Chapter 10

COVID-19 Impacts of Low-carbon Green Growth in New Zealand

Basil Sharp

This Chapter should be cited as
Sharp, B. (2022), 'COVID-19 Impacts of Low-carbon Green Growth in New Zealand ' in Anbumozhi, V., K. Kalirajan and X. Yao (eds.), *Assessing the Impacts of COVID-19: Regional Policies and Practices for Green Recovery.* Jakarta: ERIA, pp.186-201.

Chapter 10

COVID-19 Impacts of Low-carbon Green Growth in New Zealand

Basil Sharp

University of Auckland

Chapter 10: COVID-19 Impacts of Low-carbon Green Growth in New Zealand

1. Introduction

New Zealand is an island nation with a population of 5 million. In the 1970s, trade and tariff barriers protected New Zealand's manufacturers from foreign competition. Electricity was produced and priced by government agencies and subsidies supported primary industry. Faced with oil embargos in the late 1970s and declining gross domestic product (GDP) per capita, the government led investment in energy development and energy-intensive industry. Government investment was directed at hydro development and energy-intensive industry based on the discovery of a large gas field. However, growth initiatives based on centralised planning, subsidies, and poor investment decisions failed to deliver expected economic growth. Following a financial crisis in the early 1980s, New Zealand went through a host of reforms that opened the economy up to competition. Large government agencies were restructured, and some were transformed into state-owned enterprises that have either been partially or fully privatised. New Zealand now has an open economy that works on free market principles, minimal barriers to entry, and light-handed regulation.

Outcomes flowing from the exposure to exogenous forces, such as financial crises and pandemics, are directly connected to the structure of the economy and the fiscal position of government. Markets can adapt to change, and government fiscal initiatives can dampen the impact of a pandemic on both supply and demand, at least in the short run. The trajectory of change in the long run remains uncertain and is conditional on the reset of global markets and international relations.

This chapter is structured as follows. Section 2 provides background information on the economy, which sets the scene for understanding the impact of government actions to control the impact of COVID-19. Section 3 describes the sequence of alert levels implemented by the government and recovery policies directed at supporting business and the community. Initiatives underway to promote the transition to a low-carbon economy are described in Section 4. The chapter concludes with a discussion of the challenges ahead and policy recommendations.

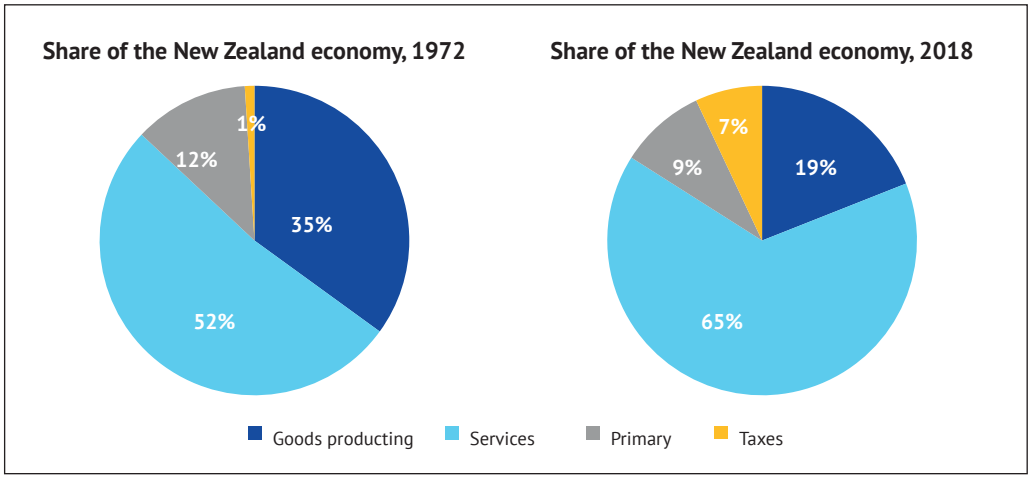
2. The Pre-COVID-19 Economy

Prior to COVID-19, the economic fundamentals had been relatively stable. Beginning in 2015–2019, the government had been running a surplus of 2.5% of GDP in 2019. Government debt was approximately 19% of GDP in 2019. The annual average GDP growth rate per capita was unremarkable, having stabilised at approximately 1.4%, about 25% below the upper half of Organisation for Economic Co-operation and Development (OECD) economies, reflecting declining labour productivity (OECD, 2019). Increased income inequality has increased in recent years, and the government has focused its policies on a broader concept of well-being. Relatively low GDP growth and increased income inequality both work to decrease the resilience of the economy and the workforce to an external shock.

2.1. Economic structure

The likely impacts of COVID-19 are also conditional on economic structure. The evolution of New Zealand's economic structure is evidenced in Figure 10.1. In 1972, the services sector contributed 35% to GDP and the goods producing industry 52%; in 2018, the services sector had increased to 65% and goods producing had declined to 19%. By the very nature of services, the pandemic's impact will be more pronounced relative to other sectors. Contraction in this sector has significant implications for recovery policies.

