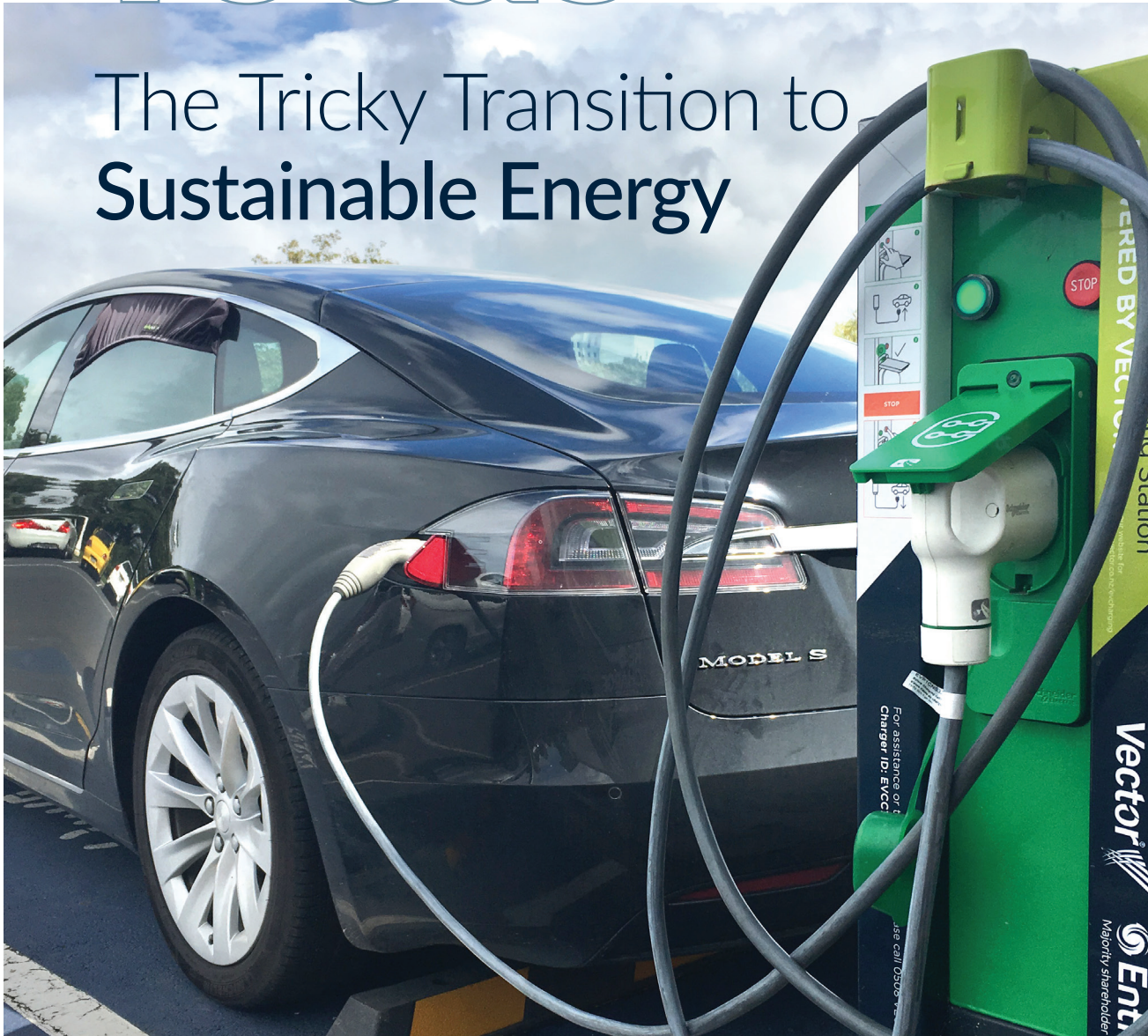


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The Tricky Transition to Sustainable Energy



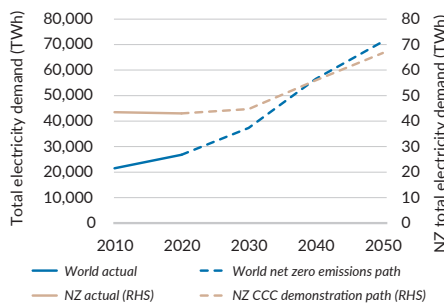
The world is pushing to reduce carbon emissions and energy markets are set for significant change, with electricity a key benefactor as transport and industry seek non-fossil fuel energy sources. However, renewable electrification of the globe is not straightforward and comes with significant challenges.

...the transition to renewable electricity has only really just begun...



The International Energy Agency (IEA) predicts that the world’s total electricity demand will need to increase by 166% over the next 30 years if it is to achieve the stated goal of net zero emissions by 2050. In New Zealand, the Climate Change Commission (CCC) estimates electricity demand will increase 55% in that time to achieve the same target. This is lower due to our already highly renewable electricity system and significant agricultural emissions, which cannot be electrified.

