



Green Investment Partners

Cleantech Cycles: The Tide Is Out



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Fabian Leonhardt
Joshua Cole



Executive Summary

This insight is an update to our original Cleantech Cycles paper published in Jan-21. We review what has happened in the interim to passive ETFs, unwrap valuations in cleantech sectors and show why investing in reasonably priced quality companies could be a good approach for green sectors. Lastly, we comment on how volatility, risk management and asymmetrical opportunities can significantly add to investment performance.

Past, Present, Future

We published the original Cleantech Cycles paper on 7-Jan-21. By coincidence, that day marked the highest share price since 2008 for the iShares Global Clean Energy ETF (“ICLN”) which has subsequently fallen 48% (as of 29-Sep-23, EUR total return). In late 2020 and early 2021 we observed companies in certain cleantech sectors exhibiting extreme valuations. As we wrote then: “The hydrogen market in 2020 is showing extreme valuations and weak fundamentals. We are not dismissing the technology but we are wary of speculation, especially as there are strong parallels to the solar bubble in 2008.”

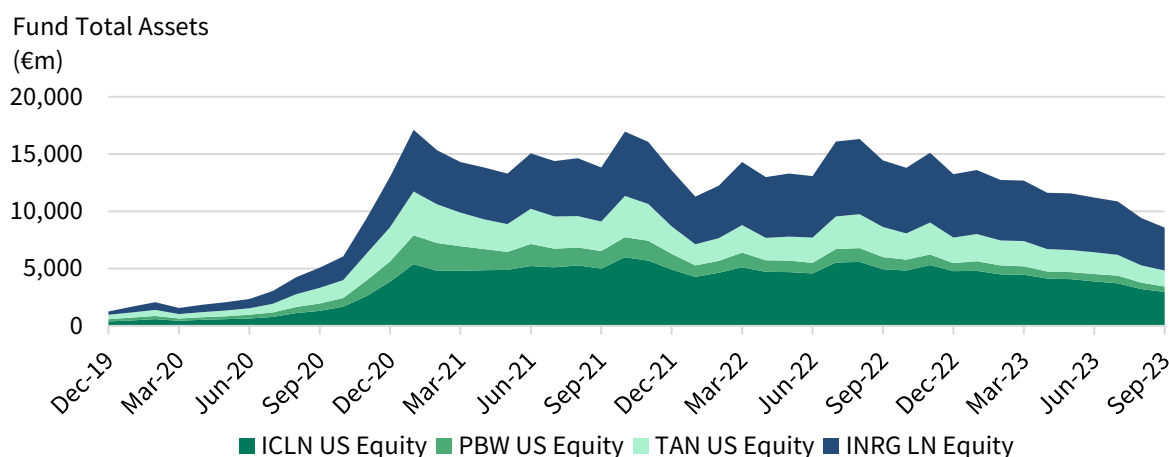
This was not the first time such bubbles had happened in cleantech (although the causes may have been different): “Cleantech boom-and-bust cycles can also lead to significant downside risk and volatility within diversified passive sector strategies.”

In the following paper we focus on three of the most popular US listed passive cleantech ETFs, which are:

- iShares Global Clean Energy ETF (ICLN), tracks S&P Global Clean Energy Index (SPGTCLNT).
- Invesco WilderHill Clean Energy ETF (PBW), tracks WilderHill Clean Energy Index (ECOTR).
- Invesco Solar ETF (TAN), tracks MAC Global Solar Energy Index (SUNIDX).

Since Jan-21 the total assets of the PBW and TAN ETFs have decreased 81% and 64% respectively. The INRG LN (INRG), a London listed ETF also tracking the SPGTCLNT saw assets decline 30% from \$5.4bn to \$3.9bn. Figure 1 shows the combined total assets of these four ETFs increased over 13 times between Dec-19 and Jan-21 peaking at USD 17.1bn, before declining 50% as of Sep-23.