Figure 10.1 Evolution of the New Zealand Economy



Source: Statistics NZ (2020). http://infoshare.stats.govt.nz/infoshare/

2.2. Trade

The economy is open and faces international markets with few barriers to the flow of goods and services. New Zealand relies on imported goods and commercial tourism. Most imported goods face no tariffs, although minimal tariffs in the order of 5%–10% apply to some goods, such as textiles, machinery, and processed foods. The Comprehensive and Progressive Trans-Pacific Partnership Agreement was implemented in 2018, and preferential tariff rates apply to goods that New Zealand has trade agreements with. In 2019, the total exported goods represented 18.5% of GDP. Approximately 60% of exports by value in 2019 were delivered to Asian countries. Over the period 2000–2020, with few exceptions, the value of imports exceeded exports.

The composition of exports and imports is illustrated in Figure 10.2a and Figure 10.2b, respectively. Primary products, notably dairy and meat products, accounted for between 38% and 44% of the total value over the period 2010–2020. The share of fossil fuel and machinery imports falls within a similar range of 40%–44%. These figures highlight the exposure of New Zealand's trade balance to international prices. Exports of primary products, such as milk powder, face competitive prices. Oil embargoes in the 1970s highlighted

the dependence on the functioning of external oil markets, and this has not changed. The dominance of imported fossil fuels and machinery is particularly relevant to government policy aimed at transitioning to a low-carbon economy.

Figure 10.2a Profile of Main Imports

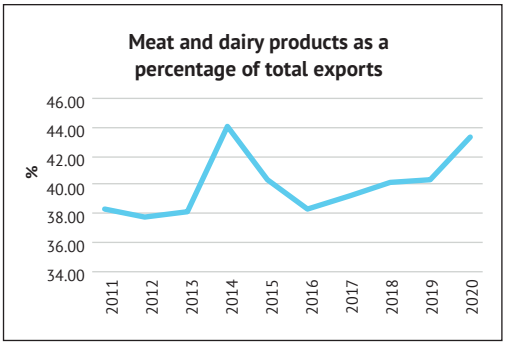
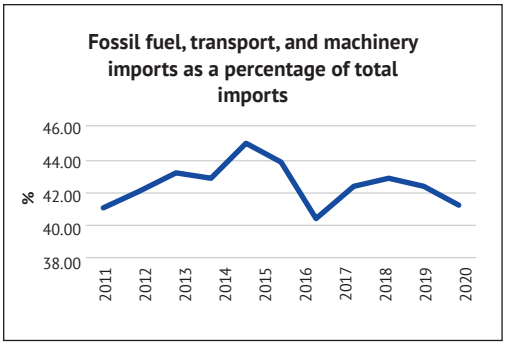


Figure 10.2b Profile of Main Exports

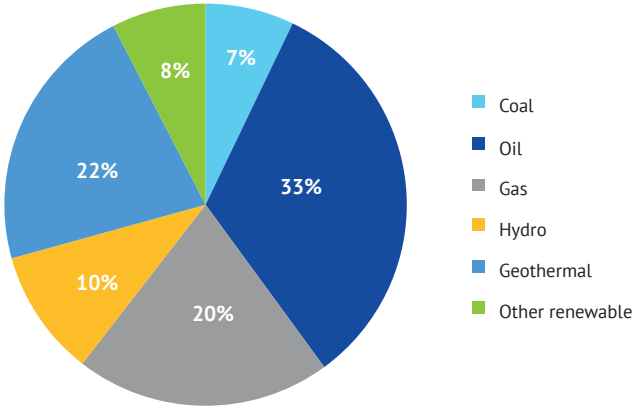


Source: Statistics NZ (2020). http://infoshare.stats.govt.nz/infoshare/

2.3. Energy

In 2019, fossil fuels provided 60% of New Zealand's primary energy, with oil and gas accounting for 53%. The supply of gas is indigenous. Although oil is recovered from local sources, it is primarily exported because the refinery was originally designed to process oil imported from the Middle East. Recent upgrades at the refinery have increased the capacity to process domestic oil.

