



ENERGY MATTERS 2015

Join the debate on our energy future

John Carnegie and Dr Stephen Batstone
BEC2050 Energy Scenarios: Navigating energy
futures to 2050

Monday 19 October, 6.30-7.45pm

www.energymatters.auckland.ac.nz



BEC2050 Energy Scenarios

Navigating New Zealand's Energy Future

BusinessNZ
Energy Council



Member of the
World Energy Council



John Carnegie, BusinessNZ Energy Council

Stephen Batstone, Sapere Research Group

Presentation to Auckland University School of
Business

19 October 2015



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CONSEIL MONDIAL DE L'ÉNERGIE

Outline

- introduce the BusinessNZ Energy Council and the World Energy Council
- overview of the BEC2050 Energy Scenarios Project
 - why we did it
 - the approach we took
 - what are we were trying to achieve
- some key results
- some reflections



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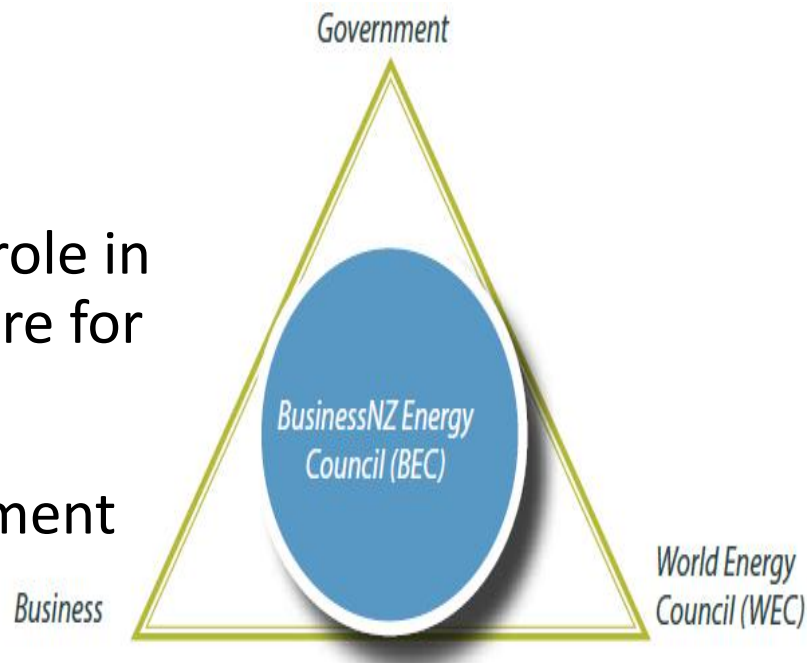


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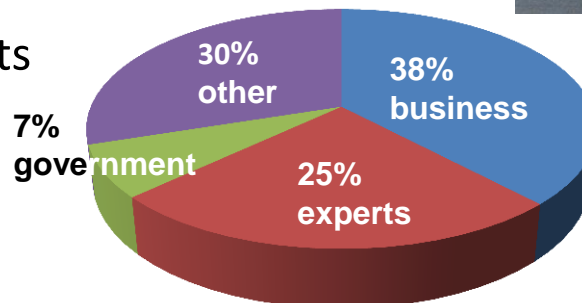
The BusinessNZ Energy Council

- the BusinessNZ Energy Council ('BEC'):
 - is a group of New Zealand organisations taking on a leading role in creating a sustainable energy future for New Zealand
 - brings together business, Government and academia
 - is the New Zealand Member Committee of the World Energy Council



The World Energy Council (WEC)

- the principal international network of energy leaders and practitioners
- promoting an affordable, stable, and environmentally sustainable energy system for all since 1923
- UN accredited
- truly global
 - 90+ country member committees
- inclusive and impartial
 - OECD & non-OECD
 - 3000+ member organisations from governments, industry, academia, & NGOs
- informs global, regional, national strategies
 - authoritative studies
 - high-level network & events



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Complexity + speed = uncertainty

- no longer one investment signal but many
 - still oil, but now multiple regional gas prices, carbon price, solar and battery technology prices
- no more 'slow' energy
 - short term used to be life of vehicle fleet ~10+ years
 - now the impact of US shale oil and gas, collapsing solar and battery prices, rise of the prosumer



