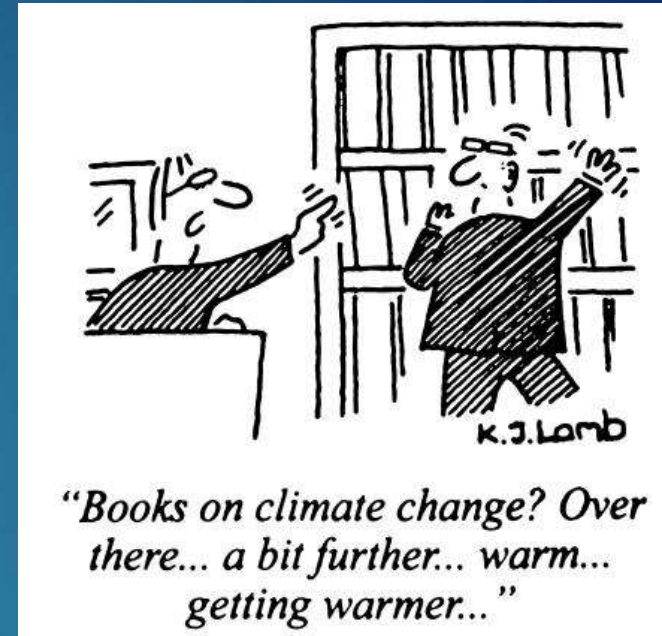


What do the emission reduction targets mean for the electricity sector and wind energy?

