



Land use implications of a Net Zero New Zealand

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: vivideconomics

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Land and livestock in a two degree world

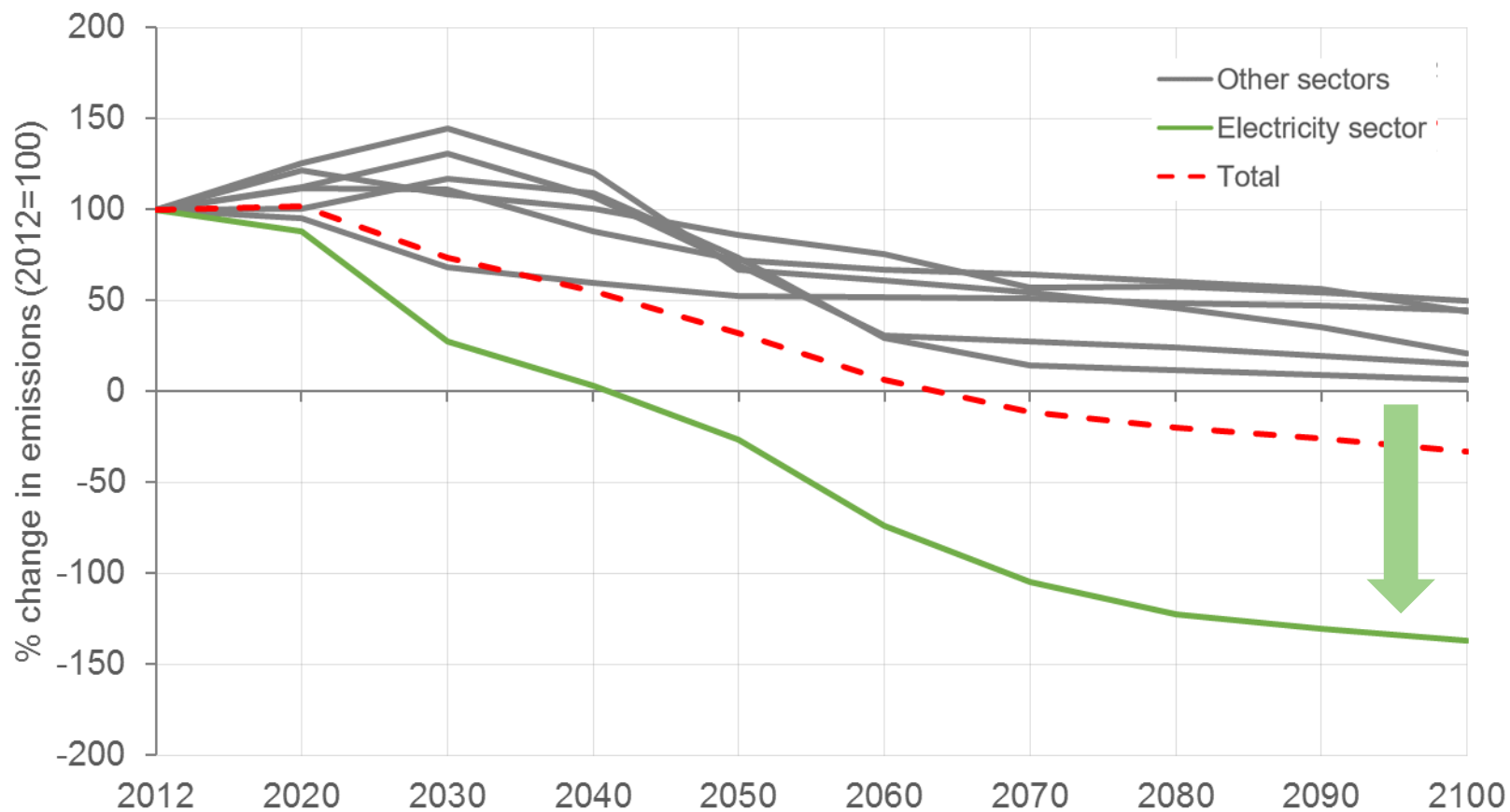
The importance of New Zealand in the global transition

Options for New Zealand in reducing emissions on the land

Where to from here?

