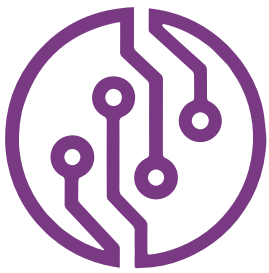


BEC2060

ENERGY SCENARIOS

Navigating our flight path



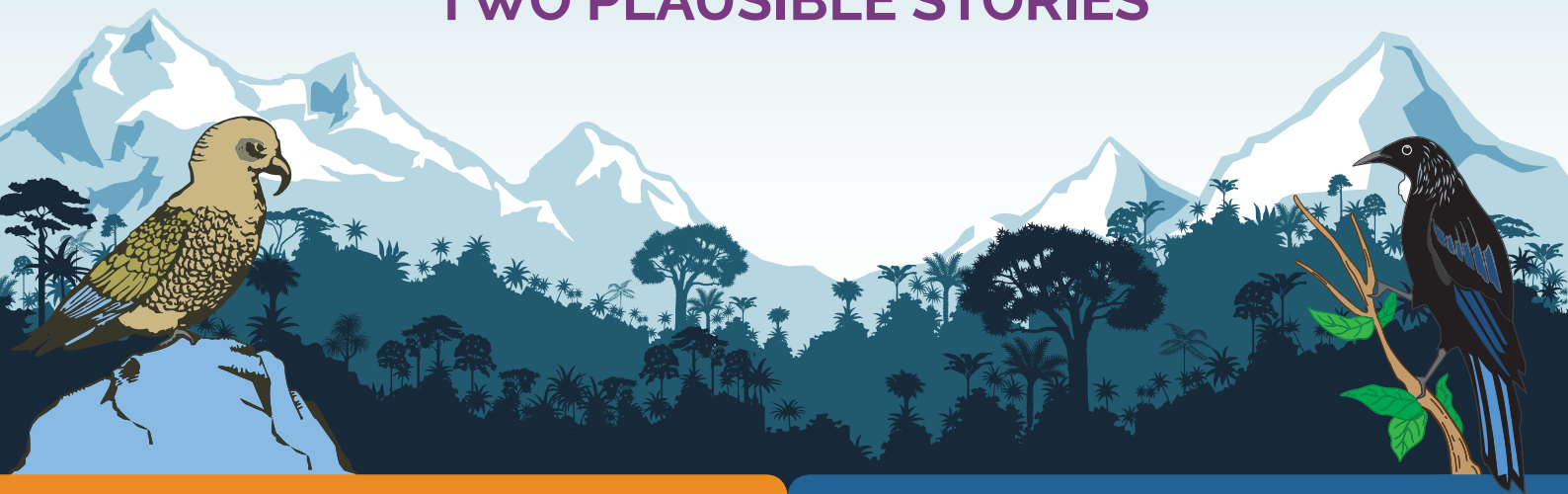
TECHNOLOGY changes driving opportunity

Energy systems are complex and interconnected. Innovative technologies and services enable carbon emission reductions in all sectors and facilitate the current trend towards the democratisation of energy. But what might it take to decarbonise the entire New Zealand economy by 2050? How do we unlock sufficient innovation?

The BusinessNZ Energy Council has partnered with the public and private sectors to develop two plausible and coherent stories about New Zealand's energy future. Having modelled these stories, the results will help you to better understand the challenges and opportunities faced by New Zealand businesses and consumers as we grapple with important issues such as the role of technology and innovation in the transition to a low carbon economy.

Go to www.bec2060.org.nz to find out more.

TWO PLAUSIBLE STORIES



Kea:

a future where climate change is recognised by society as the most important priority. New Zealand aggressively transforms itself into a low-emissions economy, faster than its global trading partners, competitors and peers.

Tūī:

a future where climate change is recognised as one of many competing priorities. New Zealand leverages off its traditional comparative advantage to generate wealth. A 'follower' approach is taken to climate policies and solutions made possible by the actions of trading partners and competitors.

The key differences between the two stories

New Zealand is **moving faster** than the rest of the world when acting on climate change. The carbon price is higher than the global price.



New Zealand is an **early adopter** and actively provides a testbed for emissions-reducing technologies.



