



TRANSPOWER



Energy sector decarbonisation How are we going?

Alison Andrew – Chief Executive, Transpower

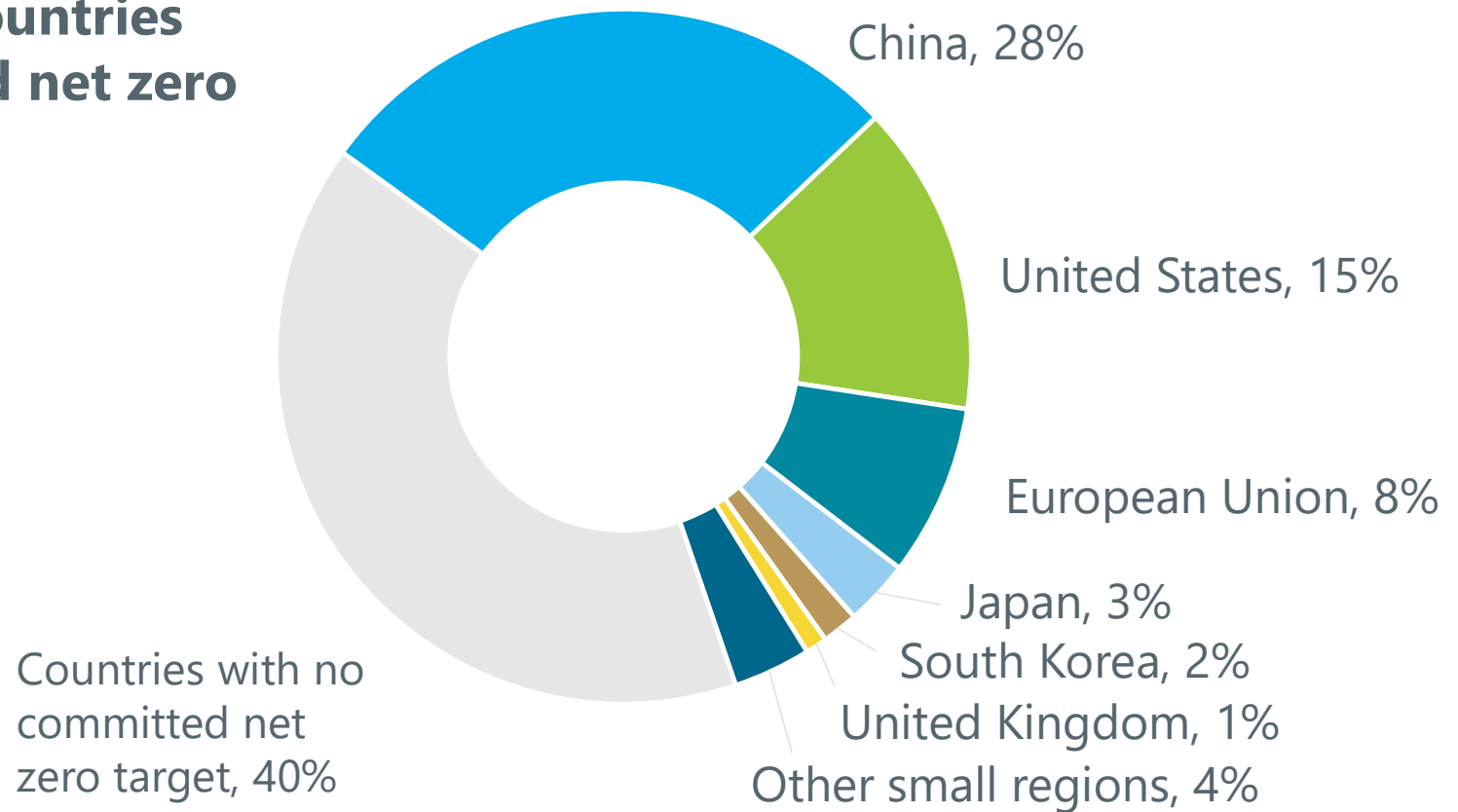
Agenda

1. The drive for decarbonisation

2. Decarbonising the energy sector
3. Ensuring energy affordability
4. Maintaining security and reliability of supply
5. Opportunities for the sector

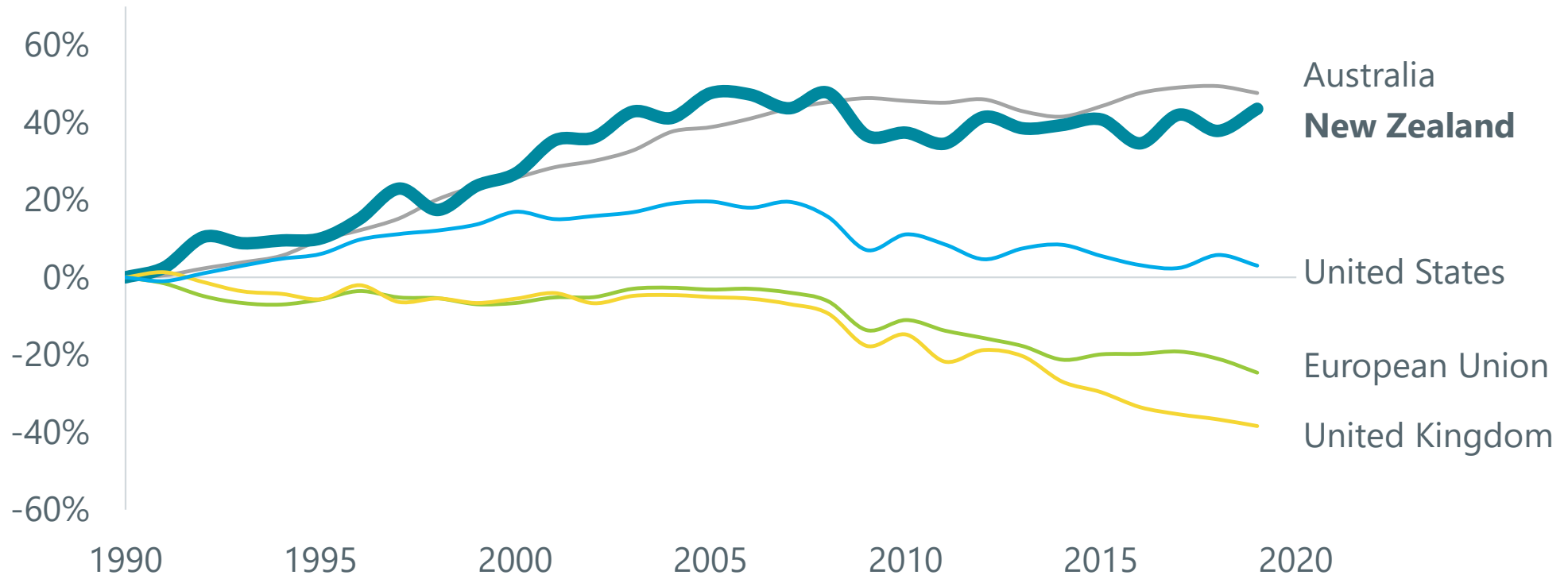
Countries representing over half of global emissions have committed to net zero carbon targets

