On the Minds of Investors

April 2021

Achieving net zero: The path to a carbon-neutral world

2020 marked the end of the hottest decade on record. With global greenhouse gas (GHG) emissions having increased by almost 50% since 1990, actions to halt climate change are increasingly urgent. The 196 signatories of the 2016 Paris Climate Agreement agreed on the goal of limiting global warming this century to well below two degrees Celsius compared to pre-industrial levels, but most countries are not on track to meet their emissions reduction goals.

As environmental focus intensifies, achieving net zero emissions by 2050 has become the new benchmark among policymakers. Last year the UK and France became the first major economies to sign a net zero 2050 target into law. In total, 58 countries, representing 54% of global GHG emissions, have now communicated a net zero target and we expect this number to increase ahead of the UN Climate Change Conference of the Parties (COP26) scheduled for November in Glasgow, Scotland.

The ambition to achieve net zero is welcome; the implementation is a daunting task that will require major breakthroughs in climate technology to overcome the current hurdles. This piece aims to provide a framework to understand and address the challenges of getting to net zero by 2050, and the associated investment implications. We break it down into four main questions:

1. What is the size and scale of the challenge?
2. What are the best strategies to achieve net zero emissions?
3. What are the options for policymakers?
4. What are the key considerations for investors?

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SECTION 1: HOW BIG IS THE CHALLENGE?

Achieving net zero emissions will require huge changes to the global economy, in terms of energy mix, consumption, housing and even human diets. Some countries and sectors are more carbon intensive than others and will need to make bigger efforts. Some carbon-intensive industries will be easier to decarbonise than others; power generation is much easier to decarbonise than steel or cement production, for example. The complexity of this problem highlights why it is important for policymakers and investors to precisely map, quantify and analyse global emissions.

Greenhouse gases are not all the same. Some have longer lifetimes, while their ability to absorb infrared radiation (heat) also varies. Carbon dioxide (CO_2) has the lowest global warming potential of the major greenhouse gases – but has one of the longest lifetimes in our atmosphere, along with fluorinated gases. This long residence time, combined with the complex response of natural carbon sinks (such as the oceans) to carbon emissions, means that any reduction of CO_2 emissions today will not immediately lead to lower CO_2 concentration in the atmosphere. This explains why policymakers are focused on bold reduction targets to halt emissions as quickly as possible. Other gases like methane and nitrous oxide have a much greater ability to absorb heat, but shorter atmospheric lifetimes.

The rapid increase in emissions over the last three decades has been mainly driven by emerging markets, with GHG emissions from large and rapidly developing countries surging – by 300% and 217% respectively in China and India, for example. In developed markets, GHG emissions have generally decreased: in the European Union they are down 20% over the same period. China is now the biggest GHG emitter in the world, and the five largest GHG emitters (China, the US, India, Europe and Russia) together account for more than half of global GHG emissions. Of course, measuring emissions on volume alone may not be a fair comparison; a closer look at GHG emissions per capita, stages of economic development and the effect of "offshoring" manufacturing reveals a more nuanced picture (see **EXHIBIT 1** and **BOX 1**).

From a sector perspective, the energy and industrial sectors have contributed most to the rise of global emissions since 1990, with GHG emissions up 56% and 180%, respectively. The increase in the agriculture sector has been more muted (16.5%), although the types of agriculture emissions are often more environmentally damaging. Power generation, transport and buildings are the sectors that emit the most CO_2 and, accordingly, are where we expect the most innovation and new regulation. See **EXHIBIT 2**.

BOX 1 — WHAT IS THE RIGHT METRIC TO MEASURE EMISSIONS?

"Absolute levels of GHG emissions clearly don't tell the whole story about the relative environmental impact of each country. At a minimum, we need to account for differences in population size by looking at emissions per capita. In addition, we may want to account for the fact that countries are at different stages of economic development. Historically, emerging markets have contributed less to global GHG emissions because their economic output has been lower. To understand the impact that these countries will have in the future, as their economic output continues to increase, we may also want to look at emissions per unit of GDP when comparing developed market and emerging market countries. In addition, some emerging market countries have higher CO_2 emissions because western countries have offshored the production of CO_2-intensive goods: 14% of China's CO_2 emissions are attributable to goods that are exported and consumed abroad. Accounting for emissions that countries have offshored to other regions is consistent with the increasing focus on companies' "Scope 3" emissions (as defined by the Greenhouse Gas Protocol), which consider emissions that companies have outsourced in their supply chain. For companies rather than countries, we take a similar approach and would consider greenhouse gases relative to a company's size."