Figure 1: Fund Total Assets of Four Passive Cleantech ETFs



We commented on passive cleantech ETFs at the time: “Their inherent design means large drawdowns and long recoveries can reoccur.” Since 31-Dec-20, the share prices of the ICLN, PBW and TAN have all declined significantly. This is despite solar installed capacity increasing by more than 75%.¹ The solar index, SUNIDX, which the TAN tracks, saw its forward P/E ratio decline from 96x to 15x between Dec-20 and Sep-23, a dramatic fall which brings it below the S&P 500 index and the MSCI World index.

Figure 2: Performance of Passive Indexes (in EUR)

Index	Ticker	US Listed ETF	Total Return (%)				Max Drawdown (%)		Forward P/E Ratio (x) ¹			
			2020	2021	2022	2023 to Sep-23	Since Jun-08	Since Dec-19	Dec -20	Dec -21	Dec -22	Sep -23
S&P Global Clean Energy	SPGTCLNT	ICLN	122	(18)	1	(25)	(85)	(42)	61	39	46	21
WilderHill Clean Energy	ECOTR	PBW	179	(25)	(43)	(17)	(77)	(69)	254 ²	N/A ³	N/A ³	N/A ³
MAC Global Solar Energy	SUNIDX	TAN	208	(21)	1	(28)	(94)	(46)	96	37	17	15
S&P 500	SPX	SPY	9	38	(13)	14	(33)	(19)	29	23	18	20
MSCI World	MXWO	URTH	7	31	(13)	13	(35)	(20)	27	21	16	18

Source: Green Investment Partners, Bloomberg

1. Bloomberg estimates for the forecast fiscal year period

2. As of 30/11/2020, data unavailable for 31/12/2020

3. Majority of companies have negative earnings

The following structural issues in passive cleantech ETFs remain:

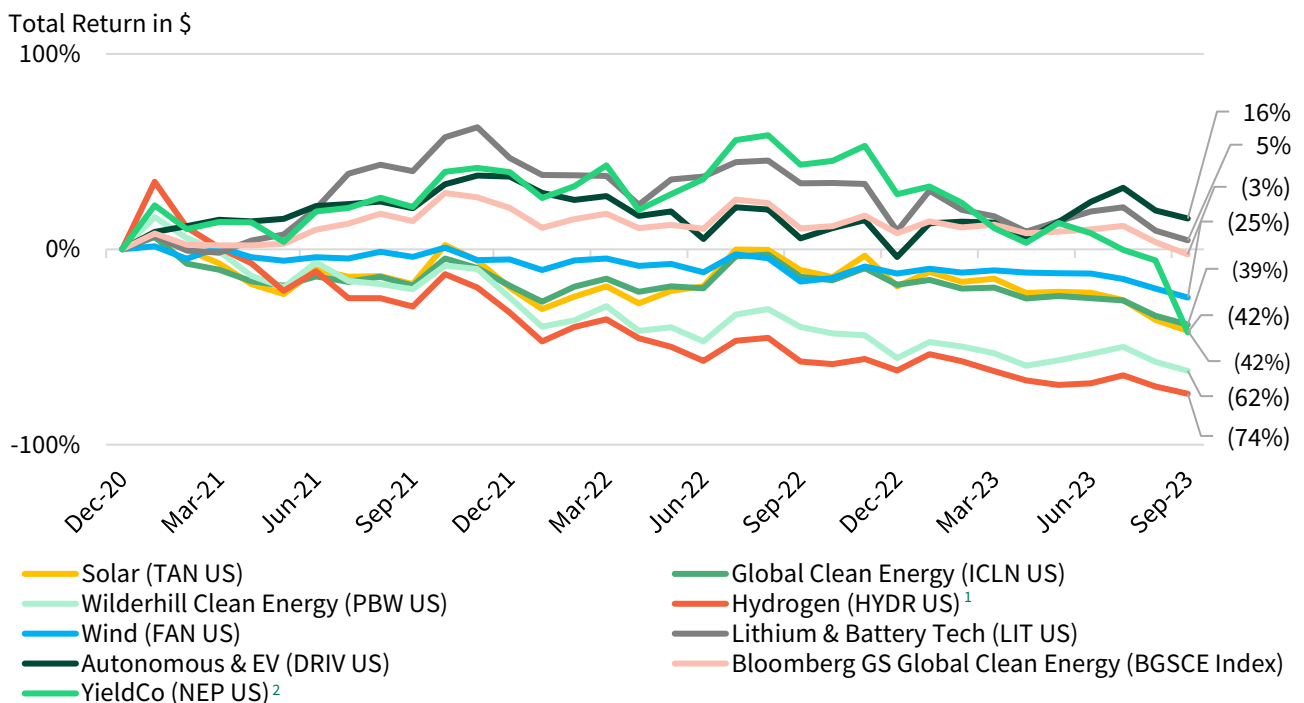
- Investing in competitive industries that are prone to boom-and-bust cycles requires industry expertise to assess opportunities, limit downside and find good risk-adjusted returns. This contrasts with passive cleantech ETFs whose nature can lead to purchasing expensive companies in bubble territories.
- When passive cleantech ETFs size positions based on market capitalisation, they are relying on past performance and not explicitly considering valuations.

