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CAPITAL MANAGEMENT

Driehaus Emerging Markets Small Cap Equity Strategy Summary

OCTOBER 2021

Much has been written about energy transition over the past year, spurred by a wave of policies and announcements targeting net zero carbon emissions by companies and countries around the world. Amid the ongoing United Nations Climate Change Conference, known as COP26, this month's commentary reflects on developments related to energy transition over the past year. We will not rehash the various net zero commitments or widely reported takeaways from COP26, but rather focus on a few key incremental changes that have shaped the backdrop for energy transition throughout the year.

The Role of Nuclear Power

2021 has represented a perfect storm of sorts for energy markets, punctuated by extreme weather events such as the Texas freeze in February, a once in a century drought in Brazil, and Hurricane Ida in the US. These events, along with the pressure on energy production associated with COVID-related disruptions and underinvestment in the sector, led to acute pockets of undersupply as energy demand recovered in tandem with industrial activity in much of the world.

The volatility in energy prices and vulnerability felt from these extreme events underscore the fragility of global power markets. As the world continues to shift toward cleaner sources of energy, considerations for the intermittent nature of wind and solar power, along with the variability in hydro power, necessitate a clean source of reliable baseload power.

Against this backdrop, nuclear power has seen a resurgence in interest, particularly in Europe, which was hard hit by the energy crunch in recent months. Roughly 70% of France's electricity is generated by nuclear power, which has helped insulate it from the recent energy shock felt across Europe. According to the Energy Information Administration, one kilowatt of energy produced in France is six times less carbon intensive as the equivalent amount produced in Germany. The scheduled phase-out of nuclear in Germany has met with resistance of late, as the marginal source of the country's energy now comes from the Russian Nord Stream-2 pipeline, carrying additional layers of environmental and energy security risks.

Even in Japan, where the devastating Fukushima nuclear accident led to a reduction in the number of reactors from 54 to 9, the Secretary General noted that 30 reactors would need to be restarted in order for the country to meet its carbon emission reduction goals.

Further, Bloomberg News recently reported that China plans to invest $440 billion to build 150 new nuclear reactors in the next 15 years, which would make the country the world's largest producer of nuclear power.

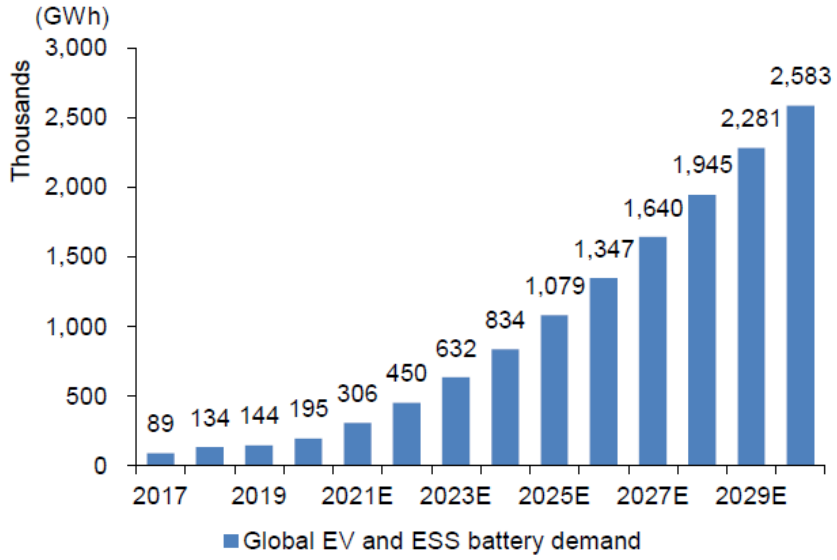
The strategy continues to hold a position in a Kazakhstan-based producer of uranium, which boasts an enviable position on the global cost curve, along with the ability to restart spare capacity in response to a sustained pickup in global demand.

Energy Storage Systems

Alongside clean, reliable baseload power, it is likely that energy storage systems (ESS) will play a major role in integrating intermittent renewable energy sources into global power grids. Utility-scale batteries can store excess generation and then use this stored electricity during peak hours. The 80%+ decline in the cost of lithium-ion batteries over the past decade has led to dramatically improved economics for the pairing of renewable energy and ESS.