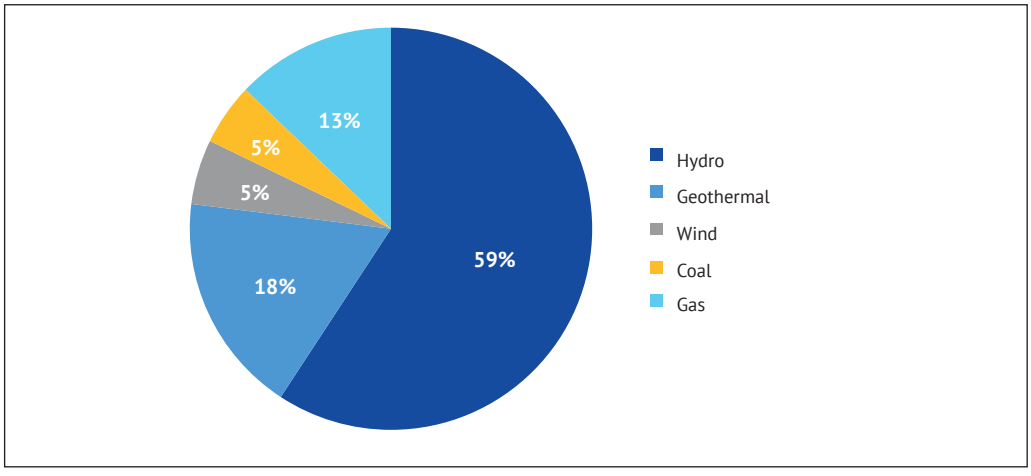
Figure 10.3 Primary Energy Supply, 2019



Source: Ministry of Business Innovation and Employment (2020). https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling

The government has set a target of 90% generation from renewable sources by 2025 (Ministry for the Environment, 2019a). In recent years, over 80% of New Zealand's electricity is generated from renewable sources, depending on the weather. Hydro generation accounts for around 60%, although it can vary according to rainfall patterns and snow melt in the South Island. In recent years, geothermal generation has exceeded gas, but gas remains an important source of generation, particularly with intermittent wind generation. New Zealand has an excellent wind resource, with generation plants running at approximately 45% capacity. Consents have been obtained for a further 2,500 megawatts (MW), and development will proceed with growth in demand (New Zealand Wind Energy Association, n.d.). Integrating more wind generation into supply will increase the need for storage, particularly hydro.

Figure 10.4 Electricity Generation, 2019

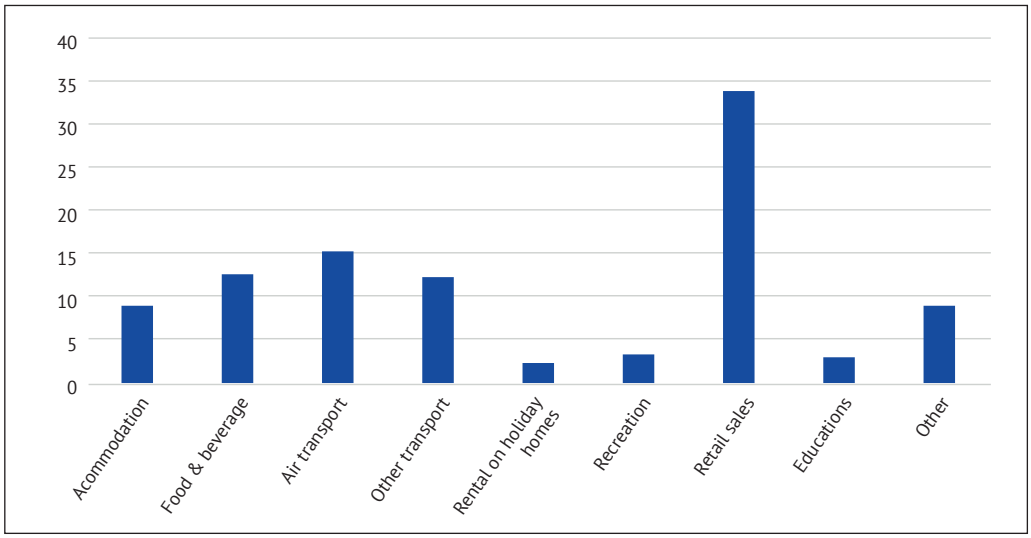


Source: Ministry of Business Innovation and Employment (2020). https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling

2.4. Tourism

Tourism makes a significant contribution to the economy. In 2019, the sector recorded 14% of total employment, direct and indirect. International tourist expenditure in 2019 was NZ$17.1 billion, in contrast to NZ$15.5 billion in dairy products exported that year. Obviously, international tourism relies on open borders, and domestic travel is conditional on rules that apply at various alert levels. Figure 10.5 shows that 34% of tourism expenditure is in retail sales, part of the services sector that contributes 65% of GDP.

Figure 10.5 Tourism Expenditure, 2019 (NZ$ million)



Source: Ministry of Business Innovation and Employment (2020). https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling

3. Economic Impact and Recovery Policy

The impact of COVID-19 on the region's economies will vary according to the robustness of each economy and its structure, trade, energy supply and demand, state of government accounts, and, of course, policies implemented in response to the pandemic. Section 2 highlighted the backdrop of key economic parameters prior to the pandemic. This section outlines the government's policy responses and highlights the outcomes associated with the pandemic.