New Zealand is not immune

- a new energy sector headline every day
 - Rio Tinto – stay or go?
 - sell down of refinery shareholdings
 - closure of Huntly units and Contact's Otahuhu
 - merger of Caltex and Z Energy
 - New Zealand Power
 - the 'Smart Grid'
 - disruptive technology – EVs, solar, batteries, home automation



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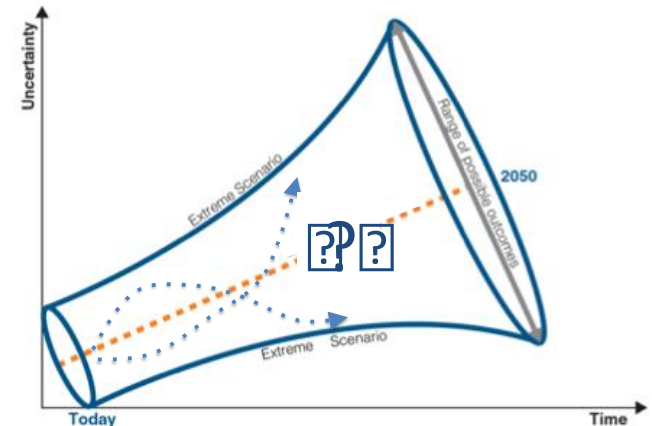
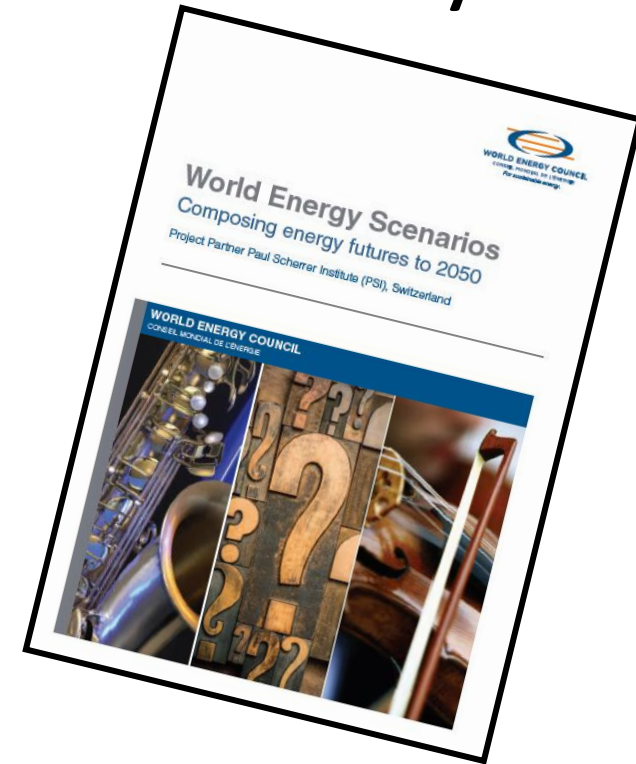
Scenarios – why?

- scenarios help us to:
 - tell more impartial stories of the future (liberate bias)
 - make areas of uncertainty transparent
 - be explicit about what drivers we can and can't control
 - road test policy and investment decisions under different worlds (trade-offs)
- and, with judicious use of modelling, we can quantify this, and bring it out of the “too hard basket”
- **this builds resilience into our future decisions**



World Energy Council scenarios study

- two scenarios developed bottom up – input from national member committees – that are:
 - *plausible* – not a prediction, but a believable scenario
 - *distinct* – to succeed, the narratives have to be different
 - *coherent* – the narratives have to hang together as a whole



The WEC scenario outlines

- two scenario stories

- **Jazz:**

market & trade based, modest carbon price, consumer driven, focussed on access and affordability, achieving growth through low cost energy, Governments facilitate GHG actions by businesses

- *Symphony:*

government led “orchestrated”, voter driven, high carbon price, focussed on environmental goals and energy security, national and regional measures to increase share of renewables in energy mix, binding international agreement on GHG emissions



