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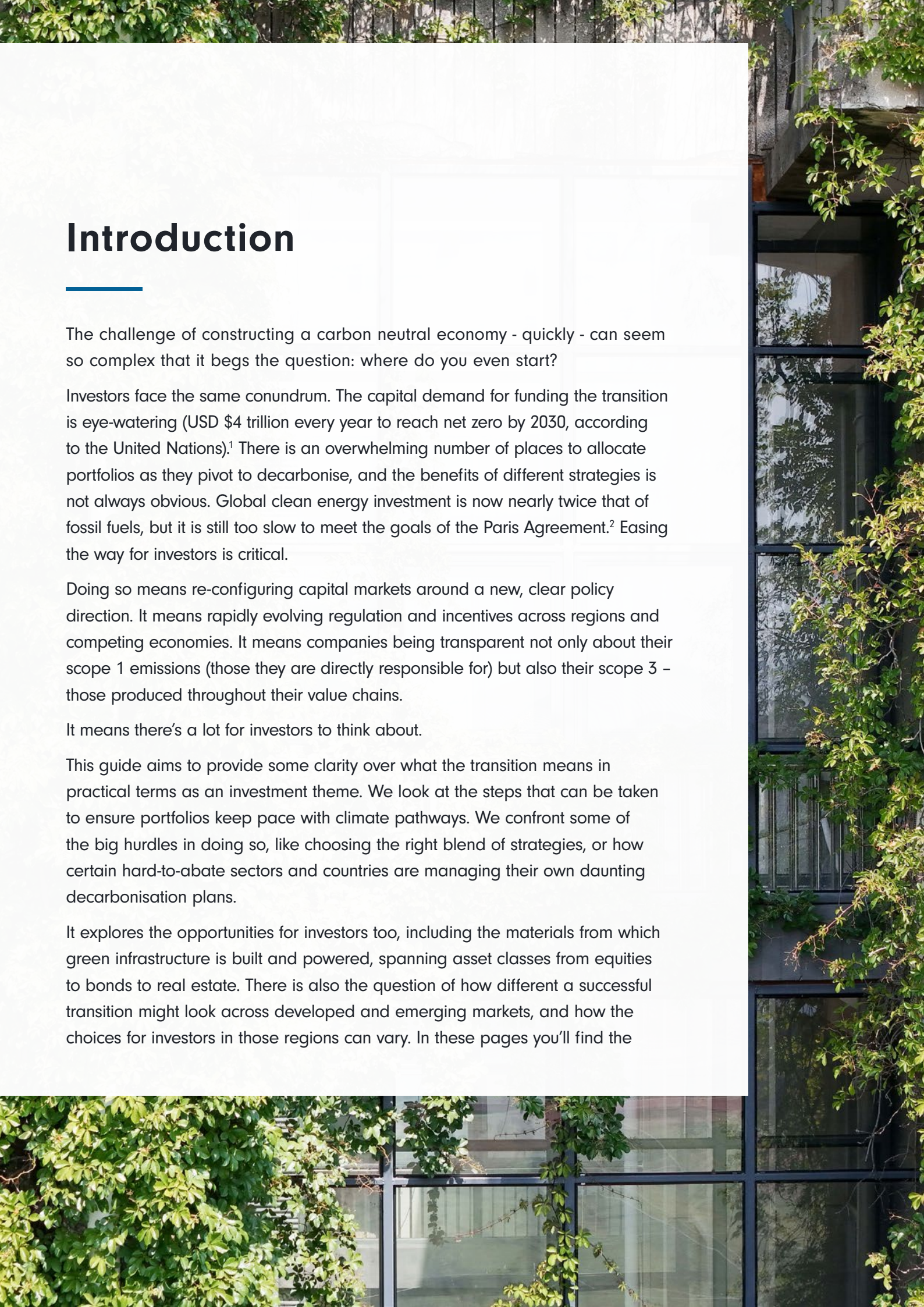
A Practitioner's Guide to Investing in the Energy Transition

This is for investment professionals only and should not be relied upon by private investors





“The vast breadth of the energy transition offers access for all types of strategies. But regardless of your approach, there are some principles to guide investors through this historic change.”



Introduction

The challenge of constructing a carbon neutral economy - quickly - can seem so complex that it begs the question: where do you even start?

Investors face the same conundrum. The capital demand for funding the transition is eye-watering (USD \$4 trillion every year to reach net zero by 2030, according to the United Nations).¹ There is an overwhelming number of places to allocate portfolios as they pivot to decarbonise, and the benefits of different strategies is not always obvious. Global clean energy investment is now nearly twice that of fossil fuels, but it is still too slow to meet the goals of the Paris Agreement.² Easing the way for investors is critical.

Doing so means re-configuring capital markets around a new, clear policy direction. It means rapidly evolving regulation and incentives across regions and competing economies. It means companies being transparent not only about their scope 1 emissions (those they are directly responsible for) but also their scope 3 – those produced throughout their value chains.

It means there's a lot for investors to think about.

This guide aims to provide some clarity over what the transition means in practical terms as an investment theme. We look at the steps that can be taken to ensure portfolios keep pace with climate pathways. We confront some of the big hurdles in doing so, like choosing the right blend of strategies, or how certain hard-to-abate sectors and countries are managing their own daunting decarbonisation plans.

It explores the opportunities for investors too, including the materials from which green infrastructure is built and powered, spanning asset classes from equities to bonds to real estate. There is also the question of how different a successful transition might look across developed and emerging markets, and how the choices for investors in those regions can vary. In these pages you'll find the

best thinking from Fidelity International's portfolio managers on where and when specific allocations make sense.

Underpinning all these ideas is the direction set by policymakers. Private investment can do its part, but what is becoming abundantly clear - and is echoed by our global team of analysts here - is that the energy transition must be driven from the top. There has been some success with the heavy investment ushered in by the Inflation Reduction Act in the US and the regulatory wave precipitated by the EU's Green Deal. But these initiatives stand in contrast to confused or weaker policy signals elsewhere. For the most part there is still not enough focus on long-term economic incentives: it must make commercial sense for a company to change, and markets need assurance that regulation won't waver.

Investors also need agreed scientific pathways against which they can measure company performance. Only then can they be confident that a particular activity is doing enough to mitigate transition and physical risks.

With that kind of direction, companies and nations can refine their own plans, highlighting the obstacles to their net zero targets. Progress then becomes self-reinforcing: the obstacles reveal where more policy and innovation are needed, government action clears the way and bolsters those markets.

What you'll find in these articles is informed by the latest details to have emerged from climate financing frameworks and taxonomies. It follows developments that underline the energy transition as a vital trend for investors, such as Japan's recent leadership in transition finance, or signs that China may commit to a more ambitious cut in its emissions on the back of its huge renewables rollout. And, of course, there's the advancements in technology which continue to broaden the scope of companies, themes, and commodities that investors can include in low-carbon portfolios.

The energy transition is a topic of phenomenal scale. We hope this guide helps bring it down to size.



Jenn-Hui Tan

Chief Sustainability Officer

¹[Five ways to jump-start the renewable energy transition now | United Nations](#)

²[World Energy Investment 2024 | IEA](#)

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There's more than one way to decarbonise a portfolio



Gabriel Wilson-Otto
Head of Sustainable
Investing Strategy

Discussions with investors about how to green their investment strategies are growing increasingly sophisticated. That's a good thing.

A client we work with recently decided to target net zero across all its operations and services. But there was a problem. The managers of its pension fund weren't sure of the best way to achieve this goal across their entire investment portfolio.

As investors move beyond setting long-term targets and start implementing concrete actions to achieve them, they face common problems: how to measure companies on their progress and credentials? What path towards net zero should they assume? How do you benchmark results? Or how to deal with the crowding out - and volatility - of some sectors most obviously contributing to the transition?

This article gives an overview of the tools investors can use to answer these questions, followed by a handful of principles from one of our multi-asset fund manager on how to go about building a portfolio once a decarbonisation pathway is chosen.

For our pension fund client, early discussions focused on a traditional credit mandate. But

after we shared results of our climate analysis - including temperature alignment estimates which showed how a traditional portfolio compared against their target - the conversation quickly moved to practical steps to adjust the client's portfolio to a 1.5-degree pathway.

After we shared results of our climate analysis the conversation quickly moved to practical steps to adjust the client's portfolio to a 1.5-degree pathway.

The first of those steps is identifying the most effective tools an investor can use to achieve alignment with a decarbonisation goal. That can be simple portfolio decarbonisation - aiming to reduce portfolio emissions on a specific 'glide path' either to net zero or relative to a benchmark. Or the investor might aim to increase over time the

proportion of stocks from issuers that have targets approved by the Science Based Targets initiative (SBTi). Another option is to aim for a specific level or rate of improvement in the portfolio's Implied Temperature Rise, a metric designed to show how companies align with global temperature goals.

The next step is deciding how aggressively to apply those tools. In other words, what's the pathway to achieving the investor's climate ambition? Answering that determines what actions to take now, and depends in turn on questions like:

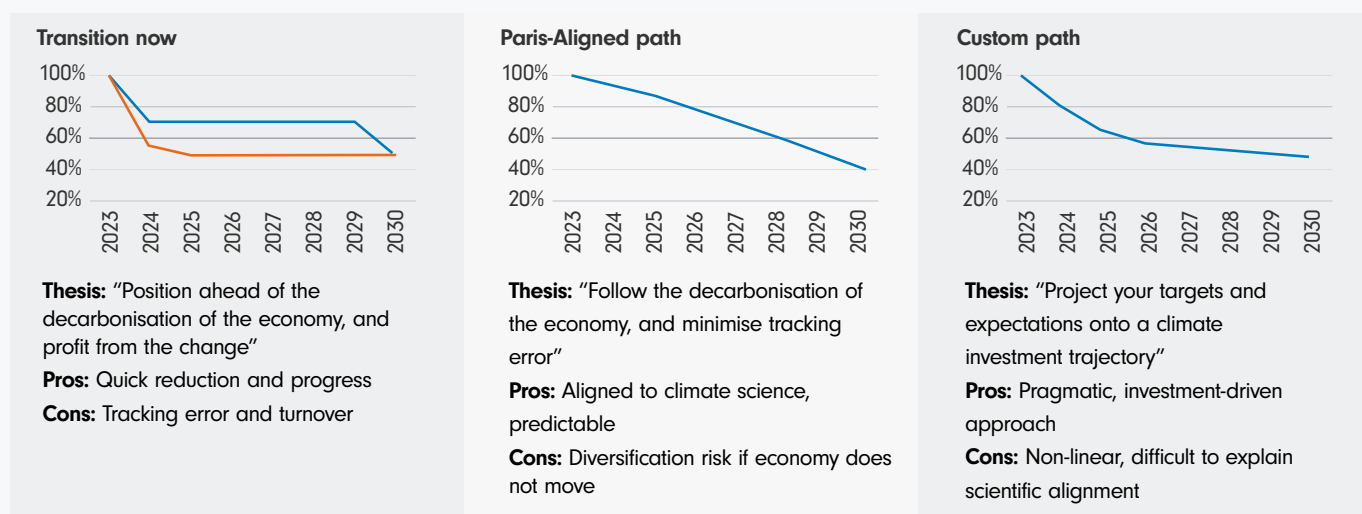
- How quickly will different economies reduce their carbon emissions, and how will the outcomes differ between, say, the EU, Asia, or the US?
- Will adoption rates for 1.5 degree-aligned targets, such as under the SBTi, continue to increase rapidly?
- How much active risk should you take on climate?

These questions help to define your decarbonisation path (see diagram).

That might be positioning for rapid change now, with the aim of getting ahead of the energy transition and looking to profit from the change. The approach has the advantage of reducing an investment portfolio's impact quickly, but at the cost of greater tracking error and more turnover.

Or you might choose a Paris-aligned path, aiming to follow the decarbonisation of the economy in line with the Paris Agreement of 2015. This provides a more predictable course aligned with climate science but there is an increasing gap between national policy and the actions needed to achieve the objectives of the Paris Agreement. That could introduce risk in the absence of a 'catch-up' policy response, as well as from sector or geographical concentration if decarbonisation is uneven.

Chart 1: Which climate view is closest to you



Source: Fidelity International, 2024.

Note: Climate Index = 100 at the start. For visual purposes only.

There's also the option to define a custom path by using your own targets and macro-economic expectations to determine your investment strategy. This can be a pragmatic approach for managing near-term risk, but it may be misaligned with the transition required to limit the worst impacts of climate change. It could also be subject to policy risk if there is a rapid unanticipated adjustment to global climate ambition.

Balancing acts

Climate change presents some obvious (and some not so obvious) risks to portfolios, but also a universe of sustainable investment solutions that can generate returns. The risk side breaks down into transition and physical risks. Managing transition risks includes assessing companies' commitments to achieving net zero and, where material, selecting issuers with lower carbon intensity and better climate risk management than their peers (how we achieved the 1.5-degree portfolio for the pension fund).

Mitigating physical risks involves trying to minimise the adverse effects on a portfolio resulting from climate change, or otherwise ensuring investors are compensated for taking that risk. In practice this means considering the location of assets and their exposure to climate threats, what adaptation measures are in place, how resilient supply chains are, and how well diversified the portfolio is when these risks are taken into account. The longer the investment time horizon, the bigger this risk.

