Investing in clean technology for tomorrow's renewable economy

Seismic changes are happening to make renewable energy the new backbone of the global economy. What hurdles must be overcome and how will investing in renewables keep us on the right side of disruption?

By *Hamish Chamberlayne*

Global growth in demand for oil is set to slow significantly by 2028, according to the International Energy Agency (IEA). Their study suggests that oil demand will peak within the decade as countries actively move away from fossil fuels – a shift that has been expedited by the fallout of the war in Ukraine, which has spurred policymakers to bolster energy security by finding alternatives to Russia's energy supply.

In stark contrast to slowing oil demand, the pace of investment in renewable energy is rising much faster than people realise. The IEA forecasts that renewables will account for over 90% of global electricity capacity expansion, with output growing by almost 2,400 GW over 2022 to 2027. By 2025, it is expected that renewables will become the largest source of global electricity generation, while the electricity share generated from oil, coal and natural gas declines. Of the renewables share, wind and solar are forecast to provide almost 20% of global power generation in 2027, with wind capacity doubling and solar capacity tripling.

These sizable forecasts are the result of aggressive policy initiatives put in place to strengthen energy security and meet net zero goals. Notably, the EU's Green Deal and the US Inflation Reduction Act (IRA) seek to invest an impressive amount into the green transition. Meanwhile, China and India have put in place initiatives around renewable energy growth. Combined, this will see the US, China and India double their renewable capacity expansion over the next five years, accounting for two-thirds of global renewables growth.

Such a seismic shift in the global energy mix will require large scale changes and solutions to some of the current sticking points surrounding renewable energy. As active investors, we take a forward-looking and practical approach when assessing these challenges. Here, we explore some of the hurdles that must be overcome in order for renewable energy to become fully integrated into the global economy.

Scaling manufacturing capacity to meet targets

Renewable companies have responded to government incentives with major plans to expand current operations and develop new

ILLUSTRATION: SHUTTERSTOCK

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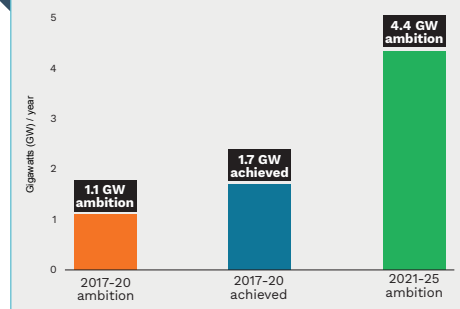
low carbon projects. In the UK, energy company SSE has recently announced plans to invest up to £ 40 billion in low-carbon energy infrastructure. Similarly in Europe, Iberdrola has committed € 47 billion to investing in projects which are driving the energy transition. While these ambitions are positive for the climate agenda, the challenge will be to find the capacity to meet these goals. As seen in Figure 1, companies have already exhibited the potential to perform beyond their own targets, but the four-fold ambition to 2025 will be a real test.

Long-term partnerships with suppliers are one way to boost manufacturing capacity and protect against volatility in supply chain prices. One example is Danish power company Ørsted’s strategic partnership with German steel producer Salzgitter. Ørsted will supply the renewable energy needed for Salzgitter to produce green steel and Ørsted will use that steel to build its wind turbines. This kind of relationship is key for renewables companies to be able to build out the infrastructure necessary to meet electricity demand. Other critical infrastructure includes solar photovoltaics, electric vehicles, charging points and energy storage. We expect to see similar capacity growth in the US, with the IRA allocating $ 30 billion in production tax credits to supply chain-specific manufacturing in the renewables space.

FIGURE 1: HIGH HOPES FOR GROWTH IN RENEWABLES



Source: McKinsey, An era of renewable growth and development, 28 October 2022. Based on company annual reports. There is no guarantee that past trends will continue, or forecasts will be realised.

Is the carbon payback for renewables a problem?

Some critics have suggested that the embedded carbon required to ‘make’ renewable infrastructure – from material mining to manufacture and construction – could diminish the potential carbon saved from using renewables. However, some studies show that the life-cycle emissions of wind and solar are much smaller than the remaining emissions from existing fossil fuels plants.