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BEC2050: the project opportunity

- we saw substantial benefits of applying the Jazz and Symphony scenario framework in New Zealand to:
 - explore the critical uncertainties that we face in New Zealand's energy future
 - use WEC scenarios (and modelling) to inform understanding of New Zealand – globally integrated
 - leverage WEC's framework and significant research on global factors, thus freeing us to focus our resources in New Zealand-relevant factors



BEC2050 energy scenarios project sponsors



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Te Tari Tiaki Pūngao



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Ministry for the
Environment
Manatū Mo Te Taiao



THE EXPLORERS
NEW ZEALAND OIL & GAS



pwc

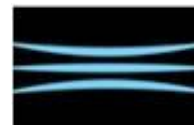
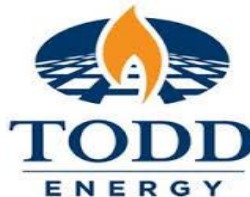


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TRANSPOWER



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Two storylines

- Using workshops, created two narratives, unique to NZ, but connected to the rest of the world
 - Kayak » NZ in a “rest-of-world Jazz”: market-led, modest CO₂ price
 - Waka » NZ in a “rest-of-world Symphony”: government-led, high CO₂ price



Narrative 1: Kayak
Narrative 2: Waka



New Zealand scenario quantification

	KAYAK	WAKA
Population	Higher (immigration)	Lower
GDP/capita	Higher	Lower
Carbon agreements	Limited Prices (2050): NZD60/tCO ₂ -e	Stronger Prices (2050): NZD115/tCO ₂ -e
Resources	EDGS Lower cost of gas exploration Coal-to-liquids without CCS not allowed	EDGS
Technology Support	None	Biofuels subsidy of 20% “Facilitation” of hydro Energy Efficiency Policies
Consumption behaviour	Price-based	Reduced light fleet vehicle use



Key Messages

1. What happens globally matters to us, but we can't control it

2. There is no such thing as 'slow energy'

3. The energy sector is increasingly complex

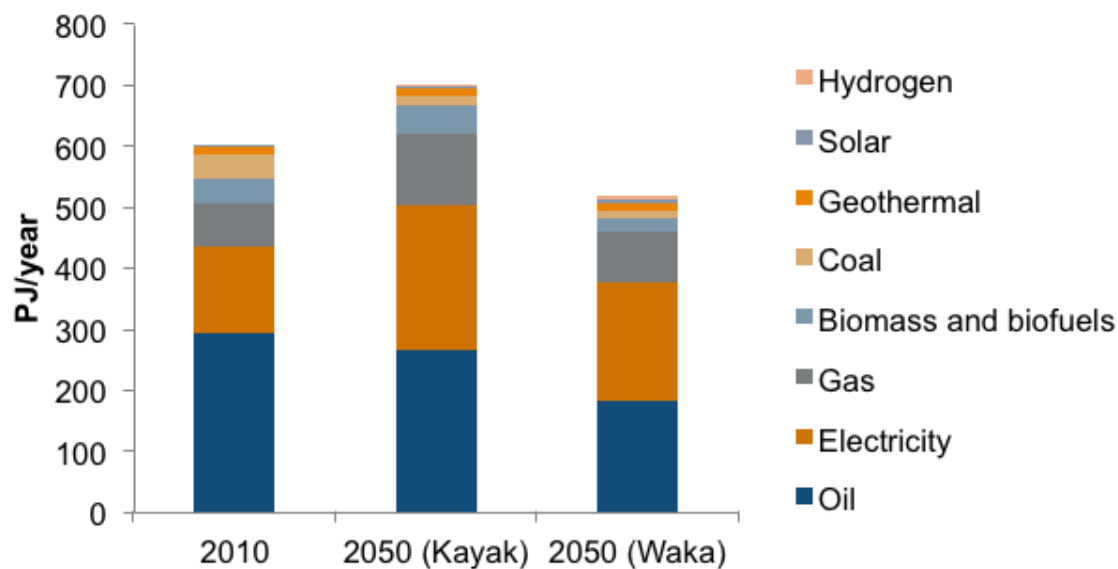
4. Balancing the Energy Trilemma means difficult choices

5. A new consumer relationship with energy is being forged

6.

