SLAUGHTER AND MAY/

ENERGY TRANSITION

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INVESTING IN TRANSITION INFRASTRUCTURE

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SIGNIFICANT INFRASTRUCTURE INVESTMENT IS REQUIRED

Infrastructure is at the heart of the energy transition and efforts to decarbonise global economies. Existing building stock, transport systems and energy infrastructure need to transform alongside developing new types of assets such as CO2 transport and storage networks and battery gigafactories. Associated, enabling infrastructure is also needed, such as new port facilities capable of servicing the deployment of significant volumes of offshore wind generation.

In order to reduce emissions by 45% by 2030 and hold global warming at 1.5°C, investment in energy transition infrastructure is key. Significant injections of capital are not only essential for the repurposing of existing systems and networks, but also for the development of a whole new range of clean infrastructure assets.

However, whilst investment in infrastructure is steadily increasing every year, it needs to accelerate at pace. The International Energy Agency (IEA) has warned that "a substantial ramp up" in investment is called for, whilst the Energy Transitions Commission (an international coalition of NGOs, financial institutions and industry leaders) estimates that a global net zero economy requires an average of $3.5 trillion capital investment a year to 2050.

WHERE AND WHAT?

The positive momentum behind infrastructure investment, and clean energy investment in particular, is not distributed evenly across countries or sectors. In a 2023 survey of its members, the Global Infrastructure Investment Association found that, in terms of acquired assets, transactions continue to be centred around Western markets, with the US, UK and EU accounting for 74% of acquisitions in 2021 and 2022, albeit with growth in other regions. Meanwhile clean energy spending is heavily concentrated in China, EU and the US, although, according to the IEA World Energy Investment Report 2023, investor activity is increasing in India, Brazil and parts of the Middle East.

With regard to sectors, the IEA **World Energy Outlook 2023** has identified a focus of activity on areas linked to clean electrification and end-use electrification, whilst investment in energy efficiency and low-emission fuels fall short. Mature clean technologies such as wind, solar, and battery storage are seen as cost-competitive in today's fuel-price environment. However, in the offshore wind sub-sector, we have seen some market participants and projects adversely affected by increases in development costs. In its **World Investment Report 2023**, the UN Conference on Trade and Development noted a requirement for investment not just in renewable energy but also in supply chains including R&D activities, critical minerals extraction and in manufacturing of solar panels and wind turbines. The IEA also reports a growing momentum for investment in newer technologies such as low carbon hydrogen and carbon capture, utilisation and storage (**CCUS**).

Other key elements of energy transition infrastructure such as power grids have seen much less growth. Grids – often publicly owned or highly regulated assets – have struggled to secure funds for anticipatory investment due to consumer-cost concerns, but a sea-change is underway due to the electrification requirements of the energy transition. The **International Renewable Energy Agency** also observed a "chronic lack of investment" in end use applications in other areas of the energy ecosystem – including heating and transport – as well as other energy transition technologies such as biofuels, geothermal and hydropower.

WHAT ARE THE CHALLENGES AND HOW CAN THEY BE MANAGED?

Geopolitical tensions, supply chain constraints, shortages in skilled labour, inflationary pressures and higher interest rates are all factors putting pressure on infrastructure investments. These macro-economic challenges may be exacerbated by sector-specific headwinds such as political risk, or immature regulatory frameworks and standards.

For example, investors in critical minerals must increasingly navigate issues of social justice and the need to find the appropriate balance of resources and returns between international and local stakeholders. Regulatory change or divergence in approaches between markets may pose a further barrier to investment. For instance, in relation to hydrogen production, the absence of an internationally recognised standard means that investors are increasingly faced with a jigsaw puzzle of national or regional definitions and standards for low carbon hydrogen. In the EU organisations are also increasingly reporting by reference to the EU taxonomy defining sustainable economic activities. However, the UK equivalent taxonomy is still under development meaning that any differences in approach are likely to place additional reporting requirements on investment managers.

Some of these challenges may be able to be mitigated or minimised. In some jurisdictions, where legislators understand and accept investor concerns, the regulatory regime itself may be designed to reduce risks to investors. Absent this, contractual risk management strategies may be used appropriately to allocate risks (albeit for a price) or to provide flexibility for the contract to continue in the event of a change in law. Finally, transaction structuring may also serve to mitigate key risks, such as having a key supplier, offtaker or government as a minority equity partner to reduce the risk of termination of long-term arrangements underpinning the investment.

TRENDS IN INVESTMENT IN ENERGY TRANSITION INFRASTRUCTURE

In order to reach the level of investment needed, different pools of capital are required to invest in decarbonisation and energy transition projects. As a result, we are seeing new dynamics emerge in the infrastructure investment landscape.