There were 53 New Zealand residents in Wuhan when the virus was first reported by the World Health Organization in December 2019. On 29 January 2020, the government announced that it was working with Australia to bring these citizens home. The country's first confirmed case of COVID-19 was reported in 2020. Alert level 4, 'eliminate', was implemented on 26 March, requiring residents to stay at home. On 29 March the border was closed to all except New Zealand citizens; the first time this power has been used. The ban did not apply to products entering the country by ship or plane. A phased reduction in alert levels followed, dropping down to alert level 1 on 9 June. However, cases in Auckland increased, leading to the region returning to level 3 on 12 August. In early October, Auckland returned to alert level 1 along with the rest of the country. Testing remains in place, and inbound travellers are required to quarantine in secure facilities for 14 days at their expense. The border remains open to the movement of freight in and out of the country. At the time of returning to alert level 1 in October 2020, there had been 1,912 cases of COVID-19 to date and 25 deaths.

3.1 Fiscal response

In March 2020, the government announced a NZ$12.1 billion public health and economic stimulus package comprising NZ$500 million for health, NZ$8.7 billion in support for businesses and employment, and NZ$2.8 billion for income support and for boosting consumer spending. The package represented 4% of GDP. A wage subsidy scheme was introduced aimed at keeping businesses afloat if they faced laying off staff. Residential rent freeze increases were mandated for a period of 6 months. A finance guarantee was available to businesses with annual revenue between NZ$250,000 and NZ$80 million, with the government guaranteeing 80% of the risk and banks covered the remaining 20%. Retail banks offered to defer repayments for all residential mortgages for up to 6 months for customers financially affected by COVID-19 (Treasury, 2020).

In May 2020, the government announced a NZ$50 billion COVID-19 Response and Recovery Fund (CRRF) as part of its annual budget. As of 14 May 2020, the government had committed NZ$29.8 billion of the CRRF, of which NZ$13.9 billion had been announced prior to Budget Day as part of an ongoing response to COVID-19, leaving NZ$20.2 billion of funding remaining. On 14 May 2020, the CRRF Foundational Package was announced, totalling NZ$12.0 billion in operating expenditure and NZ$3.9 billion in capital expenditure over the forecast period.

In August 2020, the government announced a new 2-week wage subsidy available to businesses that experienced a 40% revenue drop across a 14-day period between 12 August and 10 September when compared to a similar period in the previous year. Businesses could access tailored specialist support, free of charge, for issues such as business continuity planning, finance and cash flow management, human resource issues, and sector-specific issues in some cases. Tax relief was available to businesses making a loss in 2020. Tax incentives were directed at encouraging businesses to retain their research and development capabilities.

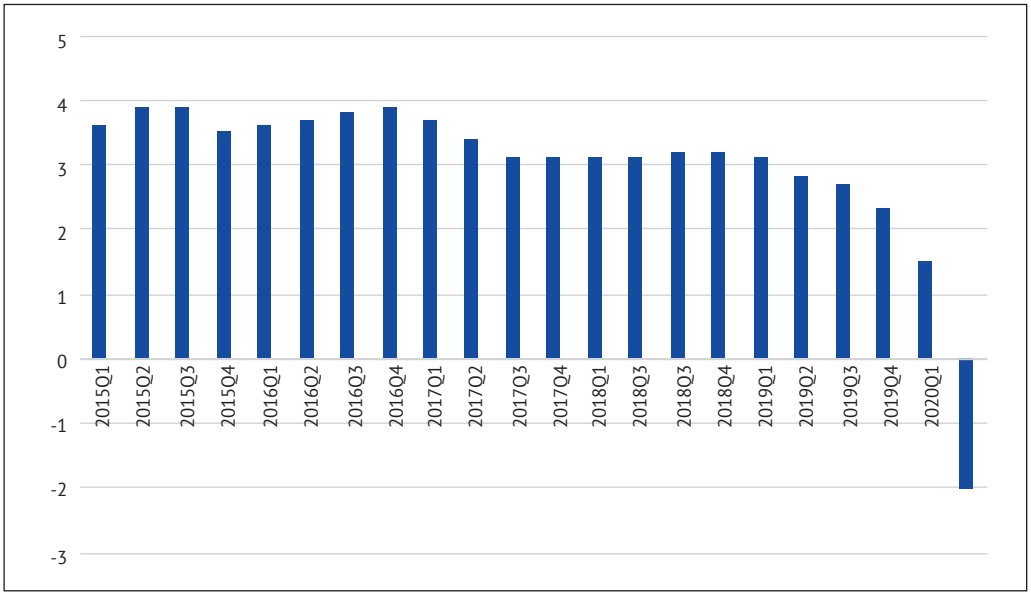
3.2 Monetary policy

New Zealand's monetary policy framework is conventional by current international standards and has a goal of price stability. In carrying out monetary policy, the Reserve Bank is required to keep inflation between 1% and 3% on average over the medium term, with a focus on keeping future average inflation near the 2% target midpoint, and support maximum sustainable employment. The official cash rate (OCR) is reviewed every quarter and was held at 0.25% in May 2020. In August 2020, the OCR remained at 0.25%, and the bank expanded its asset purchase programme to NZ$100 billion so as to further lower retail interest rates and support the smooth functioning of the economy.