FIGURE 1: ELECTRICITY DEMAND PREDICTIONS



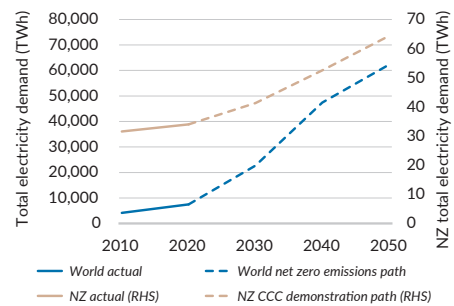
Source: IEA, CCC, Forsyth Barr Analysis

Renewable electricity generation rising – slowly

Electrification only eliminates carbon emissions if production of the electricity is free from emissions itself. Over the last decade companies around the globe, backed by government funding and supportive policies, have invested significantly in renewable generation. This has resulted in renewable generation increasing

its share of global generation from 20% to 28% between 2010 and 2020. Over the same time New Zealand increased its renewable generation share from 72% to 80%.

FIGURE 2: RENEWABLE ELECTRICITY GENERATION PREDICTIONS



Source: IEA, CCC, Forsyth Barr Analysis

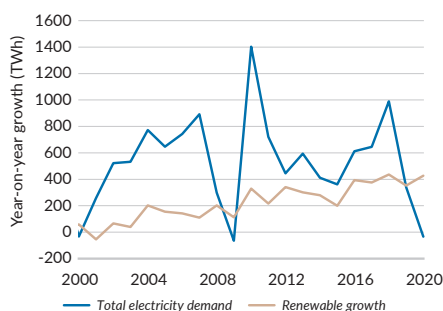
Still early days

While much has been touted, the transition to renewable electricity has only really just begun. Although renewable electricity is growing as a proportion of new generation, total demand is growing faster, meaning some new fossil fuel generation is required. Renewable generation must grow by more than demand before it can begin replacing existing fossil fuel plant. This has only occurred twice in the last twenty years, when deep recessions crunched demand: first during the Global Financial Crisis, and then second when the world was locked down by COVID-19.



...Most renewable generation operates at the mercy of the weather...

FIGURE 3: RENEWABLE ELECTRICITY SUPPLY VS TOTAL ELECTRICITY DEMAND GROWTH



Source: Our World In Data, Forsyth Barr Analysis

Renewable generation is not the same as fossil fuel generation

While the transition to renewables and reduced use of fossil fuels is likely, there are characteristics of renewable generation that will make the transition challenging: (1) the intermittency of renewable generation, and (2) that renewable generation is often distant from the demand.

Most renewable generation operates at the mercy of the weather, solar needs sunshine, wind turbines depend on wind, and hydro requires rainfall. Additionally, with the exception of hydro, it is difficult to store renewable generation. With wind and solar, the most common forms of new renewable generation, it is use it or lose it. In contrast, fossil fuel generation is always available (fuel access permitting). The intermittency of renewable generation means fossil fuel generation will have an important role to play for many years to ensure the lights stay on.

Renewable generation must also be built where the natural resource is most abundant, with hydro dams built on rivers, solar farms in sunny locations, and windfarms on windswept hills. In contrast, fossil fuel generation has the benefit of the fuel being transportable through pipelines, ships, trains and trucks. This allowed fossil fuel generation to be built close to demand, limiting electricity transmission needs.

In many countries good renewable electricity sites are not close to demand. Most of New Zealand's generation comes from hydro dams in the lower South Island whereas demand is centred in the upper North Island. In the United States, its renewable generation is likely to be located throughout the Midwest but demand is primarily on the coasts. The combination of significant forecast growth in demand combined with renewable generation replacing fossil fuels means electricity grids will require significant investment to handle the additional load and distance.

2021 has highlighted some of the renewables transition challenges

The unreliable nature of renewable generation was one of the reasons behind electricity market issues in New Zealand, Europe, and the Americas this year. Renewable generation was weak. In New Zealand, the United States and Brazil there was a shortage of water for hydro generation and in Europe a lack of wind to power windfarms. The resulting increased need for fossil fuel generation coincided with gas shortages, pushing up wholesale prices. While the average consumer was largely shielded this time around,

...nearly all projections forecast the use of some fossil fuel generation out to 2050...



we expect greater price volatility in energy markets going forward which, in time, could flow on to higher retail electricity prices.

Despite some breakthroughs in technologies such as battery storage, the lack of a viable solution for these shortcomings of renewable generation means nearly all projections forecast the use of some fossil fuel generation out to 2050. With the world's dependence on electricity increasing so does the importance of the security of supply and ensuring it is available at a price accessible to everyone.

How can investors capitalise on the transition

There are multiple entry points spread across the renewable electricity ecosystem for investors to gain exposure to the upcoming transition. One choice is energy companies that operate renewable electricity generation in New Zealand or around the world. These are a mix of new companies focussed exclusively on renewables and legacy companies adapting to the new world. Further up the chain, there are companies who supply the raw materials required to build solar panels and wind turbines. Another option is investing in the commodities themselves, with lithium, silicon and steel all set to be in high demand.

The transition to renewable energy is a necessary one but it will not come without a unique set of challenges. This year provided a glimpse. While we believe the global transition to renewable electricity will be bumpy and uneven, for investors it presents an opportunity to capitalise on the fundamental reshaping of how the world meets its energy needs.



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Understanding that sudden changes in financial markets can cause concern or indicate opportunity, your Forsyth Barr Investment Adviser is available to provide you with advice and assistance at any time.

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