When it comes to the opportunities, investors can focus on companies that are making a quantifiable contribution to positive climate outcomes. This may sound straightforward, but investment strategies that are aligned with sustainable themes tend to be concentrated in a smaller subset of sectors compared to the typical investment universe. This

concentration can lead to volatility. Clean energy, for example, has underperformed since the third quarter of 2023, while traditional energy companies have rallied.

Sustainable thematic funds meanwhile tend to be overweight stocks whose multiples became stretched in the early part of this decade, only to experience compression more recently. These are stocks with a relatively narrow set of revenue drivers, in sectors that can fall out of favour quite quickly if there's a shock. And of course, geopolitical tensions have risen and central banks have hiked interest rates in the years since sustainable thematic stocks were at their most favoured.

By contrast, the premium on sustainable blue chips that are more widely owned has been much more robust. These companies, taken together, have more diverse exposure than those typically held in thematic portfolios, which means they are naturally hedged against volatility in any one sector. They are more likely to move in line with market sentiment as opposed to sector or theme sentiment, making them less of a 'pure play' option.

Pragmatic approaches

Rather than relying on a menu of pre-existing funds, investors are increasingly turning to asset managers for advice and intelligence, as well as co-designing sustainability and outcome-based strategies for customised solutions.

A fixed-income investor looking to achieve a Paris-aligned path can aim gradually to reduce the level of carbon emissions in their portfolio, thereby reducing exposure to potential carbon and stranded asset risks. Or, if they were pursuing a temperature targeting strategy, they can tilt towards bonds issued by companies that operate with more carbon efficiency than

others in their sector, and so are less sensitive to potential carbon costs. A direct lender can make sustainability-linked loans, using coupon step-ups and climate-related covenants to hedge climate risks.

As well as addressing climate risks, an investor might also aim to hold a portfolio of companies whose revenue sources align with the energy transition.

Equity investors can seek exposure to the structural climate change theme and invest in companies providing solutions (those producing the materials necessary for the energy transition, for example).

A real estate investor can lock a green premium into an asset by improving a building's climate performance. This can be especially effective if they are buying 'brown' (less green) real estate at a discount. Returns can materialise through direct cost savings from lower energy consumption or through selling buildings at a higher multiple once they achieve certain credentials.

For some sectors, aligning revenues with climate solutions is easier said than done, since future emissions reductions rely on technologies that are

not yet commercially available, like low-carbon steel, reduced-emissions cement, or hydrogen fuel. Over the medium to long term, however, the range of solutions to invest in should grow. A common approach is a core-satellite portfolio, with the core focused on decarbonisation and a minority of satellite investments in companies expected to enable the energy transition.

A problem solved

As with so much in life, finding the right solutions begins with asking the right questions. In the case of our pension fund client, we were able to create an investment grade active credit strategy that fits with their 1.5-degree target. The liquidity and size of the relevant asset class certainly helped. But we were able to take advantage of this by considering salient sustainability questions, identifying the right decarbonisation path to target, and then using climate reporting to inform the investment strategy.

A similar approach will work for some investors and not for others. It can be tempting to see a solution and figure out how it could work for you. But before you do that, take the time to make sure it's actually a solution to your problem. There is no one size fits all.





Four principles for a multi-asset approach to the great green shift



Julie-Ann Ashcroft
Portfolio Manager,
Sustainability

The vast breadth of the energy transition offers access for all types of strategies. But regardless of your approach, there are some principles to guide investors through this historic change.

The move to a decarbonised world offers one of the most exciting moments for investors I have encountered in all the years I've managed money. However, such is the scale of the transformation that it's easy to feel overwhelmed by the choices available to engage with this megatrend.

The first thing to bear in mind is that investing in the energy transition is as much about growth as it is about long-term capital preservation. Here are four ideas to ensure you're capturing both when building a multi-asset portfolio around the theme.

1. Remember: diversification builds resilience

The transition is a myriad of overlapping sub-themes. For example, the next decade will require widespread upgrades to the grid to support our increasing reliance on electricity.

For investors that could involve targeting utility companies, the miners producing the copper for wiring, or even the businesses that are manufacturing the cables or involved in the design and development of sub-stations.

The availability of these sub-themes should be positive for any strategy because they help achieve diversification through a broad set of thematic characteristics and build resilience into a portfolio.

Allocating to big energy transition themes like climate solutions, transition materials, and water and waste is a good start. But broadening your scope to take in more specific sub-themes of the transition can protect a portfolio from an over-concentration in stocks that may be charging a green premium, which might be sensitive to interest rate movements.

Exploring new industries that fit into a transition strategy is important, but it isn't

always straightforward. Take the potential sub-theme of technology firms which support decarbonisation initiatives. This could include companies developing artificial intelligence (AI)-driven systems to optimise grid infrastructure maintenance, power-generation sites, or simulate climate and weather conditions. AI is particularly tricky for the transition though: how do these businesses remain sustainable when their energy demand is so high - and growing?

2. Keep an open mind on products and places

Be agnostic about geographical diversification. Instead, find the best companies that offer performance around a theme. It may be there are certain companies benefitting from transition developments or regulation in a particular country or region, but be cautious of overweighting to just a handful.

Be flexible too when it comes to asset classes - building a transition portfolio with a mixture of fixed income, equities, and alternative credit such as infrastructure debt all adds resilience and a natural yield diversification. The maturation of the green and blue bond markets means there are increasingly attractive options in fixed income directly linked to the energy transition, while equity holdings can allow for a greater level of engagement with issuers.

However, the primary focus should be to find the right issuers that support the theme, and then select the options that best fit the strategy. The energy transition is not a short-term project and many of the options have decades-long investment horizons. Various pieces of global legislation - including the Inflation Reduction Act (IRA) in the US and other tax credit schemes

- are supporting a very long-term approach, encouraging investments in companies now that will have an impact all along the trajectory to net zero.

For those looking for more immediate returns, we're already seeing benefits in certain sectors. The world is undertaking a massive buildout of renewable energy infrastructure and a shoring up of electricity grids. Further down the line we expect green technologies that are nascent today - those focused on hydrogen, cathode materials, and battery storage more generally, for example - to provide ongoing support to the trend.

3. Be rigorous when exploring ETFs

Alongside traditional investment options, exchange traded funds (ETFs) can offer investors a cost-effective way to focus on a specific theme, while maintaining the liquidity of their holdings by being able to trade intraday. These tracking indices follow a set of rules, so investors must be comfortable with the intellectual property that goes into the creation of an index and the principles it follows. While most traditional ETFs return beta of the underlying strategy they are tracking, portfolios focused on specific themes will want rules that maximise the alpha they're after.

There are a lot of options. Be thorough in selection. One ETF can be materially different to the next, contradictory even. Those constructed around a hydrogen theme can have holdings that contrast significantly to those built for climate or clean energy. There are many more ETFs that target specific sectors such as solar power, wind energy, and other sub-sectors. Combining them can be effective, but due diligence ensures the correct exposure. Even so, in a passive ETF you're likely to get a tail of names that you're less interested

in. Active ETFs might be preferable and provide another option that gives investors more control and allows managers to leverage their own sectoral and regional analysis - but again, thorough research is vital.

4. Never take your eye off the risks

With the transition come the physical and financial risks posed by climate change. No matter the strategy it's important that the companies which investors chose exposure to are managing those risks. Businesses that are transitioning now are in theory reducing their future costs. Those that aren't are storing up issues for the years to come.

Regulatory risks are also significant. While many policies - such as the IRA in the US and green

financing initiatives in Europe - are enshrined in law, there can always be shifts in the way they're implemented. There could also be a change in the frequency at which new initiatives are brought in, although given the energy transition is increasingly core to both economic growth and energy security this seems unlikely, particularly in Europe since Russia's invasion of Ukraine.

Indeed, the transition has become one of the central themes of the investment landscape, and - while acknowledging the risks - its strong, long-term structural growth is particularly appealing. The momentum around decarbonisation is solid; the number of investment strategies available to explore the theme is vast. It's time to take advantage of them.





Investing in the energy transition needs long-term vision - plus short-term focus



James Richards
Senior Industry
Analyst



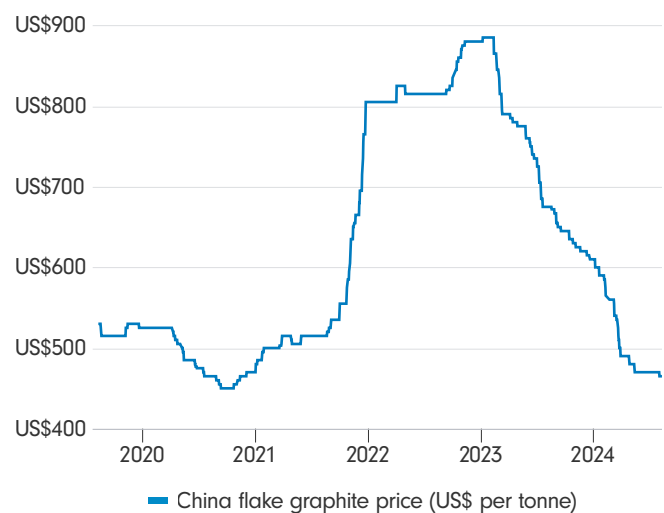
Oliver Hextall
Portfolio Manager

Commodities are at the heart of the energy transition, but their prices can be notoriously volatile. So how to invest in the transition theme without being shaken out of it prematurely?

The received wisdom that investors should “take a long-term view” is as well-worn as it is simplistic. Because while the long run certainly matters, when it comes to investing in transition materials there’s also a strong case to make for a bit of constructive myopia. By that we mean keeping a very close eye on the near term - staying on top of both commodity market fundamentals and those of the producers in each market - and not being so focused on a good growth story that it leads to expensive decisions. Demand is important but the ability of new supply to meet that demand is often neglected and is just as important - if not more so.

Graphite is a good example. The mineral has a tremendous long-term clean energy story thanks to its role in the batteries that power electric vehicles. But if you’d invested in a graphite producer a year ago you would have lost money.

Chart 2: Graphite: what goes up...

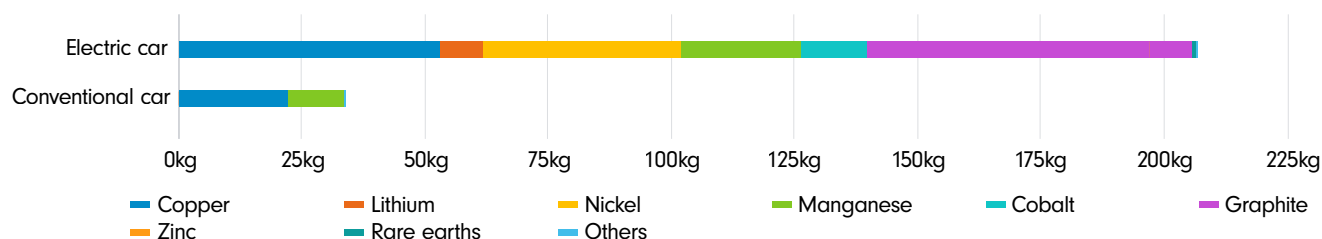


Source: Bloomberg, Fidelity International, August 2024.

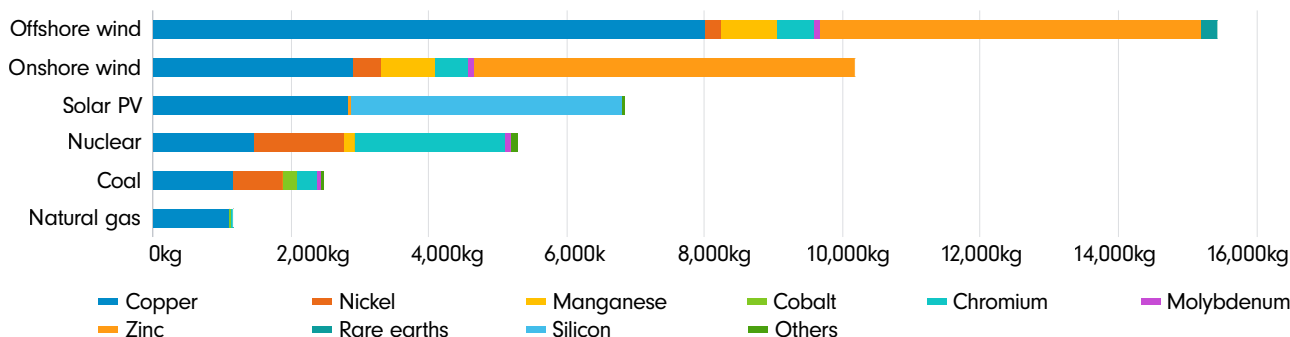
Timing clearly matters, and there’s a balancing act to perform between short- and long-term dynamics. Commodities are a bottleneck in the clean energy transition. From copper to

Chart 3: The many ingredients of the energy transition

Minerals used in selected clean energy technologies relative to comparable traditional technologies
Transport (kg/vehicle)



Power generation (kg/MW)



Source: IEA, March 2022. 'The Role of Critical Minerals in Clean Energy Transitions', Notes kg = kilogram, MW = megawatt. Steel and aluminium not included, Fidelity International, 2024.