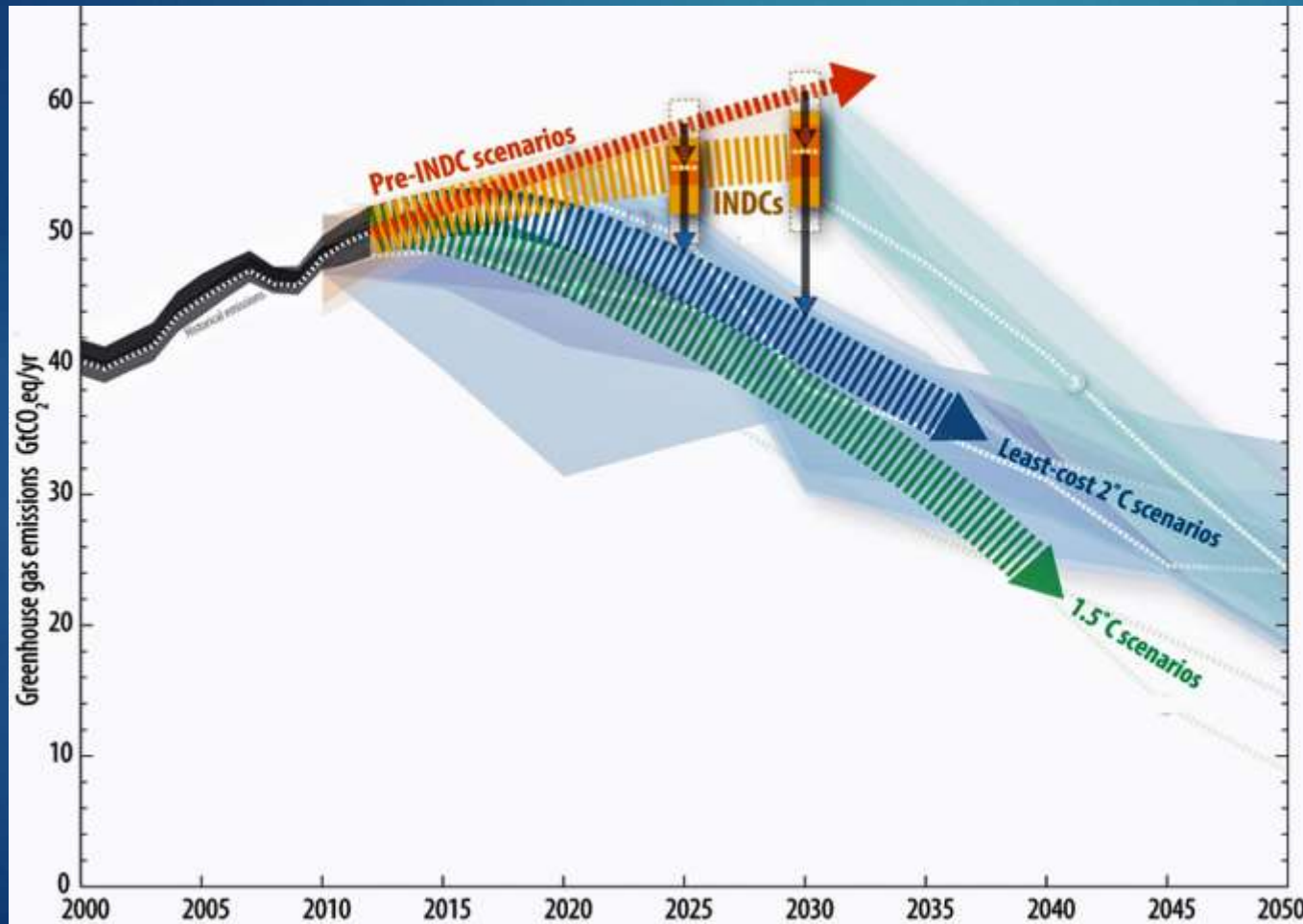
12 April 2017

Stuart Frazer

Director, Frazer Lindstrom Limited



Paris Agreement Emissions Trajectories

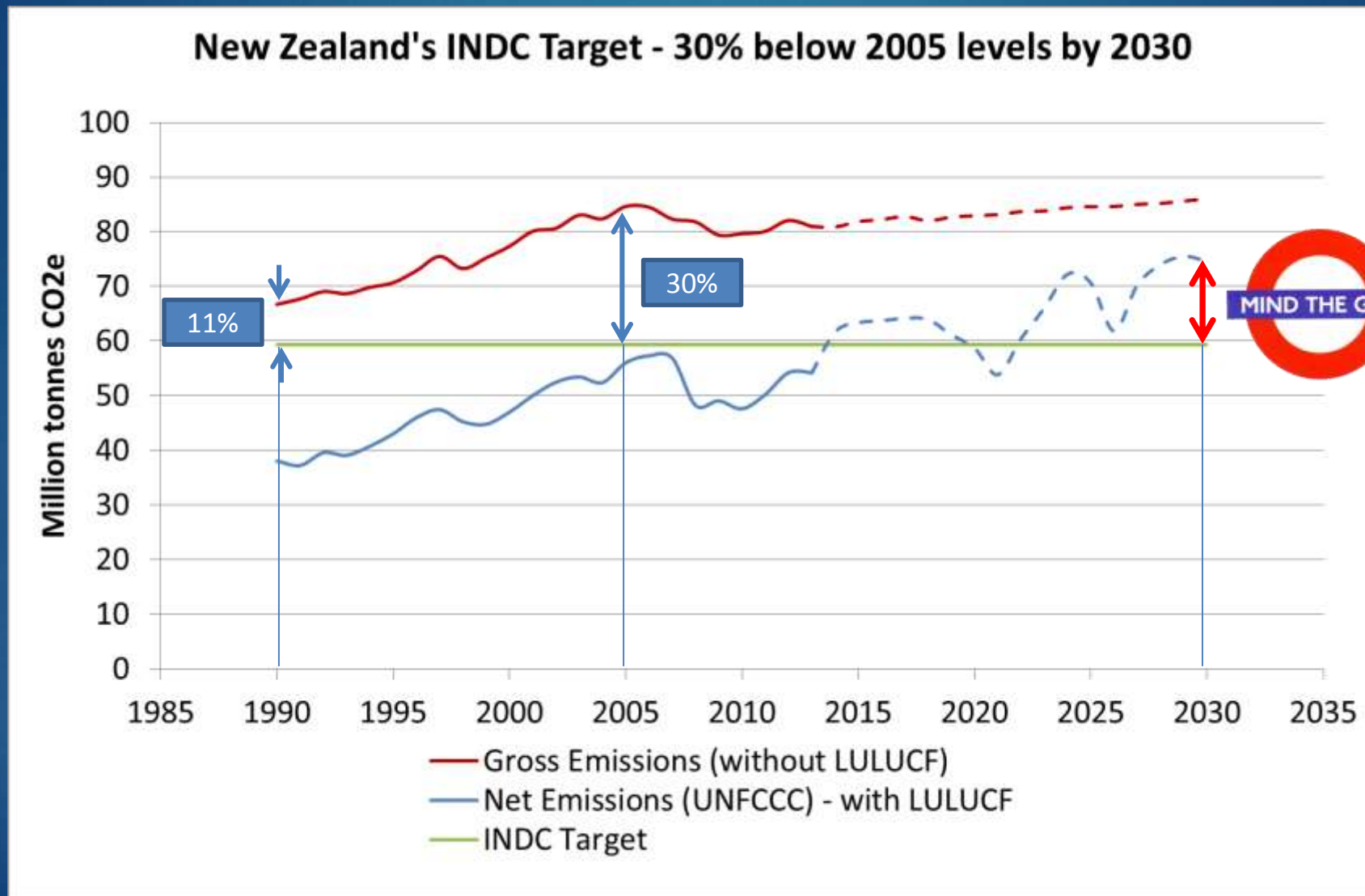


All countries to take action on climate change

- Nationally Declared commitments (NDCs)
- 2°C max warming goal, but aim for 1.5 °C
- Net-zero emissions in 2nd half of this century
- Finance - \$100B p.a.