Caspar Siegert, Ph.D., Research Analyst, J.P. Morgan Asset Management Sustainable Investing team

EXHIBIT 1A: SHARE OF GLOBAL CO_2 EMISSIONS BY COUNTRY

%, 2019

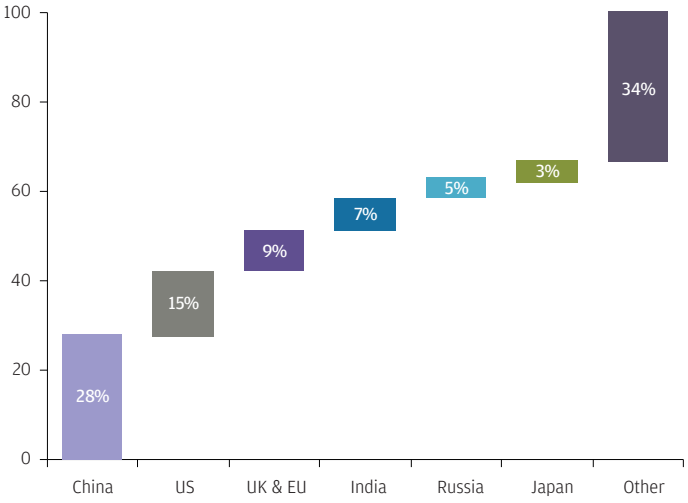
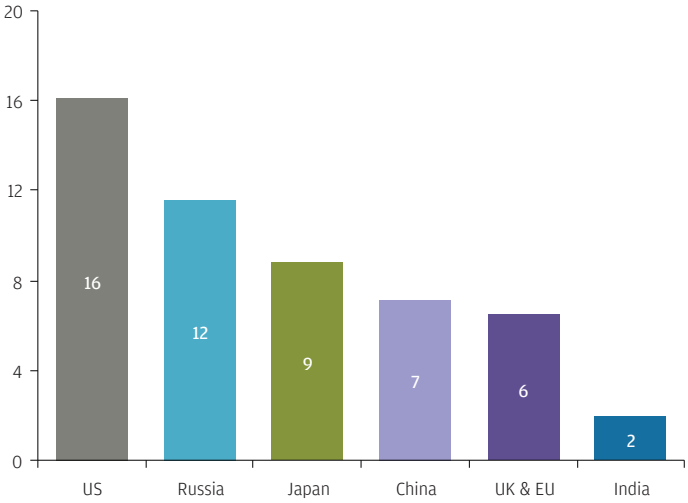


EXHIBIT 1B: GLOBAL CO_2 EMISSIONS PER CAPITA

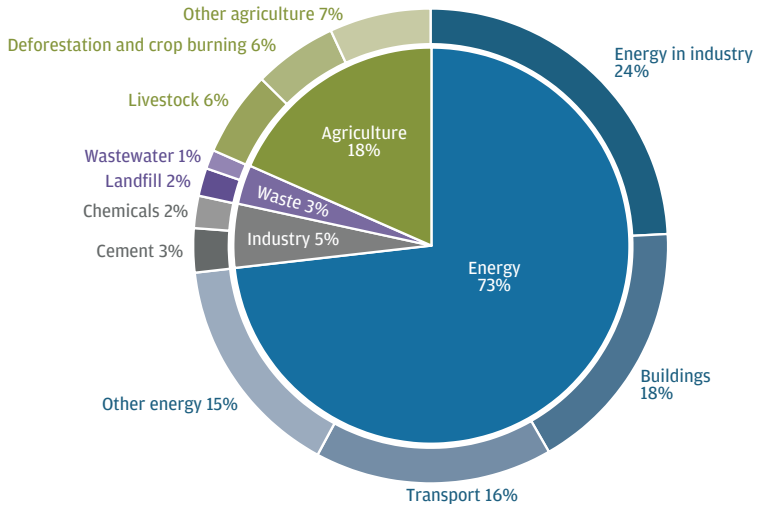
Tonnes, 2019



Source: Gapminder, Global Carbon Project, Our World in Data, United Nations, J.P. Morgan Asset Management. CO_2 emissions are from the burning of fossil fuels for energy and cement production. Emission impact from land use change (such as deforestation) is not included. Past performance is not a reliable indicator of current and future results. Data as of 31 March 2021.

EXHIBIT 2: GLOBAL GREENHOUSE GAS EMISSIONS BY SECTOR

% of GHG emissions (2016), CO_2 equivalent tonnes



Source: Climate Watch, Our World in Data, World Resource Institute, J.P. Morgan Asset Management. Greenhouse gas emissions include CO_2, methane, nitrous oxide and fluorinated greenhouse gases. CO_2 equivalent tonnes standardise emissions to allow for comparison between gases. One equivalent tonne has the same warming effect as one tonne of CO_2 over 100 years. Past performance is not a reliable indicator of current and future results. Data as of 31 March 2021.

SECTION 2: HOW TO SOLVE THE PROBLEM

Having quantified the problem, we now turn our attention to the strategies that will be required. The path to net zero emissions will require a combination of three strategies: increasing clean energy generation and electrification, improving efficiency and offsetting emissions. See **EXHIBIT 3**.