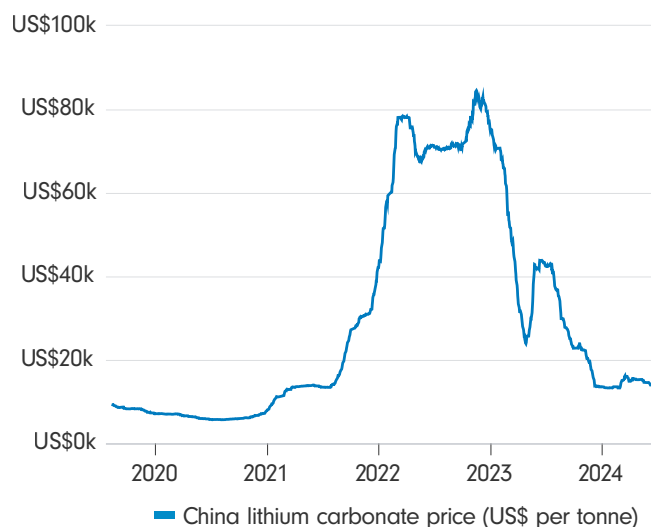
agriculture, decarbonisation-driven demand is hitting supply networks that aren't always set up to meet it. That triggers a response. As supply of, say, copper struggles to keep up with demand, there's an increased incentive to swap to other materials, to supply more scrap copper, and to use the metal more efficiently.

What incentivises all these behaviours is a higher copper price, and there's an obvious way to profit from that if you can spot the bottlenecks as they emerge.

But that's only part of the story. The more a commodity's supply is capital constrained - as opposed to resource constrained - the greater the ability to respond quickly to surging demand by boosting supply, and so the less likely those bottlenecks will persist. Take

lithium, where a huge shortage in the early part of this decade was followed by a big run-up in price.

Chart 4: Lithium pricing has been a rollercoaster



Source: Bloomberg, Fidelity International, August 2024.

Lithium, however, is in fact relatively abundant. So, predominantly Chinese producers responded to the higher price and ramped up supply, driving the price back down again, to a level we think is too low to support the investment economics of Western producers - which, in turn, is laying the ground for the next up-cycle.

Take a broad view

Graphite and lithium highlight why commodity choice matters. At least half the work our team does is top-down, identifying which commodity markets look most promising near-term. We try to take a broad view and consider potential ripple effects. Copper, for example, is widely considered a transition material, but fewer investors take the same view of aluminium. Yet the International Energy Agency has reported that a third of projected growth in copper demand arising from expanding electricity grids could be met by aluminium.

The supply chain for renewable diesel and sustainable aviation fuel shows some similar dynamics. Low carbon feedstocks, such as fats and used cooking oil, have a structural advantage under the Inflation Reduction Act in the US and we think these feedstocks will remain scarce. What was once a waste product will, we think, be increasingly valuable over time. The oil used to fry your chips in McDonald's one day will be flying you on your summer holidays.

Ammonia too is a commodity we think has an interesting future. The current ammonia market centres around its use as a fertiliser. But it can also be used as a fuel, including for shipping, a sector that faces almighty challenges in its attempts to reduce emissions. As a compound

of nitrogen and hydrogen, ammonia is useful for the transportation of green fuel (cheaper and safer than moving pure hydrogen around) and could be used to reduce emissions in a number of high-carbon industries. These use cases potentially give ammonia a big role in the clean energy transition that could double the commodity's overall market over the next 10 to 15 years.

Commodity prices: reliably unreliable

Of course, all the analysis in the world won't guarantee getting the commodity story right every time. These are, after all, famously volatile markets and a focus on the top down doesn't mean you can neglect the micro. You need a margin for error.

This is where company analysis comes in, including a consideration of sustainability. A focus on low-cost makes sense because what you want is a stock that can sit tight when its sector is under pressure and still generate cash at the bottom of the cycle. It means you can be confident that its share count will be the same when things pick up because it hasn't needed to issue new shares to raise capital. It's about finding that happy medium between growth and free cash flow producing assets.

A word on political (and geopolitical) risk

That brings us to a topic that's hard to avoid when investing in producers of transition materials: political risk. Our somewhat idiosyncratic view on the subject is that we would rather make cash flows through the cycle from high-quality assets in more risky

spots than guarantee low-risk sub-par returns in so-called 'safer' regions. Because political risk is not static. Chile, for example, has in the last few years gone from being a low-risk jurisdiction to briefly being a high-risk one, and back again. And in 2022, Australian authorities in supposedly safe Queensland saw no issue with imposing a very punitive royalty on mining companies' metallurgical coal revenues.

The upshot is that Chinese investment in critical mineral production is keeping a lid on prices, which in turn makes it difficult for Western producers to invest at these levels.

Political risk is unavoidable and is something we have to manage. It helps to start with solid cash flows from a low-cost asset and

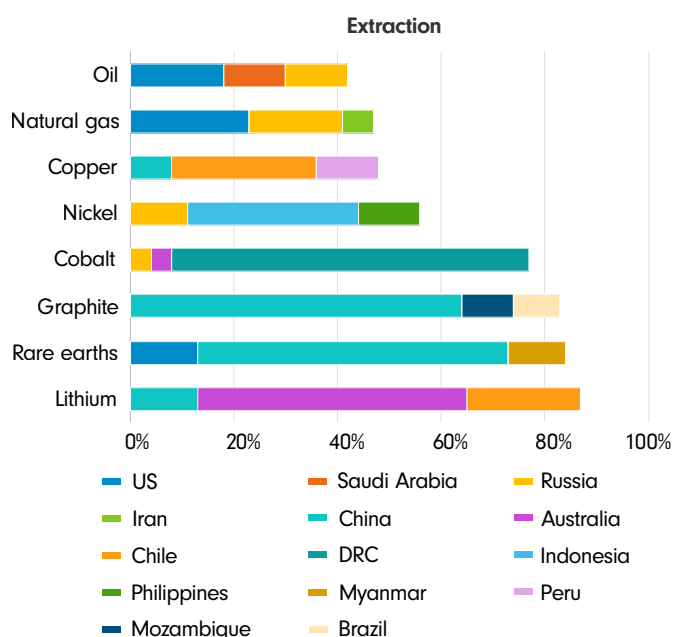
then manage that risk, rather than needing the commodity to do you some big favours.

Geopolitical risk, on the other hand, has a direct bearing on commodity cycles and future price formation. While China has a moderate endowment of critical minerals that will play a big role in the energy transition, it dominates processing. Moreover, at a time when Western companies have pulled back from allocating capital, Chinese state-owned enterprises have forged ahead with mining investments all over the world. Nickel, for example, is largely produced in Indonesia but a significant part of that production is Chinese-owned and almost all of the growth projects have Chinese partners.

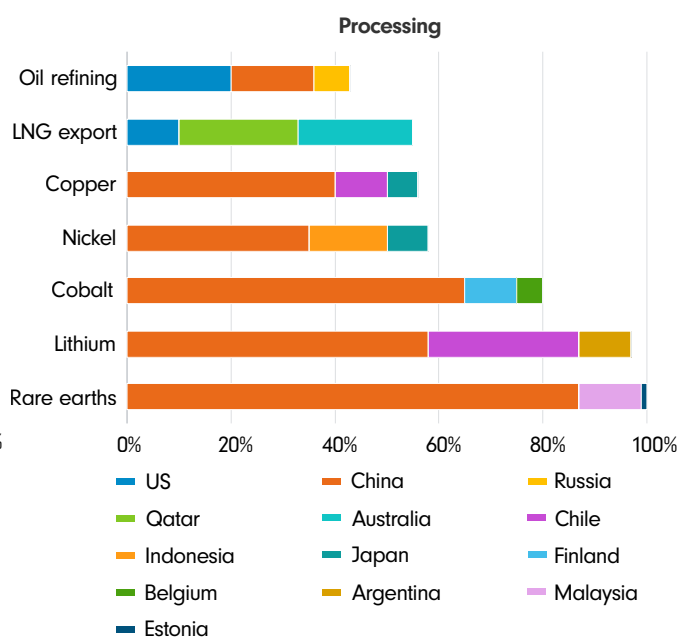
The upshot is that Chinese investment in critical mineral production is keeping a lid on prices, which in turn makes it difficult for Western producers to invest at these levels. If certain countries want China-free supply chains of critical minerals, it will require the incentive of higher

Chart 5: Who controls production

Share of top three producing countries in extraction of selected minerals and fossil fuels, 2019



Share of top three producing countries in processing of selected minerals and fossil fuels, 2019



Source: IEA (2020), USGS (2021), World Bureau of Metal Statistics (2020), Adamas Intelligence (2020), Fidelity International, 2024.
Note: LNG = liquified natural gas. The values for copper processing are for refining operations.

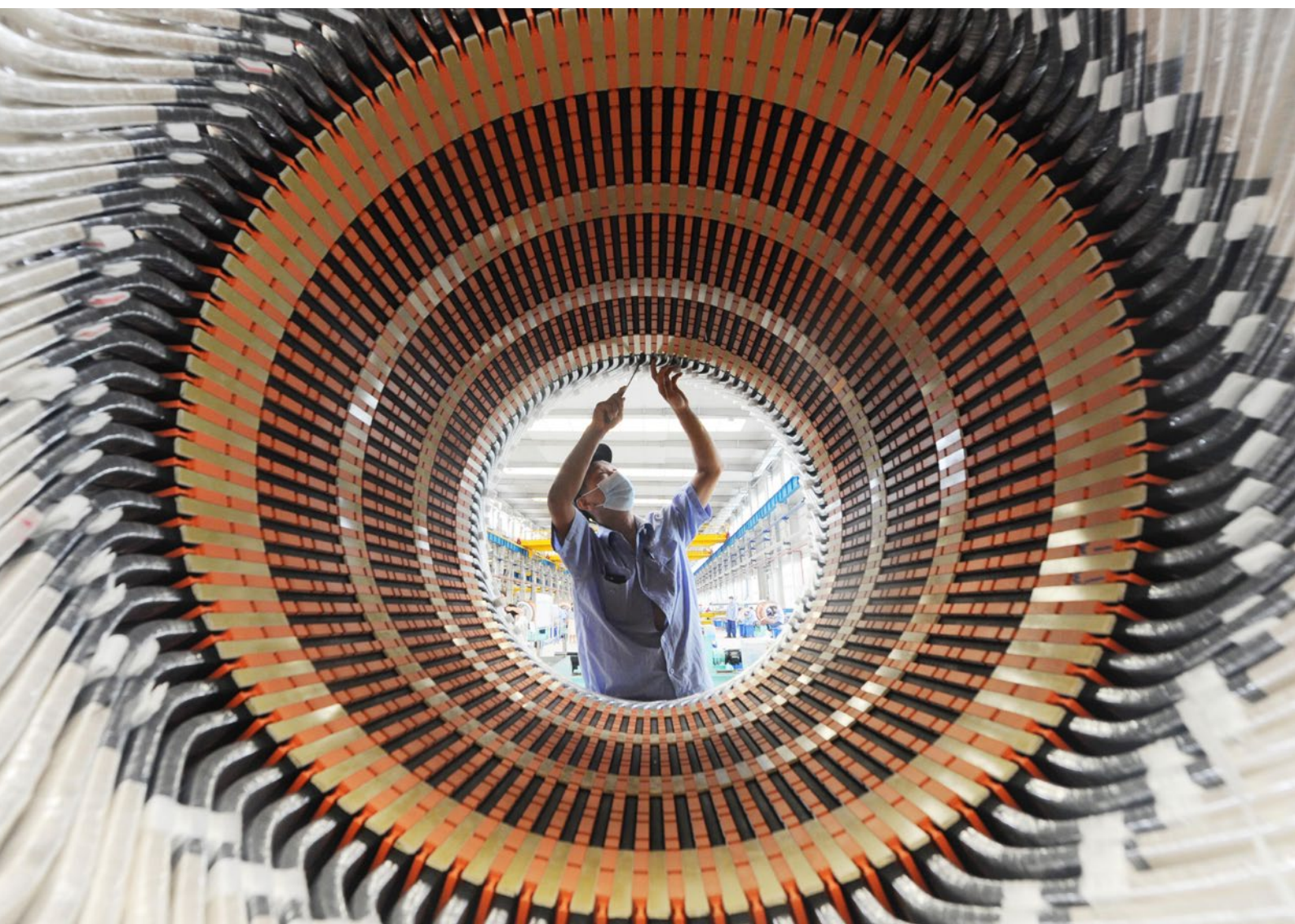
prices for producers. In practice, this is likely to mean some commodities having an international price that is higher than the Chinese price, as has happened to a degree in polysilicon.

This sort of dual pricing will need to become more widespread if Western producers are to feel confident that they can make profitable investments in growing the supply of transition-critical commodities. There is a clear strategic angle to this, and we're watching closely how governments might try to incentivise producers.