¹ Green Investment Partners, BNEF. Jun-23 installed solar capacity estimated from 50% of BNEF’s mid-scenario forecast for global PV installations.

- When passive cleantech ETFs equally weight positions, small speculative growth companies with high uncertainty can drive returns, or losses.
- Passive cleantech ETFs, generally, do not allow for significant cash holdings, therefore drawdowns can be severe during broad or more sector-specific crises.
- Investor psychology and ETF asset flows can have a reflexive impact on underlying stock prices, especially for smaller stocks. This can result in speculation, which can fuel bubbles.
- The addition or removal of a company to an underlying index, and therefore its respective ETF, can happen for a number of reasons, including size or liquidity constraints and can cause fluctuations in a company's share price, unrelated to business quality or fundamentals.

Figure 3 shows the total return of a broader number of cleantech indices, many of which have also fallen since late 2020. We calculated that hydrogen stocks are likely to have fallen the most with a decline of 74% (as of 29-Sep-23, EUR total return). To understand if these significant price movements are justified, we need to look at how fundamentals have changed over this period. There is significant growth in cleantech sectors but the key question is whether individual companies can grow profitably.

Figure 3: Performance of Passive Indexes (in EUR)



Source: Green Investment Partners, Bloomberg

1. Hydrogen total returns. From Dec-20 to Jul-21 a basket of equally weighted listed Hydrogen companies (BLDP US, PLUG US, BE US, NEL NO and ITM LN). From Aug-21: HYDR US

2. NextEra Energy Partners (NEP US) has been used as a proxy for renewable energy YieldCos

The weak share price performance in 2023 is in part due to certain companies underperforming expectations. Previously favoured companies such as Vestas, Orsted, Plug Power and Enphase have seen significant negative share price performance. Even portfolios not holding these specific companies can have short-term exposure due to ETFs selling, rebalancing and general outflows from cleantech investments. Nonetheless, this could present an opportunity to acquire profitable,

growth-oriented companies at more attractive price points. Recent take private offers show that stock market volatility may have resulted in a discrepancy between private and public market cleantech valuations.

In growing and dynamic cleantech sectors, factors such as profitability, cash flows and competitive advantages become even more important. Applying Warren Buffett's adage, now that the tide is going out due to rising interest rates, we can see which companies have been swimming naked.

Green Growth

Global investment in the low-carbon energy transition totalled \$1.1 trillion in 2022² – a record amount and 31% increase on 2021. This has been driven by the energy crisis, policy action and the maturing of low carbon industries. Of this investment:

- Renewable energy and electrified transport sectors accounted for approximately half each.
- Most low carbon sectors achieved record levels of investment in 2022, apart from nuclear which remained broadly flat.
- Despite lots of media attention, hydrogen received the least financial commitment with just 0.1%.
- China accounted for \$546bn, nearly half of the entire global investment.
- The EU and US were a distant second and third, with \$180bn and \$141bn, respectively. The landmark US Inflation Reduction Act (IRA) signed on 16-Aug-22 may change this, as it dedicates \$369bn towards energy security and climate-related initiatives.
- Energy transition investment matched fossil fuel investment for the first time; but a further ramp-up is needed for net zero.