Emissions by countries with committed net zero carbon targets



New Zealand is falling behind other developed countries in efforts to reduce greenhouse gas emissions

Annual gross greenhouse gas emissions relative to 1990



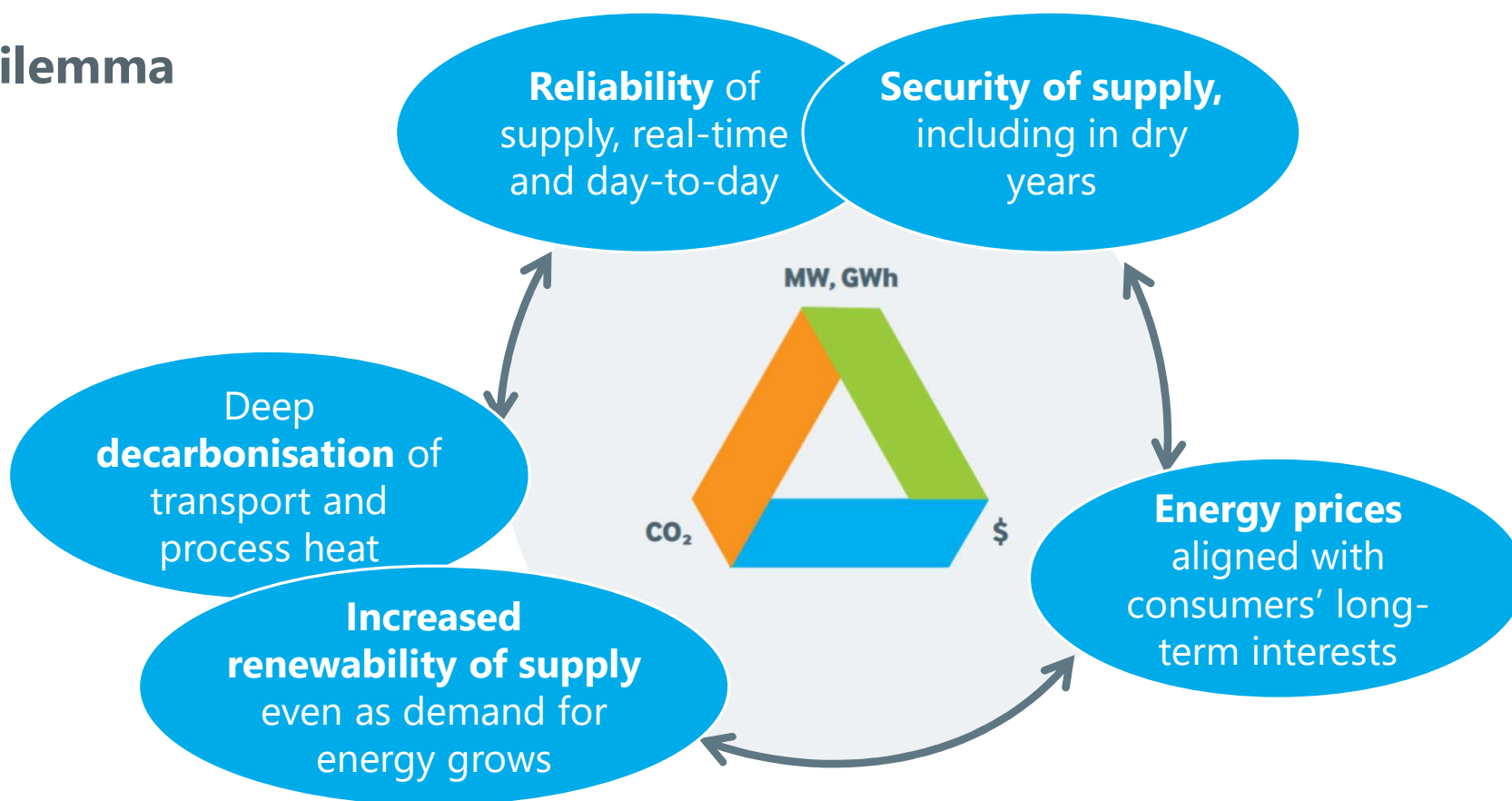
Source: Our World in Data.