Top-down and bottom-up: both matter

Investing in the energy transition is a long-term play, one that requires expertise in commodity markets and the companies that operate in them. In practice, that means not just making bets on which commodities will win big 'eventually'. Because to benefit from the long-term macro trends, it's essential to stay on top of the micro details and understand each producer's business, as it is today.

Don't fall in love with a long-term story and neglect the here and now.



Why India cannot take the same road to growth as China



James Richards
Senior Industry
Analyst

India is a vital cog in the push to net zero, but will wind up competing with the needs of the energy transition for increasingly scarce commodities.

You know the stat: over the past three decades, China has consumed as much concrete every two years as the US did in the whole of the 20th century.³ In any given year, the country consumes half to two thirds of many of the world's industrial commodities, from copper to steel to lithium to zinc.

Now imagine if India did too. It's not just a thought experiment - India took the mantle of the world's most populous nation from China in 2023 and, after decades of stalling, is finally making good on economists' expectations of development. In terms of purchasing power, it currently stands roughly where China did in the early 2000s.⁴ If it follows the same path, its GDP in dollar terms will expand by 10 times over the next two decades.

The graphic on the next page shows the commodities needed for that development at a projected peak later this century: 1 billion tonnes of extra steel annually, 18.5 million tonnes of copper, 33 million tonnes of aluminium. To put it in

perspective, that's anything from half to three quarters of the current global output of each resource.

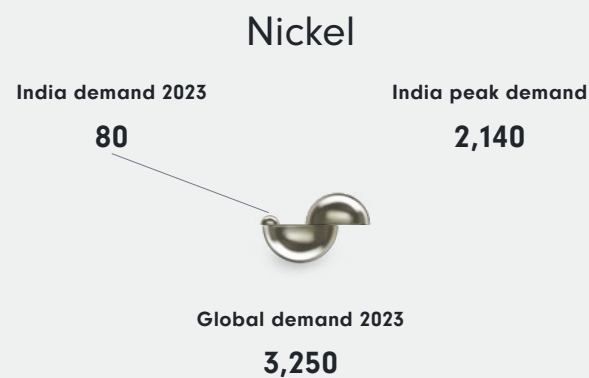
The commodities needed for India's development stand at anything from half to three quarters of the current global output of each resource.

Suffice to say, this is not possible. Either the resources are simply not available, or delivering them in such volumes would be prohibitively expensive. The material needs of the net zero transition will add several percentage points to demand for commodities over the next decade. India will have to compete with this demand for some of those commodities. That should have a profound influence on the value of materials.

³China uses as much cement in two years as the US did over the entire 20th century | Sustainability by numbers

⁴According to data from Trading Economics

Chart 6: India's transistion can't follow China's - materials will fall short



Source: Macquairie, Bloomberg, Fidelity International, August 2024. Numbers project India's potential peak use of commodities later this century in the absence of any limitations on supply. Some have been rounded for the sake of presentation.

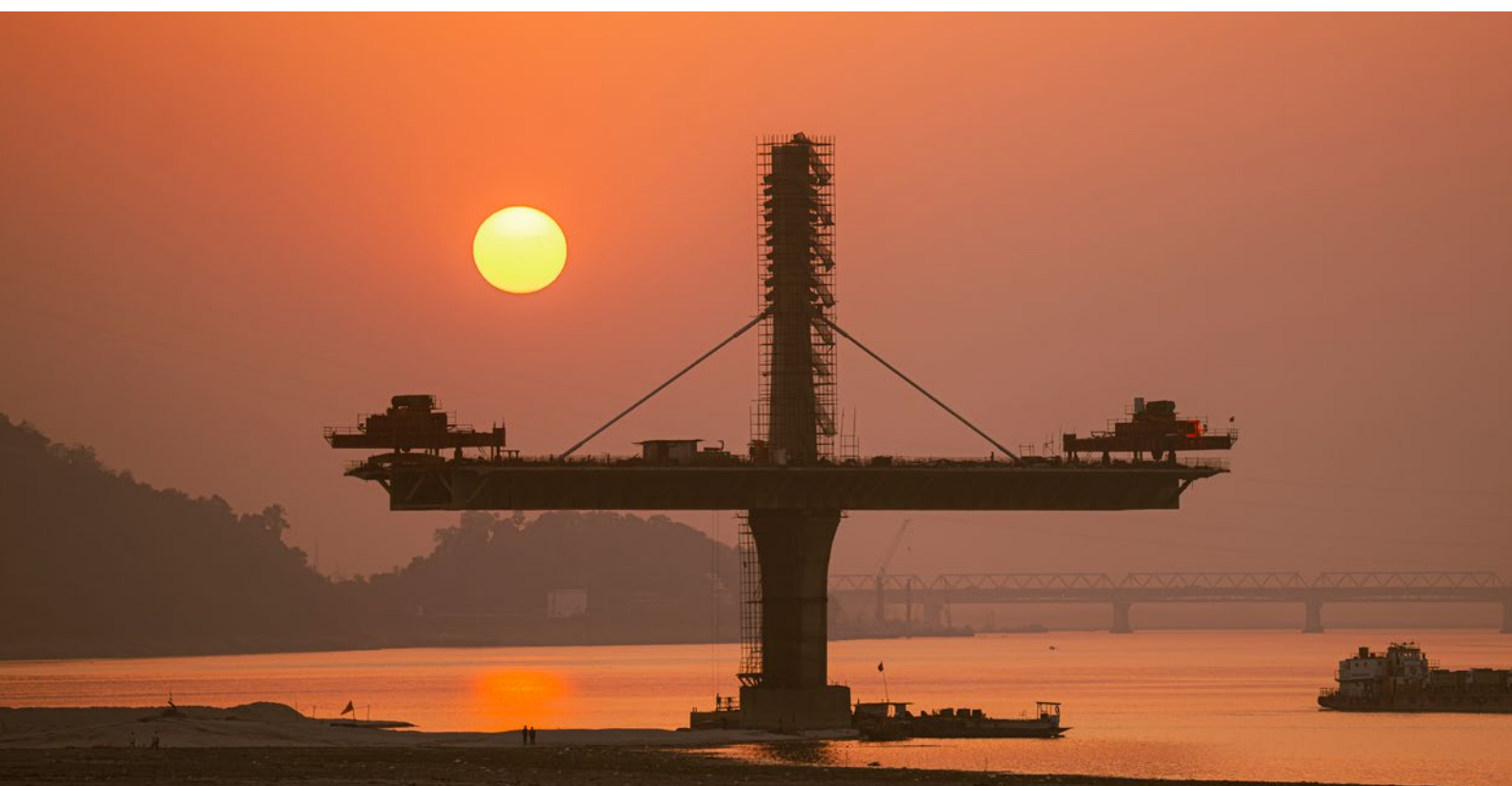
So what to do? The only answer is technology. For environmental, cost, and availability reasons, India must at some point use different solutions to China, ones that are less resource-heavy and cheaper. Determining which solutions the country is likely to opt for would be advantageous for investors. And there are some educated guesses to be made.

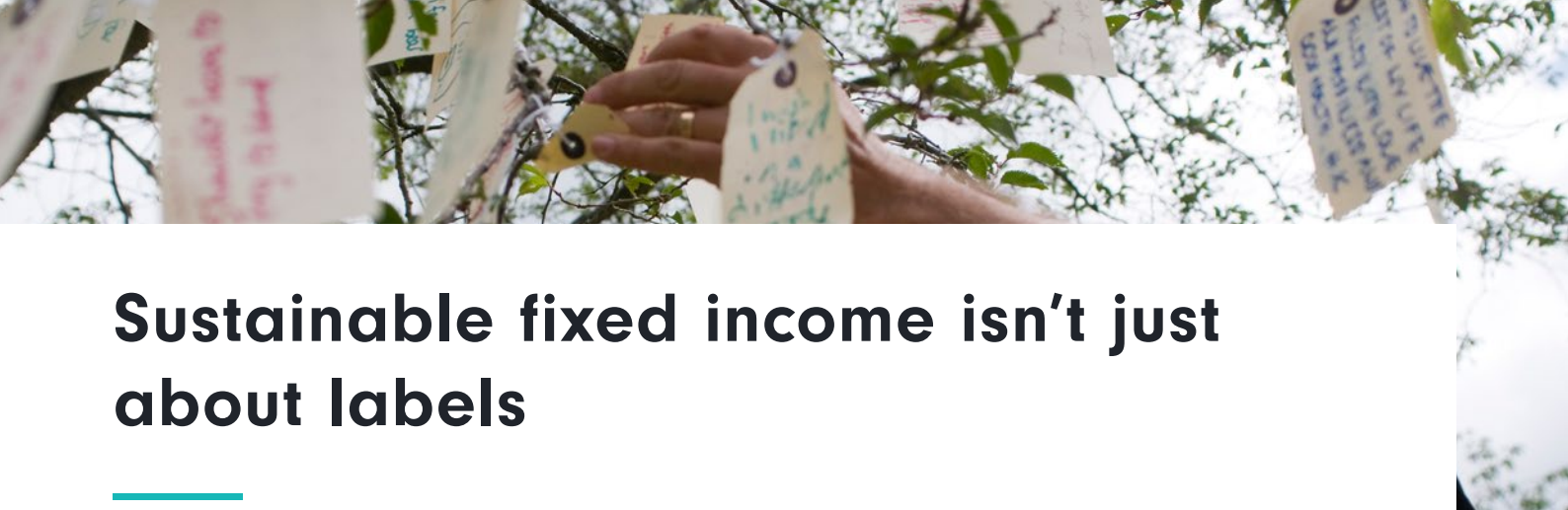
In the late 1990s, China officially became the world's biggest consumer of copper as it went about wiring a gigantic expansion of its electricity network. From 20 per cent of global demand in the nineties, China now accounts for more than half of the world's copper consumption. The Chinese state grid is the metal's biggest customer and Beijing is investing around \$100bn annually in the network compared to the \$3.5bn India will spend on average over the next six years.

That obviously points to a gigantic ramp up in investment and a need for copper - but there will have to be alternatives. For instance, India could partly replace copper with aluminium in some of its network.

The scale of expansion will be similar in other areas too. There might be enough iron ore to meet India's projected steel needs, but the use of coking coal is a bigger problem both environmentally and in terms of availability.

Bottlenecks will appear, be it in the needs of the transition or the country's broader path to higher incomes and living standards. India should be able to make the necessary investments in its infrastructure over the next decade without running into significant difficulties, but for businesses, markets, and government, the challenges will become more apparent. There is a reason why Elon Musk is striving to reduce the quantity of copper in his cars. Both India and the sectors it will rely on for development will have to innovate just as hard and as successfully as Tesla.





Sustainable fixed income isn't just about labels



Kris Atkinson
Portfolio Manager



Shamil Gohil
Portfolio Manager

Buying green bonds is not the only way fixed income investors can achieve lower carbon strategies. There is a simple alternative: buying non-labelled debt from sustainable companies.

There's an exceptionally large elephant in the sustainable investing room. A 25-trillion-dollar elephant. That was the size of global fixed income issuance in 2023 compared to equity issuance of just over USD \$420 billion.⁵ If fixed income markets are so much bigger than equity markets, then why do equities continue to dominate the discussion around transition finance?

One reason is that the bonds, as ever, seem more complicated than the equity market. Investing in the latter generally consists of buying sustainable stocks. Any complexity comes from deciding which ones are sustainable.

Much of the sustainable debt market is structured differently. 'Green bonds' evolved out of a 2007 World Bank debt issuance that channelled lenders' money into environmental projects. So began the labelled sustainable debt market, in which investors buy a bond not necessarily because of the issuer's green credentials, but because of the specific projects their money is being used to finance.

Green bonds now represent the first port of call for fixed income investors looking to lean in to the transition. Despite some well-noted concerns hovering around the construction of these markets (more on those later), they have done an admirable job of tapping the transition potential of fixed income. The branding that comes with green, blue, social, or other similarly labelled bonds can provide a useful signal for strategies that need certification of ESG-focused securities.

But they're not the only option available to investors. Look beyond the colourful monikers, and you can find plenty of sustainable, non-labelled, debt. Take for example the bonds issued by WoDS Transmission, an organisation that sends roughly 389MW of clean energy from an offshore windfarm in the Irish Sea to the UK grid. WoDS provides a significant part of the infrastructure that underlies the UK's effort to achieve net zero emissions by 2050. It would be odd for investors to overlook its bonds just because they're not labelled 'green'.

⁵Capital Markets Fact Book, 2024 | SIFMA

Beat the greenium

It might not make financial sense either. The distinction between labelled and non-labelled debt is important because it offers one way round the green premium. This 'greenium' refers to the additional yield investors surrender owing to the increased demand for sustainable debt. It's long been an issue for the labelled market - not so much for the non-labelled one. There are of course legitimate reasons why investors may overlook the greenium - for instance, to meet certain green-label quotas for their portfolios - but it should also encourage investors to consider which parts of the market serve them best.

That dilemma can be seen most visibly in companies issuing both types of debt. One business that supports people with disabilities, for example, issues both non-labelled and labelled 'social' bonds. A labelled bond like this would usually allow companies to highlight the social projects underlying an issuance, which stand apart from its ordinary debt. But the distinction in this case would appear moot given the company's usual business operations already serve a social purpose. The primary difference between the two lies in the six basis points of extra yield available on the non-labelled bonds over the social alternative.