Across the globe, green sectors are growing rapidly. In the five years before 2017, Electric Vehicle (EV) sales increased from 0.1 million to 1 million. In the subsequent five years to 2022, EV sales increased from 1 million to over 10 million and now account for 14% of global vehicle sales.³ There are now over 25 million electric cars on the road globally. This highlights the exponential nature of the EV sector. In China, battery electric vehicle sales grew 60% year-on-year in 2022 and now account for 29% of new cars sold, up from 16% in 2021. This means China's 14 million EVs account for about half the world's total fleet. Another example of rapid growth is the solar industry, where reality has exceeded growth forecasts significantly since 2006. It is expected that solar capacity will hit 2,500 GW by 2030, which is 30x the 2006 forecast and 2x the 2017 forecast for 2030.⁴ The rapid growth in solar capacity can be attributed to the 90% cost decline over the last two decades⁵, reliability improvements, inverter advancements, and government support have all contributed to this rapid growth. For the latest renewable energy statistics, please see the IEA report "[Net Zero Roadmap: A Global Pathway to Achieve the 1.5°C Goal.](#)"

² BNEF, <https://about.bnef.com/blog/global-low-carbon-energy-technology-investment-surges-past-1-trillion-for-the-first-time/>

³ IEA, Electric car registrations and sales share in China, United States and Europe, 2018-2022, IEA, Paris <https://www.iea.org/data-and-statistics/charts/electric-car-registrations-and-sales-share-in-china-united-states-and-europe-2018-2022>, IEA. Licence: CC BY 4.0

⁴ McKinsey & Company, IEA World Energy Outlook, New Policy Scenario and Stated Policy Scenario, Sep-22

⁵ <https://www.woodmac.com/press-releases/solar-power-now-cheapest-way-to-add-electricity-in-many-markets---and-getting-cheaper/>

Green Universe

Within our defined Green Universe, consisting of companies with a significant exposure to green sectors, we have seen the average current P/E ratio and current EV/EBIT ratio fall significantly, while average ROE has more than doubled, between Dec-20 to Jun-23. Average sales growth for this year is expected to be 39% year-on-year compared to 9% in Dec-20. The number of companies with a ROIC of greater than 10% has increased to 27% of all companies in the universe, up from 17% since Dec-20.

Figure 4: Fundamentals of the Green Universe in USD

	Dec-20	Jun-23
Current P/E Ratio	35x	20x
Current EV/EBIT	30x	17x
ROE	5%	11%
Est. Fwd. Sales Growth	9%	39%
Companies with ROIC >10%	17%	27%

Hydrogen

Many hydrogen companies are not producing positive earnings, so the price-to-sales ratio is more useful. The sector average has decreased from 9x to 4x between Jul-21 to Jun-23. For the top five largest allocations, we see higher price-to-sales ratios and a similar decreasing trajectory from 18x to 13x between Jul-21 and Jun-23.

Figure 5: Fundamentals of the Hydrogen Sector in USD (HYDR US)

	Jul-21	Jun-23
Price to Sales Ratio	9x	4x
Current P/E Ratio	46x	31x
Current EV/EBIT	42x	31x
ROE	-4%	-17%
Est. Fwd. Sales Growth	108%	70%

Solar

From Dec-20 to Jun-23, the current P/E ratio has decreased from 52x to 12x and a similar decline is shown in the current EV/EBIT ratio from 45x down to 7x. Meanwhile installed solar capacity has almost doubled, ROE has more than tripled, and sales are expected to grow at 30% in 2023. Across the cyclical-prone solar sector there is rising competition and a rapid buildout of manufacturing capacity. Despite this, there are currently more companies with reasonable valuations and better fundamentals than in Dec-20.

