

Double Whammy: Decarbonisation and De-risking in Developing Economies

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Executive Summary

Equity and the principle of “*common but differentiated responsibilities...*, in the light of *different national circumstances*” for developing economies was fundamental to the signing of the Paris Agreement. Yet, corporate strategies for Paris compliance have not differentiated sufficiently between developed and developing countries. In practice, strategies such as the EU Paris Aligned Benchmarks and Climate Transition Benchmarks (PABs and CTBs) do not distinguish between regions – meaning emerging markets PABs must decarbonise at the same 7% p.a. rate as developed market PABs. This can lead to unintended consequences for investors focused on total portfolio decarbonisation and we argue it does not represent genuine Paris aligned investment.

The Paris agreement also calls for “*making finance flows consistent with a pathway towards low GHG emissions and climate-resilient investment*”. A large proportion of the clean technology growth required in net zero scenarios will come from emerging markets; but climate solutions exposure in developed and ACWI based climate index strategies is often limited.

China is leading progress on many transition technologies, such as batteries; it is both dominant and firmly embedded in the global clean tech value chain. However, Chinese companies are under-represented in index-based investment strategies due to what we describe as the “China Fudge Factor”.

The **Storebrand Plus Funds** aims to overcome these issues by seeking exposure to ‘climate beta’ and by systematically identifying as many climate solutions companies as possible, in all regions globally. Most sizeable climate solutions investment opportunities in our resulting global opportunity set are listed in emerging markets. In contrast, we find the opportunity is limited for ‘passive’ investors in ‘Paris Aligned’ or climate indices to tilt towards green revenues and climate solutions in a diversified manner. Our approach is to diversify the exposure, increasing the positive climate beta tilt but via more companies. Interestingly, despite the greater exposure to climate solutions and greater climate tilt/active share than these climate indices, our expected tracking error is lower vs the market cap index than most climate index strategies in our sample¹.

¹ We believe our sample to be representative of the broad market of climate index strategies, which we monitor regularly via Morningstar and Bloomberg.

1. Paris aligned portfolio construction and the absence of 'common but differentiated responsibilities'

There are important differences between 'Paris alignment' and 'net zero'. The Paris agreement is rooted in real world consequences that rely on international cooperation – so it was crucial to its success that the Paris agreement distinguished between developed and developing economies.

The United Nations (UN) and the Intergovernmental Panel on Climate Change (IPCC) acknowledge that developed nations hold more responsibility for climate change due to historical emissions and have more capability than emerging economies to decarbonise and adapt to the effects of climate change.

This is reflected in Article 2.2 of the Paris Agreement which states: ***"This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."***

The International Energy Agency (IEA) recently updated their net zero pathway, highlighting: ***"In our pathway, advanced economies reach net zero sooner to allow emerging and developing economies more time"***.

Institutional investors are increasingly compelled by regulators to consider the financially material climate related risks they are exposed to from the transition to a low carbon or 'Paris aligned' future.

So far, the focus has been on decarbonising existing portfolios using 'Paris compliant' trajectories based on scientific pathways from the IPCC. The benchmark for that approach was set by the EU in 2019 with the creation of their regulated Paris Aligned Benchmarks (PABs) and Climate Transition Benchmarks (CTBs) which both require an annual portfolio decarbonisation rate of at least 7% p.a.

But recent academic assessment of corporate Paris Compliance strategies, illustrates that ***"the underlying pathways may not have distinguished sufficiently between developed and developing nations."***

Similarly, the PAB regulations do not distinguish between countries or regions - so to be 'Paris aligned' the 7% decarbonisation

rate applies regardless of the regional focus of the parent benchmark.

The result is that currently available emerging market equity PABs are forced to decarbonise at the same rate as developed market PABs – and some claim to 'go further' than EU regulations, decarbonising at a rate of 10%p.a.