There is another reason investors may wish to look beyond labels. Any company can, in theory, issue a green bond. The advantage for sustainably-minded investors is that they obtain a green stamp for their strategy as well as confidence that their money is (usually) ringfenced in support of an environmental purpose. The disadvantage is they have no influence over how the company uses its other cash piles.

By contrast, buying non-labelled debt requires the investor to take a view of the issuer and not just the particular bond on offer.

That's useful when it comes to buying the bonds of a company like Broadcom. Broadcom is the world's seventh largest semiconductor company, meaning it has a material role in fitting the world's existing infrastructure with cleaner technology.

Broadcom does not issue labelled green bonds - that is, bonds funding a specific green use of proceeds. But that does not mean their bonds aren't green. Proceeds raised from the company's bond issuances support its ongoing business activities, which in turn support the energy transition (even if there are wider questions around the scope 3 emissions of the technology sector).

Buying non-labelled debt requires the investor to take a view of the issuer and not just the particular bond on offer.

Moreover, a lack of investor confidence around how exactly companies plan on using lenders' capital has been one factor stunting the growth of labelled debt markets. Definitions over what constitutes 'green' have improved, yet it was only two years ago that one airport authority raised \$1 billion through the issuance of a green bond to help fund the development of a third runway. We're confident though that as these frameworks develop further for labelled bonds, investor interest, and market strength will only increase.

Buying non-labelled securities requires the investor to form a reasoned opinion of the companies' sustainability credentials in the first order. The

lender does not need to separate their view of the issuer's regular business activity from that of a particular bond. It simplifies the job of screening and plays to the strengths of fixed income investors' active credit research and engagement.

Tackling the transition

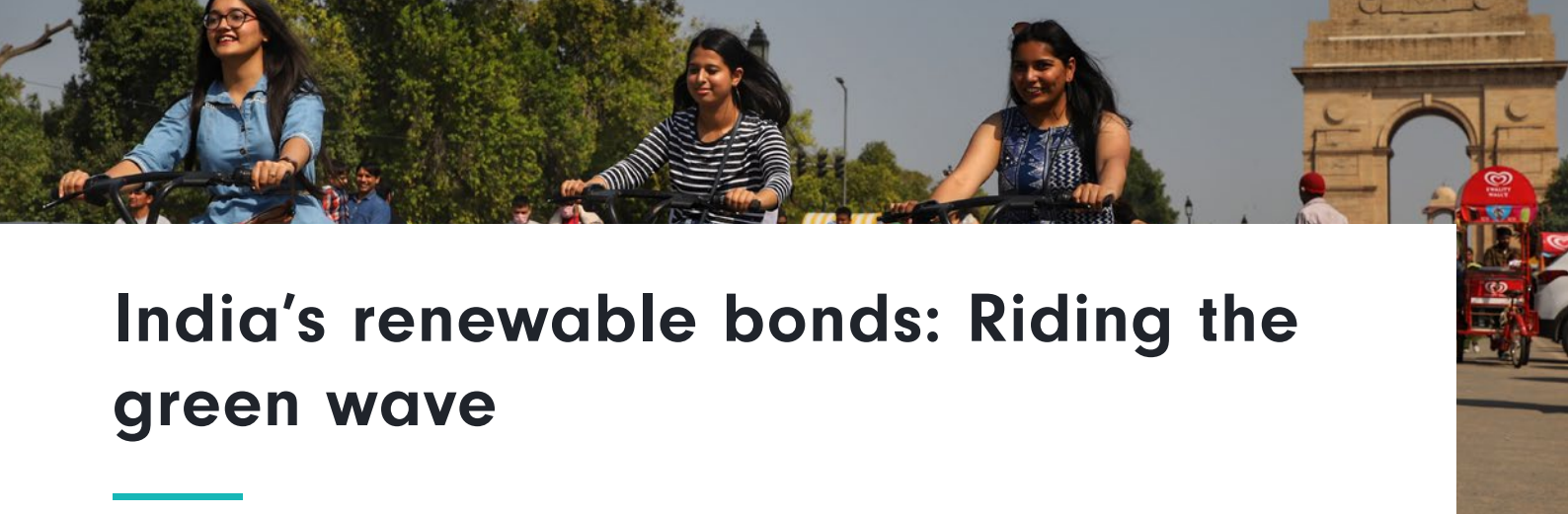
At the same time, the buying of non-labelled bonds also allows investors to take on the trickier sides of financing the transition. Hard-to-abate sectors, including energy or mining companies, tend not to issue green bonds even when they're making serious moves to transition, because they know investors are prone to doubt the intentions or the credentials of the company. 'Transition bonds', issued by brown companies to fund their progress,

were designed to fill this gap but have similarly struggled to gain momentum.

Yet these companies too require funding to support their transformation. The job of ensuring they're up to the task falls upon the investors themselves, through active research of the company's credentials followed by frequent engagement to track progress.

That's hard work, but funding the green energy transition never promised to be easy. It's clear that doing so requires active mobilisation of fixed income markets, which are too large for sustainable investors to overlook. Buying labelled bonds is one way - good old-fashioned credit research is another.





India's renewable bonds: Riding the green wave



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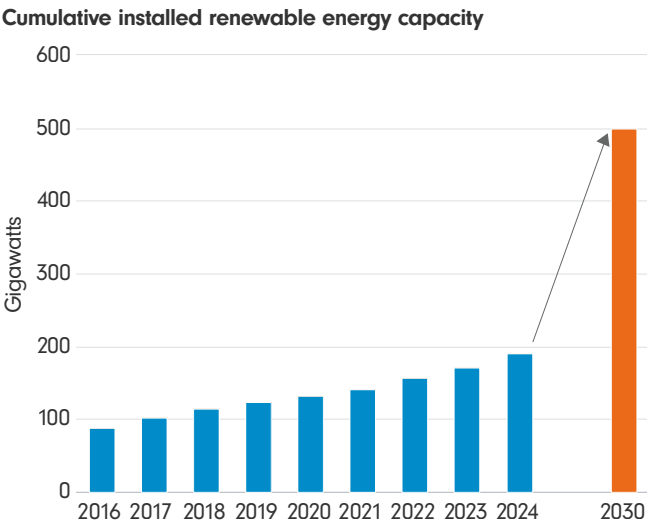
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India's need to deliver more green power is likely to make its renewable energy sector a destination for global capital for years to come.

India's transition to renewable energy still has a very long way to go. Cumulative installed capacity from renewables was only 191 gigawatts as of March of this year, less than two fifths of the country's 2030 target.⁶ The government has made moves to encourage investment, including waiving interstate transmission charges for renewable generators. But spending will have to nearly triple by the end of this decade to put the country on track to meet the target of carbon neutrality by 2070.⁷

Much of that capital will come from corporate credit and bank loans, with Indian renewables companies' offshore dollar bonds steadily becoming an important chunk of the high yield market in Asia. Their weight in the market has doubled over the past three years.⁸

Chart 7: India aims to nearly triple its clean energy capacity by the end of the decade



Source: India's Ministry of Power, Fidelity International, July 2024. Note: The 2016-2024 data are based on financial years ending in March. The 2030 number is the government's target.

These renewable power producers' bonds offer a combination of relatively lower beta exposure and compelling yields. Most issuers are rated in the BB

⁶According to India's Ministry of Power
⁷International Energy Agency, [World Energy Outlook 2023](#)
⁸As of April 2024, Indian renewables companies' bonds represented about 6 per cent of the JP Morgan Asia Credit (JACI) Non-IG, more than double the 2.7 per cent three years ago

space, the highest rating band for high yield bonds. The bonds' average yield-to-worst (the lowest return that can be received without the issuer defaulting) is 7.4 per cent, higher than the 7 per cent for similar-rated peers in Asia (excluding China property bonds), and higher than the yield-to-worst of 6.5 per cent in the US and 5.1 per cent in Europe.⁹

India's robust growth story enhances the bonds' appeal. The South Asian economy is projected to grow 6.8 per cent this year, the fastest of the world's major economies.¹⁰ S&P Global in May raised its outlook on India's sovereign rating from stable to positive, citing its strong economic fundamentals.

No alternative

For the government, the stakes in the long run could not be higher.

India surpassed China to become the world's most populous nation last year and Prime Minister Narendra Modi has focused for a decade on delivering the growth that would lift more of that population out of poverty. To do so, it must deliver radical increases in the power available for businesses and homes in cities where daily blackouts are a fact of life. The country's peak energy demand, driven by heightened industrial activity, grew 12.7 per cent in 2023-24 from a year earlier, faster than the 8.2 per cent expansion in GDP.¹¹

Straddling the equator, it is among the countries most exposed to global warming. A scorching heat wave in May took temperatures in New Delhi to almost 53°C (about 127°F).¹² Meanwhile, India's power generation is dominated by greenhouse

gas-heavy coal. Only a fifth of all power generation was met by renewables in the financial year 2023-2024.¹³ The pace of renewable build-out will have to increase.

The government's resulting commitment to change and the growing number of projects have kept issuers' credit fundamentals relatively stable. The Ministry of Power's late payment surcharges have caused a meaningful drop in overdue receivables owed by state-owned distributors (the primary buyers, or 'off-takers', for renewable energy). Companies have enjoyed cheaper funding from domestic lenders and we expect financial conditions to remain supportive as government-owned non-bank financial companies continue to step up funding for renewable projects. Access to capital and stable cash generation will help borrowers withstand a high interest rate environment.

Net challenges

The task ahead for India's renewable sector is huge. On a macro level, the surprise election outcome earlier this year does raise concerns about Modi's ability to make more coherent changes in the system. Similarly, on a micro level, the sheer amount of capex needed to upgrade energy infrastructure may strain issuers' financial profiles in the near term.

But once the projects are launched, the capital spending should yield benefits in the years to come - both for investors in bonds, and for a world in which cleaner development in India is an environmental must.

⁹As of June 2024. European BB-rated bonds are denominated in euros

¹⁰According to the International Monetary Fund

¹¹According to India's Ministry of Power

¹²[India heatwave kills at least 33, including election officials | Reuters](#)

¹³According to India's Ministry of Power

The art of the possible - why real estate will lead the way in the energy transition



Adrian Benedict

Head Of Real
Estate Solutions

Our built environment may be energy inefficient, but the technology already exists to vastly reduce its power consumption and switch the entire sector to renewable sources. Updating assets to be greener not only generates pricing and rental premiums for investors, it also means the real estate industry has a head-start on enacting real change.

The benefits of properties with stronger sustainability profiles are now so demonstrable that both buyers and tenants are willing to pay a premium for them. Advances in building materials and technology mean the real estate sector is taking the lead for investors looking to harness the transition theme.

The scope for change - and investment - are considerable. The built environment is responsible for around 40 per cent of Europe's energy consumption.¹⁴ This is not a figure that can be simply cut to nothing; buildings will always need power to function. But our offices, homes, and commercial buildings - many of which date back decades or even centuries - are not always using power in the most effective way or taking advantage of the latest technology. Around 75 per cent of buildings across the European Union are energy inefficient.¹⁵

Realising their potential can be relatively straightforward - and it does not mean knocking down our cities to start again. After all, demolition and construction are the most carbon-intensive stages of a building's life cycle. Renovating an existing asset creates 60 per cent less embodied carbon compared to building something new.¹⁶ Add the latest technological innovations and the amount of carbon needed to operate the building can also be reduced to zero.

What does that look like? There are the basics: installing improved insulation, adding more efficient LED lighting, heating, ventilation, and air conditioning systems to reduce the power a building needs. But a building can also generate its own - green - power. Rooftop solar panels or wind turbines, or replacing traditional gas and oil-

¹⁴In focus: [Energy efficiency in buildings | European Commission](#)

¹⁵In focus: [Energy efficiency in buildings | European Commission](#)

¹⁶[Energy efficiency of the building stock in the EU | RICS](#)

powered boilers with air-sourced heat pumps, can end the reliance on carbon-based fuels.

Then there are the new technologies in development that offer exciting glimpses into the future. The creation of fully transparent photovoltaic panels could soon mean that every window in an office or home can generate solar electricity. Innovations in sustainable materials and their manufacture such as carbon-negative cement, green steel produced without the use of fossil fuels, or even mycelium bricks made from organic waste and fungi fibres, could all play a part in reducing carbon in construction. Given that concrete production is responsible for up to 8 per cent of global carbon dioxide emissions, any improvements here would have a dramatic impact.¹⁷

Ahead of the curve

The European Union estimates that renovating all of its inefficient buildings to be more sustainable could reduce the region's total energy consumption by 5 to 6 per cent.¹⁸ It's an ambitious figure, but individual projects demonstrate the extent to which an asset's energy footprint can be cut if remodelled with power efficiency in mind. Take for example a central London office block that's currently undergoing such a remodelling. This is not an old, crumbling, brown building: this is an asset originally built in the early 21st century, but a mere twenty years on we're in a position to improve radically its energy efficiency. Upgrading its facilities with many of the technologies listed above will reduce the primary energy demand of the building by more than 75 per cent. On completion, the building will

be capable of operating at net-zero carbon, with no reliance on fossil fuels at all.