Figure 6: Fundamentals of the Solar Sector in USD (TAN US)

	Dec-09	Dec-19	Dec-20	Jun-23
Current P/E Ratio	17x	26x	52x	12x
Current EV/EBIT	17x	24x	45x	7x
ROE	-11%	-1%	4%	13%
Est. Fwd. Sales Growth	16%	28%	18%	30%
Global Cumulative Installed Solar Capacity (GW)	24	644	790	1,396 ¹

1. Green Investment Partners, BNEF. Jun-23 installed solar capacity estimated from 50% of BNEF's mid-scenario forecast for global PV installations.

Asset Valuations

Recent stock market volatility may have resulted in a discrepancy between private and public market prices. We have since seen a number of take private offers across cleantech sectors, such as for the Spanish renewables developer-operator Opdenenergy and European waste management firm Renewi. TransAlta Corporation agreed to acquire all the outstanding shares of TransAlta Renewables in Jul-23 with the deal closing in Oct-23.

There still seems to be support for renewable energy projects. As one example, the Swedish renewable energy developer, OX2 sold a 115MW wind farm to a European utility in Q3-23 for SEK2.7bn (~€230m) which equates to around €2m per MW. OX2's CEO Paul Stormoen commented that "the sale process has also proved that there is a lot of interest among investors for this kind of renewable energy project."⁶

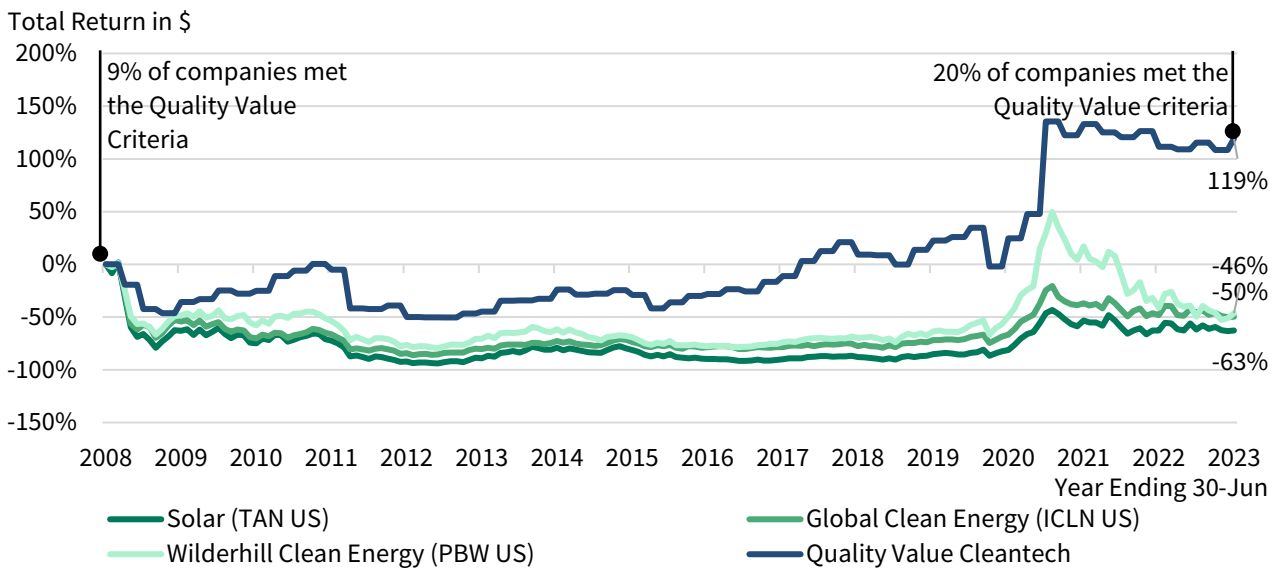
Investors and infrastructure funds in the past may have been able to raise funds with a fairly low expected return of mid to high single digits, which provides, at least for now, some form of floor value. However, this may change if they struggle to raise new funds with those expected returns, which we believe is likely.

Value Quality Outperforms

Over 15 years, passive cleantech ETFs have generally underperformed broad equities. Therefore, to build upon our original [Cleantech Cycle paper](#) we tested whether reasonably priced quality green companies can help protect against boom-and-bust prone sectors. We simulated the past performance of a hypothetical strategy based on a simple quality and value criteria, defined as companies with a ROIC > 0% and P/FCF < 30x. This was applied over a 15 year period to 30-Jun-23 to the companies held within three passive cleantech ETFs: TAN, ICLN and PBW.