Agenda

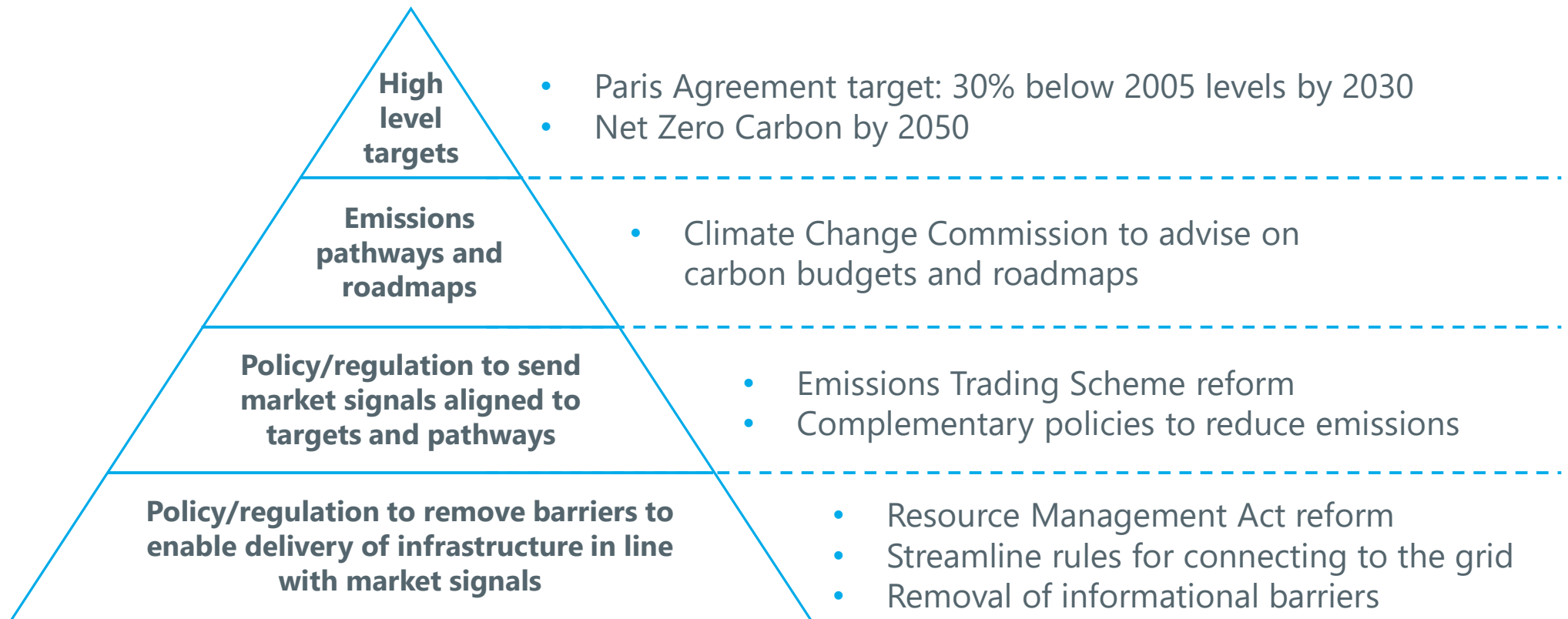
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Decarbonisation needs to be grounded in the context of the energy trilemma

Energy Trilemma



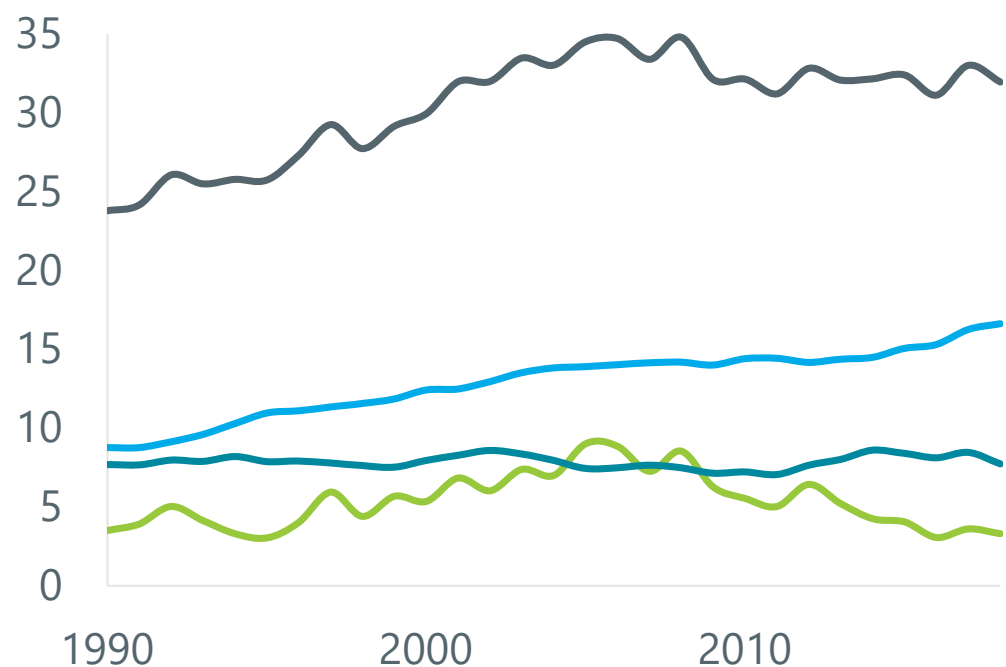
Our climate targets can only be achieved when emissions pathways, policies, regulation and markets align



Energy sector emissions have grown over the past thirty years, driven mostly by transport

Energy emissions over time

(Mt CO₂-e, 1990-2018)