All of this technology puts the real estate sector ahead of the curve for the energy transition. Although not every building has a heat pump installed or a network of solar panels lining its roof yet, this is only because of a lack of capital or management foresight. That capital is on the way though. Because sustainable buildings are still relatively scarce in Europe - less than 20 per cent of offices across big European cities have a green certificate¹⁹ - there is an attractive green premium on offer for those buying into the sector.²⁰ One report showed that total returns for efficient buildings in the 12 months to Q2 2023 were 1.2 percentage points higher than for inefficient buildings, with the differential growing to 3.2 percentage points between inefficient and efficient offices.²¹

Tenants are also willing to pay more to rent sustainable buildings: almost three quarters of corporate real estate decision makers say they are likely to pay a premium to occupy an office with green credentials, with over half planning to do so by 2025.²² Similarly, around two thirds of occupiers renting logistics facilities such as warehouses are planning to be net zero across their property footprint before or during 2030.²³ While a green building may cost companies more to rent, their energy efficiency can mean that operating bills are less, reducing their overall spend on occupying the real estate.

¹⁷[Making concrete change, Chatham House Report](#)

¹⁸In focus: [Energy efficiency in buildings | European Commission](#)

¹⁹[The Value of Green Building Features, CBRE Research](#)

²⁰[Buildings that go green: making an impact while still making alpha, Fidelity International](#)

²¹[Sustainability Index 2023, CBRE](#)

²²[The Future of Work Survey, JLL](#)

²³[European Logistics Occupier Survey 2024, CBRE](#)

Taking the weight

The process of investment and renovation must accelerate if climate goals are to be met. Some 80 per cent of existing commercial real estate in the European Union needs updating to become more efficient,²⁴ although only 1 per cent of buildings in the region undergoes energy-efficient retrofits each year.²⁵

Increasing the pace of renovations even by a small amount would significantly cut the energy used by real estate. Given that other industries will find it harder to reduce their reliance on fossil fuels, accelerating improvements in this sector could help with reaching net zero targets even as other sectors fall behind. In addition, if our

buildings can cut the amount of energy they use, the aggregate demand for renewable electricity could come down. This would offset the growth in demand from other industries that are unable to cut their energy usage as quickly - an increasing concern given supply constraints - while also helping to alleviate the pricing pressure for those more difficult-to-abate sectors.

The targets laid out by the Paris Climate Agreement are moving out of reach, and the time frame in which we have to take action is narrowing. Those sectors that have the capacity to implement change - including real estate - should do so in earnest, and welcome the wave of investment that follows.

²⁴According to data from the Royal Institute of Chartered Surveyors

²⁵According to data from the International Energy Agency





Winning the argument on sustainable investing in Asia



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Head of
Investment,
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**Dhananjay
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Portfolio
Manager



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Head of
Stewardship, Asia
& Portfolio Advisor

Growth in Asia's sustainable assets has stalled in recent years and many investors remain unconvinced. But as net-zero deadlines edge closer and attitudes shift, the case for investing in those same assets will strengthen.

A growing number of young Asians have been taking to social media to debate how to live more sustainably. In China, a discussion group titled "[Leaving No Trace](#)" on Douban, a social network platform popular among young Chinese, has attracted more than 40,000 members. Tips are traded on reducing carbon footprints such as turning old jeans into chic denim bags, using worms to make fertiliser out of food waste, or bringing reusable cups and straws to enjoy bubble tea - a favorite drink among young people in Asia.

The eco-conscious youth are not only seeking to build sustainability into their daily lives. They're demanding investment portfolios do the same too. According to a 2024 survey by Fidelity International and YouGov, close to 70 per cent of Asia Pacific youngsters aged below 30 say it's important to act

responsibly or sustainably as investors - keeping up a trend set by millennials (30-44 years).²⁶ The survey also shows both cohorts to be equally optimistic about the power of investing to make a positive impact on the world.²⁷

The eco-conscious youth are not only seeking to build sustainability into their daily lives. They're demanding investment portfolios do the same too.

²⁶68 per cent of respondents under 30, 70 per cent of respondents aged 30-44, and 62 per cent of respondents aged 45-69 say it's important to act responsibly or sustainably as investors

²⁷The survey was conducted by YouGov in six markets in May 2024 and published in July. A total of 6,515 respondents, aged between 18 and 69, participated in the survey

Chart 8: Apac young investors are prioritising ESG issues

Almost 70% of respondents aged below 30 say it's important to act responsibly or sustainably as investors.



Source: Fidelity International, YouGov, September 2024.

Note: Answers to the survey question "To what extent do you agree or disagree with the following statements?" Figures are percentages of respondents who chose "strongly agree" or "somewhat agree".

are starting to replace voluntary ones across the region. Mainland China introduced guidelines that require some 400 listed companies to publish sustainability reports by 2026.²⁸ It will be mandatory for listed companies in Singapore and Hong Kong to make climate-related disclosures from 2025.²⁹ Greater transparency helps paint a clearer picture for investors about what companies are doing on the ground.

Most of the world's emissions come from Asia, where robust economic growth has only increased the region's carbon footprint.

Greater transparency, clearer pathways

Most of the world's emissions come from Asia, where robust economic growth has only increased the region's carbon footprint. Channeling funds to local companies that take the lead in the energy transition could have enormous consequences for the fight against climate change.

Encouragingly, regulatory regimes are growing more supportive of the type of sustainable investing that drives capital to these companies - and ensures they are using the money wisely. Most notably, mandatory ESG reporting frameworks

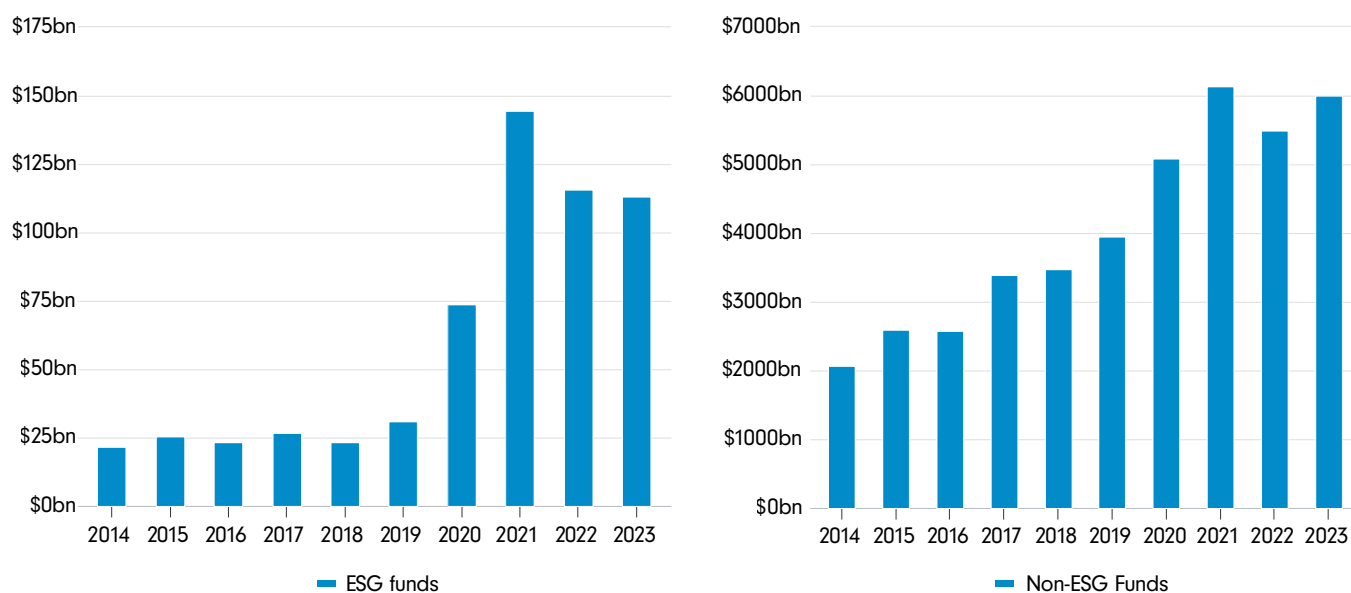
The first stages of the ESG revolution led to an almost sevenfold jump in Apac's ESG funds between 2014 and 2021, from USD \$21.4 billion to \$145bn.³⁰ That was of course still a very small proportion of investors' overall capital, but represented a much faster expansion than that of non-ESG funds, which only tripled during the same period. Weak performance of ESG-focused portfolios, coupled with concerns about geopolitics and greenwashing, led to a 22 per cent drop in ESG funds in the two years that followed.

²⁸[China Stock Exchanges Announce Mandatory Sustainability Reporting Requirements for Companies | ESG Today](#)

²⁹[More Singapore businesses will have to report sustainability information, starting with listed firms in 2025 | Channel News Asia](#); [Hong Kong Exchange to Require IFRS-based Climate Disclosure Beginning 2025 | ESG Today](#)

³⁰According to Morningstar Direct data

Chart 9: Growth in Apac's ESG funds stalled in 2022 and 2023



Source: Morningstar Direct, Fidelity International, September 2024.

Note: Data includes both ETFs and mutual funds, covering seven markets, Australia, mainland China, Hong Kong, Japan, Singapore, South Korea, and Taiwan. ESG funds are defined as Morningstar Sustainable Funds.

Green gold

Despite the decline, we see strong growth potential for ESG investors in Asia over the long run. The region is home to the world's leading manufacturers of electric vehicles, solar panels, and critical components of green technologies, with many high-emitting companies progressively replacing coal-fired power plants with clean energy sources. As investment in the energy transition builds and environmental awareness pushes changes in consumer behavior, avenues of growth available to these companies will multiply.

Meanwhile, substantive changes in corporate governance are underway in Asia. More effective board structures and greater diversity at the most senior levels will bolster oversight and protection of a broader group of stakeholders, including

minority interests. We expect Asian companies to manage ESG risks better as a result - including a prioritisation of long-term over short-term targets. Those that do are more likely to create value for investors through resilient growth. And over the medium to long term, this should improve the risk-reward equation for ESG investors.

There is still a long road ahead for sustainable investing in Asia. The total size of associated assets is tiny compared to the entire fund universe in the region. And there remains plenty of room for Asian regulators to do more to weed out greenwashing. Young Asians for one are unlikely to stand for it. After all, there's more to protecting the planet than old jeans and bubble tea.

Asia's lead in transition bonds



Vanessa Chan

Head of Asian Fixed Income
Investment Directing

Asian issuers dominate the nascent market in transition bonds, an investment vehicle designed to fund activities or projects that reduce greenhouse gas emissions from heavy-emitting industries, such as steel, cement, and petrochemicals.

Total issuance may be a drop in the global fixed income ocean, but of the USD \$32.2 billion of outstanding transition bonds worldwide, 78 per cent were sold by Japanese, Hong Kong, and mainland Chinese issuers.³¹ Japan issued the world's first sovereign transition bond in February 2024 to fund projects such as exploring hydrogen technologies for steelmaking and fuel-cell batteries, and promoting production of clean-energy cars.³² The issuance was part of its plan to raise up to ¥20 trillion (\$139bn) via transition bond sales over the next decade.

Why Asia?

The rise of this debt instrument is first and foremost a result of the increasing demand for transition finance in a region that is still heavily dependent on fossil fuels but needs to achieve both economic development and decarbonisation. The average age of coal-powered plants in China and India is just 13 years, compared to 34 in Europe and 41 in the US.³³ A managed early retirement of young coal plants and a transition of the energy system are critical in Asia, especially given the ongoing strong growth in power demand on the back of robust economic expansion. With 'green' debt instruments typically channelling capital to projects or companies that already have a low-carbon footprint, there is a gap for a funding mechanism



Gabriel Wilson-Otto

Head of Sustainable
Investing Strategy

that supports companies' or their activities' incremental progress towards decarbonisation. As a result, Asia has provided considerable support for transition taxonomies and government policies, all of which is aiding growth in transition bonds.

What next?

More needs to be done to boost the appeal of the asset class. First, the market needs a well-established cross-border taxonomy to define the environmental outcomes that eligible projects should generate. The absence of clear, consistent, universally accepted standards for the transition is the biggest hurdle for investors.

Second, issuers should communicate clearly how proceeds will be used; how a bond contributes to climate change goals and forms part of a broader transition plan. Reliable data collection and transparent reporting would help alleviate greenwashing concerns and bolster investors' confidence in this relatively new type of debt.

Finally, clear national transition plans and associated policy initiatives can help provide more certainty for long-dated capital expenditure in the move towards a low-carbon economy, which could drive further growth in transition finance.

The big changes that Asia's heavy emitters need to make require stable and long-term funding. As the pressure to decarbonise intensifies, issuance of transition bonds is likely to pick up. This small corner of the sustainable debt market will have its moment, and most likely in the not-too-distant future.