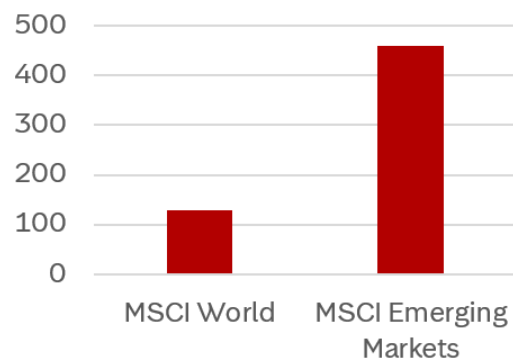
We argue this does not represent genuine 'Paris aligned' investment as it does not meet the Paris Agreement goal of reflecting equity due to different national circumstances.

We have shown in our earlier research that focusing on Scopes 1-3 emissions alone can present a misguided indicator of where financially material climate risk sits in a portfolio². Rigid or systematic portfolio decarbonisation can lead to climate solutions technologies being underweighted or altogether avoided. This unbalanced focus on total portfolio decarbonisation, relative to growth trajectories in portfolio green revenues, means many attempts at Paris aligned portfolio construction lack real world credibility.

As shown in Figure 1, emerging markets portfolios tend to exhibit higher carbon

emissions than developed markets, meaning they can be an easy reduction target for investors focused on total portfolio decarbonisation.

Figure 1: Carbon Intensity Scope 1 and 2



Source: Storebrand analysis using Trucost data, as at 31 December 2023. WACI [ton co2-equiv/mGBP sales]

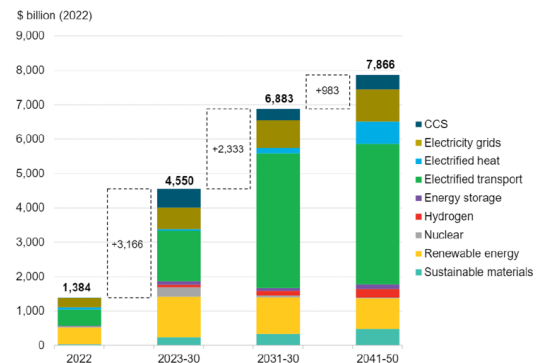
Concerns over social and governance risks have led to some ESG aware investors pulling out of emerging markets entirely – with portfolio decarbonisation cited as a co-benefit. Western investors have dramatically cut their exposure to China due to geopolitical tensions, leading to an unfortunate misfire for 'Paris aligned' investors in emerging markets. Many developing countries host companies leading progress in climate solutions technologies that are often missed by

² [The Paris Alignment Paradox: Scoping Out Solutions - www.storebrand.com](https://www.storebrand.com)

climate- or ESG-conscious international investors.

That is contradictory to article 2c) of the Paris Agreement which focuses on: "**Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.**" In practice, that means investing in the technologies and products that we need to transition to an electrified economy: grid investments, heat pumps, electrified transport, and of course renewable energy sources. As shown in Figure 2, this requires investments of over \$4.5tn a year for the next decade, increasing to \$7tn (2030-2040) and then \$8tn a year through to 2050 to align with the Paris goals.

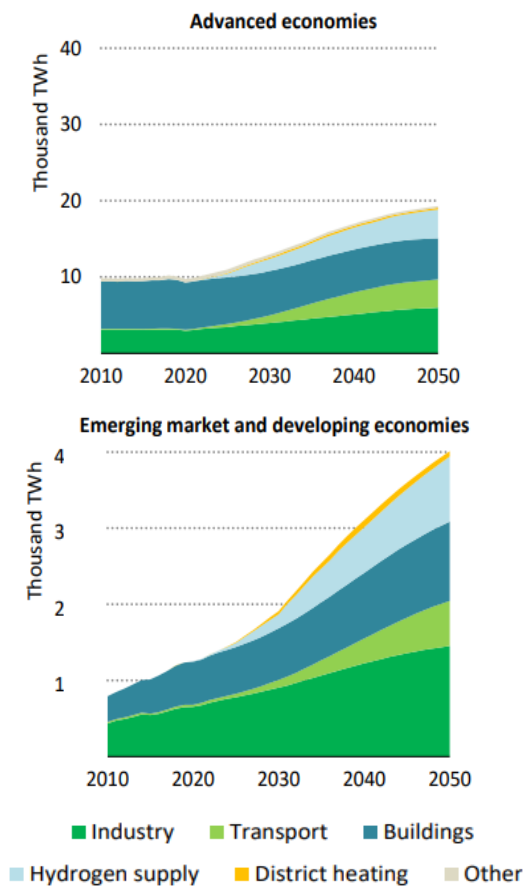
Figure 2 – Comparison: 2022 energy transition and grid investment vs required annual investment in 2023-30, 2023-40, and 2041-50 in NEO 2022 Net Zero Scenario