Increase clean energy generation and electrification

From coal to clean

Clean energy technologies will have the largest role to play in achieving net zero targets, given that 73% of global emissions stem from the energy sector itself. BP's latest energy outlook illustrates that the share of oil, coal and gas in the global energy mix would have to decline from close to 90% to around 20% by 2050, with coal almost completely eliminated as an energy source. See **EXHIBIT 4**.

Coal creates more CO_2 per unit of energy than any other fossil fuel source. It has also become a relatively less attractive option in many parts of the world as the cost of renewable sources has declined: wind energy costs are down 70% since 2009, while solar costs are down an eye catching 90% over the same period. Despite this, the degree of progress in eliminating coal varies widely. In the US, consumption of energy from renewable sources surpassed that from coal for the first time in 2019, while in the UK, no coal has been burned in the country's four coal-fired power stations for over a year.

The emerging markets face more substantial challenges to quitting coal for a variety of reasons. First, developed markets have more economic incentive to close plants because they tend to be old: the International Energy Agency (IEA) estimated in 2019 that the average age of coal plants in emerging Asia is only 12 years, compared to 46 years in the US. Further contributing to the issue, many assets in the developing world are owned by the state, especially in China, which makes them less sensitive to economic incentives than privately-owned equivalents. The coal industry is also a key source of jobs. In India roughly half a million people work as coal miners, with many more indirectly supporting the coal industry.

Finally, while there is broad agreement that coal needs to be wound down as soon as possible, it is not feasible for renewable supply to be ramped up rapidly enough to act as a one-to-one replacement. A switch to natural gas would lower carbon emissions in the interim (as natural gas burns more efficiently), but would also lead to higher levels of methane which is far more environmentally damaging. Avoiding over-reliance on gas in the coming years warrants an increasing focus.

Significant infrastructure upgrades will also be required to enable the storage and transfer of clean energy around the world. Designing a power grid with the flexibility to deal with the variability of wind and solar power production is a complex challenge. Governments have a key role to play in driving progress: they can invest in infrastructure, such as robust transmission systems, while incentivising the private sector to hunt for technology breakthroughs. Much cheaper storage options will be needed to smooth out fluctuations in renewable power sources, and while manufacturing costs of storage technology, such as batteries, will come down with scale, material costs could prove more challenging. This year's boom in the prices of metals such as lithium and cobalt – key components of batteries – likely indicates that investors are looking to price in the sharp increase in demand ahead.

Going electric

The large-scale electrification of existing industries is the next step, with the rise of electric vehicles (EVs) being one example. A wave of auto manufacturers have recently announced plans to shift to all electric production over the coming years, but while EV sales have almost tripled over the past five years, IEA data still estimated their global market share at just 4.4% of total auto sales in 2020. Part of the challenge is that, until recently, there had been little first-mover advantage. Motorists were reluctant to go electric until a robust charging infrastructure had been created, while energy companies were wary of building the charging network without being able to see the demand. As we discuss in Section 4, we expect the long-term winners in this area to be those who focus on dedicated EV platforms, rather than bridge technologies such as hybrids.

For some industries however, full electrification is not feasible. For example, prototype electric engines are being developed for airplanes, but batteries are still far too heavy to be a viable energy source for long-haul flights. Industrial production that uses high-heat processes is another area where full electrification may not be achievable. Here, low-carbon biofuels and hydrogen power will likely form part of the solution.

Improve efficiency

Improvements in energy efficiency to reduce the overall level of energy demand will also be an important part of reducing emissions. The recent expansion of LED lightbulb usage in India is a good example of a high-impact change. A policy initiative procured LED bulbs for the national market at scale and sold them through vendors at lower prices, although still at a profit. LED bulb sales rocketed, taking annual sales from 5 million in 2014 to about 670 million in 2018. The annual energy savings from the project are estimated to be sufficient to power the whole of Denmark for a year.[1] Changes may be straightforward for assets with relatively short lifetimes such as lightbulbs, but greater policy incentives will be needed for equipment that is replaced much less frequently.

Shifts in consumer preferences, particularly diets, can also help to reduce energy demand. The data behind arguments for cutting meat consumption is compelling: 77% of agricultural land is dedicated to producing meat and dairy – which account for just 18% of the world's calories.[2] Focusing on meat alone, however, would neglect many other nuances, such as the chemicals used in food production, how food is packaged and how far it has travelled. Tackling food waste – which contributes 6% of global GHG emissions – is another priority.

Changes will be required in the agriculture industry too, particularly around the efficiency and precision of fertiliser and water usage. European Commission research has shown that, when used efficiently, fertilisers can improve crop yields while simultaneously helping to capture more carbon dioxide thanks to the increased production of biomass. However, excessive fertiliser use can create significant disruption to the surrounding environment. High investment costs to employ more precise techniques have hampered uptake, again highlighting the need for policy incentives to drive change.