³¹According to Bloomberg data

³²[Greenwashing fears dampen global interest in Japan's inaugural transition bonds | S&P Global Market Intelligence](#)

³³[Average age of existing coal power plants in selected regions in 2020 | IEA](#)

Regulation: The wild card in the game of net zero



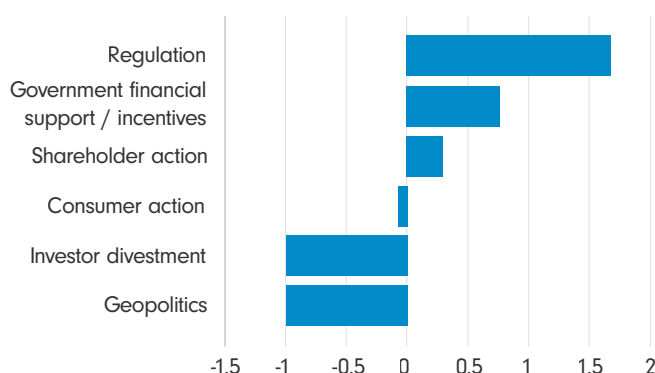
Fiona O'Neill
Head of Global Equity
Capabilities

Fidelity analysts call for more support and long-term planning from policymakers to aid companies' transition efforts.

The process of decarbonising whole business sectors is not linear. But what Fidelity's research teams are observing time and again is there is one dominant driver now needed to push fundamental sectoral change: government policy.

In our [annual ESG survey earlier this year](#), 81 per cent and 63 per cent of our analysts respectively identified regulation and government support as one of the three most important tools to improve companies' environmental practices.

Chart 10: Regulation, government incentives, and shareholder action will drive companies' environmental practices



Question: "What do you think will drive changes in environmental practices at your companies over the next 12 months?" Chart shows average importance of activity as rated by analysts on a scale from -3 (is not important) to +3 (is the most important). Source: Fidelity International ESG analyst survey, May 2024

But while broader policies such as the EU's Sustainable Finance Disclosure Regulation (SFDR) and the Inflation Reduction Act (IRA) in the US have already had positive effects, regulatory support is not coming through quickly enough, particularly in the sectors where there are greater challenges to reaching net zero. Of the Fidelity analysts surveyed again in August, half of those covering hard-to-abate industries such as materials said not enough is being done by policymakers.

Now the research teams are calling for more specific regulatory changes. An equity analyst focused on Australian mining notes that a consistent approach is needed across subsidies and tariffs, while a fixed income analyst covering the European airlines industry calls for regulators to "subsidise or finance investment in sustainable aviation fuels (SAF) production".

Alongside these requests for change within individual industries, our analysts are also keen to see stable policy frameworks that provide long-term visibility to help drive investment.

The 2024 calendar is full of elections and potential policy changes, so we could see some shifts in approach before the end of the year. But stable, supportive regulation must underpin any changes in administration, with long-term developmental strategies such as investment in infrastructure and training for future skills.

More carrots, fewer sticks?

Policymakers have the option to use either the carrot (incentives through financial support, as demonstrated by the IRA) or the stick (such as the regulation in practice in Europe). Some analysts have noted that as we move closer to the target dates laid out under the 2016 Paris Agreement, it's important that any sticks being wielded act as a true deterrent and are properly enforced.

"The difficulty is that at the moment regulators may struggle with enforcement," says one fixed income analyst in Europe. "Companies just have to calculate and report on their own energy efficiency, and only after some years are remedial actions required for the most polluting offenders. By that time, we are already in the 2027 framework and it's not clear what powers there will be to force firms to comply with targets."

On a more positive note, analysts do report that incentivising regulations are already having an impact. A fixed income analyst focusing on consumer discretionary names in North America points out that policymakers are making a difference with basic self-help energy saving investments. And in the UK, the Future Homes Standard, which aims to decarbonise new-build properties by improving heating and hot water

systems and reducing heat waste, is already stimulating activity for manufacturers of ventilation and heat pump systems.

Pay up

As a society, we've become very good at doing things in the cheapest way possible, but the energy transition is going to require more expensive solutions in many industries, and a lot of the decarbonised technologies we're hoping to see in wider use are more commodity intensive. An electric vehicle uses six times more minerals than a combustion engine, while the build out of onshore wind turbines will increase the need for copper, manganese, chromium, nickel, molybdenum, and rare earths.³⁴

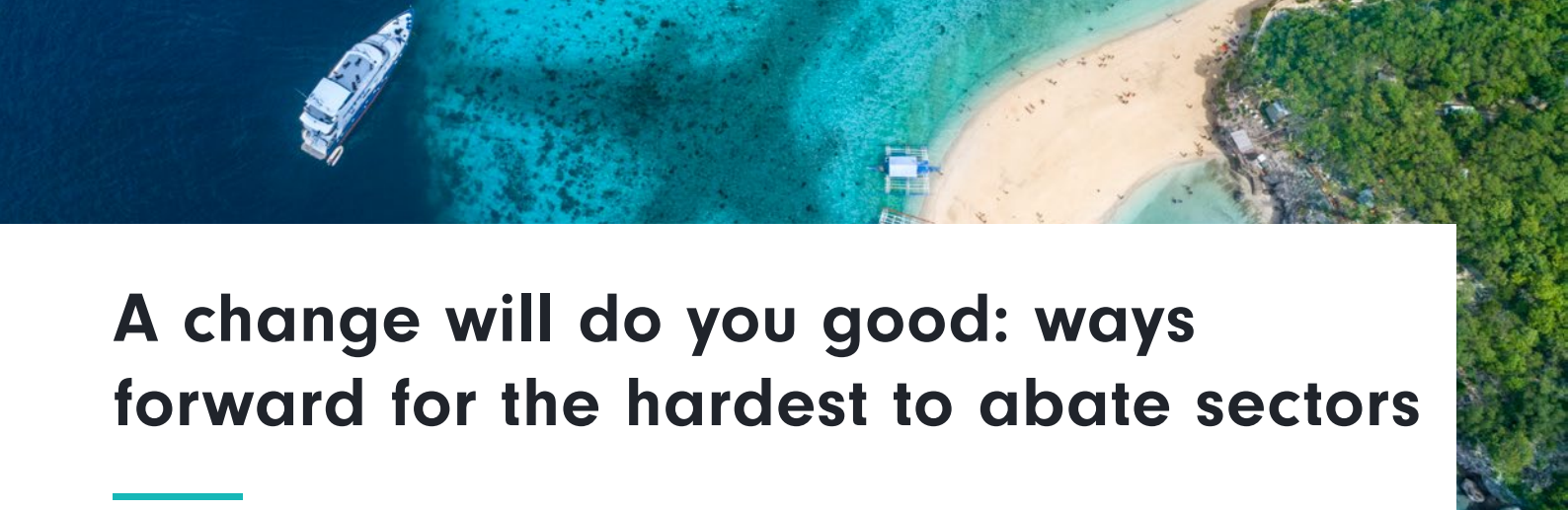
The rising demand for these materials will drive scarcity, which will lead to higher prices and bottlenecks. Ultimately, it presents us with a question: are we as a society willing to pay the price of abatement?

Certainly, it seems that consumer preferences are shifting with the desire to see change. Customers are more sensitive to the environmental and human impact of the goods and services they procure. As consumers become more scrupulous about what they buy, how their products are made, and what energy is used in their home, this should force policymakers' hand to regulate for real change.

We are still far off the target laid out in the 2016 Paris Agreement to limit warming to a 1.5 degree rise. Current expectations suggest that we're on a trajectory for an increase of up to 2.9 degrees.³⁵ For companies from all industries and across all regions, policymakers must step up to accelerate the process.

³⁴Overall mineral demand from wind in the base case by scenario, 2020-2040 | IEA

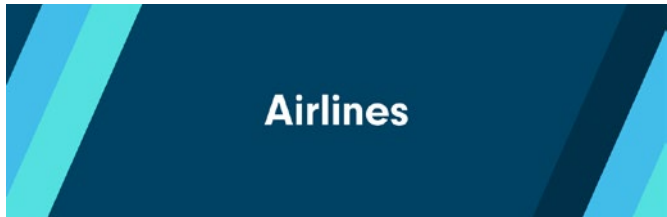
³⁵Nations must go further than current Paris pledges or face global warming of 2.5-2.9 degrees | United Nations Environment Programme



A change will do you good: ways forward for the hardest to abate sectors

Fidelity International Research

Climate targets require every industry to reduce energy use and cut reliance on fossil fuels. But for certain sectors it really is a case of easier said than done. Here, analysts from across Fidelity International present the latest challenges - and possible solutions - for the hardest to abate industries.



Airlines

Airlines face a unique challenge when it comes to going green: where electric battery technology is the bedrock of transition in sectors like electric vehicles (EVs), these are simply too heavy to put on a plane. Some smaller aircraft can (and do) use electric batteries. But they won't work for the vast majority of planes, and therefore won't provide the means to reduce almost all of the industry's emissions. That's a severe handicap.

The solution lies in developing Sustainable Aviation Fuels (SAF) like biofuels, which come from food waste and other biomass. The good news is that the science is basically there, and airlines have been allowed to use a blend of fuels that include SAF on commercial flights for more than a decade.

The problem now becomes one of scale, and that's the second challenge airlines face.

To understand the difficulty, think about how hard it is proving we can create a reliable network of EV charging points. Now imagine doing something similar with airplanes. The adoption of SAF at scale involves adapting all the existing infrastructure behind airports and planes to handle the new fuels. That requires huge amounts of capital investment and, crucially, time.

Unfortunately, I don't see a way that consumers won't bear the brunt of the associated costs. As well as the capex demands, SAF themselves are now significantly more expensive to manufacture than regular fossil fuels.

That sounds bad, but I'm actually quite positive on the shape of the market, largely because companies are more aware of the challenges than they were, say, five years ago. Every airline and aerospace company I speak to is desperate for

a more environmentally-friendly source of fuel - if they found one, they'd put their competitors out of business overnight. The cost of paying for carbon credits, like those established through the European Emissions Trading scheme, provides more financial motivation to transition at pace, as does an increasingly weighty regulatory burden.

- Marcel Stotzel



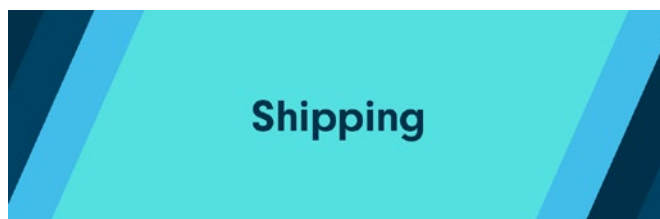
There has been very little investment in the electricity grid across the developed world over the past two decades. But given the energy transition means working with more complex renewable energy sources and new demand from an increasingly electrified society, this needs to change quickly. We're already seeing much more pressure on the system from data centres, and from countries looking to onshore manufacturing activities, for example. It's all the harder given growth in electricity demand was so lacklustre over the last few decades as systems such as lighting and computing became more efficient.

Upgrading to a superior, decarbonised grid requires a huge amount of capital, but it also means tackling issues around permitting and policy. There's also the headache of finding sufficiently trained labour and increasing the production of equipment such as transformers to cope with higher demand.

There is some good news – for example, the bottlenecks around equipment manufacturing are now easing, and capital is coming in, although countries that have set aggressive targets for decarbonising their grids, such as the UK, are looking overly optimistic.

Shifting to more intermittent renewable energy means a complete change to our system architecture, away from a base loaded system. Again, there exist options such as batteries or pumped storage hydropower, but operators continue to look for a better long-term solution. This is a sector that's very good at solving its own problems though – even if they're not perfect.

- Alexander Laing



It's been suggested that for shipping to be compliant with a 1.5-degree pathway the sector will need to cut the carbon emitted in the transportation of every container box by 50 per cent from its 2019 levels by 2030. At any one moment, there are around 20 million container boxes on the move on our oceans, and our existing fleet of container ships is not yet set up to run on clean fuels.³⁶

In 2023 the International Maritime Organization (IMO) produced an industry-wide strategy to reduce the carbon intensity of international shipping

³⁶[Science Based Target Setting for the Maritime Transport Sector | Science Based Targets, May 2023](#)

by at least 40 per cent by 2030.³⁷ It's not clear what power the IMO has to enforce the target, however.

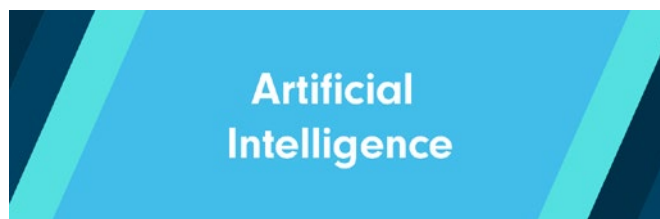
Given that most ships typically have a life cycle of 20 to 25 years, many don't see the financial benefit of paying to upgrade their vessels before they're due for the scrapyard – especially given there's no significant regulatory pressure in play yet.

Nevertheless, some shippers are trying. Retrofitting existing vessels to dual-fuel engines is one option being explored, although this can only be done with newer and larger ships. Maersk is buying ships that run on methanol, which emits a fraction of the carbon of conventional fuel. Liquified natural gas (LNG) can also help with particulate emissions, although it still has a relatively high carbon footprint.