Growth in energy demand is by no means a certainty

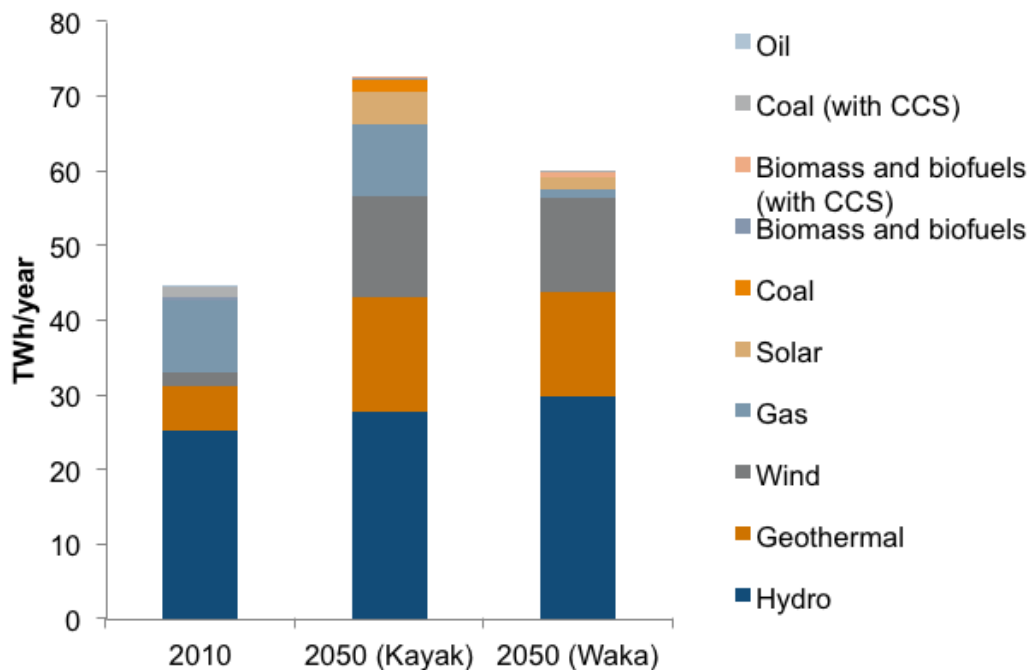
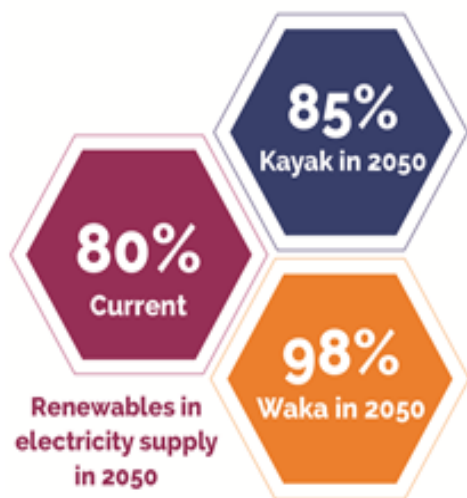
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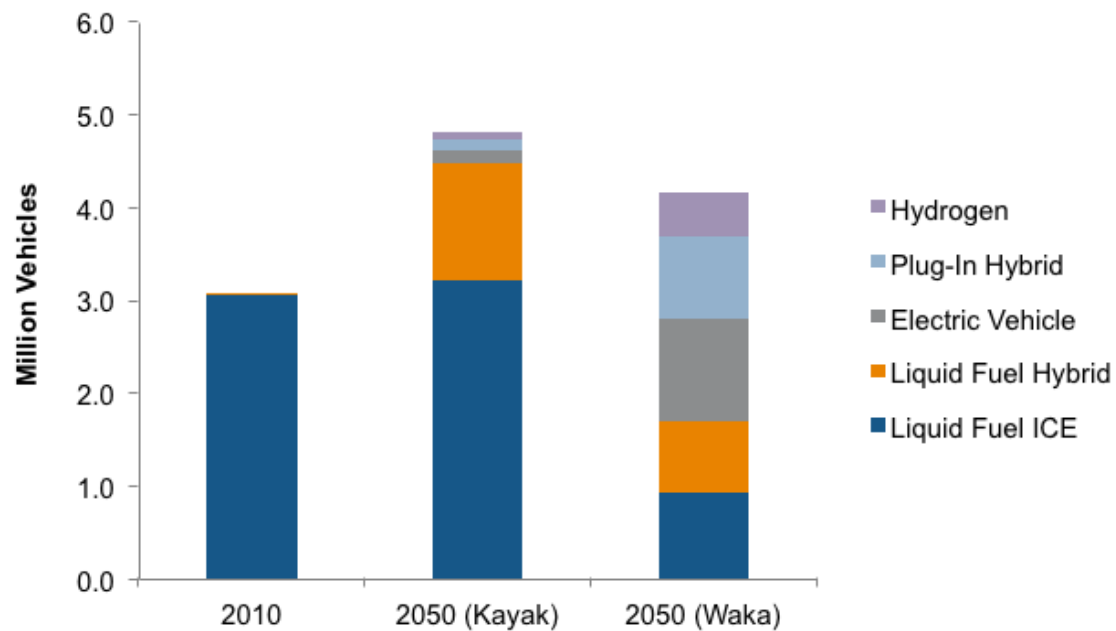
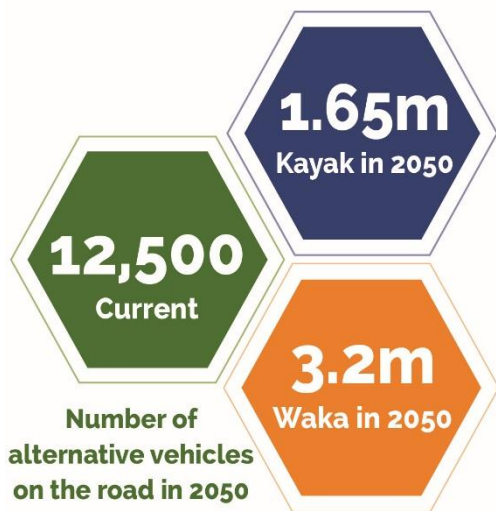
The electricity mix in 2050 will mainly be renewables, but we do not have an endless low cost supply