Offset emissions

On the basis that emissions cannot be fully eliminated by 2050, offsets will be required if net zero targets are to be reached. Natural habitats, such as forests and peatlands, are the most effective carbon sinks, yet they are disappearing at a frightening pace. The world lost over 1.3 million square kilometres of forest between 1990 and 2016, according to World Bank data – an area larger than South Africa. We expect the focus on biodiversity – the way that companies coexist with and protect the environment around them – to accelerate accordingly. Heated criticism from global leaders over the Brazilian government's handling of Amazonian deforestation highlights how this issue is increasingly moving into the mainstream political sphere.

[1] https://www.carbonbrief.org/guest-post-how-energy-efficient-led-bulbs-lit-up-india-in-just-five-years
[2] Our World in Data - https://ourworldindata.org/global-land-for-agriculture

EXHIBIT 3: STRATEGIES TO ACHIEVE NET ZERO"

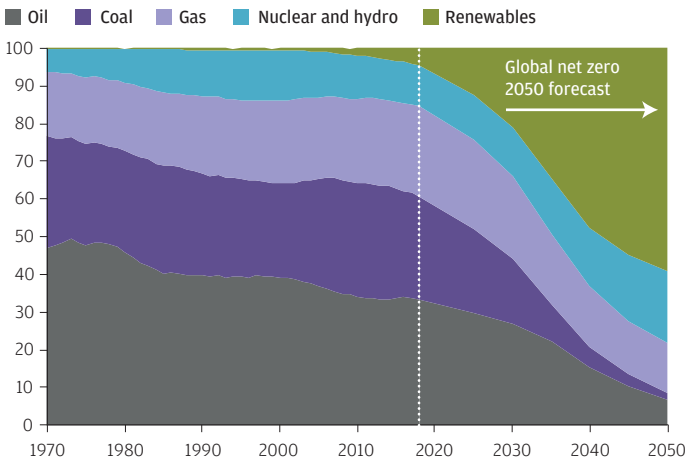
STRATEGY	DESCRIPTION	EXAMPLES
Energy generation and electrification	• Maximise use of electricity across industry and household energy consumption • Overhaul global energy mix to boost renewables and reduce/eliminate fossil fuels, especially coal	• Electric vehicles • Electrified industrial production • Shift in energy sources away from fossil fuels to renewables
Efficiency	• Reduce energy demand by upgrading equipment • Shift in consumer preferences, such as diet • Greater precision within agriculture	• Energy-efficient lightbulbs • Reduced meat consumption, rise of meat alternatives • Reduced food waste
Emission offsets	• Remove remaining unavoidable GHG emissions from the atmosphere, and store in ways that avoid harm	• Reforestation and bolstered conservation efforts • Increased focus on biodiversity • Man-made technology solutions, such as carbon capture

Carbon capture, utilisation and storage (CCUS) is one of the main technology-based emission offset strategies. CO_2 emissions are separated from other gases created by industrial processes or power generation; they are then compressed and transported to sites where they can be used or stored. Most emissions are injected into rock formations deep below the earth's surface, although other uses are being developed, such as creating synthetic fuel or adding fizz to drinks. Huge investment will be required to scale up projects to lower the cost of carbon capture, but momentum is building. A recent report from the IEA highlighted that governments and industry committed more than USD 4.5 billion to CCUS in 2020. Given the amount of growth required, it's no surprise that green technology companies are attracting such a high valuation premium in markets today.

Offsetting strategies are often an attractive way for companies to reduce their footprint over time because they generally involve less disruption than making the changes required to materially reduce gross emissions. Yet according to estimates from the Intergovernmental Panel on Climate Change, sequestration and removal will be able to contribute less than 10% of the net GHG emission reduction required over the next decade to stay on track to hit net zero by 2050. Investors should analyse corporate ambitions to reach net zero targets with this in mind. For most industries, emission reduction – rather than offset – will need to be the priority.

EXHIBIT 4: GLOBAL ENERGY MIX

% primary energy consumption



Source: BP Energy Outlook 2020, J.P. Morgan Asset Management. Forecast is based on BP's scenario for global net zero emissions by 2050. Past performance is not a reliable indicator of current and future results. Data as of 31 March 2021.

SECTION 3: POLICY PRESCRIPTIONS

Having isolated the major sources of carbon emissions and discussed the range of solutions, now comes the hard part: implementation. Policymakers will be the key drivers of efforts to mitigate climate change; given the urgency and sheer scope of the challenge, they will need to pull on all of the levers available to tackle the economic and scientific barriers.

As we discussed in our 2020 LTCMA paper **Weighing the investment implications of climate change**, governments can approach this issue with a "sticks"-based approach that mandates climate change mitigation, or a "carrots"-based approach that incentivises it. Infrastructure spending, research and development (R&D), subsidies, and tax incentives (carrots), along with regulation (stick), all have roles to play. Indeed, fossil fuels are cheap and widespread today in part because the industry benefited from precisely these incentives to bring production to scale and reduce costs.