Source: Bloomberg New Energy Finance: *Energy Transition Investment Trends 2023*. Taken from Storebrand Asset Management Whitepaper: *The Paris Alignment Paradox: Scoping Out Solutions*, May 2023

An interesting feature of the global transition to a Paris aligned economy is how much of the required clean technology growth will come from emerging markets. Net zero will be won or lost in developing countries, which will be increasing living standards and decarbonising at the same time – the 'just transition' in action. The co-benefits of the clean tech transition for emerging economies are many.

Figure 3 – Net Zero Electricity Demand by Sector and Region



Source: IEA, based on NZE 2050 Scenario³

Paris alignment is largely about growing a new electrified economy, at breakneck speed – it is not merely about decarbonising our existing portfolios.

Our approach to Paris aligned investing differs to that taken by the EU in their PAB regulations. Rather than focusing on

decarbonising our portfolio by 7% p.a. we seek exposure to **climate beta** in the real economy. This means reducing our exposure to climate negative companies and activities and increasing our exposure to climate positive companies and technologies. For example, climate beta can come from exposure to companies benefiting from policies enabling Paris aligned growth in the real world – US Inflation Reduction Act (IRA), EU Green Deal and China's new regulations covering their national Emissions Trading Scheme.

The US IRA has had huge implications for Korean battery makers –such as Korean company LG Energy Solution which announced a large investment into LFP battery production in Arizona in 2023. It is now estimated that around 20% of the stock's value is attributable to IRA subsidies. Biden recently doubled down on his China trade barrier, announcing a new 100% tax on Chinese EVs⁴. But Western battery makers are, on the whole, behind China and "playing catch up"⁵ on battery technology.

Our research shows that a large proportion of the green revenue/climate solution

³ Net Zero by 2050 – Analysis - IEA

⁴ Biden's China Tariffs Are the End of an Era for Cheap Chinese Goods - The New York Times (nytimes.com)

⁵ FT.com: Rival battery technologies race to dominate electric car market

technology exposure in a standard developed market or ACWI 'climate aware' index, such as PABs and CTBs, often comes from a single US company, Tesla.

In April last year Tesla announced it would be building a new battery factory in Shanghai to increase production and lower costs, despite political pressure in the US for American companies to become less reliant on China. Divesting the entire Chinese equity market on social concerns gives only the illusion of a China-free portfolio. For example, one third of the value of an EV is in the battery and China accounts for 75% and 99% of manufacturing the two leading battery technologies (NMC and LFP)⁶.

Although US and European policymakers are trying to reduce domestic dependency on China it will take time to catch up with decades of Chinese investment in clean tech progress and whether those policies will lead Western industries to become competitive with China remains to be seen.

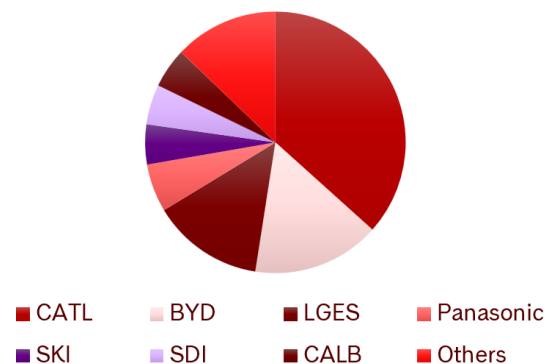
It is not possible to simply separate China from the technological transition to a low carbon future and a large majority of the

investible universe related to batteries and renewable energy is presently concentrated in China.

2. Paris Alignment and the China Fudge Factor

China is dominant throughout the clean tech value chain, but it remains under-represented in index-relative investment portfolios.

Figure 4 - The Global Market Share of Battery Makers



Source: SNE

Chinese company CATL is responsible for over a third of global market production, combine that with BYD and just the two biggest Chinese companies are responsible

⁶ FT.com: Rival battery technologies race to dominate electric car market

for over half of battery production globally – followed by Korean company LG Energy Solution.