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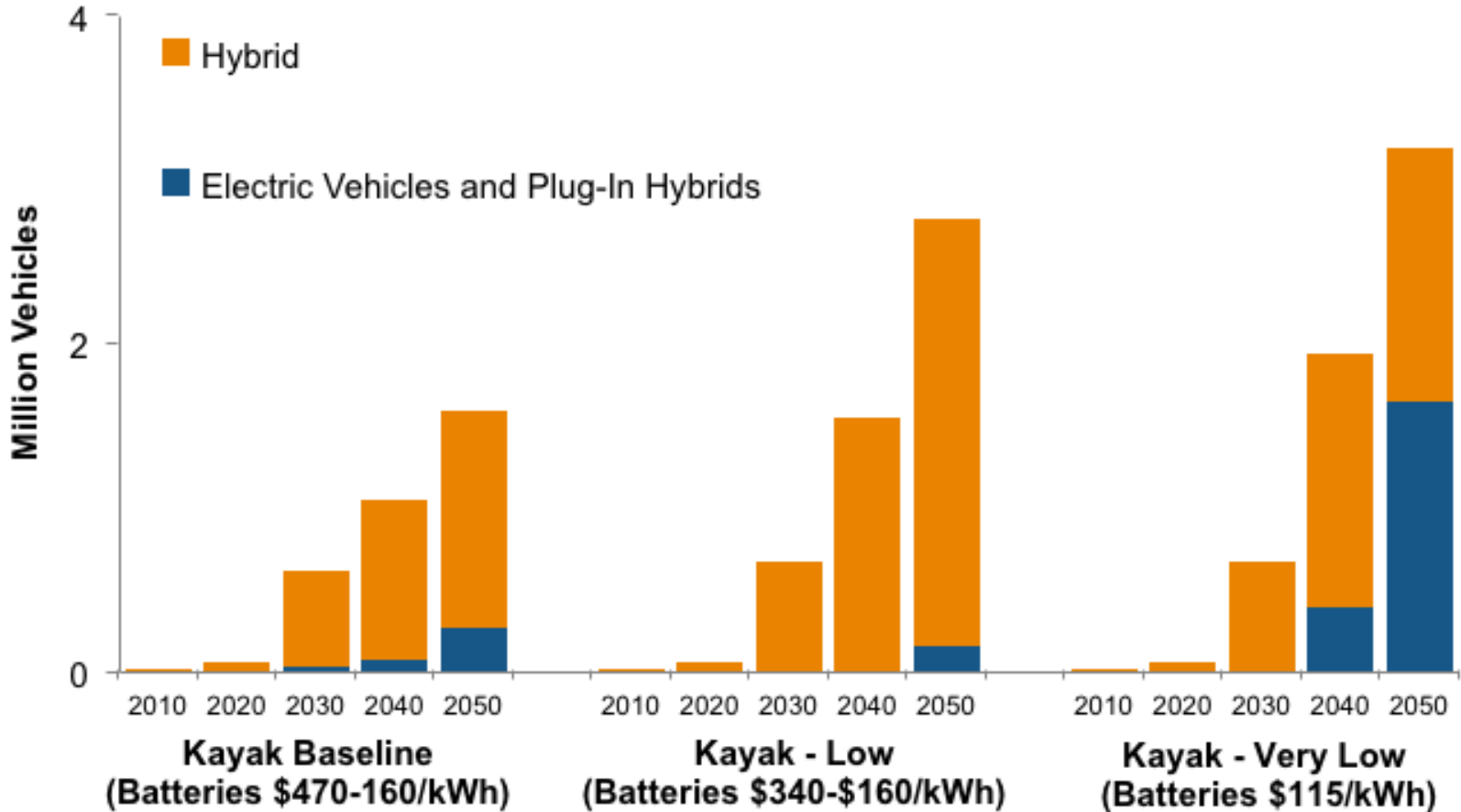
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Transformative transport sector change is possible