Government facilitates the swift uptake of new energy technologies within New Zealand and supports the local deployment of energy technologies developed overseas.



Lower rate of population and GDP growth, and risk of growing unemployment as the economy restructures.



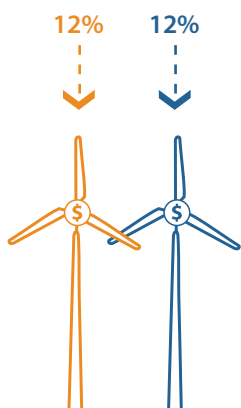
New Zealand is **moving more slowly** than the rest of the world in acting on climate change. The carbon price is lower than the global price.

New Zealand is a **fast follower** and favors market-based instruments when adopting new technologies.

Government has a light-handed approach and intervenes where there are market failures. New Zealand adopts new energy technology when it becomes price competitive.

Faster annual population and GDP growth, using New Zealand's traditional competitive advantage in primary sectors. Risk to trade emerging because of this.

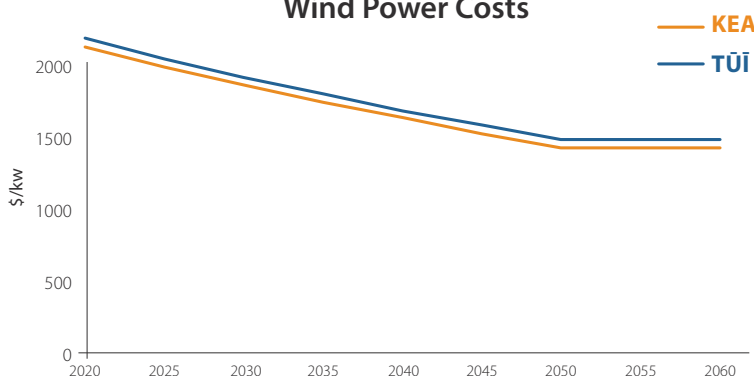
TECHNOLOGY COSTS

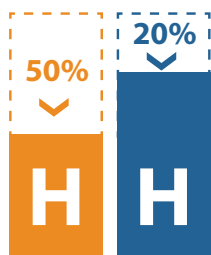


The scenario narratives are driven by society's response to the climate change challenge. A key way the two responses are reflected in the modelling is through the input of technology price trends.

Both scenarios assume a further cost reduction of about 12% for wind power over the next 10 years.

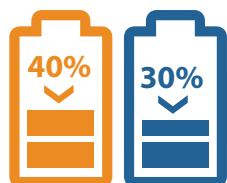
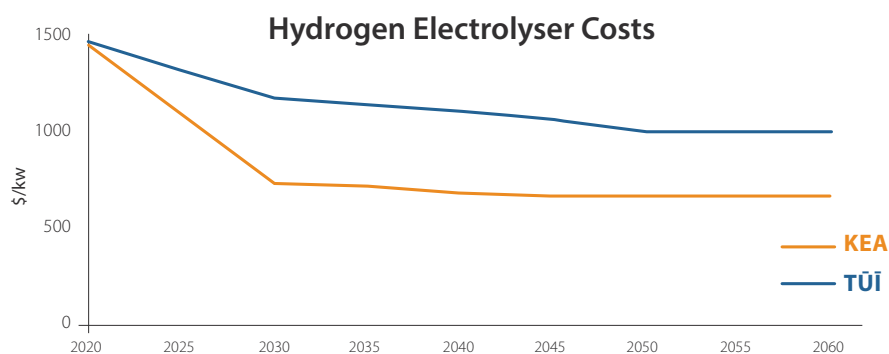
Wind Power Costs