Renewables also exhibit a favourable energy return on investment (EROI) – the ratio of the amount of usable energy acquired from a particular resource to the energy expended to acquire that energy – compared to other energy sources. Research finds that a coal-fired power station has an EROI of 9:1. In contrast, wind has an EROI of 44:1. To put this more simply, it means that 44 units of energy can be yielded from one unit of energy invested in wind, versus nine units yielded from coal.

Over the long term, we believe the potential benefits of renewable power outweigh the immediate carbon cost. As such, there is a clear long-term case for renewable energy in creating a low carbon economy.

Circular principles and effective waste disposal

Currently, wind and solar infrastructure have fixed lifespans of 20 to 30 years, which poses the problem of what to do with projects when they reach the end of their lives. Turbine blades piling up in landfills and toxic solar panel waste are counter to the positive impact that renewable energy promotes. With growing concern about waste associated with the disposal of renewable infrastructure, companies must consider the way all resources are managed from start to finish.

Boralex, a Quebec-based company which develops and operates renewable power facilities in Canada, France and the US, is responsible for overseeing renewable infrastructure over an entire lifetime. At the outset, Boralex’s activities consume very few raw materials directly, with the company instead choosing to integrate a circular approach to its resource management wherever possible. For used turbine materials, the business is exploring several options, including sales on the >

Hamish Chamberlayne, CFA

Head of Global Sustainable Equities and Portfolio Manager, Janus Henderson Investors

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second-hand market, refurbishment, and recycling. These practices reduce the overall reliance on new materials, thus easing pressure on both the supply chain and waste landfill.

New solutions are also emerging to tackle components of renewable infrastructure that are less easy to dispose of. Turbine blades, for example, contain complex composite materials to create lighter and more aerodynamic blades, which pose challenges when recycling. Danish wind turbine manufacturer Vestas recently announced a new chemical technology to break down old blades into liquid in order to extract high quality materials to use in new blades. In the solar space, the first specialist recycling facility is opening in France to manage the large amount of waste that is anticipated as the uptake in solar panels increases, with the intention to recycle 99% of components. In addition to recycling, constant innovation in solar panel design is gearing towards a more circular approach to panel manufacture.

Smart energy storage

Storing energy will also be vital to achieving a low carbon economy when the sun isn't shining and the wind isn't blowing. Batteries, thermal energy storage and pumped hydro allow for energy to be stored and accessed when it is needed. SSE recently announced plans to convert an old hydro power station in Scotland into pumped storage, which involves pumping water uphill at times of low energy demand and releasing the water through turbines to create electricity when it is needed. The new Sloy hydro-electric power station can provide constant flexible energy for up to 160 hours, enough to power around 90,000 homes for up to one week. This will play a significant role in managing the energy supply and is an example of how firms can upgrade existing infrastructure to meet today's needs.

While pumped hydro makes up the majority of current energy storage, grid-scale battery growth is on the rise. According to the IEA, grid-scale battery growth is projected to account for the majority of storage growth worldwide. Despite grid-scale battery installation increasing year-over-year, the IEA states that more progress is needed in this area to facilitate the hour-to-hour variability of wind and solar electricity generation required for a net zero scenario. China is the leader in battery making today, but Canada, which has the necessary minerals and skilled workforce, is emerging as the next competitor in battery production.

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What does this mean for investors?

The growth runway for renewable energy is huge. Not only is it backed strongly by governments across the globe, but the pace of investment in clean technologies is much faster than many have anticipated. As such, we expect to see a seismic shift from fossil fuel-based to renewable industries in the next decade.

It is important to note that renewable energy companies are only one aspect of achieving a low carbon economy. Electrification and digitalisation are two very important vectors for decarbonisation and there are many different companies playing a part in these trends. To us, as sustainable investors, this presents many potential investment opportunities. We take a forward-looking, practical approach to find companies which are innovative and offer solutions, all the while maintaining robust balance sheets. This approach, we believe, helps us to stay on the right side of disruption. ■

SUMMARY

The pace of investment in clean energy is fast outpacing fossil fuels, and it is forecast that renewable energy will become the largest source of global electricity by 2025.

Such a shift in the global energy mix will require large scale changes and solutions to the current challenges around renewable energy, including successfully scaling capacity, managing renewable waste, and ensuring effective energy storage.

There are a host of innovative companies across the entire renewable infrastructure supply chain that offer solutions to today's challenges. We believe that investing in these companies can keep us on the right side of disruption.