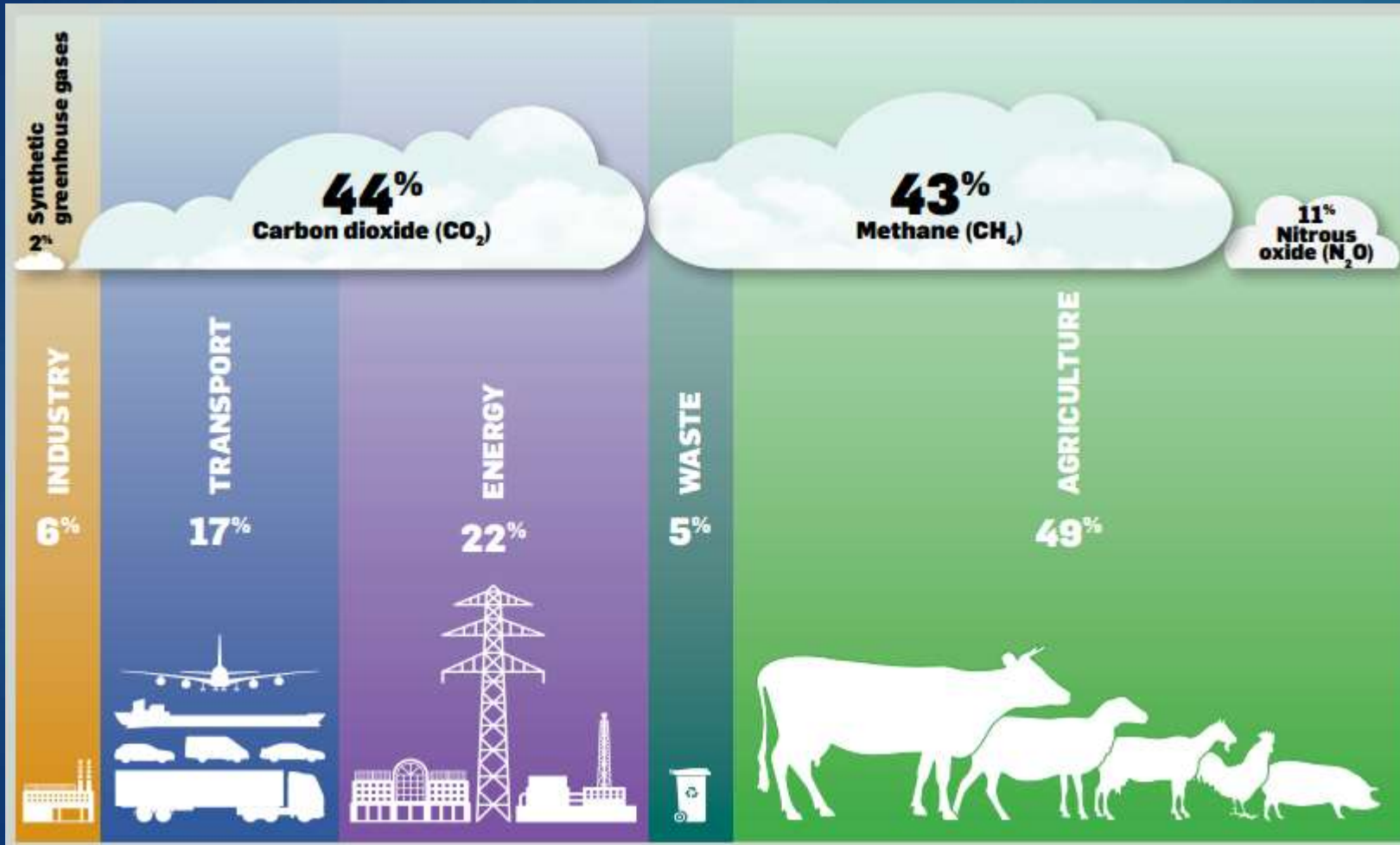
Source: UNFCCC

New Zealand's INDC Target



Source: Frazer Lindstrom
Data: MfE

Sources of New Zealand's Emissions



Category	MtCO ₂ e
Gross Emissions	81.1
LULUCF (Forestry)	-24.4
Net Emissions	56.7