3.3. Economic impact

Annualised quarterly growth leading up to Q2 2020 ranged between 1.5% and 3.9%, and retracted by 2% in Q2 after Level 1 was announced by the government. The government announced a lockdown in March 2020, and the borders were closed except for the movement of goods. Figure 10.6 shows the economic contraction in Q2 2020.

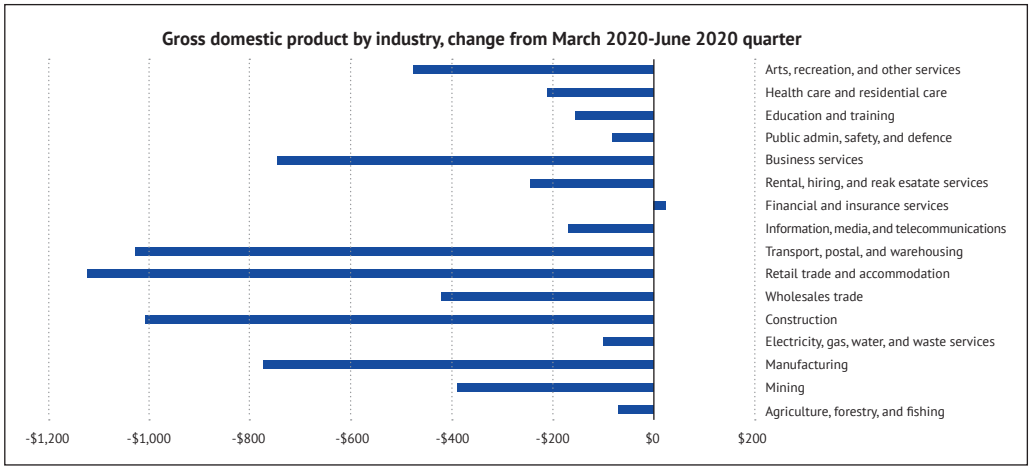
Table 10.6 Quarterly Percentage Change in GDP (%)



Source: Statistics NZ (2020). http://infoshare.stats.govt.nz/infoshare/

Greater insights into the economic contraction are shown in Figure 10.7. As noted earlier, the economy is dominated by the services sector. This sector relies on tourism and consumer spending. The marked decline in retail and services from March to June 2020 is a consequence of the lockdown, as expected.

Table 10.7 Change in GDP by Industry (NZ$ million)

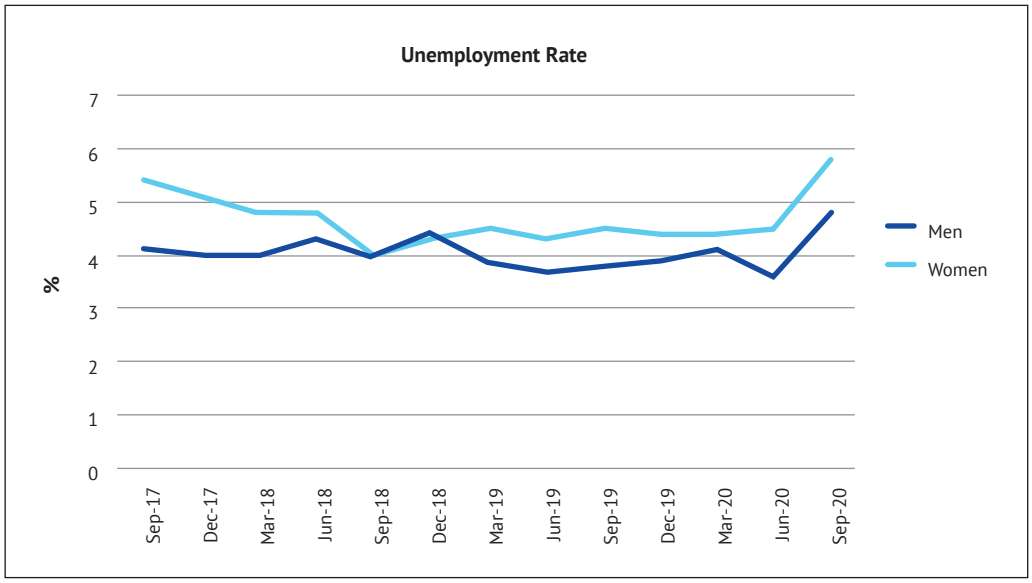


Source: Statistics NZ (2020). http://infoshare.stats.govt.nz/infoshare/

3.4. Employment

Pre-COVID total unemployment was slightly over 4% and remained at 4.2% in March 2020 and 4% in June 2020 (3.6% for men and 4.5% for women), most likely the result of the government's wage subsidy scheme and infrastructure investment prior to the pandemic. Total unemployment increased to 5.3% for the September quarter, 4.8% for men and 5.8% for women.