Earlier this year, analysts at Macquarie increased their estimate for global ESS demand by a massive 78% in 2022 and 123% in 2023. While their new 2023 ESS estimate only comprises 17% of total battery demand, Macquarie believes that ESS could be as large of a contributor to the global battery market as electric vehicles over time. Together, electric vehicles and ESS are expected to drive significant growth in global battery demand over the next decade (Exhibit 1).

Exhibit 1. Forecasted Global Battery Demand



Source: Macquarie Research, June 2021

Policy in China has kickstarted ESS demand, as some provincial governments now require 10% of newly approved wind and solar projects to be accompanied by ESS. Macquarie expects this proportion to rise to 40-50% over time, leading to significant demand growth.

One of the strategy's holdings in China is a lithium-ion battery producer, which reported 120% year-over-year growth in its battery production in the first half of 2021, with ESS being a strong contributor to demand. The strategy also participated in the recent IPO of a company seeking to leverage artificial intelligence capabilities alongside an ESS product to help its customers optimize their use of renewable power.

Energy Security

While the long-term path for renewable energy remains promising, China's recent power crunch has underscored a simultaneous need for energy security. China has ambitious targets for renewables to comprise 25% of its primary energy mix by 2030 and 80% by 2060. However, the reality is that wind and solar together represent 11% of the current power mix, while coal-fired power is roughly half of the country's mix. Hydro power, which is 14% of the mix, has struggled recently against a high base, with output declining by 1% year-over-year through the first eight months of 2021. Over that same period, coal and natural gas consumption grew by 9% and 16% respectively, well in excess of domestic production growth. This left China competing against other countries for imported source of energy. As the peak winter heating season approached, independent power producers found themselves lossmaking, with dwindling stockpiles of coal. Consequently, capacity utilization for these producers declined to approximately 50%, and the central government undertook the difficult decision to curtail power output to certain high energy intensity industries, such as cement, steel, aluminum, textiles, and petrochemicals.

This painful episode then led the Chinese authorities to push local companies to rush to procure coal and other sources of energy, while simultaneously capping local coal prices. Inevitably, economic growth will take a hit, and China has faced criticism in the wake of COP26 for its continued reliance on coal.

The growth of renewable energy, as well as electric vehicles, are firmly in China's economic interests, as some 75% of the respective supply chains are controlled by Chinese companies. However, this shift toward renewables is likely to be accompanied by broader energy security initiatives in order to avoid a repeat of this year's power crunch.

One of the strategy's holdings is a China-based producer of turbine fracturing pumps used in shale gas production. These pumps reduce greenhouse gas emissions by eliminating idling during non-operating periods and running on multiple fuel sources. By using gas from in-field, the pump's fuel cost can be 80% lower than diesel-fueled fracturing equipment. We expect China to increasingly prioritize the domestic development of natural gas as part of its energy security strategy amid the transition to renewables, furthering the demand prospects for this company.

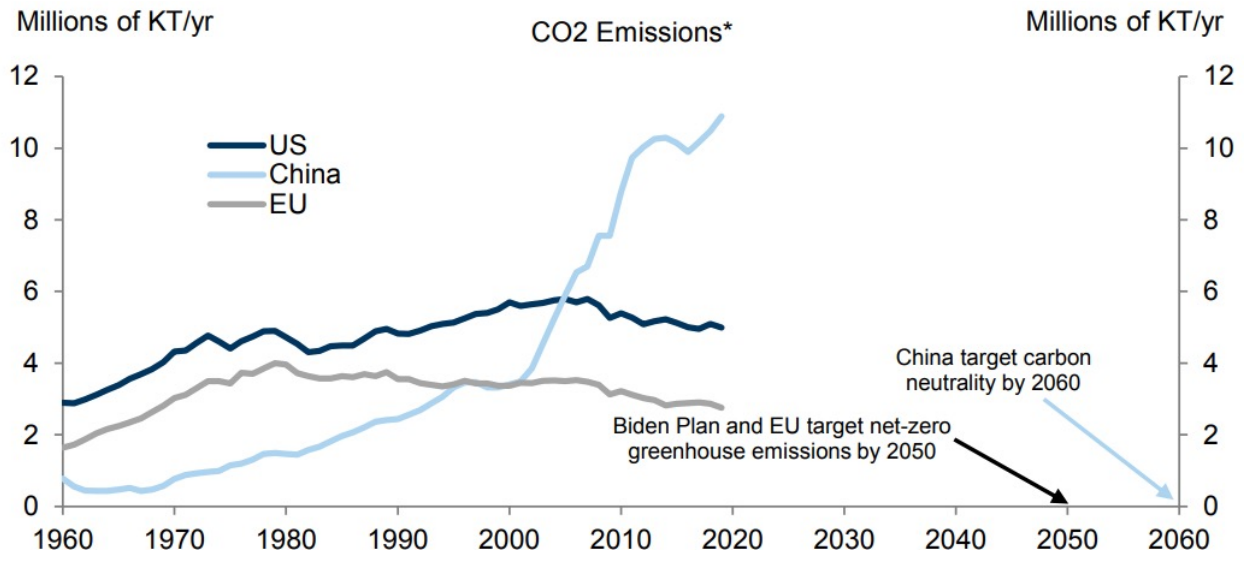
The Pathway to Net Zero in an Emerging Markets Context