Source: MfE
Dataset: 2014

NZ Trajectories: BEC 2050 deep dive

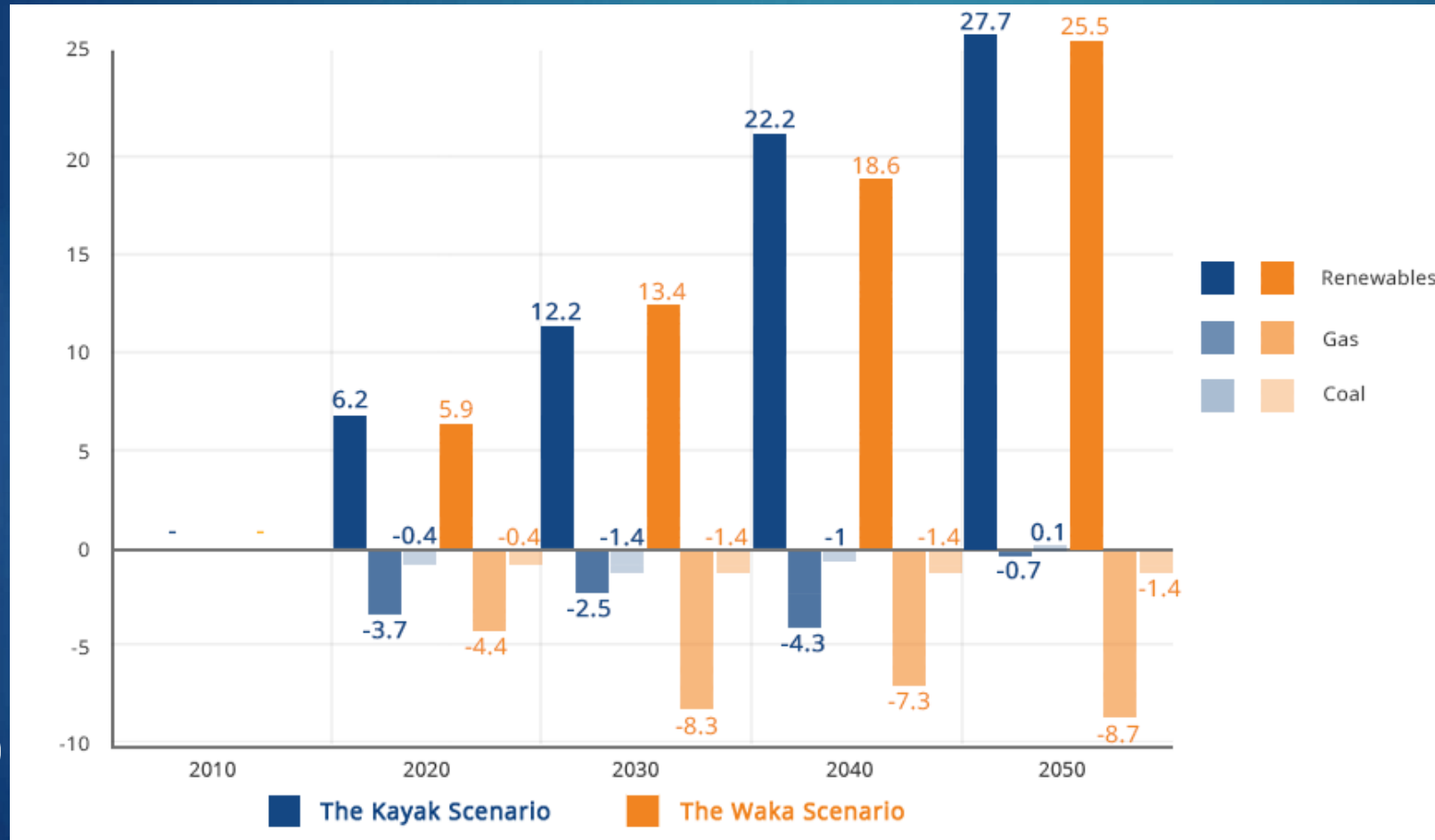


CHANGE IN ELECTRICITY GENERATION BY FUEL (TWH/YEAR)

25

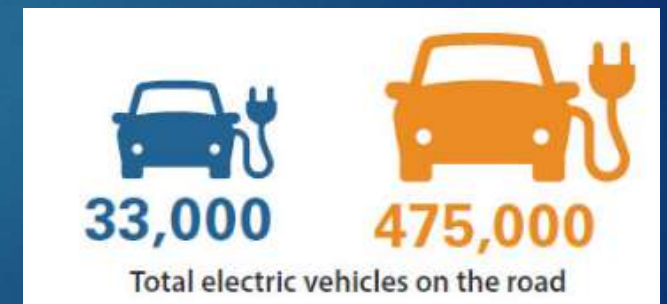
0

-10



Nearly two-thirds of the emissions reductions in residential, commercial and agriculture sectors come from their use of electricity.