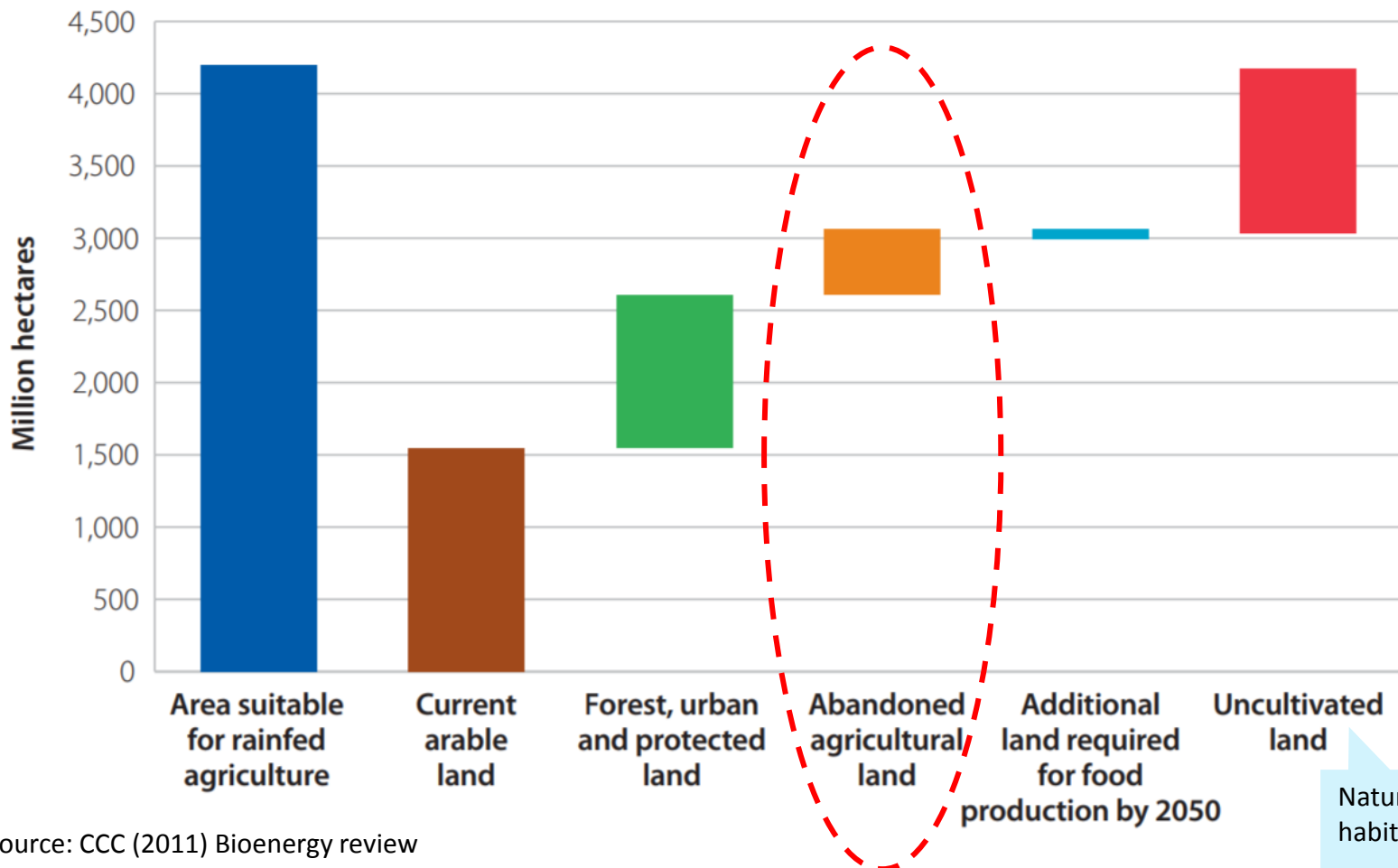
The 2 degree goal is achieved by balancing emissions sources and sinks – the Net Zero goal - in the second half of the century

NEGATIVE EMISSIONS ARE REQUIRED TO MEET 2 DEGREES



Net Zero is a challenge for global land use patterns: bioenergy creates competition for land between food and fuel

THE LAND AREA AVAILABLE FOR BIOENERGY IS LIMITED IN 2050



Climate goals require moving beyond incremental improvements towards pathways that utilise the full range of options