Below are the four key components of policy that will facilitate a carbon-neutral future.

INFRASTRUCTURE INVESTMENT: Public infrastructure investment can help by committing vast sums of money and taking on more risk than individual companies can, while quickly building scale and consistency. Government investment serves as the foundation on which the private sector can then innovate, compete and ultimately reduce costs. Formal public-private partnerships can deliver economic growth and advance the energy transition, while also generating opportunities for private investors. Real assets stand to be a notable beneficiary.

Infrastructure that supports a renewable energy supply is a high priority. Solar and wind investment and capacity continue to grow, and further investment could help meet some of the technological challenges around storage and efficiency. In the meantime, investment in national grids could connect the many isolated suppliers and expand the reach of renewables. Increasing investment to improve nuclear power, a reasonably reliable and efficient form of sustainable energy, will also help to diversify from solar and wind, which are currently less reliable and efficient.

Policymakers have a number of options to make transportation greener, such as accelerating individual electric vehicle adoption by building charging stations. Local governments can electrify their fleets of fire trucks, police cars, garbage trucks, mail trucks, buses and school buses.

McKinsey estimates that about USD 3.7 trillion per year, or about 4.1% of GDP, is required to upgrade and maintain the world's infrastructure, and an additional USD 1 trillion is required to meet sustainable development goals.[3] Upgrades should be designed to withstand climate change impacts, including an increased frequency/severity of extreme weather events (such as tropical cyclones, droughts, floods and wildfires.) Now is an opportune time for infrastructure spending: interest rates are low, the need is high, and recovering economies can benefit from the powerful multiplier effect on economic growth and jobs. See **BOX 2** for more on the latest plans in the US.

INCREASE R&D: R&D spending to improve existing technology will be key to reducing economic barriers. For example, we do not yet have carbon-neutral materials to use in steel, cement or fertiliser. We are unlikely to be able to electrify airplanes or long-haul trucks, but they could use more advanced biofuels that we have not yet developed. We need more research on direct air capture (DAC) technology that seeks to remove CO_2 that is already in the air. These initiatives require much longer timelines and have a high probability of failure. Yet the scientific community achieved an extraordinary feat with Covid-19 vaccines in less than a year, with the help of ample funding, global coordination, and a partnership between the public sector, private industry and the academic community. This can be replicated to solve some of the toughest problems in reaching net zero.

INCENTIVES: Subsidies, tax credits and other incentives such as loans and guarantees can help accelerate change and bring down costs. Investment in solar and wind, for example, has been greatly aided by subsidies. Incentive programmes that engage consumers, such as swapping internal combustion vehicles for electric vehicles or upgrading appliances, can speed up transitions already underway. They can also help smooth out more challenging transitions over time. For example, subsidies or tax breaks to create electric vehicle manufacturing plants in areas where a local economy has depended on coal mining could provide new jobs and growth that eventually surpass the economic importance of coal.

REGULATION: Thoughtful regulation can also help reduce economic barriers and catalyse real change. Tougher fuel, energy and appliance standards can push companies and consumers to reduce their carbon footprints, as can more stringent codes for buildings and future construction, with respect to insulation, material usage, heating and cooling systems, and lighting. If regulatory items are phased in over the course of a decade, companies and consumers will have ample time to comply with new standards. In some cases, regulation can actually be helpful in creating demand. For example, concerns about nuclear safety and waste have been a significant barrier to increasing nuclear generation capacity in recent years. R&D spending and infrastructure investments can help improve nuclear reactors, but regulation may be key to overcoming safety and environmental concerns.

Finally, to be most effective from a climate perspective, infrastructure investment, R&D spending, incentives and regulation should be combined with a carbon pricing strategy. The price of carbon can be set through taxes or emissions trading schemes (ETS), both of which incentivise carbon producers to reduce their carbon intensity. Europe has been a pioneer in this field, launching its ETS platform in 2005. Although many countries still do not have such schemes at a national or even local level, carbon pricing is regarded as one of the most efficient and cost-effective means of reducing emissions. While carbon prices have been rising in many ETS alongside their emissions coverage, the average price still falls far short of the levels seen as necessary to limit global warming. See **EXHIBIT 5**. A sudden adjustment to much higher carbon prices would have a dramatic effect on inflation, but we see a gradual rise as more likely over time.

[3] McKinsey: "**Bridging infrastructure gaps: Has the world made progress?**" 2017.

BOX 2 — WHAT IS THE OUTLOOK FOR US INFRASTRUCTURE?

Although the US commitment to battling climate change has wavered in recent years, the Biden administration's infrastructure proposal (the American Jobs Plan) recommits to this goal through investment in infrastructure and R&D, with incentives for energy, transport, infrastructure upgrades, innovation and training.