COP26 has highlighted the different trajectories to net zero emissions in the developed and emerging world. As shown below, China's aggregate emissions are greater than the US and Europe combined (Exhibit 2). However, on a per capita basis, China's emissions are far lower than the US (Exhibit 3). Further, the developed world undertook its era of industrialization earlier than the emerging world. If measured on a cumulative basis, the US would be the world's largest emitter, representing roughly 25% of global emissions.

Irrespective of how one measures emissions, it is important to note that the US and Europe's aggregate emissions have peaked, while China has set forth a policy target of peak emissions by 2030. India garnered attention during COP26 by committing to a net zero target by 2070. However, skeptics point out that China's 2060 net zero target and India's 2070 target are several decades away, while a greater sense of urgency may be required to meet the Paris Agreement's goal of limiting temperature rises to 1.5°C. The reality is that India is still in its development phase, and accordingly the country's aggregate emissions are likely to rise for several more years before reaching a peak (Exhibit 4).

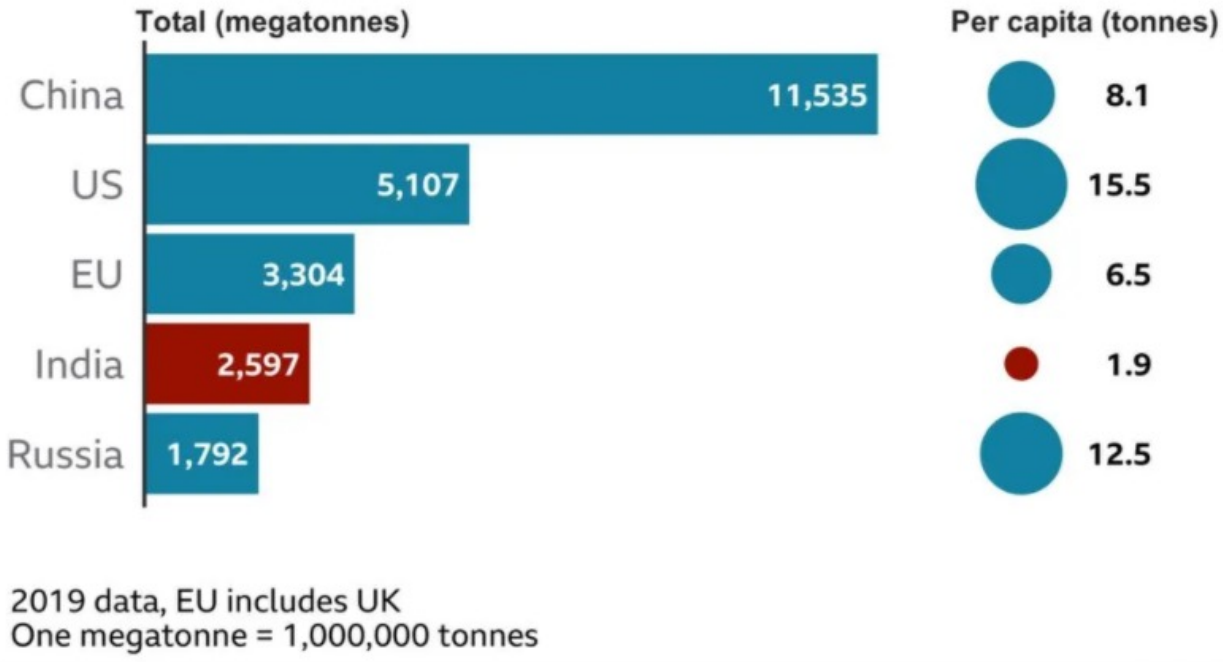
Emerging economies have been aggressively adopting renewable energy and promoting policies to curtail energy intensity, however their relative starting point compared to the developed world implies that carbon neutrality goals will not be achieved as quickly as the US and Europe.