Fleet Change in 2030

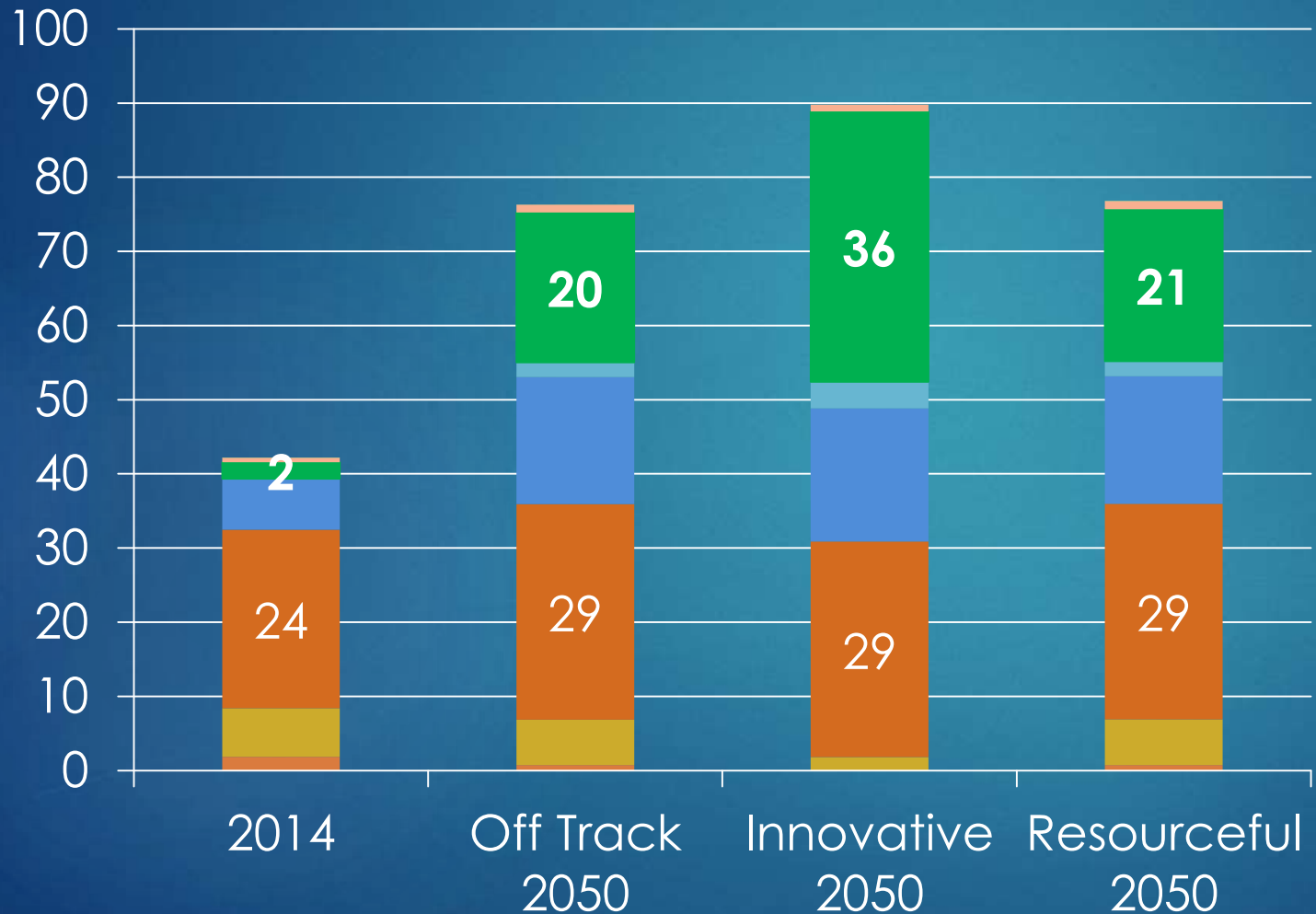


Source: NZ BEC

NZ Trajectories: Globe-NZ Vivid Economics



TWH/YEAR



- Other
- Biofuels
- **Wind**
- Solar
- Geothermal
- **Hydro**
- **Gas**
- **Coal**

Net zero in New Zealand:
Scenarios to achieve domestic emissions neutrality in the second half of the century

Fleet Change in 2050



3.5 million

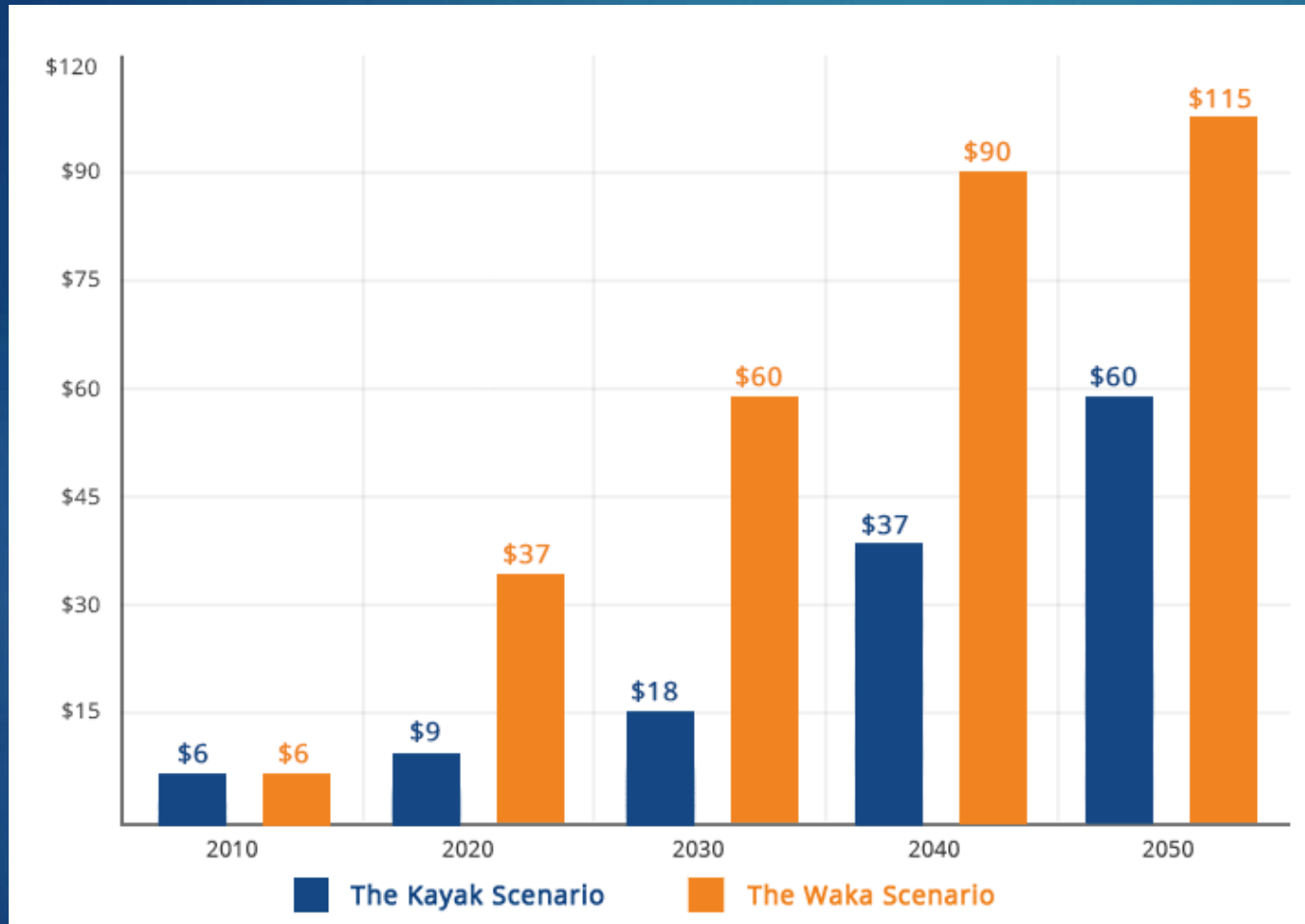
The role of carbon pricing...