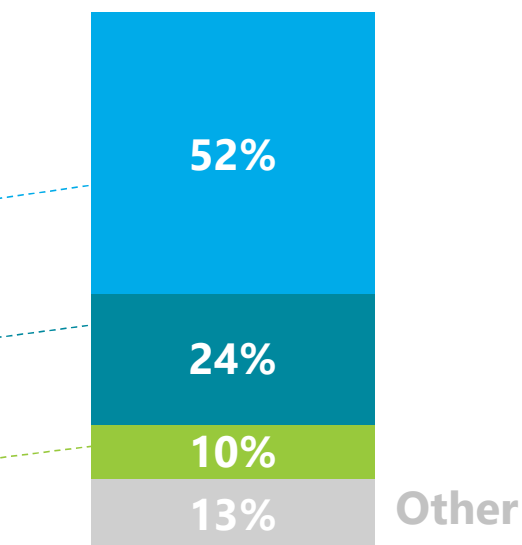
Overall
+34%

Transport
+90%

Process heat
+1%

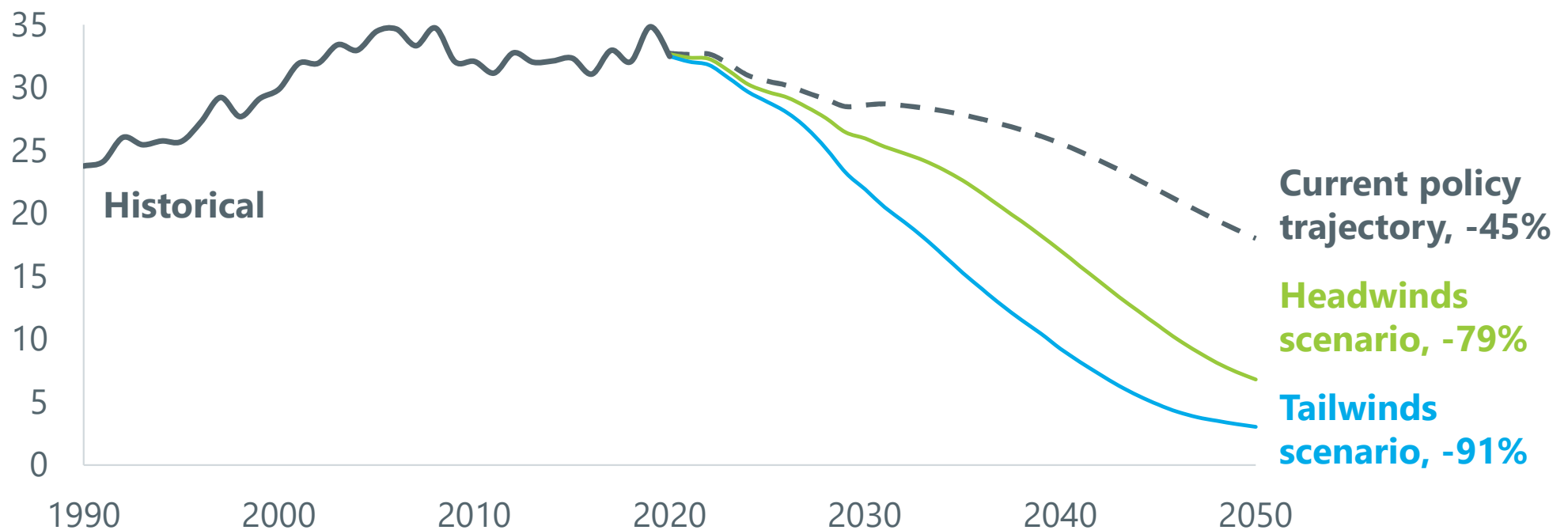
Electricity
-5%

Breakdown of energy emissions (2018)



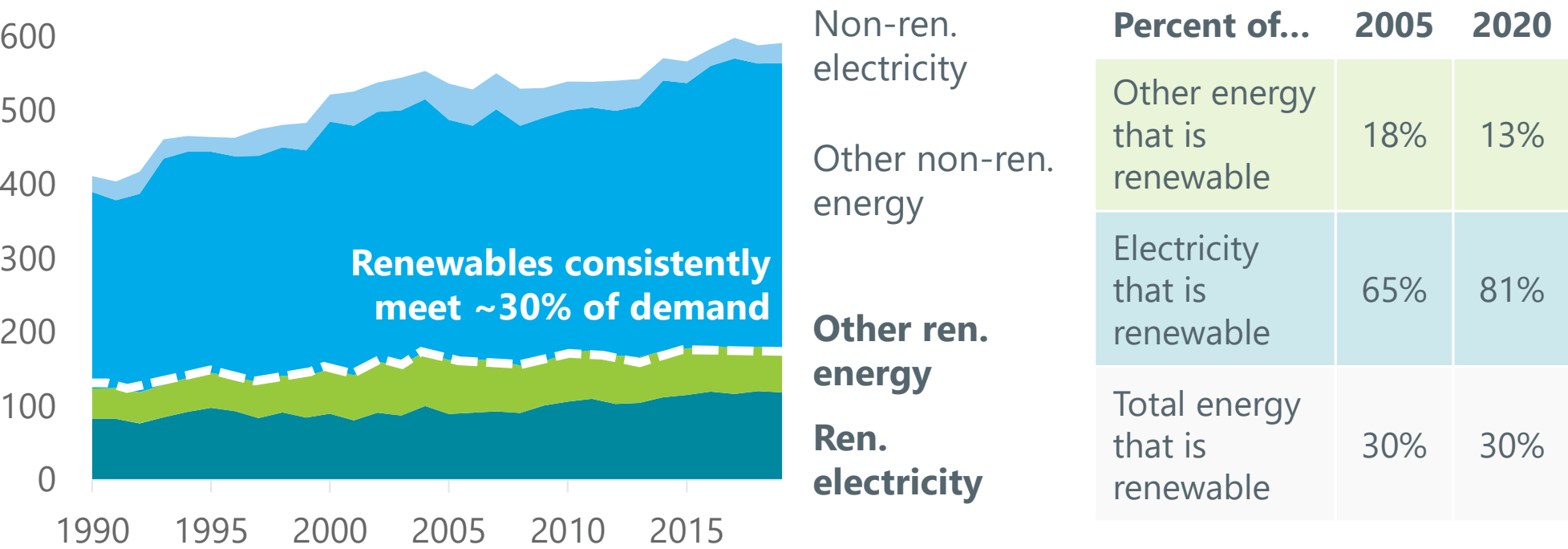
Current policies will reduce energy emissions over time but not to the levels we need

Climate Change Commission energy emissions forecasts
(Mt CO₂-e, 1990-2050)



Renewability of New Zealand's energy system largely unchanged over time

Renewability of New Zealand's energy consumption
(Gross PJ, 1990-2018)



Source: Ministry of Business, Innovation and Employment.