Value chains for the energy transition are complex and technical. There are 50 steps in the production process for a lithium-ion battery – which means there are many investment opportunities for diversified access to the rapid revenue growth expected in lithium-ion batteries and associated industries in the next ten years.

This picture represents decades of Chinese investment in the energy transition.

Western investors are generally underexposed to this if they're using ACWI or Emerging Market benchmarks to judge their allocations to China, as we have illustrated below. In Figure 6 we show the market share of three of the world's largest lithium-ion battery companies – CATL (Chinese), LG Energy Solution and Samsung SDI (both Korean).

Figure 5 – Clean Energy Manufacturing Capacity by Location⁷

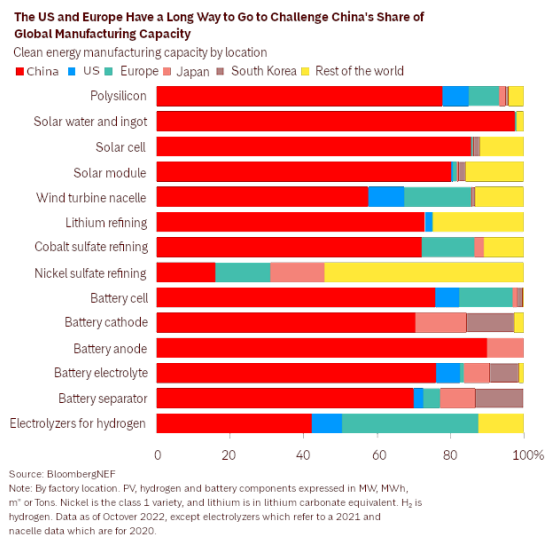
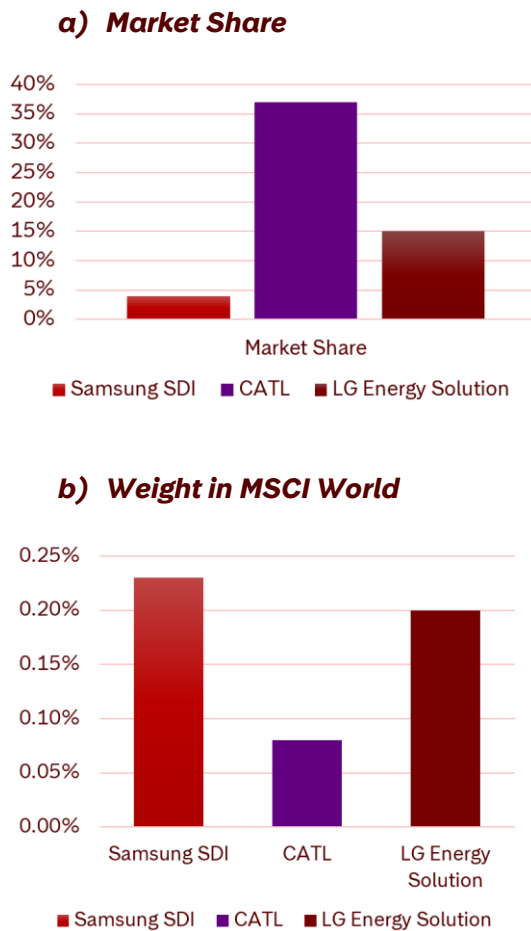


Figure 5 shows China is currently dominant in almost every element of clean energy manufacturing capacity.

⁷ BloombergNEF



Figure 6 – Market Share of Three Battery Companies and their weights in MSCI World



Source: Bernstein, MSCI, Bloomberg, 31 January 2024.

CATL has a dominant market share but the weight given to CATL in MSCI's EM benchmark is only 0.08% vs 0.23% for Samsung SDI and 0.20% for LG Energy Solution. This seems strange given the index is supposed to represent the investable

market opportunity based on market cap weightings. Of course, there are other issues at play in the index position, such as the company's valuation and free float percentage – but these do not explain the large discrepancy in MSCI's China weights.

