.9% (up only slightly on 9.3% in 2023) as factors specific to the US auto market – large vehicles, long travelling distances and lower gasoline prices – make electrification more difficult. Recent reiteration of federal government targets (c.50% EV penetration by 2030 with mandates in California being even more ambitious) and plans from manufacturers to launch twice as many EV models in 2025 (with plans to transform domestic production to c.65% EV by 2030) give us confidence on the transition towards EVs. Even in its "bear case" scenario for EV penetration, Bernstein see the US EV market growing at 18% p.a. to 2030.



## Monthly plug-in vehicle penetration rates by region

#### Source: EV-Sales, Cleantechnica, Atlas EV Hub, 2024

After the US election in November, there will be greater clarity on clean vehicle and advanced manufacturing tax credits within the Inflation Reduction Act, allowing auto and battery manufacturers to confirm their investment plans. Generally, the economics of an EV purchase are more sensitive to interest rates than ICE vehicles. As interest rates come down, lower financing costs should act as a further catalyst for EV penetration.

European governments are also starting to respond to the sluggishness in EV sales. In Germany, for example, additional tax incentives for company car fleets (representing 70% of Germany's BEV sales) were approved recently to help the auto industry achieve its 2025 carbon emission target. This should mean 30-60% BEV growth in 2025, substantially higher than the 20% expected in 2024.

Beyond the short term, government commitment to the rollout of EVs remains solid. Thirty-six countries (twenty-seven in the EU) currently have targets for banning the sale of ICE vehicles and with the right policy support and incentives, we expect that targets will broadly be achieved. We take confidence from Norway, which will achieve its target to ban ICE vehicles at the end of 2024, only eight years after the target was announced. EV penetration has risen from 10% in 2013 to over 90% in 2022 and currently sits at 95%. While Norway is a small high-income country, it is interesting that its EV adoption path (S curve) is being tracked very closely by China, which reached 50% EV (BEV and PHEV) penetration in the summer months of 2024.

China has reached the tipping point for mass electric adoption thanks to the average price of EVs falling below that of combustion engine models. Indeed, according to the IEA, the sales-weighted average price of EVs across all segments was lower than that of ICE vehicles in China in 2022.

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#### China: average vehicle transaction price by drivetrain (USD)

In the US, according to the Kelley Blue Book, the average sale price of an EV in the US was around \$53,500 in 2023, only c.10% more than the ICE equivalent. With batteries, which represent around 30% of the cost of an EV, coming down in price by 30% in 2024, the US will soon be reaching price equivalence soon and shifting towards mass adoption as a result.

Ultimately 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. While regulatory and policy-based initiatives have been necessary to grow the EV industry to critical size, it is ultimately better technology (Chinese battery manufacturer CATL has developed a lithium iron phosphate battery with a 1,000km range) and better economics (60% of all EVs sold in China in 2023 were cheaper than the ICE equivalent) that will cause EVs to dominate.

The slower pace of EV penetration in the US and Europe has also brought near-term profitability pressures for our two South Korean **EV battery** manufacturers, LG Chem and Samsung SDI. Both companies are critical to US plans to build large-scale battery plants as part of the EV supply chain. Given the hostile stance towards the Chinese auto industry is bipartisan in US politics, we see it as highly likely that the US develops a domestic EV supply chain and incentivizes "friendly" countries to bring their technology, to invest in the US, and to create high-quality US manufacturing jobs. As for the rest of the EV supply chain, clarity should be forthcoming after the election.

For our investee companies exposed to the EV component supply chain, the common theme currently is underutilization of their manufacturing plants. LG Chem, for example, is operating at below 60% utilization, which is weighing on operating margins. 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.

## Solar and wind installers (12% of portfolio)

Solar and wind power installations 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. Tier 1 solar manufacturers are reducing capex plans while tier 2 and 3 players (such as Akcome New Energy and Gansu Golden Solar) are starting to exit the market. In the downstream, solar inverter manufacturers EnPhase and SolarEdge indicate that the inventory



destocking cycle has ended in the United States and close to ending in Europe. Signs of a bottom to the cycle are therefore appearing.