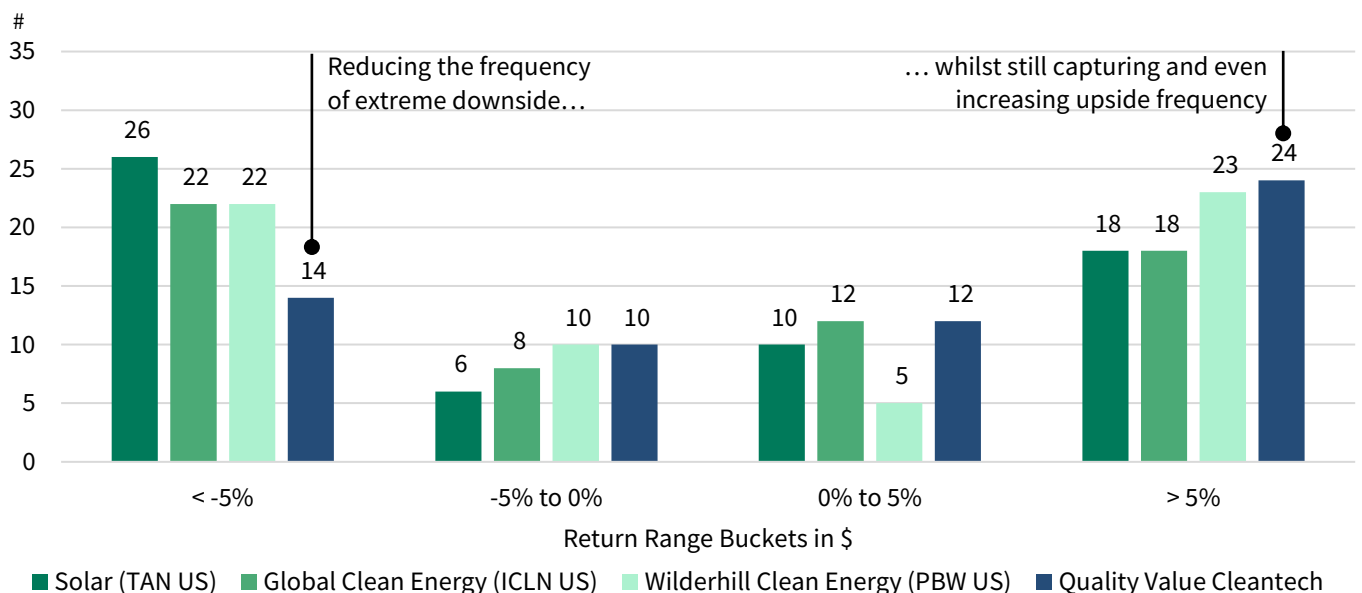
⁶ <https://www.ox2.com/newsroom/press-releases-news/2023/ox2-sells-115-mw-wind-farm-anglarna-in-sweden-for-27-billion-sek/>

Figure 7: Quality Value Cleantech Performance⁷



Rather than the overall performance of the hypothetical quality value cleantech strategy, we looked at how the performance was derived. The strategy exhibits less extreme drawdowns whilst still capturing upside and is concentrated with 6 to 34 companies. We believe an active approach with quality and price discipline is better for sectors prone to boom-and-bust cycles. There are now more companies with better quality fundamentals at a reasonable price than 15 years ago.