New clean technologies may be difficult for some investors who lack the mandate to invest until technology has matured or greater deployment has occurred, with the associated learnings and cost reductions that this brings. However, in sectors such as low carbon hydrogen and CCUS we are seeing the entry of both small-scale private capital and large-scale industry-funded capital. Traditionally, funds and institutional capital typically step in later after construction when assets are being de-risked. Yet we are seeing exceptions: certain institutional funds are taking on roles more akin to venture capital, investing in assets outside their existing portfolio profiles in order to learn about specific sectors or technologies and associated risks.

Government support schemes are also being designed with different types of capital and risk appetites in mind. For example, the USA's Inflation Reduction Act uses a high level of subsidy via tax credits to attract developers and private investors into energy transition infrastructure. By contrast, in the UK, we are seeing an increase in the use of the Regulated Asset Base models in assets such as new nuclear power, hydrogen pipeline networks and carbon dioxide transport and storage networks, providing stable, regulated returns for investors.

Certain changes to the regulatory treatment and capital requirements for insurers are also playing a role. Solvency UK, the prudential regulatory framework for insurers and reinsurers, is intended to facilitate infrastructure investment by UK insurers, due to recent and upcoming changes which it is hoped will encourage investment in sectors such as low carbon energy generation and energy networks.

WHAT ARE THE SHIFTS EXPECTED IN 2024?

In 2024, we anticipate energy transition infrastructure will continue to be a strong and resilient asset class in a broad range of sectors and markets. We expect to see new opportunities for investors as governments increasingly align their policies and budgets with their climate commitments. In a competitive global capital landscape, policy makers will be working hard to foster a positive investment environment fit for a net zero future.

There is likely to be increasing competition for mature assets and infrastructure targets, whilst newer technologies and markets would benefit from more investment looking to test value propositions before deciding whether to scale up. With global economies seeking to plug the considerable gaps in energy transition supply chains, investors may be revisiting their portfolios to identify where long-term returns are most likely. This may result in greater investment into more developing markets if the right conditions for growth exist.

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SPOTLIGHT ON THE ROLE OF HYDROGEN AND CARBON CAPTURE IN CORPORATE DECARBONISATION


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DECARBONISATION AS A BOARDROOM AGENDA ITEM

Intergovernmental agreements and national decarbonisation targets are translating into regulation aimed at requiring decarbonisation across the global economy. In the UK and EU, measures impacting business range from sustainability disclosures, transition plans and supply chain scrutiny to national or regional carbon pricing, and carbon border taxes.

But the drivers to decarbonise are not just regulatory. Customers, investors and lenders are increasingly conscious of the environmental and social impact of their activities. And businesses themselves are also increasingly reassessing their purpose and viewing their ESG strategy as a way to drive value and to attract the best talent. 2024 will continue to see the corporate world seeking solutions to become more sustainable.

ENERGY PROCUREMENT STRATEGY IS AT THE HEART OF DECARBONISATION PLANS

Decarbonisation is primarily an energy issue. As a result, deploying energy efficiency measures, electrifying sectors of the business - for example moving to a fleet of electric vehicles - and switching to a pure renewable energy supply are a key part of many decarbonisation strategies.

Procuring renewable power can be done in a number of ways. Many organisations opt to buy power using green tariffs. However, in the UK for example, the rules which allow the use of renewable energy guarantees of origin to be used by suppliers of green tariffs to "green" fossil

fuel-derived power are coming under increasing criticism. As a result, organisations are increasingly opting to pursue direct procurement strategies, such as corporate renewable power purchase agreements (**CPPAs**). We expect interventions by governments and regulators focused on encouraging the further use of CPPAs in some markets: for example the EU's third Renewable Energy Directive (**RED III**), approved in autumn 2023, aims to address some of the barriers to CPPAs.

TACKLING EMISSIONS THAT ARE HARD TO ELECTRIFY

Where electrification is not feasible, businesses are increasingly considering carbon capture, usage and storage, low carbon hydrogen and derivative fuels as part of their decarbonisation strategy. This is particularly relevant for sectors which are hard to electrify such as aviation, shipping, heavy goods transportation, and in industrial processes such as steel, cement and chemicals production. Data from the International Energy Agency in 2019 estimates that these sectors account for around 30% of global CO2 emissions.

Carbon capture technology is an established, multi-use technology

Carbon capture technology can be applied to facilities to ensure that most of the carbon emitted is captured and permanently stored using carbon dioxide transportation and storage networks (**CO2 T&S networks**). In markets exposed to carbon pricing or where a carbon border tax applies to exported goods, the avoidance of carbon costs can be a significant driver for investment. CCUS can also be used to remove CO2 from the atmosphere – a process known as Direct Air Capture – resulting in emissions reductions, generating carbon offsets. However, despite being a proven technology, deployment of carbon capture at scale to date has been limited, and costs remain high.