Exhibit 2. Aggregate Carbon Emissions



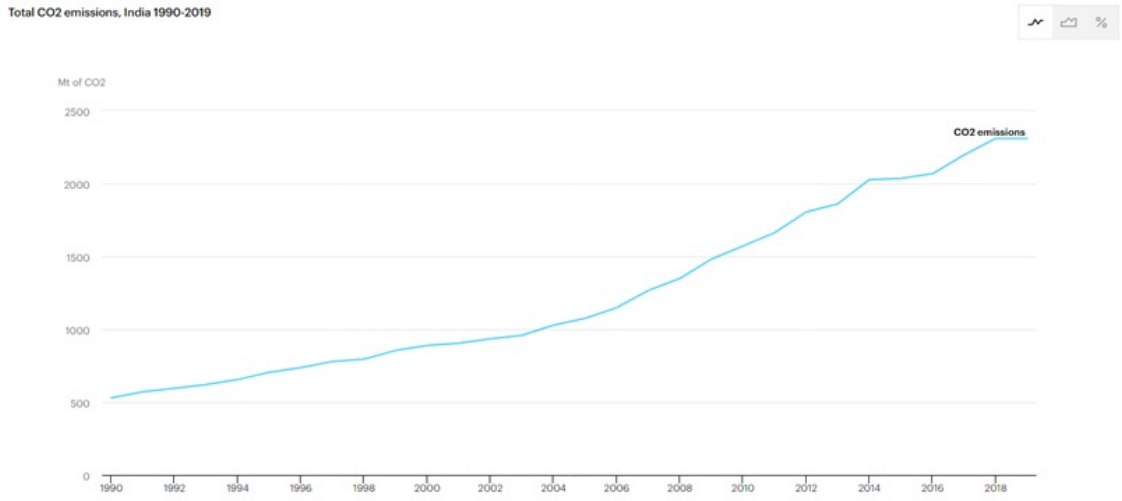
Source: Goldman Sachs

Exhibit 3. Per Capita Carbon Emissions



Source: EC, Emissions Database for Global Atmospheric Research

Exhibit 4. India Aggregate Carbon Emissions



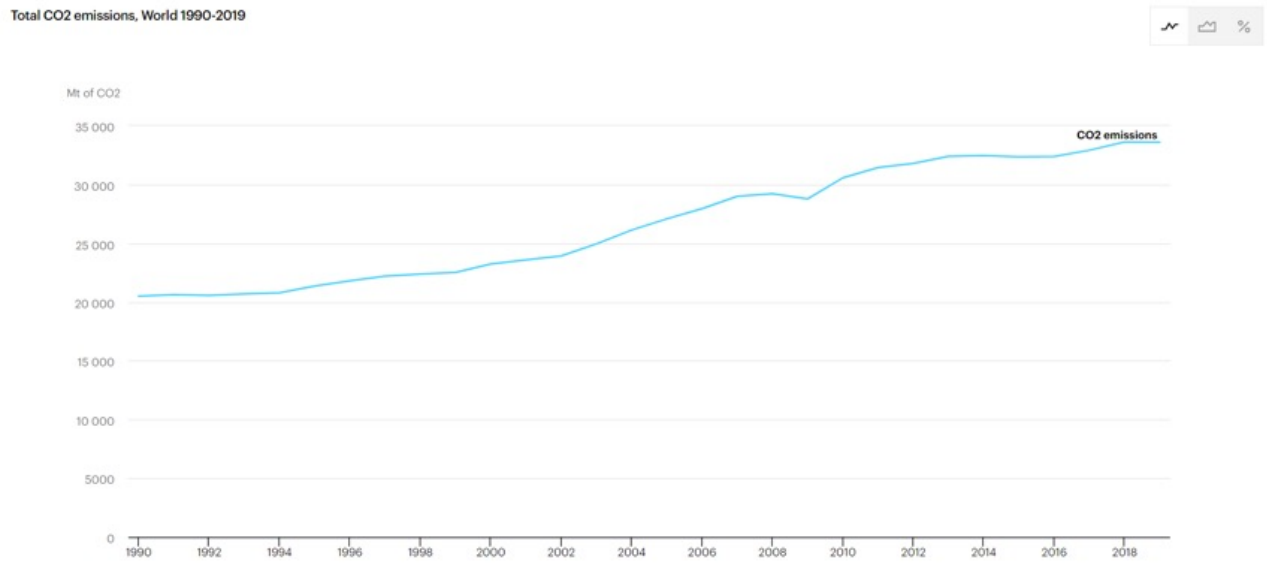
Source: IEA

The Cost Associated With Energy Transition

Given the trends of rising prices for raw materials that are critical to the energy transition alongside the broader inflationary backdrop that has transpired over the last twelve months, the economic cost of energy transition is an important consideration for policymakers.

In US Treasury Secretary Janet Yellen's remarks to COP26, she noted, "It's a global transition for which we have an estimated price tag: some have put the global figure between $100 and $150 trillion over the next three decades. At the same time, addressing climate change is the greatest economic opportunity of our time." Current global carbon emissions amount to 33.6 billion tons (Exhibit 5). The price of carbon under the European Union Emissions Trading System is currently $70/ton. Assuming emissions and the price of carbon were to both stabilize at current levels, the cost of the next 30 years' worth of emissions would be $70.6 trillion (33.6 billion tons x $70/ton x 30 years). Given the likelihood of higher emissions and/or carbon prices over time, Yellen's estimate of $100-150 trillion looks reasonable.

Exhibit 5. Aggregate Global Carbon Emissions



Source: IEA

One of the challenges associated with energy transition is procuring the vast quantity of resources that will be necessary to produce wind turbines, solar panels, batteries, electric vehicles, and charging stations. Bank of America quantifies the supply growth needed for key raw materials through 2050, finding that an incremental $72 billion per year of capex will be needed in the mining sector through 2030 to achieve the necessary supply (Exhibits 6-7). This compares to an average of $99.5 billion spent per year over the past ten years.