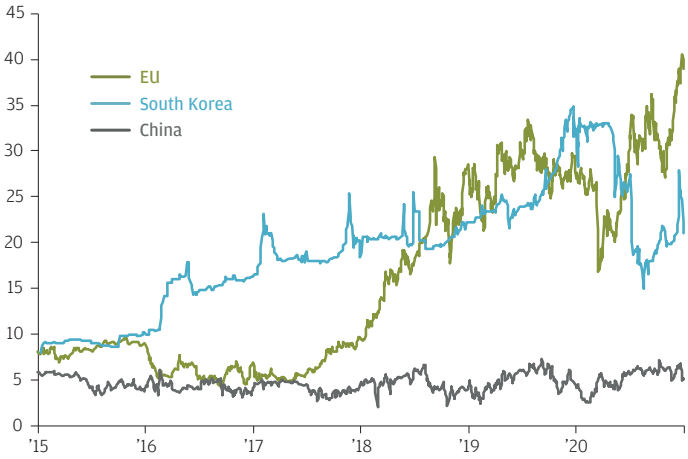
- **ENERGY** – USD 100 billion toward the electric grid and clean energy to achieve carbon-free electricity by 2035.
- **TRANSPORT** – USD 174 billion to promote electric vehicles, including building 500,000 electric vehicle charging stations, electrifying the US Postal Service fleet and 20% of public school buses, and creating incentives for consumers to purchase EVs.
- **INFRASTRUCTURE** – USD 50 billion dedicated to improving infrastructure resilience against extreme weather and restoring and conserving natural infrastructure, such as wetlands and forests; USD 46 billion earmarked for clean energy manufacturing; USD 27 billion to mobilise private investment and upgrade residential, commercial and municipal buildings and transportation.
- **INNOVATION** – USD 35 billion in R&D for climate technology, including storage and carbon capture.
- **JOBS AND TRAINING** – USD 16 billion for jobs to cap leaks in energy pipelines; USD 10 billion for a Civilian Climate Corps.

Many of these objectives would be implemented through spending, but also tax credits, grants and subsidies. The plan would also extend subsidies for clean energy and eliminate them for fossil fuels. On the regulatory front, clean energy and energy efficiency standards would be implemented alongside existing efforts to reinstate many of the environmental and energy regulations repealed during the prior administration.

Although the final legislation may differ from the bill proposed, at least USD 400 billion is allocated for direct climate efforts, a substantial investment that should spur private sector innovation and investment opportunities in industrials, materials, utilities, renewable energy and manufacturing.

EXHIBIT 5A: EMISSIONS TRADING SYSTEM PRICES

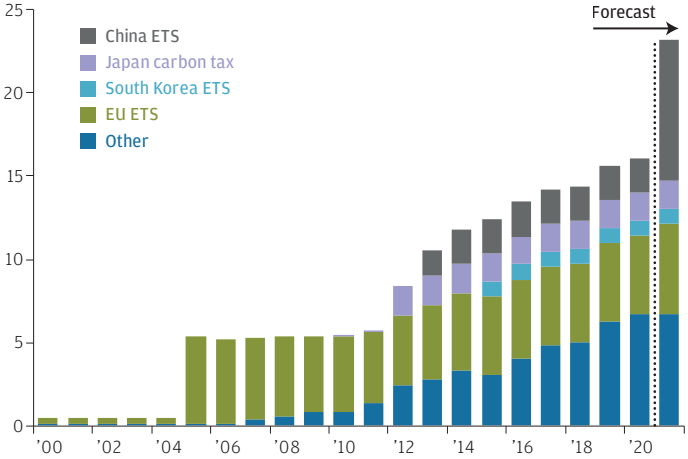
USD per tonnes of CO_2 equivalent



Source: International Carbon Action Partnership, J.P. Morgan Asset Management. China ETS price is based on the average of Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen and Tianjin ETS prices. CO_2 equivalent tonnes standardise emissions to allow for comparison between gases. One equivalent tonne has the same warming effect as one tonne of CO_2 over 100 years. Past performance is not a reliable indicator of current and future results. Data as of 31 March 2021.

EXHIBIT 5B: GLOBAL EMISSIONS COVERED BY CARBON PRICING INITIATIVES

% of global greenhouse gas emissions



Source: World Bank, J.P. Morgan Asset Management. ETS is emissions trading system. Past performance is not a reliable indicator of current and future results. Data as of 31 March 2021.

SECTION 4: INVESTMENT IMPLICATIONS

The transition to a net-zero-emissions world will have an enormous but uneven impact across economic sectors. In this section, we ask a group of J.P. Morgan Asset Management's research analysts for their views on how the transition to net zero will impact some of the industries that will undergo the greatest changes – autos, energy, infrastructure, logistics, real estate and industrials.