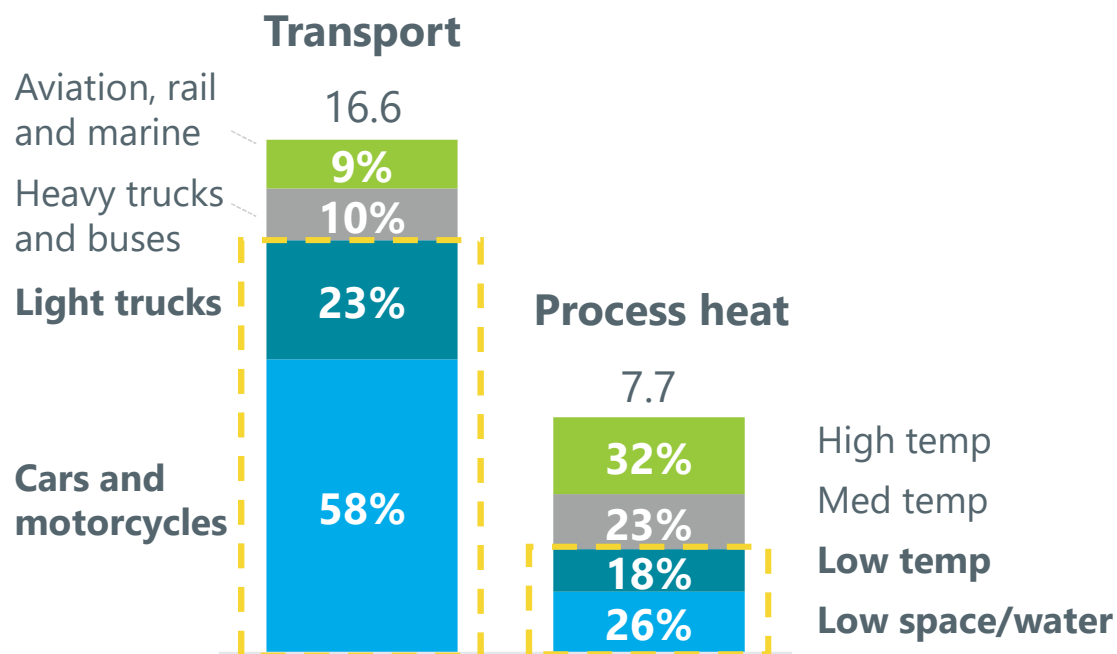
There are significant opportunities to decarbonise in the transport and process heat sectors

Key opportunities:

- Light transport electrification and mode shift
- Low temperature process heat electrification
- Biomass for medium temperature process heat
- Biofuels and hydrogen for hard to electrify transport segments
- New renewable electricity generation – 85% to 95% renewable

Breakdown of emissions

(Mt CO₂-e, 2018)



Source: Ministry for the Environment.

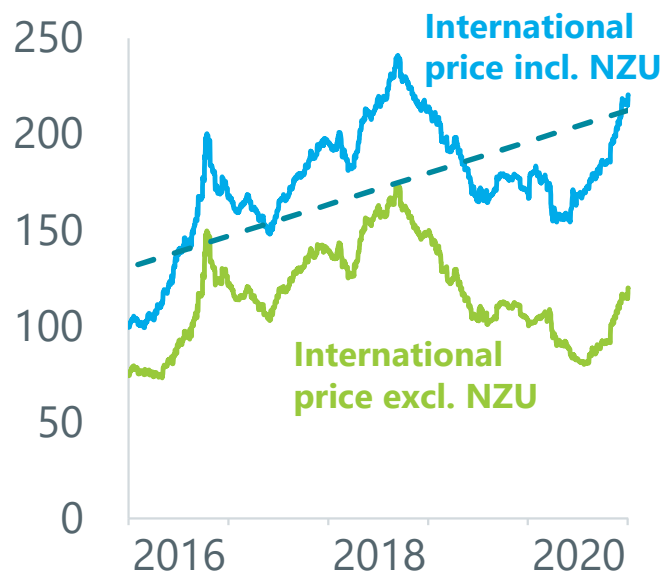
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Cost of fuels are rising and the past year has been volatile

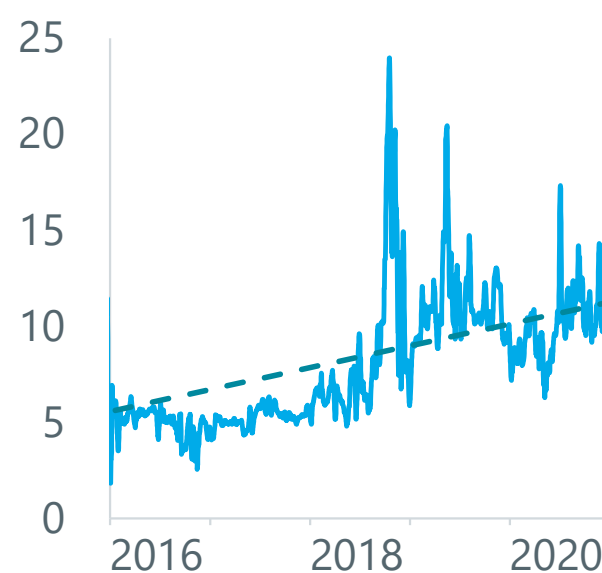
International coal price

(\$/tonne)