Figure 8: Quarterly Total Returns Frequency by Return Range Buckets



⁷ Quality Value Cleantech is a simulated past performance of a hypothetical strategy of buying companies that meet a quality and value criteria, defined as companies with a ROIC > 0% and P/FCF < 30x, from Jun-08 to Jun-23. Companies are selected from a universe comprised of companies held within the TAN US, ICLN US and PBW US. The performance is based on an equally weighted portfolio and total return with quarterly rebalancing. Management, performance, trading, or other costs are not included, and past performance is not a reliable indicator of future performance. The portfolio is concentrated with a range of 6 to 34 companies

Reviewing the quarterly total returns frequency across the three ETFs and the quality value cleantech strategy, we observe that the latter had the least number of extremely negative quarters (i.e. quarters where losses exceeded 5%). Solar had the highest number of extremely negative quarters, for extremely positive quarters solar scored lowest and the quality value cleantech strategy highest. To reduce the frequency and magnitude of extreme downside, while still capturing the upside is the asymmetry we look for. This should be seen as an observation on downside protection rather than a study of outperformance, as we have not tested for statistical significance or attempted to remove all potential statistical biases. Sometimes simplicity and logic are effective.

Not All Opportunities Are Made Equal

We aim to allocate more capital towards companies that, we believe, can deliver strong returns over the next five years with conservative assumptions. Therefore, we do not believe that equally weighting all companies that meet our minimum investment hurdle is the correct approach. We aim to size positions according to our strict assessment of a company, and we would not invest if an opportunity does not meet our investment hurdle. This is at odds with passive cleantech ETFs that are forced to invest independently from any investment return calculation. Similarly, if we fixed the number of positions in a strategy, we could not guarantee that we would find that exact number of excellent investments within our universe. This is one of the reasons why we expect to hold few or many companies at different stages of a market cycle.

Funds often see inflows increase after periods of good performance and outflows increase after poor performance. For individual investors this can lead to a lower money-weighted return. We will communicate to our investors, when we believe there are investment periods to achieve a higher money-weighted than time-weighted return. We are transparent about our approach and return prospects. Periods of opportunities will plausibly arise after times of uncertainty and significant drawdowns.

Our long-term success depends on finding the right investors who understand our approach and are willing to invest when the market becomes depressed about the long-term outlook. The market has periods of mild, medium and rare-but-wild volatility. Behaving correctly in periods of wild volatility is important for long-term outperformance and applies to both the manager and investors alike.

Opportunities and Risks in Cleantech

Risks within cleantech can also offer great opportunities. Market volatility is not always a detractor but can add to performance by offering better entry points. We have highlighted a number of opportunities and risks below:

- Electricity generation weighted power prices will be lower as more solar and wind is added to a grid. This creates an opportunity for energy storage, interconnectors and baseload power. There is risk for solar and wind producers if they underestimate the effect, such as the “duck curve”⁸ in California. For asset valuations the region and grid connection matter.

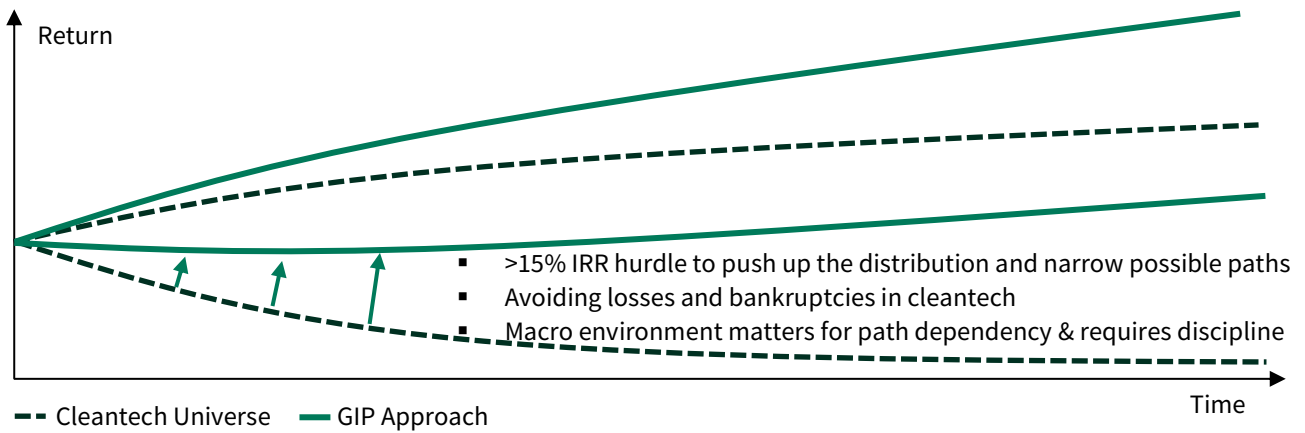
⁸ <https://www.energy.gov/eere/articles/confronting-duck-curve-how-address-over-generation-solar-energy>