AUTOS

Vishal Singhal, Credit Research Analyst in the Global Fixed Income, Currency and Commodities group

Cars and light commercial vehicles account for over a third of transportation-related emissions, which explains the intense focus on vehicle emission reductions and the adoption of EVs, leading to one of the biggest transformations in the industry's history. In the EU, the drive to reach net zero may lead to further tightening of the bloc's already strict 2030 vehicle emission targets. This huge transition is creating substantial risks and headwinds for the auto industry, but also opportunities for incumbents that can make their business models more sustainable by proactively embracing climate and emission principles and doing costly business transformations now.

We are most focused on companies that have been more aggressive on their EV strategies. The long-term winners will likely be those with dedicated EV platforms and higher levels of vertical integration of the battery electric vehicle (BEV) powertrain, including investments in the battery cell and its supply chain. We favour companies focusing more on pure electric vehicles rather than bridge technologies such as hybrid engines.

The transformation will require significant investment spending (capex and R&D) at a time when margins from traditional vehicles are in decline and EV profitability is still a challenge for most companies. Battery costs are a key issue, with cost parity versus combustion engines unlikely to be reached until later this decade. However, carmakers that postpone changes are likely to face significant operational headwinds, investor apathy and potentially negative effects on their credit ratings. We see this investment in the future as critical, even with some increase in leverage, and are instead focusing on investment efficiency and offset measures (cooperation, partnerships and cost reduction measures).

ENERGY

David Maccarrone, Equity Research Analyst, US Equity and International Equity groups

The decarbonisation and electrification of energy brings enormous opportunities and risks for traditional energy companies. Forecasting profitability for the lowest-emitting, lowest-cost fossil fuel assets remains essential when investing in the energy sector. Franchise positions of major energy companies can also be reinforced while capitalising on changing consumption behaviours. For example, retail outlets of these companies will have opportunities to serve electric vehicle (EV) customers with charging facilities, while also expanding their convenience store merchandise to meet the demands of increased mobility. New product offerings, such as biofuels, hydrogen and carbon offsets, might eventually contribute to profits.

But the path to net zero requires step-changes in decarbonisation with emerging, scalable technologies. Europe is taking the lead in developing larger-scale, integrated solutions. One consortium is developing a green hydrogen hub in northern Europe that would include an offshore wind project powering an electrolyser producing hydrogen that partially decarbonises an oil refinery. Another major project in Scandinavia will capture CO_2 from industrial sources, transport it by pipeline and permanently store it in offshore underground reservoirs.

These investments are being championed by European oil companies building on existing project development competencies and expanded technical skills. Even with strong industrial integration and supportive carbon prices, today's economics are marginal. Additional technology gains are needed to deploy such strategies more broadly – a development about which we are optimistic over the longer term.

The path to net zero will feature energy companies scaling down but still executing on their traditional businesses, while investing and delivering on climate-beneficial new ones. We believe there will be abundant opportunities for energy companies to grow earnings through existing business models during this time. Expansion opportunities that create enduring shareholder value may be more scarce considering the risks around commercialising technology and the magnitude of capital hoping to participate in this world-changing transition.

INFRASTRUCTURE

Nick Moller, Global Infrastructure Investments group

The energy transition to net zero has been a focus for many years within private infrastructure, given the potential and actual direct impacts to opportunities and risks within the sector. The Covid-19 crisis has accelerated this focus as many governments pledged commitments to environmentally-friendly stimulus.

Facilitating the energy transition will continue to provide a wide variety of investment opportunities. We expect utilities will be spending further on green infrastructure as they continue to shift away from traditional fossil fuels towards renewables. Yet, in light of the intermittency of renewables, this is likely to be complemented by less carbon-intensive and non-intermittent natural gas generation, and to some extent battery technologies as costs decline. We also anticipate that there will be necessary complementary investments in electricity transmission and utility electric grids, because renewables are frequently located away from urban centers.

We believe "stranded asset" risk will remain in focus as the energy transition moves forward, with a particular lens on more carbon-intensive fossil fuels, though the timeframe is still unclear. Valuations are a further risk for investors. The recent significant increase in investor interest in green infrastructure has boosted the stock prices for certain publicly listed infrastructure assets/companies. However, the supply of such investments has not grown as quickly, given the length of new development cycles, which could impact forward-looking returns. Managing essential infrastructure in a sustainable way, with a focus on governance, is critical for risk-adjusted returns.

LOGISTICS

Aamina Kurji, Equity Research Analyst, International Equity group

The transportation sector is responsible for 16.2% of global greenhouse gas emissions, led by road transport, which contributes 11.9% of emissions, of which 40% comes from road freight rather than passenger vehicles. With aviation and shipping at only 1.9% and 1.7%, respectively, the burden of emissions reductions weighs heavily on logistics players with heavy road networks.