LG Energy Solution has a 2.5 times larger weight in MSCI EM than CATL despite a free float of only 20%, compared with around 50% for CATL⁸.

China is under-represented in global MSCI indices due to a technicality in the inclusion of Chinese domestic A shares.

All global indices allow for 'foreign room', meaning they cap exposure to companies based on how much foreign investors can access of companies listed in certain markets. MSCI imposes a 'Foreign Ownership Limit' of 30% on China A Shares to account for that – however this still does not account for the small positions in Chinese companies relative to those in other emerging markets. We find the answer by digging far into the MSCI index methodology⁹, on page 153:

⁸ 80% is held by LG Chem

⁹ Source: MSCI Global Investable Market Indexes Methodology, February 2024. Available at MSCI.com

Figure 7 – MSCI Index Methodology



MSCI began including Shanghai and Shenzhen shares in 2018 using an ‘inclusion factor’ to gradually phase in China A shares over time. It began with a weight of 5%, then increased the weight with a three-phase approach to 10%, 15% and 20% - but stopped there in 2019¹⁰. It is not clear why MSCI stopped at 20%, and when, or even if, the inclusion process might continue, but the resulting position of China in the MSCI All Countries World Index at only around 4%¹¹ does not represent its global “economic significance”¹².

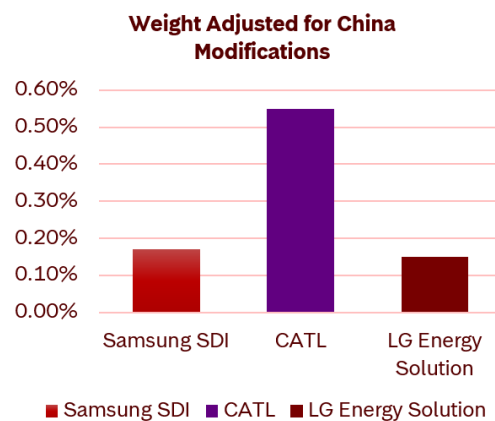
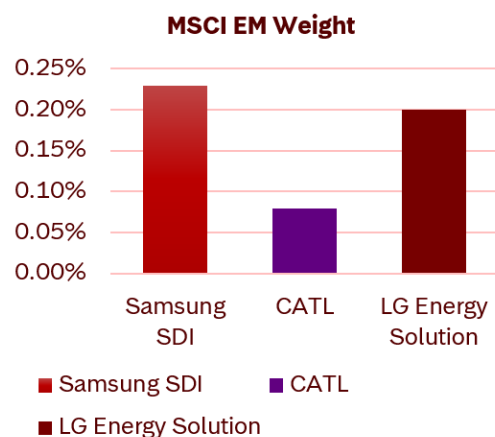
Therefore, at present, the maximum weight of Chinese companies in MSCI indices is only 6% of market cap [30% Foreign Ownership Limit x 20% Inclusion Factor]. We see this as a meaningful under-representation of Chinese companies’ presence in the transition economy.

¹⁰ [China A Share Update: MSCI Increases Inclusion Factor to 20% – Global X ETFs](#)

¹¹ 4.2% as at end January 2024

In Figure 8a, we have shown the same three battery companies’ MSCI weights as in Figure 6 but then adjusted the weights in 8b by removing the China modifications.

Figure 8 - Three Battery Companies and a) their weights in MSCI World, then b) adjusted for the China modifications



Source: Storebrand analysis. Bernstein, MSCI, Bloomberg, 31 January 2024. b) Weight adjusted for both 20% inclusion factor and 30% foreign room factor.

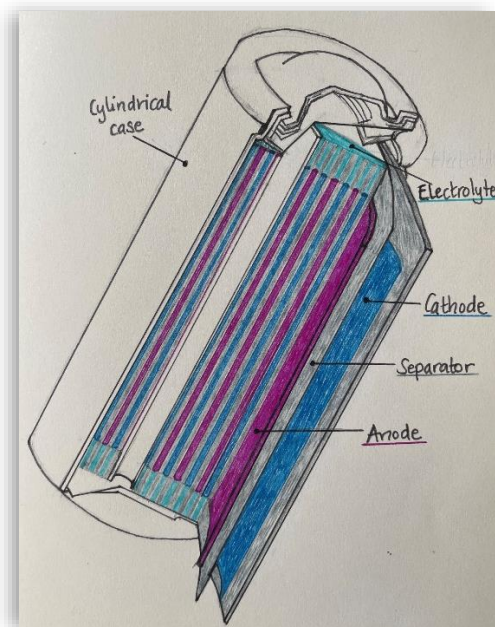


If we adjusted the index weights for the China fudge factor then CATL would have a weight of 3x that of either Samsung SDI or LG Energy Solutions.