▶ BEC 2050 Deep Dive (NZD 2011 real)

120

0



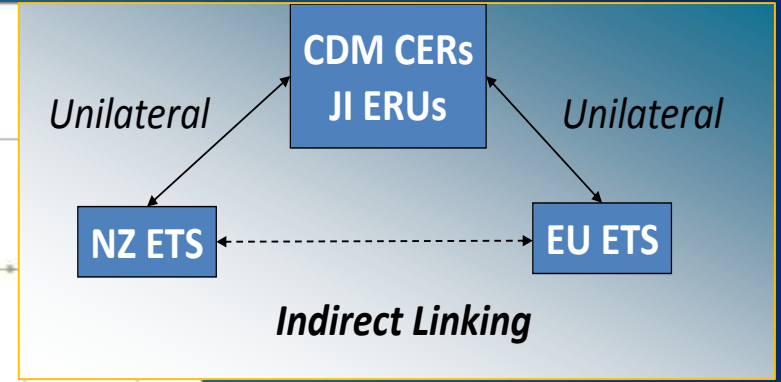
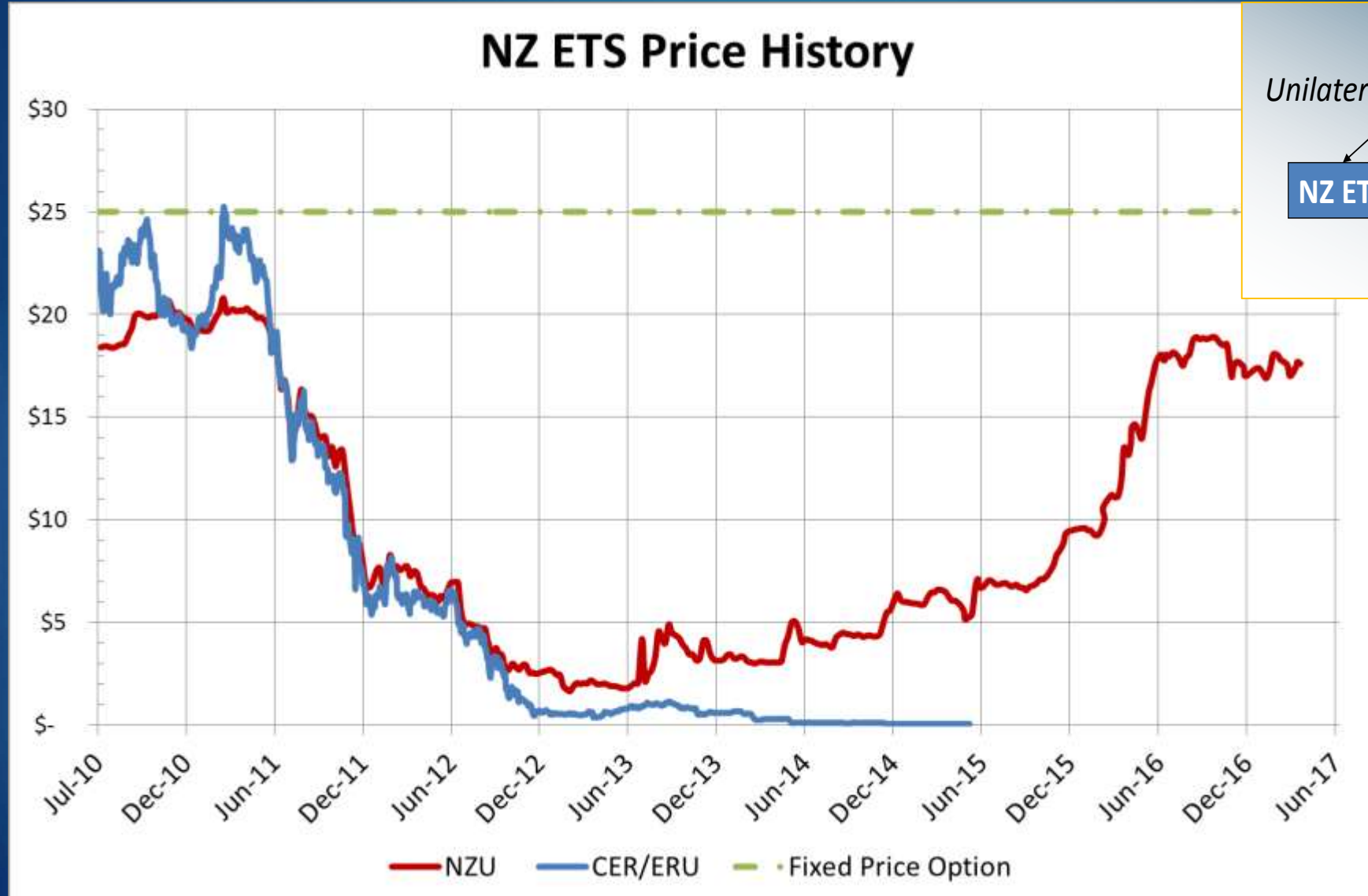
Source: NZ BEC

▶ Globe–NZ Vivid Economics NZD

- ▶ 0 – 50 = Low Cost Options
 - ▶ Electric vehicles
 - ▶ Forestry
 - ▶ Energy efficiency
- ▶ 50-100 = Medium Cost Options
 - ▶ Electric freight vehicles
 - ▶ Electric industrial medium heat
- ▶ 100+ = High Cost Options
 - ▶ Electric industrial high heat
 - ▶ Fugitive and industrial process emissions

Source: Vivid Economics

NZ ETS Price History



Source: Frazer Lindstrom
Data: Point Carbon, Carbon-Pulse.