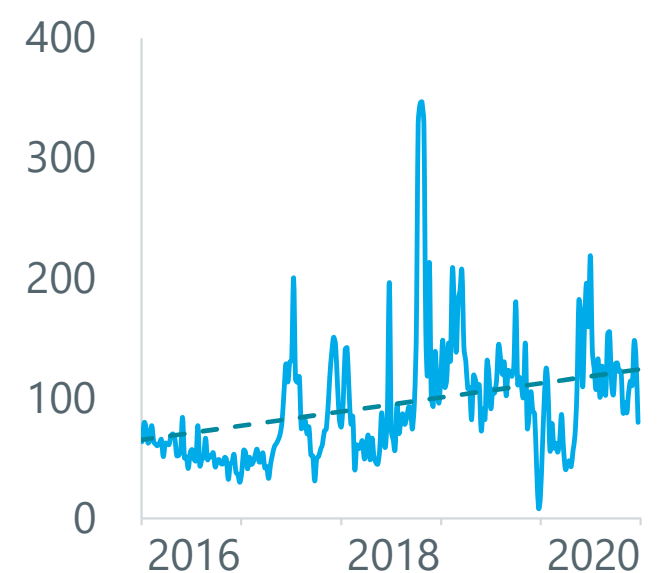
Gas spot price

(\$/GJ)



Wholesale electricity price

(\$/MWh)

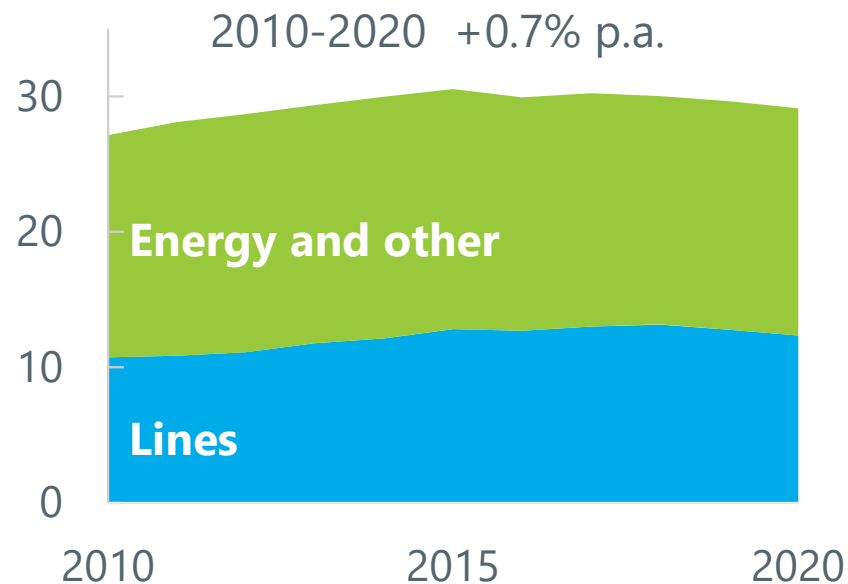


Sources: Trading Economics, emsTradepoint, Electricity Authority.

Households have been sheltered from spikes in wholesale electricity prices and bills are lower

Residential cost of electricity

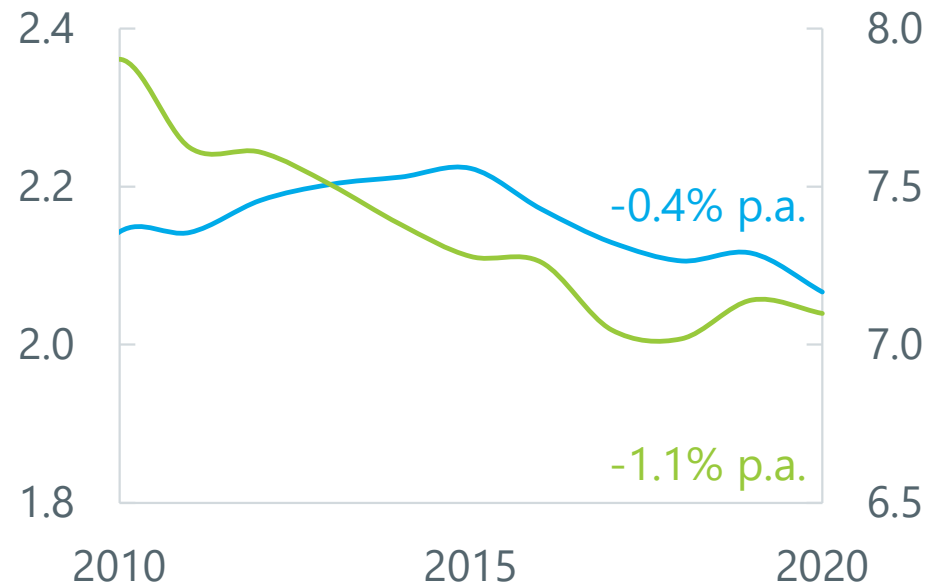
(c/kWh, real)



Average annual consumption

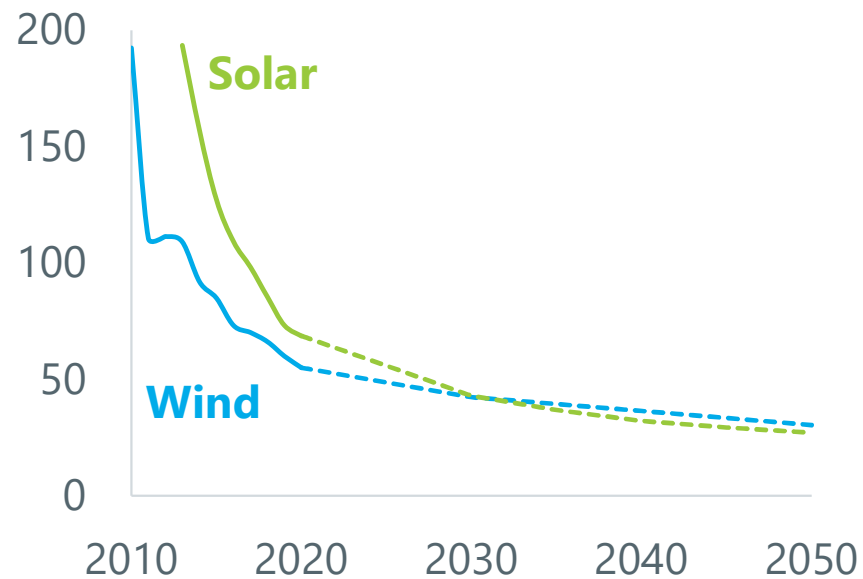
(● \$000, real)