3. Climate Beta and the Battery Value Chain

The battery value chain is a good example of where investors can access 'climate beta'. It is a certainty that a lot more batteries are going to be needed in a net zero economy. There are 50 steps in the production process for a lithium-ion battery, so the value chain is complex.

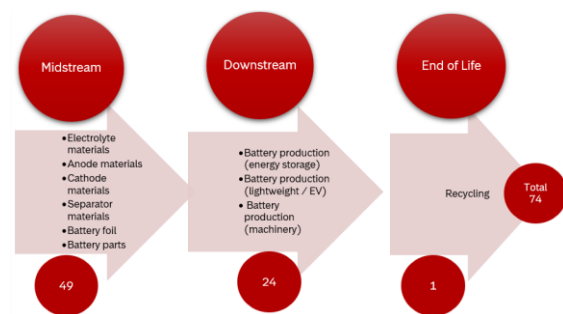
Figure 9 – Parts of a Cylindrical Cell Battery



Source: Storebrand and Financial Times. Image adapted from FT¹³.

There are four main stages to the battery value chain, as illustrated in Figure 10.

Figure 10 – The Battery Value Chain



Source: Storebrand (data as at 31 December 2023)

As an investor that seeks broad, diversified index-like market exposure to the transition, we try to capture as many companies as we can in each of these phases. We then include them in portfolio optimisation where weights are chosen according to their market capitalisation as well as risk exposures, country, sector, factor and climate risks or opportunities.

Our aim is to find companies that provide exposure to 'climate beta' through offering climate solutions products and services. However, we find that there are too few 'pure play' climate solutions companies in the

¹³ [Rival battery technologies race to dominate electric car market \(ft.com\)](https://www.ft.com/content/2023-01-11/rival-battery-technologies-race-to-dominate-electric-car-market)

market cap index at present and there is no definitive market-based list of such companies.

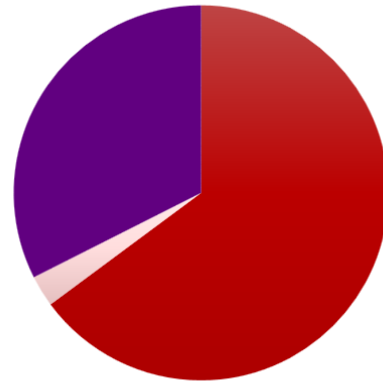
We use a systematic process, incorporating AI technology provided by Morningstar, to identify companies across the opportunity set, rather than country or sector specific opportunities. This method means we will continue to seek out and add new, relevant listed companies as they become available.

Our process has identified over 70 investable companies in the battery value chain, offering access to diversified 'climate beta'.

We aim for diversified, low risk exposure to the growth in batteries required for the energy transition. At present the majority of investable opportunities are in China, as illustrated in Figure 11.

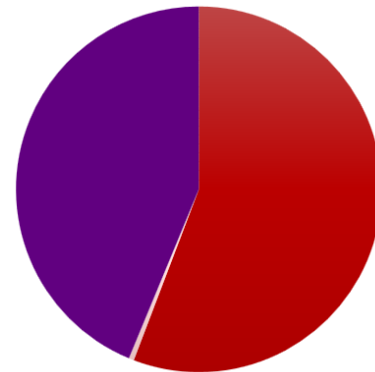
Figure 11 – Regional split of Battery Value Chain exposure

Regional split (# companies)



■ China ■ Hong Kong ■ Korea

Regional split (mkt cap x free float)