Table 10.8 Unemployment Rate by Gender, September 2017–September 2020

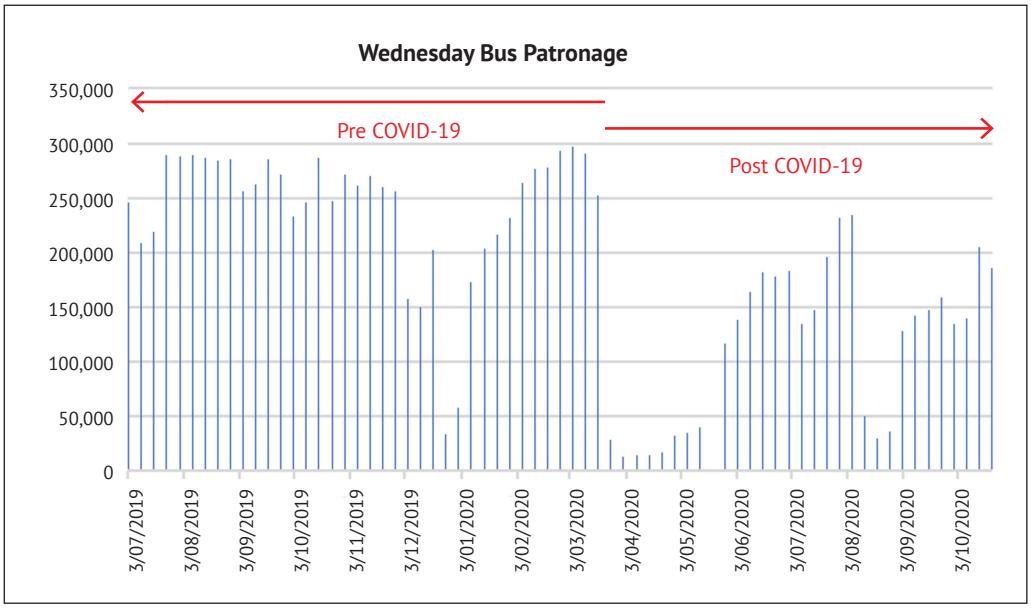


Source: Statistics NZ (2020). http://infoshare.stats.govt.nz/infoshare/

3.5. Transport

Figure 10.9 shows the mid-week bus ridership prior to the March lockdown and the gradual easing of restrictions from June 2020. Investment in dedicated bus lanes, vehicle upgrades, and the increasing state of congestion on arterial routes resulted in increased ridership. Working from home, social distancing, and residual fear over contracting the virus has meant that ridership has yet to return to pre-COVID levels.

Table 10.9 Impact of COVID-19 on Bus Patronage



Source: Statistics NZ (2020). http://infoshare.stats.govt.nz/infoshare/

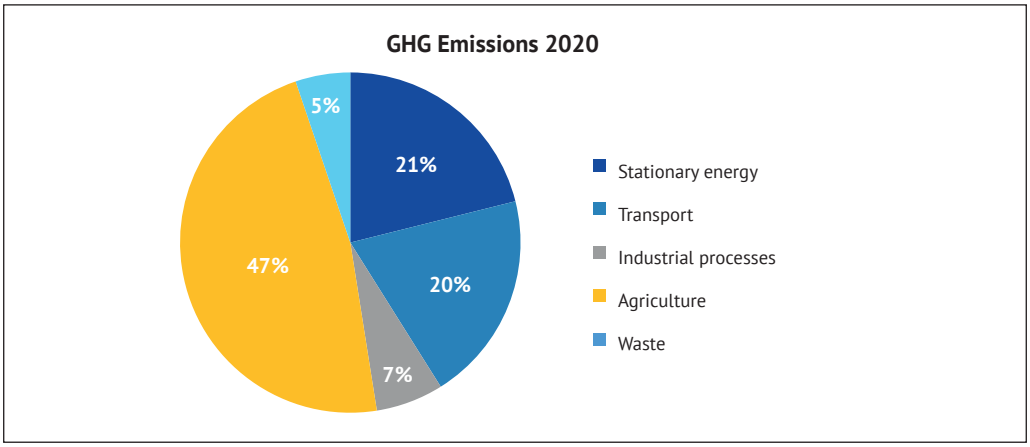
4. Transitioning to a Low-carbon Economy

In order to align with the global ambition set under the Paris Agreement, legislation in 2019 established a target of net zero emissions for all greenhouse gas (GHG) emissions other than biogenic methane by 2050 (Ministry for the Environment, 2019b). The target for biogenic methane reduction is 24%–47% below 2017 emissions. Many initiatives aimed at transitioning to a low-carbon economy were in place before COVID-19.

4.1. Greenhouse gas emissions

The composition of GHG emissions is illustrated in Figure 10.10. New Zealand has a unique emissions profile, with approximately 50% of GHG produced from agriculture. Reducing biogenic methane emissions from pastural agriculture is a major challenge. Approximately NZ$20 million is invested each year into research aimed at reducing biogenic methane emissions.