Exhibit 6. Resource Demand from Technologies Required to Achieve Net Zero

Compound annual growth rates of up to 25% YoY are required out to 2030

	Supply	Demand											
		Batteries		Transportation		Energy		Hydrogen		Total		CAGR	
	2020	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050
Copper	23,389,096			5,870,114	7,921,539	4,117,691	4,470,435			9,987,806	12,391,974	3.5%	1.4%
Lithium	386,947	3,141,497	5,410,475							3,141,497	5,410,475	24.7%	9.4%
Nickel	2,615,340	2,838,432	4,737,969							2,838,432	4,737,969	7.6%	3.5%
Cobalt	142,883	607,720	1,024,626							607,720	1,024,626	18.0%	7.3%
Silver	30,687					8,554	10,477			8,554	10,477	2.5%	1.0%
Platinum	6,415,424			1,755,551	4,820,573			747,964	1,120,786	2,503,515	5,941,359	3.3%	2.2%

Source: IEA, BofA Global Research

Exhibit 7. Capex Requirements to Meet Demand Growth for Resources Required to Achieve Net Zero

Miners need to spend $72B just to facilitate demand growth for the MIFTs; this figure does not include consumption increase from traditional sectors not directly related to de-carbonisation

	Demand		Capex intensity	Growth capex and depreciation, total	
	2030	2050	US$/t	2030	2050
Copper	9987.8	12392.0	20000	390	501
Lithium	3141.5	5410.5	3000	19	33
Nickel	2838.4	4738.0	50000	287	479
Cobalt	607.7	1024.6	4000	5	8
Silver	8.6	10.5	30	9	3
Platinum	2503.5	5941.4	1800	9	22
Total capex, US$ BN				719	1,045
Annual average, US$ BN				72	35

Source: BofA Global Research

Inevitably, as new technologies and production methods gain critical mass, end consumers may become more efficient in their use of resources. However, from a macro perspective, it is striking that $4 copper has coexisted with the first decline in China property prices over the last five years. Counter to the last twenty years, this is no longer a world where China's fixed asset investment drives metals prices. Renewable energy and electric vehicles are instead the key source of incremental demand. It is equally striking that amid this environment of $4 copper, not a single new copper project has been sanctioned in the past year.