(● MWh)

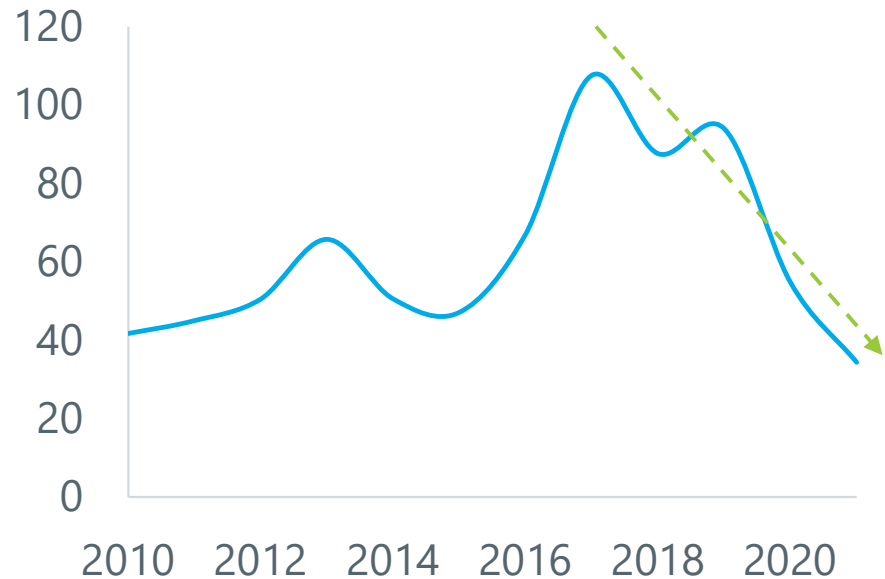


New renewable generation can bring down the cost of electricity

Levelised cost of energy of new renewable electricity generation
(NZ\$/MWh)



Example: Falling Australian prices
(2020 real AU\$/MWh)



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Peak demand hasn't grown considerably over the recent years

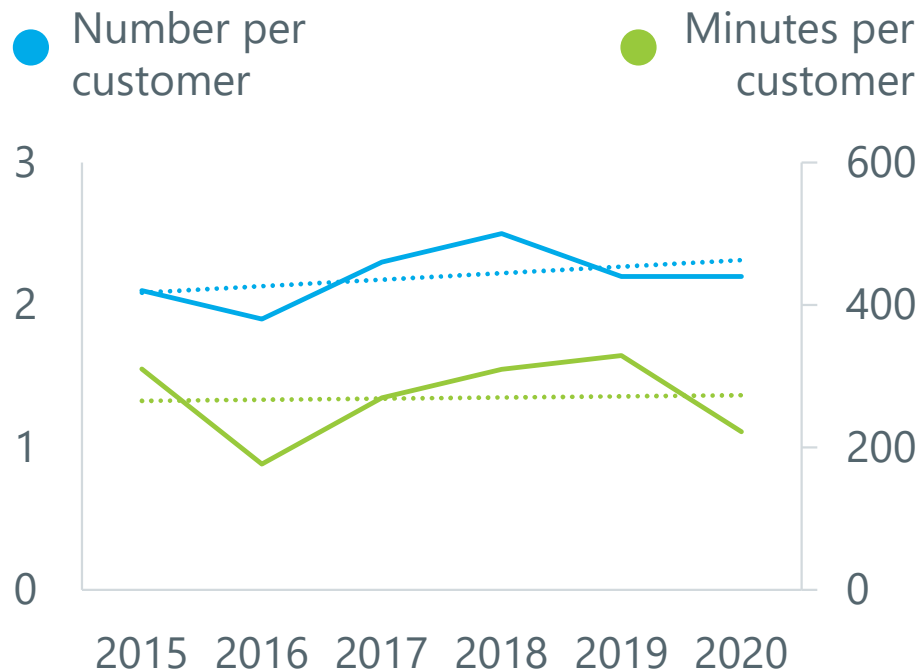
Weekly peak grid demand
(GW)



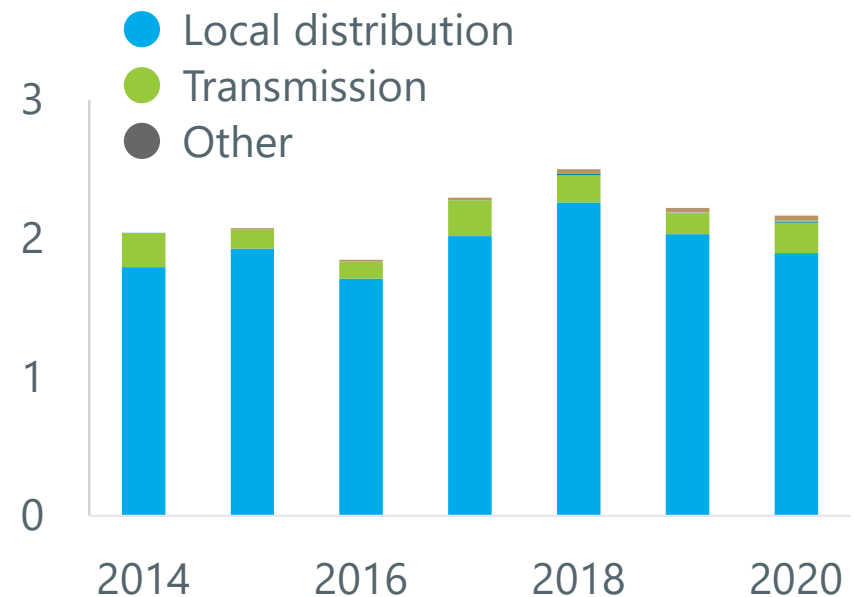
Source: Electricity Authority.