- In several countries there are electricity grid bottlenecks because of the significant growth of wind farms and solar plants. Today, grid investments have the wrong incentives and offer low returns. This needs to change as it is negatively impacting developers and leading to project delays. It also offers an opportunity for business models that help to reduce demand on the grid, provide flexible power and distribute power.
- Competition and oversupply are key risks of cyclical sectors, however they provide an opportunity to invest at the bottom of the cycle and strengthen the leading players. There are risks of overpaying and investing in weak players at the wrong time of cycle.
- Within cleantech, valuations and the ability to differentiate growth from hype in individual subsectors is important. Overall, the hydrogen sector is not yet profitable and has experienced speculation that exhibits qualities of a bubble.
- Changes in the national and local regulatory environment need to be understood and can provide both opportunity and risk. For example, undersubscribed auctions can result in profitable projects.
- The commodity price cycle is important, for example steel prices can impact turbine manufacturers and metal prices can impact battery manufacturers. Supply and demand in commodity cycles can be a key driver of profitability in cleantech companies.
- Rising interest rates can be an opportunity for an unlevered company and a higher risk for a levered competitor. Interest rates are key for all asset-based companies that rely on project finance, but this can be somewhat buffered if power prices increase.
- Business model sensitivity to inflation matters. It can be an opportunity with inflation adjusted tariffs for projects and for business models that can hedge inflation or adjust prices accordingly.
- Political and geopolitical risks are intensifying, particularly between China and the US. The two superpowers provoking each other is not great for either side or businesses. However, opportunities can include the market overreacting to news versus reality. Tariffs can be painful for one company but a gain for another company.
- Extreme weather events and climate change will likely increase and negatively impact companies and their supply chains. Reaction to such events and risk diversification can also be opportunities for outperformance. Good insurance will matter to avoid the worst case.

Investment Performance and Asymmetry

In financial theory we are often taught about probability distributions. In life and in the stock market, the reality is we do not receive a full return distribution over 20 years – we only receive one path. Therefore, we need to push up the distribution we receive, narrow the possible paths, reduce losses and avoid bankruptcies. We need to make sure we can survive and live well with the worst possible paths and eliminate them where we can. In Howard Marks’ memo “Fewer Loser, or More Winners?” he highlights that investment outperformance will always be about asymmetry, with different forms of aggressiveness and defensiveness. Our structure affords us the opportunity to generate asymmetry by constructing a portfolio of companies with robust fundamentals and using volatility within cleantech sectors to our advantage.

Figure 9: Illustrative Return Distribution and GIP Approach



Conclusion

As we wrote in our original Cleantech Cycles paper: “In some irrational speculative environments, we anticipate our strategy will underperform passive cleantech ETFs. However, over the long-term real fundamentals are what truly matter and are how a company is eventually measured. To paraphrase Benjamin Graham, in the short-term the market is a voting machine, but in the long-run the market is a weighing machine – evaluating the substance of a company. We are confident that fundamentals will prevail and provide more sustainable returns over the coming years, compared to the speculative growth in stock market valuations we have seen in some areas in recent years, most notably within the hydrogen fuel cell sector.”

The tide has been going out in many cleantech sectors since early 2021. The risks of passive cleantech ETFs we highlighted in Jan-21 have largely been shown through significant drawdowns in some of the most popular ETFs. However, it is comforting to see average fundamentals have improved and support for cleantech globally is still a major tailwind for the sectors. With the heightened volatility and lower valuations, there are a significant number of opportunities today. We aim to build a system that shields us from short-term noise, and allows us to use volatility as an opportunity to enhance a portfolio’s average IRR and achieve outperformance.

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