The strategy is invested in a company whose operations are based in the Democratic Republic of Congo, boasting one of the top five global copper deposits, and having recently announced the second phase of development for the project. While many metals maintain strong demand characteristics, we expect copper to be the prime beneficiary of the energy transition within the industry, as traditional mining jurisdictions for copper face rising regulatory and geological constraints, while no new megaprojects are on the horizon.

Energy transition is an important global ambition with significant commitments from major countries around the world. That said, the journey over the next several decades is unlikely to be a linear path. Challenges such as finding a clean source of reliable baseload power, storing the power produced by renewable sources, ensuring energy security while simultaneously forging a credible path toward net zero, and procuring the necessary resources to facilitate a cleaner energy mix without generating inflation concerns will inevitably present bumps in the road. However, the broad theme of energy transition encompasses significant investment opportunities across multiple sectors, with an opportunity set that is poised to increase substantially over time.

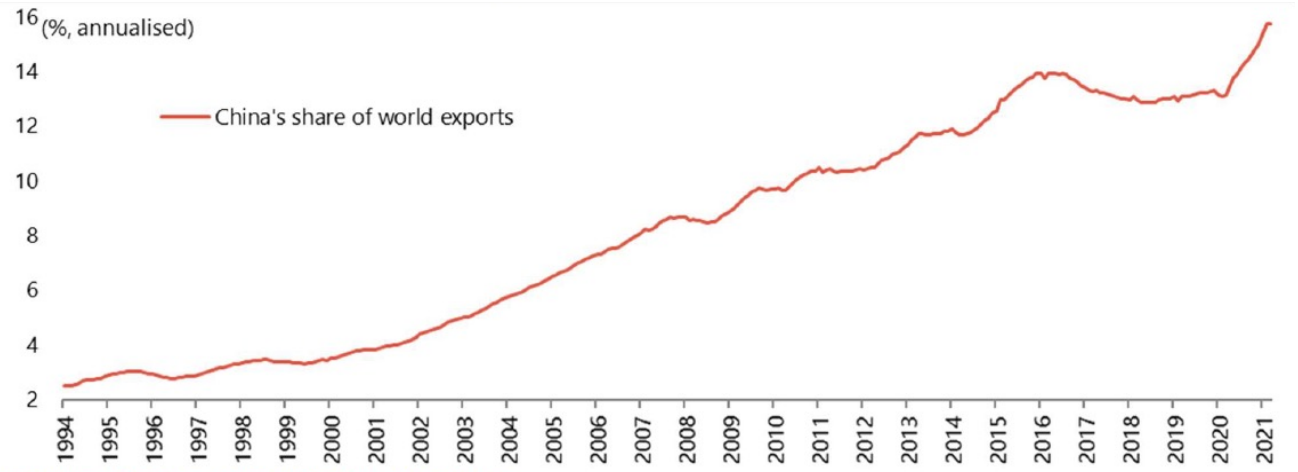
Performance Review

At the sector level, the most significant contributors to returns were information technology and consumer discretionary. Communication services and utilities detracted the most value. At the country level, China and Kazakhstan contributed most to performance for the month, while Brazil and India were notable detractors from performance.

Until next month,

Chad Cleaver, Lead Portfolio Manager
Driehaus Emerging Markets Small Cap Equity Strategy

Exhibit 21. China's Share of Annualized World Exports



Source: IMF – Direction of Trade Statistics, Datastream

As this year's summer chartpack shows, we are excited about the opportunity set across small caps within emerging markets. We are encouraged by recent performance trends of the asset class and continue to find many interesting growth stocks across a number of countries and sectors.

Until next month,

Chad Cleaver, Lead Portfolio Manager
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