On average, consumers in New Zealand are likely to experience more and longer outages compared to 2010

Average customer outages



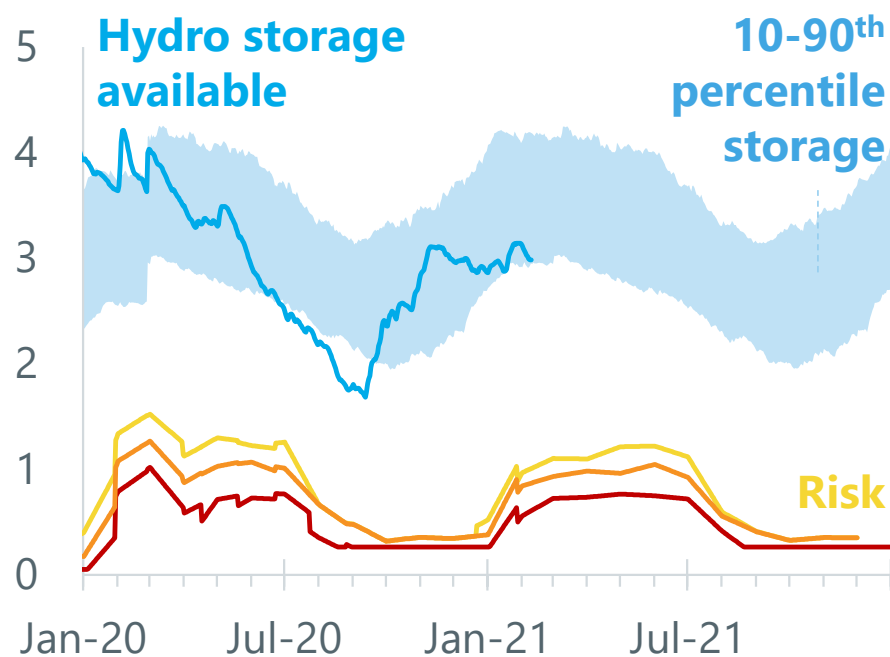
Breakdown of average customer outages by origin



Hydro levels and gas supply creating uncertainty in immediate future

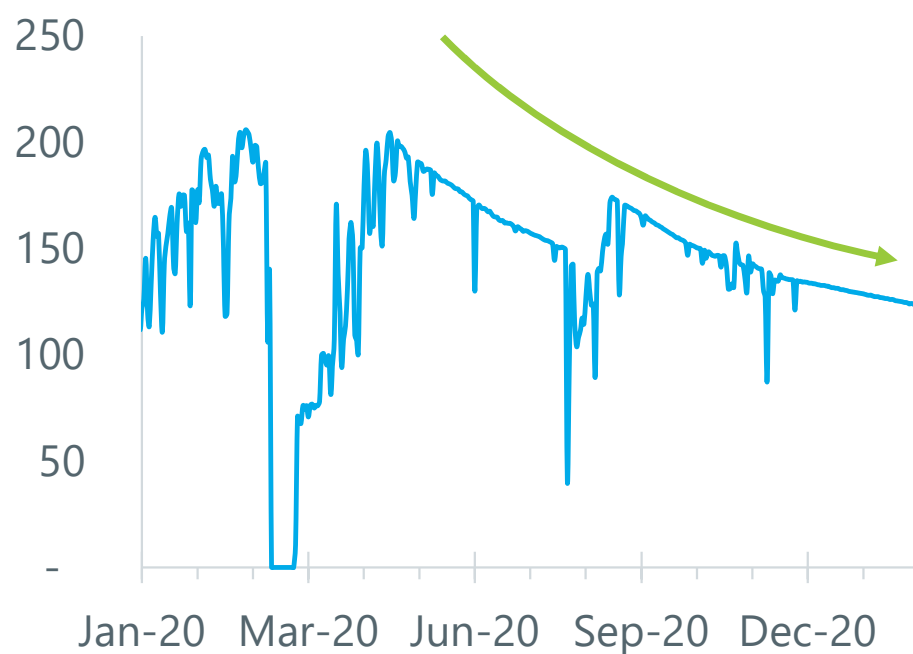
Electricity risk status curve

(Available storage, TWh)



Pohukura gas production

(TJ)



Source: Transpower Security of Supply Assessment, OATIS.

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Value shifts in the energy sector will enable New Zealand's transition to a zero carbon future

Today

Fossil fuelled transport and process heat

Thermal generation

Poles and wires solutions

Local incumbents

Value located up the value chain

Traditional markets



A net zero carbon future

Renewable transport and process heat

Renewable generation

Poles and wires alternatives

New domestic and international entrants and prosumers

Distributed energy resources

New trading platforms and modes of transacting energy

We need to continue working on the ten industry areas of change outlined in Whakamana i Te Mauri Hiko

- 1 Streamlining connections processes for energy infrastructure
- 2 Integrated energy system planning
- 3 Getting the incentives right for decarbonisation and renewables
- 4 Removing barriers to low carbon infrastructure
- 5 Demand-side participation in energy markets
- 6 Ensuring supply meets peak energy demands
- 7 Security of energy and managing dry year risk
- 8 Protecting system stability
- 9 Access to skilled workforce
- 10 **Collaboration**



Thank you

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