Figure 10.10 Sectoral Composition of Greenhouse Gas Emissions, 2020



Source: Ministry for the Environment (2019b).

Emissions from transport are mainly produced from road vehicle emissions, which have increased in recent years. Car ownership, at around 0.8 cars per capita, is high by international standards. The average age of cars is 14 years, and the average distance travelled is 30 kilometres per day. In contrast to agricultural emissions, technology offers an available solution to transport emissions. In 2016, the government announced its Electric Vehicle Programme aimed at achieving a goal of 64,000 electric vehicles (EVs) by 2021 (Ministry of Transport, 2020). Government policy aimed at increasing the number of EVs included exemption from road user charges, assistance with the development of charging infrastructure, and a NZ$6 million fund aimed at encouraging innovation to accelerate uptake. A fiscally neutral proposal aimed at reducing the tax on EVs and increasing the tax on large fossil fuelled vehicles was not implemented. In 2020, there were about 20,000 EVs, and it looks as though the target will not be achieved.

4.2. Emissions Trading Scheme

The New Zealand Emissions Trading Scheme (ETS) is a key mechanism for achieving the government's emission reduction targets. Units representing 1 tonne of CO_2-equivalent are traded on the market. The government gives foresters units for CO_2 absorbed by their trees, which can then be sold to emitters requiring units to cover their emissions. In 2020, approximately 50% of New Zealand's emissions were covered by the ETS. The price of units is in the range of NZ$30–NZ$35 per tonne.

4.3. Pumped hydro storage

Variability in weather patterns presents a challenge to the goal of transitioning to 100% renewable electricity. New Zealand's existing hydro catchments sometimes do not receive enough rainfall, and storage levels run low. This, coupled with the inherent intermittent characteristics of wind, presents a challenge. Currently, fossil fuel generation serves to meet demand when lakes are low and the wind is not blowing. In recognition of the dry-period problem, the

government approved funding of NZ$30 million to investigate Lake Onslow as a pumped storage solution. A further NZ$70 million will be invested in design based on the findings of the business case. Bardsley (2005) suggests that the Onslow scheme has a potential of 5 terawatt-hours of storage. Installing 1,200 MW of generating capacity would complement the expansion of wind generation and further advance the likelihood of achieving 100% renewable electricity by 2030.

4.4. Infrastructure upgrades

In January 2020, the government announced NZ$6.8 billion being invested across road, rail, public transport, and walking and cycling infrastructure. Over NZ$1 billion was allocated towards rail upgrades to cope with the expected growth in freight and reduce carbon emissions.

4.5. Hydrogen

In September 2019, the government released its vision for hydrogen as an eco-friendly alternative fuel for vehicles and set aside $10 million to develop a roadmap to invest in green hydrogen and develop strategic partnerships with business. Commercial interest in hydrogen is occurring on multiple fronts. The country's oil refinery, one of New Zealand's largest producers of steam-formed hydrogen, is constructing a 26.7 MW solar farm that will supply 10% of their electricity needs. Hyundai New Zealand has established its hydrogen demonstration project to showcase the NEXO fuel cell electric powertrain. Ports of Auckland has committed to build a hydrogen production and refuelling facility at its Waitematā port. The company and project partners Auckland Council, Auckland Transport, and KiwiRail will invest in hydrogen fuel cell vehicles, including port equipment, buses, and cars as part of the project.

In December 2017, Tuaropaki Trust entered into a Memorandum of Understanding with Obayashi Corporation of Japan to pilot the production of green hydrogen. The plant will use geothermal energy produced at the Trust's geothermal power station at Mokai, 28 km northwest of Taupō. Construction of the 1.5 MW hydrogen plant at Mokai began in 2019, and the plant was scheduled to be operational in 2020. A joint venture between Ballance Agri-Nutrients Limited and Hiringa Energy Limited, with NZ$19.9 million in funding from the Provincial Growth Fund, will see the production of green hydrogen from renewable electricity and water at a facility in Kapuni, South Taranaki. The NZ$50 million project will see the construction of industrial-scale hydrogen from an electrolyser, which will be powered by four large wind turbines close to Ballance Agri-Nutrients' ammonia-urea plant in Kapuni. Installed wind generation capacity of 16 MW will also supply renewable electricity directly to the plant. Green hydrogen will be used as both feedstock into the ammonia-urea plant to reduce the plant's environmental footprint and as a zero-emission transport fuel for local buses, trucks, and cars.

In August 2020, the Infrastructure Reference Group provisionally approved NZ$20 million for Hiringa Energy to establish New Zealand's first nationwide network of hydrogen fuelling stations (New Zealand Government, 2019). The initiative

will involve the installation of eight hydrogen refuelling stations located in Waikato, Bay of Plenty, Taranaki, Manawatu, Auckland, Taupō, Wellington, and Christchurch. These stations will provide refuelling for zero emissions heavy hydrogen-powered fuel cell electric vehicles (FCEVs), such as trucks and buses. This initial network will provide coverage for about 95% of heavy freight routes in the North Island and 82% of the South Island.