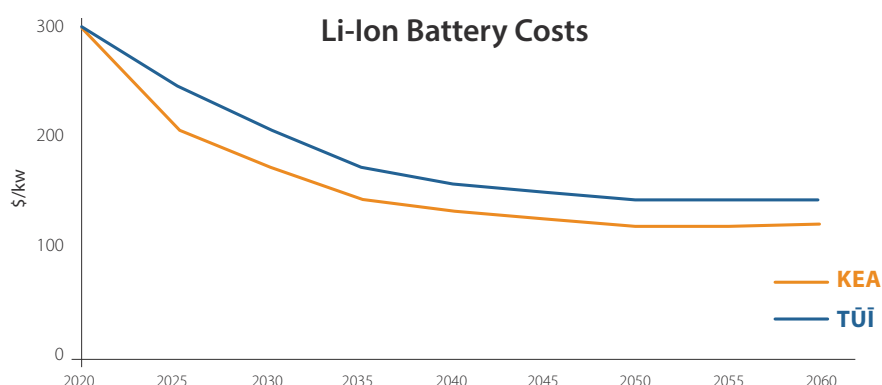


Under **Kea**, hydrogen electrolyser costs drop almost 50% over the next 10 years.

In **Tūi**, these costs drop by 20%.



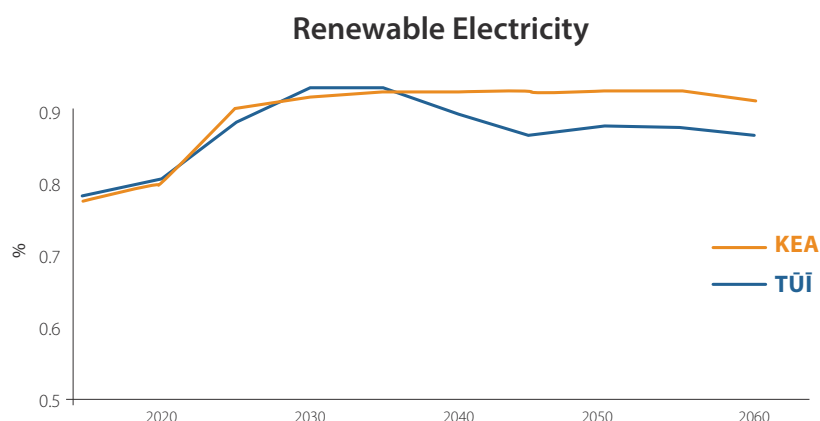
Kea assumes a cost reduction of 40% for li-ion battery storage over the next 10 years, **Tūi** another 30%.



RENEWABLE ENERGY TECHNOLOGIES

In **Kea** new technology is adopted faster, though the rate is constrained by low growth during the economic transformation in the first decade. New technologies include solar and wind as well as more distributed energy systems in cities and towns, which arise in the second and third decades. The overall demand for energy recovers during the latter decades, with a focus on decarbonising the energy system.

Under **Tūi**, the renewable portion of electricity drops from a high of 96% in 2035 back to 88% in 2040 as a combination of gas, and coal with carbon, capture and storage (CCS) is used to meet the increase in security of supply requirements.

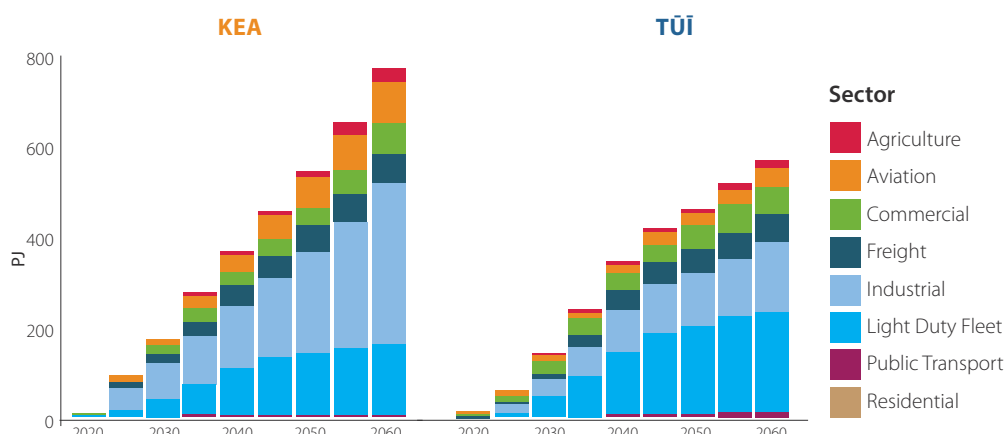


ENERGY SAVINGS THROUGH TECHNOLOGY EFFICIENCIES

In **Kea** efficiency gains in technology lead to an energy saving of almost 400 PJ by 2040 and 800 PJ by 2060.