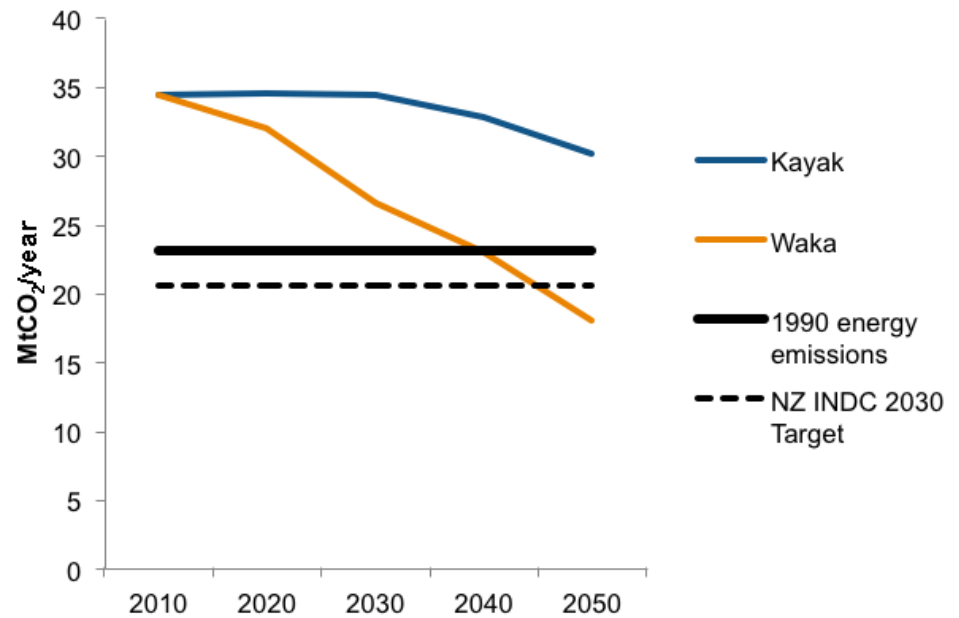
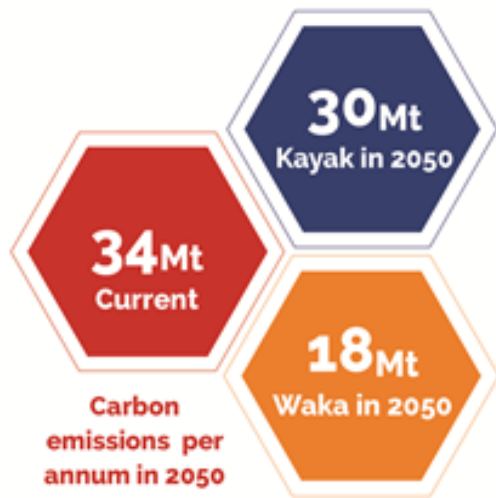
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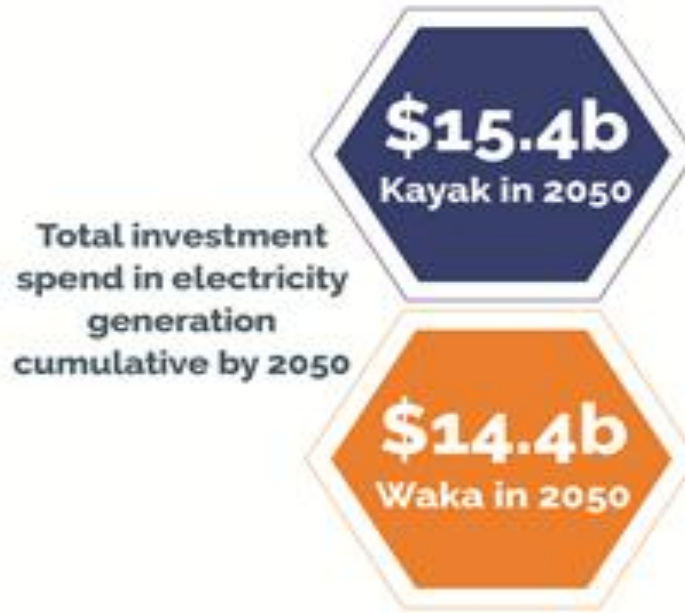
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Further significant reductions in energy sector emissions will be challenging, even with a high carbon