4.6. Regional cooperation

New Zealand's Aid Programme budget is NZ$2.2 million spread over 3 years through 2021. The investment priorities emphasise private sector-led growth that supports sustainable development. In addition to well-being and human capital, recent investment priorities have included resilience to climate, natural disasters, and energy. Expertise in renewable energy development and market design has led to investment supporting the upgrade of electricity networks and solar and small-scale hydro development.

5. Future Challenges and Policy

New Zealand faces a dual challenge, one being growth and well-being and the other the transition to a low-carbon economy. Economic growth in the near term will be conditional on the state of global markets. Given that New Zealand markets are open and regulation is light-handed, endogenous innovation and changing patterns of production and employment can be expected in the near term. The economy is dominated by a service sector that relies heavily on tourism and consumer spending. International tourism will only return when the borders are open. Until then, services relying on revenue from international visitors will continue to contract. Opportunities will emerge as residents substitute international travel for domestic travel. However, borders are open, and the flow of imports and exports can be expected to return to pre-COVID-19 levels.

The government introduced a series of innovations aimed at transitioning to a low-carbon economy before the pandemic. The ETS has been strengthened and remains a key tool in achieving net-zero emissions by 2050. Achieving 100% renewable electricity generation by 2030 is feasible. Consents for an additional 2,400 MW of wind generation have been approved, and construction will proceed when financially viable (New Zealand Wind Energy Association, n.d.). However, energy storage will be needed, and currently this is provided by gas. Further conventional hydro development is limited by many sites being located within the conservation estate. Recent interest in pumped hydro storage at Lake Onslow has the potential to provide backup when needed. The government has provided financial support to prepare a business case for development. It is highly likely that private sector investment will be called upon if the project goes ahead. The government's 51% ownership share of four major generating companies could further act as a catalyst for development.

Decarbonising transport is a major challenge. It is unlikely that the target for EV uptake will be met without a comprehensive policy involving price incentives and emission standards. Per capita ownership of cars is high by

international standards, and the light-vehicle fleet is old. A fiscally neutral policy aimed at lowering the relative price of EVs and increasing the price of fossil-fuel-powered vehicles offers an opportunity to grow the EV fleet. The government's support for the hydrogen industry is comprehensive, and commercial partnerships are already emerging. New Zealand has a particular advantage in producing hydrogen from geothermal energy. Hydrogen is well suited to powering heavy vehicles critical to the primary sector.

Finally, it is worth noting the role of government going forward. It is unlikely that government agencies will return to investing in energy projects as was the case prior to the mid-1980s. Transition will proceed based on market principles and commercial return. The role of government is akin to that of a facilitator, providing seed funding for commercial proof of concept, and perhaps providing a nudge with regulations governing vehicle emissions. This approach has served New Zealand well.

REFERENCES

Bardsley, W.E. (2005), 'Note on the Pumped Storage Potential of the Onslow-Manorburn Depression, New Zealand', Journal of Hydrology (NZ), 44, pp.131–35. https://researchcommons.waikato.ac.nz/handle/10289/2702

Ministry of Business, Innovation and Employment (MBIE) (2020), https://www.mbie.govt.nz (accessed 30 October 2020).

Ministry for the Environment (2019a), About the National Policy Statement for Renewable Electricity Generation. https://www.mfe.govt.nz/more/energy/national-policy-statement-renewable-electricity-generation/about-nps (accessed 30 October 2020).

Ministry for the Environment (2019b), About New Zealand's Emissions Reduction Targets. https://www.mfe.govt.nz/climate-change/climate-change-and-government/emissions-reduction-targets (accessed 30 October 2020).

Ministry of Foreign Affairs and Trade (2020), https://www.mfat.govt.nz/assets/Aid-Prog-docs/IATI-PDFs/PACPF (accessed 30 October 2020).

Ministry of Transport (2020), Electric Vehicles. https://www.transport.govt.nz/multi-modal/climatechange/electric-vehicles (accessed 30 October 2020).

New Zealand Government (2019), A Vision for Hydrogen in New Zealand. Green paper.

New Zealand Wind Energy Association (n.d.), http://www.windenergy.org.nz/wind-energy/nz (accessed 30 October 2020).

Organisation for Economic Co-operation and Development (OECD) (2019), New Zealand, OECD Economic Surveys, Executive Summary, June 2019. Paris: OECD.

Statistics NZ (2020), http://infoshare.stats.govt.nz/infoshare/ (accessed 30 October 2020).

Treasury (2020), COVID-19 Economic Response Measures, 16 October. https://www.treasury.govt.nz/information-and-services/new-zealand-economy/covid-19-economic-response/measures (accessed 20 October 2020).