Tūi will save up to 350 PJ energy by 2040 and 600 PJ by 2060, overall 25% less than **Kea**.

Tūi's energy savings are driven by the transport sector while **Kea's** energy savings are driven by greater energy efficiency in the industry.



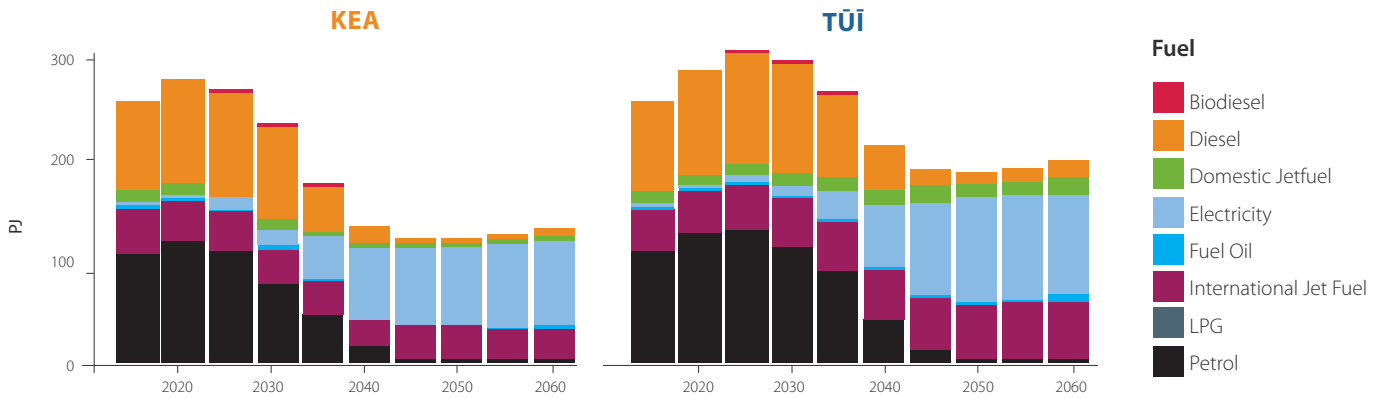
TECHNOLOGY CHANGES IN TRANSPORT

Electricity is critical for the economic transformation. Under **Kea**, electrification of mass transit begins early and alternative fuels for trucks are being trialed extensively. By 2040 the electrification of the vehicle fleet is widespread, coupled with the emergence of automated mass transit. A key innovation is the growing use of mobility-as-a-service by 2060, the vehicle fleet (all types) is electrified, and there is more extensive use of active modes, such as mobility-as-a-service. Public transport has rendered private car ownership obsolete.

Electric vehicles on the road by 2040



Including a significant portion of hybrid petrol cars.



In contrast, **Tūi**, the passenger fleet continues to be dominated by private vehicles, with long commutes required from the development of greenfield areas. Electricity displaces petrol gradually, but the heavy vehicle fleet doesn't make the switch until the last decade. By 2040, commuting remains the key driver for travel. The gradual adoption of automated cars makes the long commute more bearable but urban sprawl hampers productivity. By 2060, the number of vehicles rises as people maintain vehicle ownership, although most of the fleet is powered by renewable energy.

KEY INSIGHTS



Both scenarios illustrate that the race of technology is finely balanced and mitigation policy should be technology agnostic as much as possible. Based on uncertainty surrounding the pace of technological change, and the fact that New Zealand imports most technology, we need to make sure that we provide the right environment for business and consumers to transition to a low carbon and climate change resilient innovation-friendly environment.



If mobility-as-a-service is growing, then New Zealand's road legislation needs to be able to facilitate this.



Cross-sector collaboration is crucial: interconnectivity between sectors is growing and to optimise outcomes for all, we need to think outside the energy box.



The prevailing carbon price will be a key 'carrot and stick' for the pace and scale of technological adoption and innovation across all sectors. Technologies, systems and infrastructure that optimise New Zealand's renewable energy advantage and largely renewable national electricity grid is a key opportunity.

Project Investors



Project Partners