10.

Given the magnitude of the investment required, having the right policy frameworks in place will matter



Reflections on the results

- heavy interplay of electricity, renewables, transport, emissions reductions
- ‘double whammy’ of NZ’s renewable electricity abundance:
 - further emissions reductions in electricity at the margin
 - transport can leverage renewables and achieve significant emissions reductions
 - but relativity of oil and electricity price crucial
- some may find the solar results challenging/surprising – but still “transformational”



Scenario thinking – what we learnt

- a slow, methodical process to identify ‘critical uncertainties’ and their interconnectedness pays dividends in the long run
- keeping scenario storylines away from “what we think will happen” was a constant challenge
 - temptation to view Kayak as continuation of status quo
 - reality is that we will paddle a path between storylines
 - you don’t have to ‘agree’ with the scenario storyline (plausibility)
- how to balance ‘wild cards’ (e.g., major technology disruption) with the coherence of a storyline
 - are the scenarios ‘extremes’ or just “fuzzy boundaries”?
- there is no substitute for “anguishing” and ‘revisiting”



What have we achieved?

- the BEC2050 project has delivered
 - a robust framework for thinking about future energy system uncertainty
 - trusted modelling, that has been vetted by industry, academia and government
 - a platform and common vocabulary on which the industry and policy-makers can now discuss and share views about the future



Summary

- an emerging world of uncertainty, complexity and change
- scenarios are helpful as they:
 - challenge us to move outside of our own ideological biases and anchoring...answer the question “how could this play out differently, and what impact could that have?”
 - force us to tell a story, rather than just make disconnected/unrealistic assumptions
- modelling helps us reconcile the many interconnections in the industry



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Thank you Questions?

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