A significant barrier to investment is the availability of, and reliance on CO2 T&S networks. They are key for the success of a carbon capture project – if the network is delayed or suffers an outage, the captured carbon must be vented, exposing the capture business to carbon costs and, in the event of prolonged outages, a stranded asset. These networks are not generally established yet, meaning businesses seeking to deploy carbon capture technology will also need to assess the deliverability of the CO2 T&S network.

As a result, carbon cost avoidance may not be sufficient incentive for investment. Some governments, such as the UK, are seeking to intervene via support packages for initial projects offering both financial incentives and mitigation of co-dependency risks. Other jurisdictions, such as the USA, leave CO2 T&S network risks to be managed between project developers, but offer more generous subsidies to compensate firms for the higher level of risk involved.

The role of hydrogen is still emerging but is gaining traction

Today, around 98% of the hydrogen produced is derived from fossil-fuels with the resulting carbon dioxide emissions being released into the atmosphere. This fossil-fuel derived hydrogen is used primarily in industry (e.g., refining, chemicals and steel) and represented around 2.5% of global energy-related carbon emissions in 2019. By contrast low carbon hydrogen can be made using a number of methods including by capturing the emissions from natural gas-derived production (known as blue hydrogen). Another method uses electrolysis of water using renewable or low carbon electricity (known as green hydrogen). As well as displacing the use of existing fossil-fuel derived hydrogen, low carbon hydrogen is also seen as a replacement for natural gas in heavy industry or as a fuel more generally. When combined with recycled carbon, it may also be used in the production of drop-in, synthetic fuels, which has the potential to decarbonise aviation and shipping.

Production of and demand for low carbon hydrogen is expected to grow in the coming years. In the EU, demand is expected to be stimulated by RED III which sets a target of 60% of hydrogen used in industry to be from renewable fuels of non-biological origin by 2035 and a target of 29% of fuel used in transport to be renewable transport fuels by 2030. The UK is targeting 10 GW of low carbon hydrogen production by 2030.

We are already seeing a scale up of low carbon hydrogen production. Regions like Australia, Africa and the Middle East are gearing up to become net exporters: for example, Slaughter and May are advising on a multi-billion US$ green hydrogen project between the Republic of Namibia and Hyphen Hydrogen Energy. This project is geared towards exports. In the longer-term, we expect to see the development of an international hydrogen market. Distinct import markets are already emerging. For example, Germany and Japan are expected to be net importers of hydrogen: Germany has pioneered H2Global, an organisation that aims to support hydrogen imports.

MAKING THE BUSINESS CASE FOR INVESTMENT

Whilst there are risks associated with early investment in new sectors, there are government support schemes which can make these investments a viable option for corporates' decarbonisation strategies. The UK government, for instance, offers broad support, ranging from grants for development activities, to capex and operating support. These are available to companies producing low carbon hydrogen, as well as companies seeking to introduce carbon capture technology in their operations. For example, in December 2023, the first hydrogen allocation round has seen 125MW of electrolytic hydrogen production awarded £2bn of revenue support.

The EU is also incentivising decarbonisation using green hydrogen. It is aiming to reduce the price gap between renewable and fossil-fuel derived hydrogen, reducing risk

for entrants and stimulating the formation of a market with the launch of the European Hydrogen Bank. The first **pilot auction** opened in November 2023, which is expected to allocate support to renewable producers located in the European Economic Area in the form of a fixed premium per kilogram of hydrogen produced. H2Global (which has recently joined forces with the European Hydrogen Bank) is facilitating green hydrogen imports into the EU, pioneering a central buyer model and acting as an intermediary between producers who require long-term offtake agreements, and buyers who prefer short-term contracts.

Initiatives are also underway to ensure finance is available to projects, despite their novelty. For example, **UK Infrastructure Bank** has a mandate to provide financing solutions (e.g., credit enhancements, senior debt and senior debt guarantees) to enable the government to meet its ambition to build four CCUS clusters, capturing 20-30 million tonnes of CO2 per year by 2030. A similar fund has recently been launched in Canada, the Canadian Growth Fund.

KEY TAKEAWAYS

CCUS, hydrogen and e-fuels are expected to play an important role in decarbonisation strategies in 2024 and beyond. The drivers to decarbonise mean that challenges to investment must be addressed, whether in regulation, via government support or via commercial agreement. Those interested in investing in these innovative schemes will need to evaluate their decarbonisation pathways, assess what government support is available and stay ahead of shifting regulatory regimes.

THE POTENTIAL OF HYDROGEN
A GUIDE TO KEY EUROPEAN MARKETS

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