NZ ETS Review 2015/16



Priority issues: *decided*

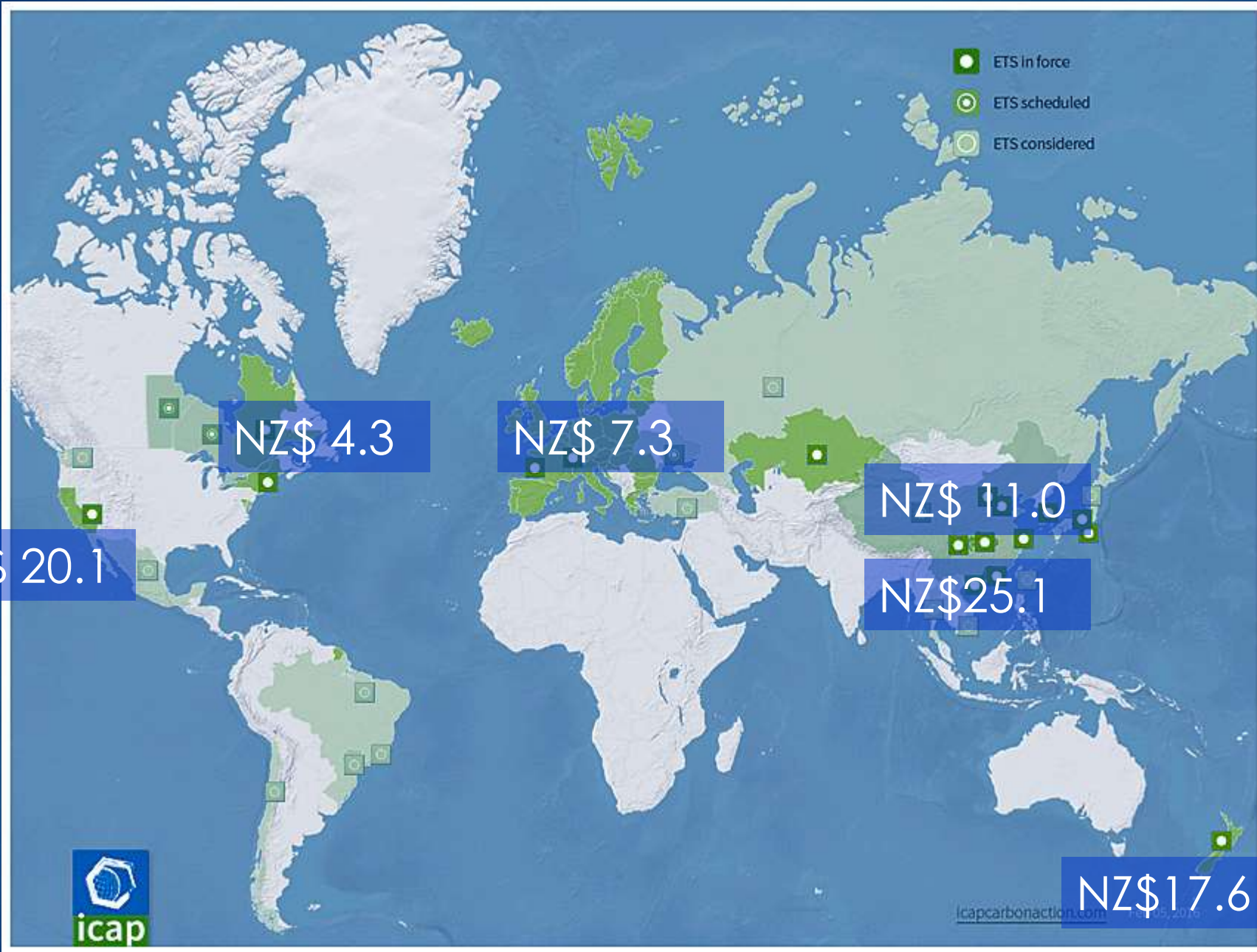
Moving to full surrender obligation

Year(s)	2010-16	2017	2018	2019+
Surrender Obligation	50% 1 unit : 2 tCO ₂ e	67% 1 unit : 1.5 tCO ₂ e	83% 1 unit : 1.2 tCO ₂ e	100% 1 unit : 1 tCO ₂ e

Other Issues: *decisions awaited*

- ▶ **Managing unit supply – auctioning, international unit access**
- ▶ Managing price stability
- ▶ Forestry accounting rules
- ▶ Addressing barriers to the uptake of low emissions technologies