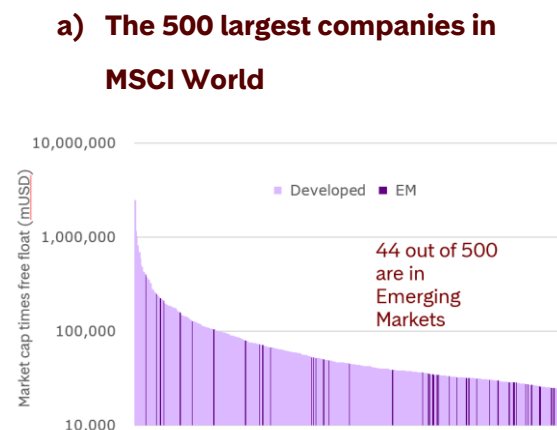


■ China ■ Hong Kong ■ Korea

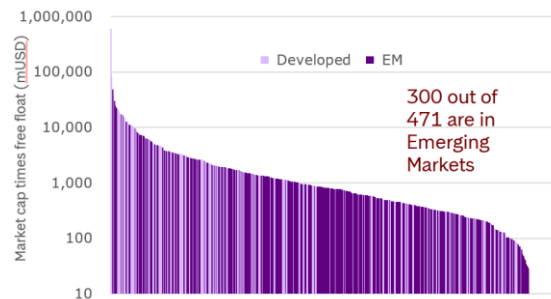
Source: Storebrand Global ESG Plus, holdings in battery value chain companies in the Climate Solutions Portfolio, as at 31 December 2023

This battery value chain picture is representative of what we find across the climate solutions opportunity set. Our analysis presents a similar picture for grid investment opportunities – it is a common theme across all types of solutions companies that the most sizeable investable opportunities are in emerging markets, as illustrated in Figure 12.

Figure 12 – Companies sorted from largest to smallest (market cap x free float)



b) The 471 Climate Solutions¹⁴ companies in our ACWI investment universe



Source: Storebrand, MSCI. The free float factor is taken from Bloomberg

Emerging Markets are an inextricable part of the global transition value chain, and a breeding ground for investment opportunities in climate solutions technologies.

An investment portfolio that seeks 'Paris alignment' would lack opportunity, and perhaps even credibility, without considering either value chain exposure or demand growth in emerging markets, including China.

¹⁴ Storebrand internal definition for Plus funds methodology= min 50% revenues or 50% market cap associated with climate

solution activity. More information on the climate solutions methodology is available on request.



4. The Limited Climate Solutions Exposure in 'Paris Aligned' Benchmarks

There are many features to consider when aligning with the goals of the Paris Agreement. Economy decarbonisation is, of course, the primary goal but genuine Paris alignment also involves growing the green economy - and incorporates the global south.

There are only 74 companies that meet our climate solutions definition in the MSCI Emerging Markets Index and only 36 in the MSCI World Index. The opportunity set for 'passive' investors is therefore limited as 'Paris Aligned' or climate indices are created with market cap 'parent benchmarks' as the investment universe. So, although the methodology of many climate benchmarks incorporates a tilt towards green revenues / climate solutions, the opportunity to do so in a diversified manner is limited. In practice we find that many climate benchmarks have concentrated overweight positions in a handful of 'low carbon' companies, although

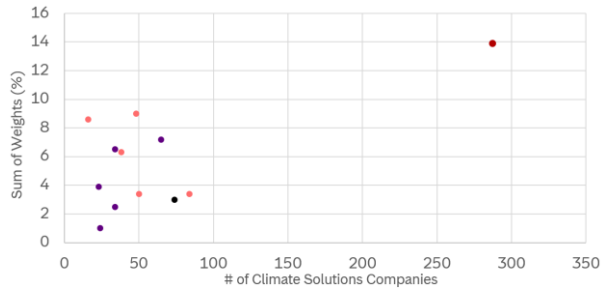
those companies may have no apparent link to the transition or 'climate beta'¹⁵.

Our method has identified 471 companies across global developed and emerging markets, allowing us to offer diversified exposure to companies delivering products and solutions directly linked to the climate change problem.

In Figure 13, MSCI EM is shown in black, it has 74 solutions companies at a 3% weight. The climate indices are constrained to the universe of companies in the original 'parent' benchmark but tend to concentrate their positions, they have fewer companies but higher weights than the market cap index.