We have seen some companies announce significant plans to achieve net zero targets, consisting of a combination of electrifying delivery vehicles for ground transportation and targeting much higher use of sustainable aviation fuel for air freight. Whether this will be rewarded by lower environmental taxes, subsidies for being more green or simply from higher customer demand is unclear. Yet regardless, we believe companies at the forefront of these changes stand to benefit, and only those with the ability to invest are in a position to transition their models. Larger players with greater volumes of freight to transport can optimise their logistics networks to increase utilisation on every route, thereby lowering the emissions-to-sales ratio too. Smaller local players may find it harder to make the necessary changes while keeping costs manageable. This all suggests that, on the route to net zero, the strong simply get stronger.

REAL ESTATE

Dianna Russo, Real Estate Americas Group

Reducing your reliance on carbon, making your systems more efficient, and reducing power usage wherever possible lowers your property's operating expenses and, therefore, enhances performance and returns. Equally important, carbon reductions can increase the property's attractiveness to today's most desirable tenants, providing a competitive edge that may allow increases in the rental rate.

The logical conclusion of the arms race of tenant appeal is net zero. However, to achieve the required reductions, property owners need to get comfortable with potentially large capital expenditures. For example, if an owner chooses to replace equipment that is not at the end of its useful life in order to achieve reduction goals, increased costs result, though often policymakers will offer incentives to induce upgrades. While some equipment upgrades pay for themselves with efficiencies, most will not.

On the other hand, there is also a growing cost to carbon. Fines and penalties based on usage or emissions represent a real cost for property owners in markets where there are heavy regulations. Legislated reductions in carbon emissions and usage are increasingly common. The sustainability ratings of assets by various industry groups also drive owners to look more carefully at usage. Tenants have standards and look to work or live in assets that match their overall corporate/personal goals.

Many property owners have turned to Renewable Energy Credits (RECs) to offset the remaining usage when working to a net zero commitment. RECs are created when a plant generates one megawatt hour of energy from a renewable source, such as wind or solar. Unfortunately, there are not enough new renewable energy sources being constructed to produce enough RECs to meet the demand, thus the price of these RECs has increased significantly.

One attractive way of lowering a property's carbon footprint is to install solar panels and use the energy produced onsite to power the property – though as in other areas, reliable battery storage is needed to make this option more efficient. Renting the rooftop or parking lot to a solar provider is another option that instead adds the renewable energy to the power grid and provides an added income stream to the asset.

When you are a fiduciary to your clients you need to weigh all the risks against all the benefits. The industry is evolving, and rapidly. To net zero or not to net zero? In the end, the need to remain competitive will drive the answer.

BASIC MATERIALS AND INDUSTRIALS

Polina Diyachkina, Equity Research Analyst, Emerging Markets and Asia Pacific Equity group

Pure renewable energy plays tend to be scarce, and the most obvious names can often be expensive. Yet while renewable companies will likely continue to enjoy solid premiums given both their scarcity and their ESG credentials, we believe there are many other ways to invest in this theme. These businesses range from renewable equipment producers and grid suppliers, to companies that possess technologies used in carbon capture, storage, production and transportation. Other opportunities include companies involved in the use of hydrogen, such as some engineering companies and fuel cell producers, as well as companies that possess technologies to decarbonise heavy industries, such as ammonia for coal plants and hydrogen for steel and cement producers.

Some traditional energy and power generation companies are active in renewables investments or have aggressive plans to decarbonise and are still trading at low valuations. A good example is a coal and hydro power producer in Japan, which announced a plan to cut CO_2 emissions by 40% by 2030 and to be carbon neutral by 2050. Another example is an oil refiner that will have over 30% of its profits coming from offshore wind by 2030. Provided that companies are making clear improvements, we believe that engaging in ESG and decarbonisation discussions with these companies results in a better outcome for both society and shareholders than simply selling out of investment positions.

CONCLUSION

Dramatic changes to the global economy will be required if net zero emission targets are to be achieved by 2050. Quantifying the scale of the problem is a challenge in itself: calculations should account for a company or country's size and stage of economic development, rather than looking at the volume of emissions alone. To reduce emissions, a combination of increased clean energy generation and electrification alongside improved efficiency will be required. Offsetting strategies will be needed to tackle the remaining unavoidable emissions, although these strategies are capacity constrained. For most industries, emission reduction rather than offset is required, and investors should view corporate commitments with this in mind.

Policymakers will be the key driver of change, by providing both carrots-based incentives to encourage investment, research and development, and also sticks-based measures such as carbon pricing schemes. Our research analysts see both opportunities and risks in their sectors: for industries such as logistics, we expect the strong to only get stronger, while in other areas such as energy, major technological breakthroughs will still be required. Following a decade of dominance for consumer-facing technology companies, companies that can achieve climate-based technology solutions look set to be the biggest beneficiaries of new environmental initiatives ahead. Regardless of the industry under consideration, a thorough understanding of how the wave of policy changes ahead will impact cash flows and valuations should be an essential part of any investment decision today.

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