Bucking the trend within the solar sector has been 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.

The wind industry appears to be recovering from its cyclical trough ahead of solar. We note that the industry-level book to bill ratio (a ratio of new orders to existing sales) has reached 1.5x on a trailing 12-month basis, suggesting a very healthy outlook for industry growth. This is in sharp contrast to the pressures suffered over the last few years from inflation, rising interest rates and supply chain disruptions. Vestas' latest results showed orders up 40% versus last year.



## Trailing 12-month European wind orders (€'m, LHS) and book to bill (RHS)

Source: company data, Guinness Atkinson Funds estimates, 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 will end, providing opportunities for manufacturers to regain normalized profitability levels. Wind power complements solar power and the build-out of the wind industry needs to increase significantly in the near term to get even close to a net zero trend. Ex-China, wind is a consolidated industry and there should be good opportunity for supply chain companies to recover normalized levels of profitability.

## Renewable power generation (19% of portfolio)

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. With the yield on the US 10-year treasury starting the year at 3.9% and ending August at a similar level, it is not surprising that the expectations for generation companies have not really changed.

This sector is another major beneficiary of the cloud computing and AI trends mentioned earlier. Hyperscalers, with net zero commitments, have been paying 20% higher prices for wind-based power purchase agreements (PPAs), on the basis that a renewable power producer can provide quick access to long-term contracted electricity supply, since electricity represents 20% of the operating costs of a data center. This uplift in renewable power demand outlook has led several



private equity companies to bid for IPPs with Brookfield, KKR, TAQA and EQT bidding for Neoen, Encavis, Naturgy and OX2 respectively.



**US Power Purchase Agreements (PPAs)** 

Source: Levelten, 2024

The renewable power generation sector generally has a higher interest rate sensitivity, since i) participants have higher debt burdens and ii) the value of long-term cash flows from generation are more sensitive to the discount rate being utilized in the stock market. In anticipation of lower interest rates, our renewable power generators have generally performed positively so far this year. However, we think the positive impact of lower financing costs on boosting renewable power investment plans is still to come.

Longer-term, the 20 to 30-year trend towards renewable power generation continues and renewables should represent 60% of power grids by 2050. This is primarily driven by economics as renewables are at the bottom end of the cost curve, even after allowing for raw material and energy inflation and higher interest rates. Recent deflation in solar module costs will further help the relative economics of renewables as it feeds through into actual project developments.

Importantly, the generation companies in our portfolio have the skills to develop and operate projects, across a range of different technologies with associated grid storage and are well placed to benefit from a very attractive long-term growth of renewables.

## 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 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. 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.



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 earnings growth expectations for the fund have always been greater than those for the MSCI World index. The growth premium has been as little as 3% p.a. (September 2021) to as much as 16% p.a. (May 2023) and has averaged about 10% p.a. The current growth expectation of 14% p.a. is a premium of only 5% p.a. to the MSCI World; close to recent lows and reflective of the "wash out" in earnings expectations for parts of the portfolio.

#### Performance

Monthly as of 08/31/2024	YTD	1 Year	3 Years	5 Years	10 Years
GAAEX	0.00%	-0.87%	-5.79%	14.63%	3.01%
MSCI World Index NR	16.72%	24.43%	6.89%	13.09%	9.56%
Quarterly as of 06/30/2024	YTD	1 Year	3 Years	5 Years	10 Years
GAAEX	-3.67%	-13.09%	-5.60%	12.63%	2.15%
MSCI World Index NR	11.75%	20.19%	6.86%	11.78%	9.16%

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.



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 08/31/2024:

1.	Iberdrola SA	5.17%
2.	Trane Technologies PLC	4.97%
3.	Nextera Energy Inc	4.89%
4.	Schneider Electric SE	4.52%
5.	Hubbell Inc	4.48%
6.	Legrand SA	4.48%
7.	Eaton Corp PLC	4.11%
8.	Siemens AG	3.86%
9.	ON Semiconductor Corp	3.54%
10.	First Solar Inc	3.43%

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