International Emissions Trading Scheme Status & Prices

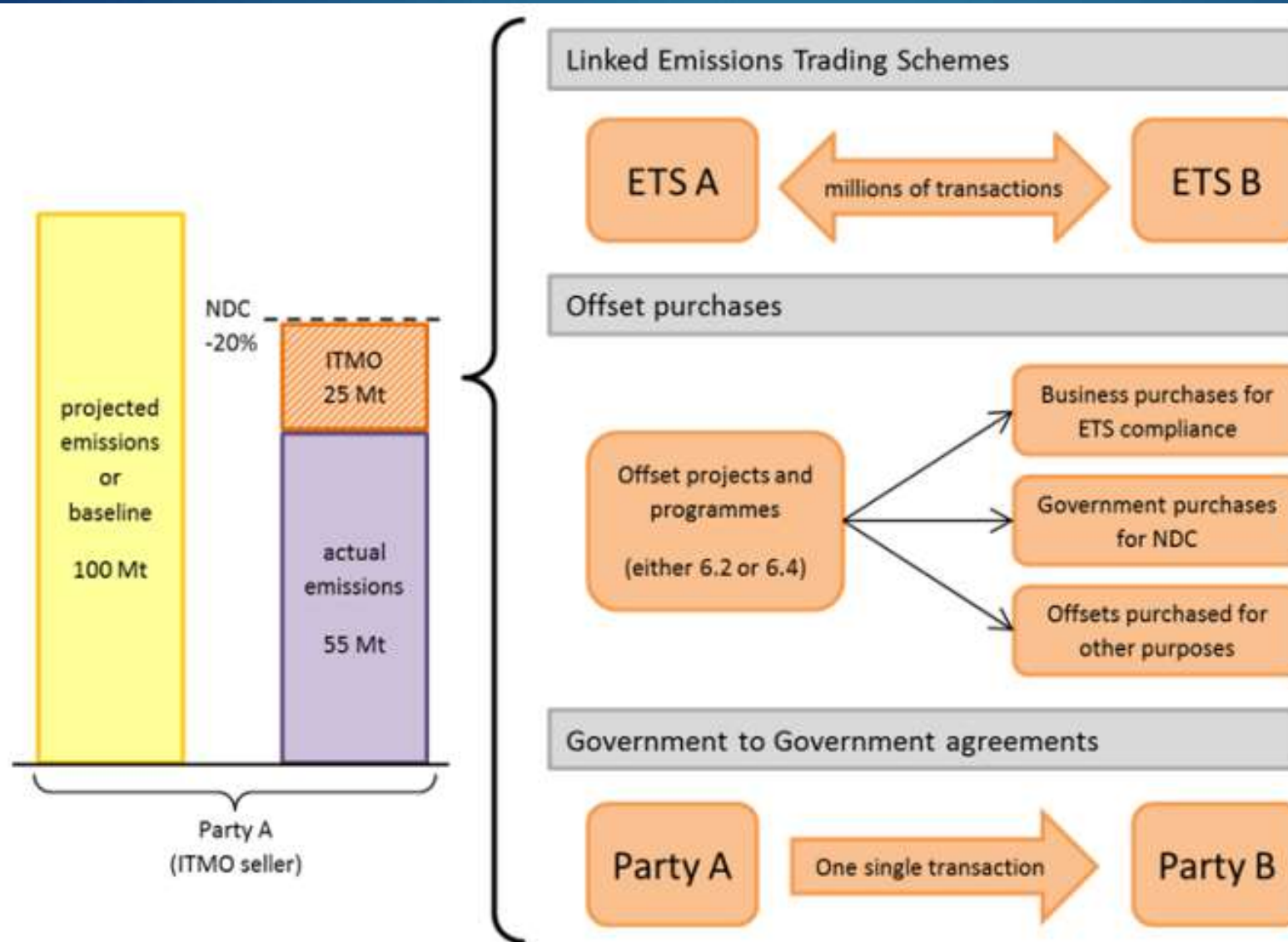


Transactions that could make up the ITMOs

11



Internationally Transferred Mitigation Outcomes



Source:
NEW ZEALAND Submission
to SBSTA on the guidance
referred to in Article 6(2) of
the Paris Agreement 26
September 2016

Potential NZ ETS Development

12



- ▶ Early 2020s - Government purchase of emissions reductions (“ITMO”) against which NZUs can be auctioned.
 - ▶ Mid 2020s – purchasing of international offsets initially by government, with matched NZU auctions
 - ▶ subsequently re-opened to NZ ETS participants.
 - ▶ Late 2020s (if ever) – linking with another domestic emissions trading scheme.

Increasing NZU Price “Volatility” Risk



Known Unknowns for Wind?

13



- ▶ How much increased wind generation capacity will Paris Agreement demand?
- ▶ Can a higher NZ ETS carbon price drive that demand?
 - ▶ Transport sector fuel \$ response inelastic, vehicle technology is driver?
 - ▶ Fossil fuel industrial and commercial demand switch to electricity?
- ▶ Will we ever get a stable (*enough*) C-price on a certain (*enough*) rising trajectory to drive further wind investment?
- ▶ At near 100% renewables does a C-price affect the electricity price in the current pricing model?
- ▶ Can we ever install wind generation at levels projected (10+ fold)?

Is wind at a critical crossroads?

14



Canary Wharf
Financial Hub

Old Royal
Naval College,
Greenwich

Questions?



www.frazerlindstrom.com

Reliance and Disclaimer

This presentation has been prepared by Frazer Lindstrom Limited in good faith and reflects the knowledge, expertise and experience of the consultants involved. Frazer Lindstrom accepts no responsibility whatsoever for any loss occasioned by any person acting or refraining from action as a result of reliance on this presentation.

Frazer Lindstrom does not warrant the accuracy of any forecast or prediction in this presentation. Although Frazer Lindstrom exercises reasonable care when making forecasts or predictions, factors in the process, such as future market behaviour, are inherently uncertain and cannot be forecast or predicted reliably.

Frazer Lindstrom shall not be liable in respect of any claim arising out of the failure of an attendee investment to perform to the advantage of the attendee or to the advantage of the attendee to the degree suggested or assumed in any advice or forecast given by Frazer Lindstrom.