¹⁵ Please see our paper for more analysis: [The "magnificent" performance of climate index strategies - www.storebrand.com](http://www.storebrand.com)

Figure 13 – Climate Solutions Exposure in Climate Index Funds



- Storebrand EM ESG Plus
- MSCI Emerging Markets
- EM PAB Tracker
- Other EM Climate/Low Carbon Index Tracker

Our approach is to diversify the exposure, increase the positive climate beta tilt but via more companies. Interestingly, despite the greater exposure to climate solutions and greater climate tilt/active share than these climate indices, our expected tracking error is among the two lowest when measured vs the MSCI EM market cap index¹⁶. Our analysis shows that some of the climate indices have 3-4% tracking error vs the market cap index.

¹⁶ Ex ante TE is calculated using MSCI BarraOne and holdings for various climate index trackers from Morningstar.

Conclusion

Corporate strategies and institutional pathways for 'Paris alignment' have not sufficiently accounted for the Paris agreement goal of "common but differentiated responsibilities". As a result, 'Paris aligned' investment strategies narrowly defined by an indiscriminate portfolio decarbonisation rate and without stronger focus on green economy growth, such as PABs and CTBs, lack real world and scientific integrity. Carbon emissions can be a misleading indicator of portfolio Paris alignment and lead to reductions in both climate solutions investments and emerging markets – both of which are key to the transition.

Investors are cutting back on emerging markets exposure, particularly China, due to social, governance and geopolitical risks. This delivers an unfortunate decarbonisation and derisking double whammy for 'Paris aligned' investors in developing economies.

Emerging markets offer multiple, diverse opportunities for investors seeking exposure to a Paris aligned economy via 'climate beta'. China is an undeniable and inseparable piece of the global value chain puzzle and holds a dominant position in many technologies and products crucial to the transition. Diversification of transition supply

chains away from China is likely to increase going forward due to targeted international policy, particularly from the US and Europe. But China offers by far the most developed opportunity set for investors seeking solutions exposure in emerging markets and remains under-represented in global indices. Further, analysis of net zero demand projections, income growth expectations and adaptation opportunities shows an investment portfolio that seeks climate beta or 'Paris alignment' would lack investment candidates, and perhaps even credibility, without considering either value chain exposure or demand growth in emerging markets, including China.

An inherent uncertainty in global policy and pathways towards Paris Alignment, and international efforts to diversify the green energy value chain away from China mean a diversified approach, that does not aim to time markets or pick winners, may be optimal. Paris Aligned Benchmarks do not offer exposure to the full opportunity set available climate solutions opportunities in Emerging Markets and passive attempts at Paris alignment are problematic.

The road to a Paris aligned future is uncertain and will be bumpy – but any response must be truly global. Climate change is not a regional issue.

Important Information

This is a marketing communication, and this document is intended for professional investors only should not be construed as investment advice. Except otherwise stated, the source of all information is Storebrand Asset Management AS ('SAM') as at 30/04/24.

Statements reflect the portfolio managers' viewpoint at a given time, and this viewpoint may be changed without notice. Historical returns are no guarantee for future returns. Future returns will depend, inter alia, on market developments, the fund manager's skills, the fund's risk profile and subscription and management fees. The return may become negative as a result of negative price developments. Future fund performance is subject to taxation which depends on the personal situation of each investor, and which may change in the future. Before any investment is made in the Fund, investors are urged to consult with their tax advisor for a complete understanding of the tax regime, which is applicable to their individual case. The fund's NAV is calculated in foreign currency and returns may vary as a result of currency fluctuations. An overview over applicable fees is available here: <https://www.storebrand.com/sam/lu/asset-management/offerings/funds-list>

The management company of the AMX UCITS CCF is Carne Global Fund Managers (Ireland) Limited (CGFMIL) registered in Ireland (No. 377914), authorised, and regulated by the Central Bank of Ireland, registered with the Securities Exchange Commission as an Exempt Reporting Adviser (CRD 173794); and the Commodity Futures Trading Commission as a Commodity Pool Operator, member of the National Futures Association. AMX UCITS CCF has appointed Storebrand Asset Management AS as investment manager.

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