In the longer term, hydrogen is being touted by many as a potential solution – although it's a 10 to 15-year time horizon before it can be fully implemented. Green ammonia is another exciting prospect given it's a clean, carbon-free fuel. Some companies are already exploring that route.

I think we will end up seeing a combination of these fuels forming a solution, while there will also be innovations that allow ships to reduce their energy needs. A prototype is in development for a container ship with sails, for example. While wind can't move the current generation of container ships on its own, there could be some marginal benefits of hybrid systems that save one or two per cent on fuel consumption.

- Jonathan Neve



It won't surprise anyone to hear that demand for energy from the artificial intelligence (AI) industry is growing. But this is steady growth rather than a gigantic spike. As a rule of thumb, one graphical processing unit (GPU) - the chip at the centre of AI operations - uses as much power in a year as one US consumer. The industry is currently adding 4 to 5 million new GPUs per year, meaning global GPU demand is equivalent to an additional 1.5 per cent annual growth in the US population. This figure could increase as GPUs become more powerful and their energy demand increases, although all the AI companies in our coverage are very much focused on reducing the power requirements of their operations. Often, the cost of maintaining, powering, and operating the chips used in data centres is more than the upfront cost of the chip itself, so there's an economic incentive to try to increase power efficiency.

Obviously where marginal energy demand is tight, a couple of percentage points growth in the requirements on a system can have an impact on the supply-demand balance. It's therefore important at the moment to place data centres in locations where there's more power capacity available. Further down the line - and so long as the demand for AI continues - we're going to have to increase supply capacity.

However, the challenge is not only in the amount of energy needed, but also the nature of the supply. Data centres run 24 hours a day, seven

³⁷[2023 IMO Strategy on Reduction of GHG Emissions from Ships](#)

days a week, and so need a steady base of power. That's difficult when you're considering the intermittent nature of renewable sources of energy. Nuclear power, which has zero carbon emissions and provides steady base level power, is likely to be used in combination with battery storage or pumped hydro to smooth over that generation versus demand gap.

There are also solutions being developed to cool data centres more efficiently, and to improve chip architecture. We're already seeing some suppliers creating more specialised chips. Google has custom-developed its own tensor processing units (TPUs), which run better and at lower cost than the generic GPU. As the sector matures and the technology is standardised, more individual firms could be encouraged to create their own specialised solutions.

- Jonathan Tseng



The easiest way to reduce emissions from the mining industry is for the sector to make greater use of renewable energy. This could include more electric trucks, which have progressed significantly in the last couple of years. Indeed, in August Fortescue announced it is teaming up with Liebherr to develop the world's first self-driving electric mining truck. It could also involve trucks powered by hydrogen such as those trialled by Anglo American.

But the biggest challenge facing the industry is removing carbon from the processing. Intensity varies dramatically from one metal to another -

producing nickel and aluminium, for example, is highly carbon intensive. Alternative low-carbon processes can often cost more and, in many cases, will only be economical if those products attract a premium. In practice this means consumers accepting to pay that premium. Low-carbon aluminium has had some early success here, but progress is uneven and the same cannot really be said of, say, nickel.

At times, there may be a need to support the transition more directly - the large amounts of capex now being announced to decarbonise Europe's steel plants demonstrate how financially painful this can be. Policymakers have a role in providing a supportive regulatory framework. It's difficult to see how the sector shifts to an acceptable carbon intensity without widespread carbon taxes, for example. These have been effective in changing behaviours in Europe but, without wider adoption, risk leaving affected European industries exposed and uncompetitive.

The bottom-line is that abating the emissions of the metals and mining sector will need to be paid for. The energy transition won't happen without the materials the sector produces. Supplying them in the necessary quantities using low-carbon, sustainable processes will cost more than using traditional methods. The obvious example is green steel. Producing low-carbon steel is technically feasible, using green hydrogen or electricity from renewable sources instead of metallurgical coal. But it comes at a premium which varies depending on where you produce it, and even a relatively modest premium can make more sustainable alternatives economically unviable in the absence of external support.

- James Richards

- Oliver Hextall



Repowering the wind industry

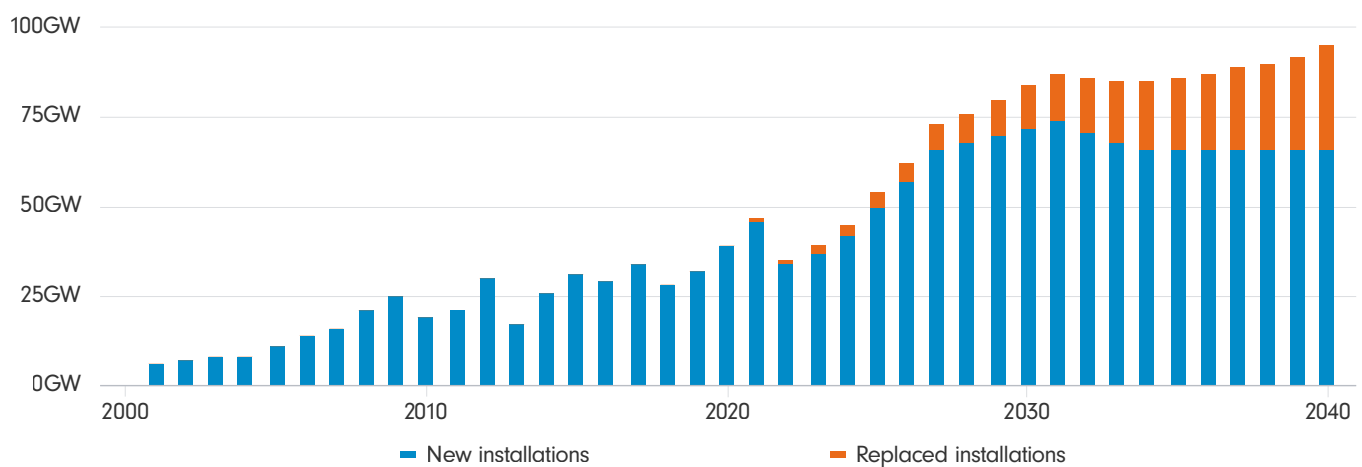


Alexander Laing
Analyst & Portfolio Manager

A project on Spain's gusty southern coast puts hard numbers on how the replacement - or 'repowering' - of turbines will improve the efficiency of wind farms, both financially and in terms of generation, over the next decade.

Chart 11: Repowering the wind industry

New wind generation capacity and replaced capacity (GW)



Source: Bloomberg, Fidelity International, June 2024.

It was high time. Jutting out into the Atlantic on the very southern tip of the Iberian peninsula, Tarifa is Spain's windiest town and one of the earliest destinations for the country's surge in wind farm construction in the 1990s. Its giant white windmills will be among the first to be replaced - or in industry speak, 'repowered' - by local renewables specialists Acciona Energy over the next year, in a project that will be duplicated across Europe many times in the next decade. What's most striking, however, are the numbers. In Tarifa, Acciona will replace 98 of its 1990s turbines with just 13 new towers. The farm's production, however, will surge by 72 per cent - enough to power 73,000 homes versus the 42,000 it currently provides for.³⁸ The economics should also deliver: repowering wind farms carries few of the startup costs in land, leases and approvals that new locations require and the profit margins should be healthy.

From an investor's perspective, the most interesting segment at the moment may be turbine manufacturers.

It's been a torrid couple of years for investment in the wind power revolution, but the nature of the troubles are also a sign of a maturing market. A shortfall in grid investment in Europe - in part the result of regulatory bottlenecks that governments have been working to fix - had slowed installations. The US market has suffered from uncertainty

around subsidies. High interest rates have also hurt the economics of turbines at a time when manufacturers' costs have risen.

Paths around these obstacles are emerging. In Germany, where new onshore installations were only 1.5 GW in 2022 (far below official targets), some 7 GW was tendered last year, helped by an easing of the permitting process. The new Labour government in the UK could further boost investment in the grid. The country's energy regulator, Ofgem, whose charter previously was simply to protect the consumer and keep prices down, now is also tasked with enabling net zero, allowing bills to rise for the necessary investment.

From an investor's perspective, the most interesting segment at the moment may be turbine manufacturers. Many had been struggling with a development cycle that continuously delivered new technology before they were able to make money from the previous generation - a problem they have now solved.

Repowering is one piece of the puzzle. As the chart shows, by the end of the next decade the replacement of existing turbines could make up more than a quarter of all sales. The power generation that's possible with the new turbines provides an opportunity for manufacturers to cash in on the huge technological breakthroughs and improvements in efficiency of the past 20 years. Wind, hopefully, in their sails.

³⁸[ACCIONA Energía repowers the Tahivilla wind farm](#)



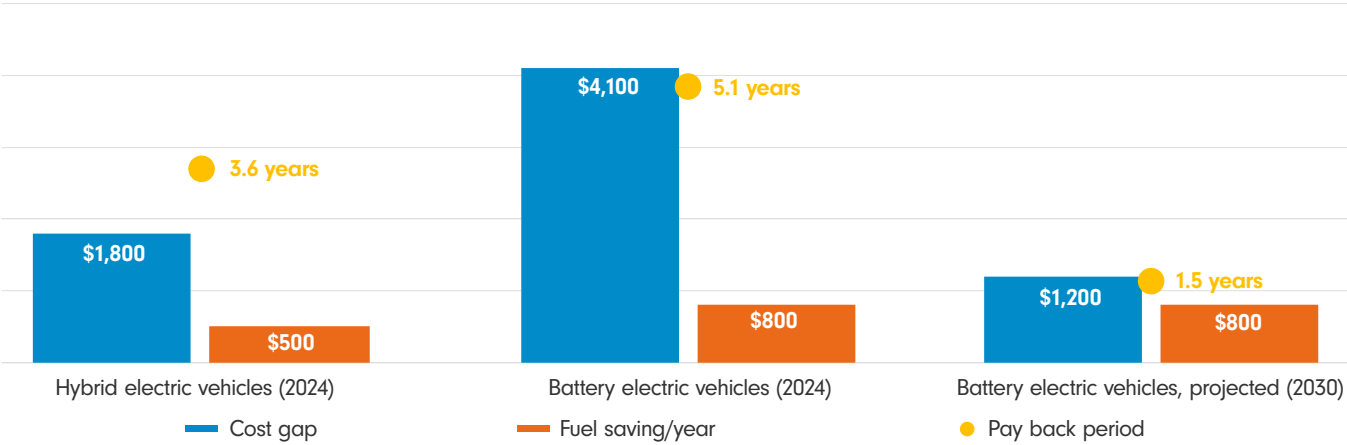
Back to the future with hybrid EVs



Daichi Ban
Research Analyst

Consumers are warming to hybrid electric vehicles (EVs) for lower cost and longer cruise time than battery EVs. But that demand could dissolve once battery technology catches up in the next few years. Carmakers, countries, and investors betting on the energy transition should pay attention.

Chart 12: Back to the future with hybrid EVs
Time EVs take to offset premium over Internal Combustion Engine cars via fuel cost savings



Company data, Goldman Sachs, Fidelity International, July 2024.
Note: Chart shows electric vehicles (EV) fuel costs compared with internal combustion engine (ICE) vehicles. EVs are generally more expensive but more fuel efficient than ICE cars. Pay back period represents the number of years it takes an EV to recoup that premium via lower fuel costs. Values are in US dollars.

Hybrid was the future once. The petrol and electric combo that replaced revving engines with a more tranquil experience was a novelty and the cleanest option in a world looking for ways to ease itself off fossil fuels. That was until the proliferation of 'pure play' battery EVs (BEVs) made the hybrid use case obsolete. In comparison, adopting hybrids looked like a half measure for the half-hearted environmentalist. Hybrids were headed for the dustbin of history, while their owners were made subjects of satirical memes.

By the time latecomers
catch up in technology,
hybrid will no longer be
the future.

The hybrid surge is responsible for [the most profitable year ever](#) for Japanese carmakers Toyota and Honda. Along with several Korean peers, they've been betting heavily on hybrid technology for decades - a natural consequence of their countries' energy mix, which is more reliant on natural gas and thermal power than Europe and the US. But those trying to emulate their success will miss the boat. As the chart shows, battery technology - the bulk of the cost of BEVs - is set to accelerate by 2030 and significantly reduce BEVs' price premium over ICE and its payback period, making them more attractive than HEVs. By the time latecomers catch up in technology, hybrid will no longer be the future. That's why even carmakers benefitting from the hybrid wave are pivoting to battery technology - and that's where investors should focus their attention.

Fast forward to 2024 and hybrid is the future once more. The urgency to reduce carbon emissions combined with high inflation are driving consumers back into the embrace of hybrid EVs (HEVs). The chart above, based on company data compiled by Goldman Sachs, shows that a consumer ditching an internal combustion engine (ICE) vehicle for something greener would pay USD \$4,100 more for a BEV, and just USD \$1,800 more for an HEV. The HEV will save enough energy to offset that additional cost (versus owning an ICE) in 3.6 years; a BEV would take 5.1 years. Supported by petrol at faster speeds, HEV owners also don't have to worry about 'range anxiety' - the fear of running out of power when there's no charging station in sight.

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