THE KAYA IDENTITY IS USED TO UNDERSTAND DRIVERS OF EMISSIONS AND OPTIONS FOR MITIGATION

GHG emissions =

population × calories/person × land/calories × inputs/land × GHG/input

Agronomic efficiency

- destocking
- precision farming

Land use intensity

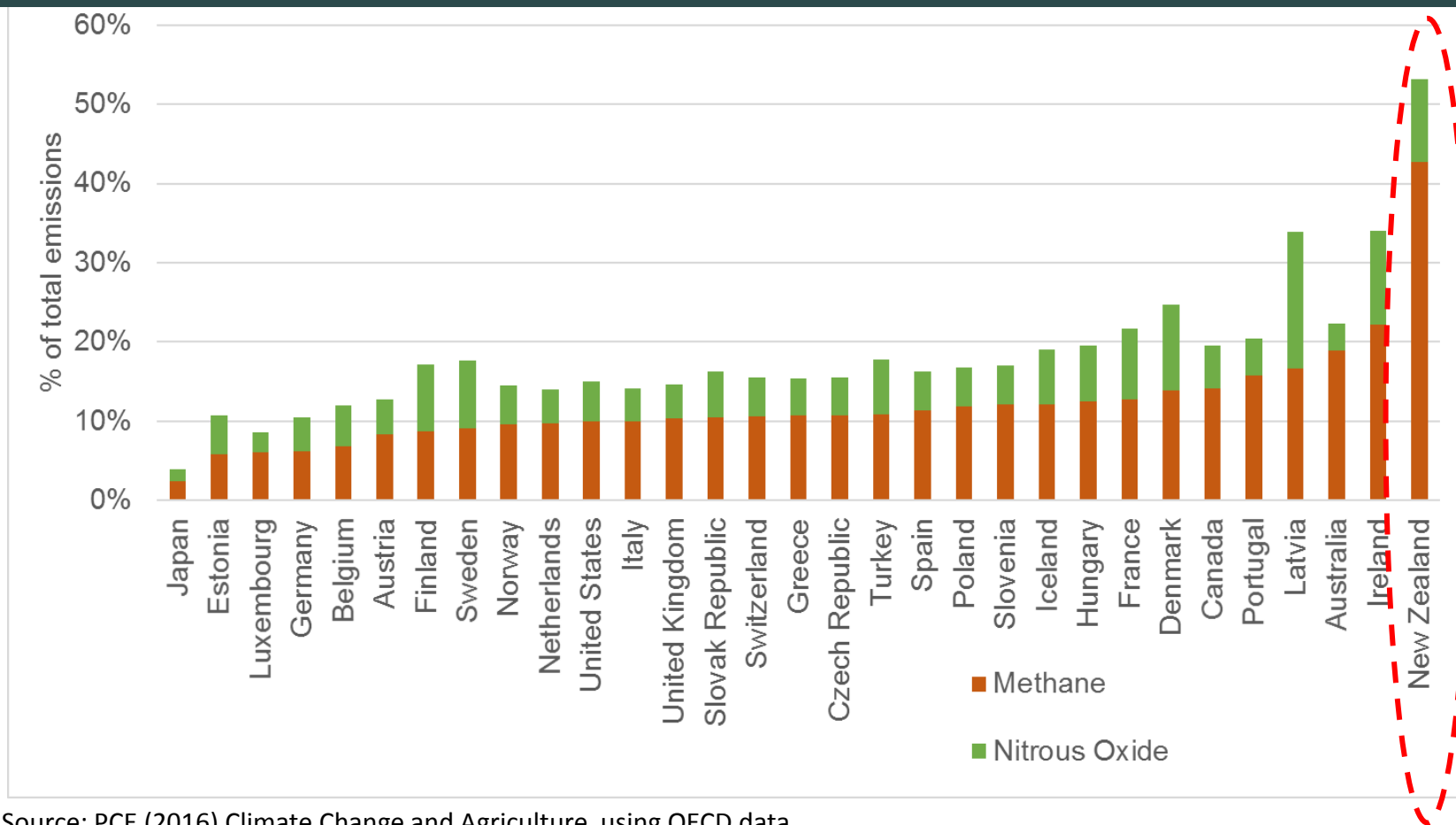
- shift to plant protein
- intensification

Carbon intensity

- feed changes
- waste management
- low carbon fuels
- carbon farming
- vaccines/inhibitors

The challenges and opportunities on the land are very relevant to New Zealand

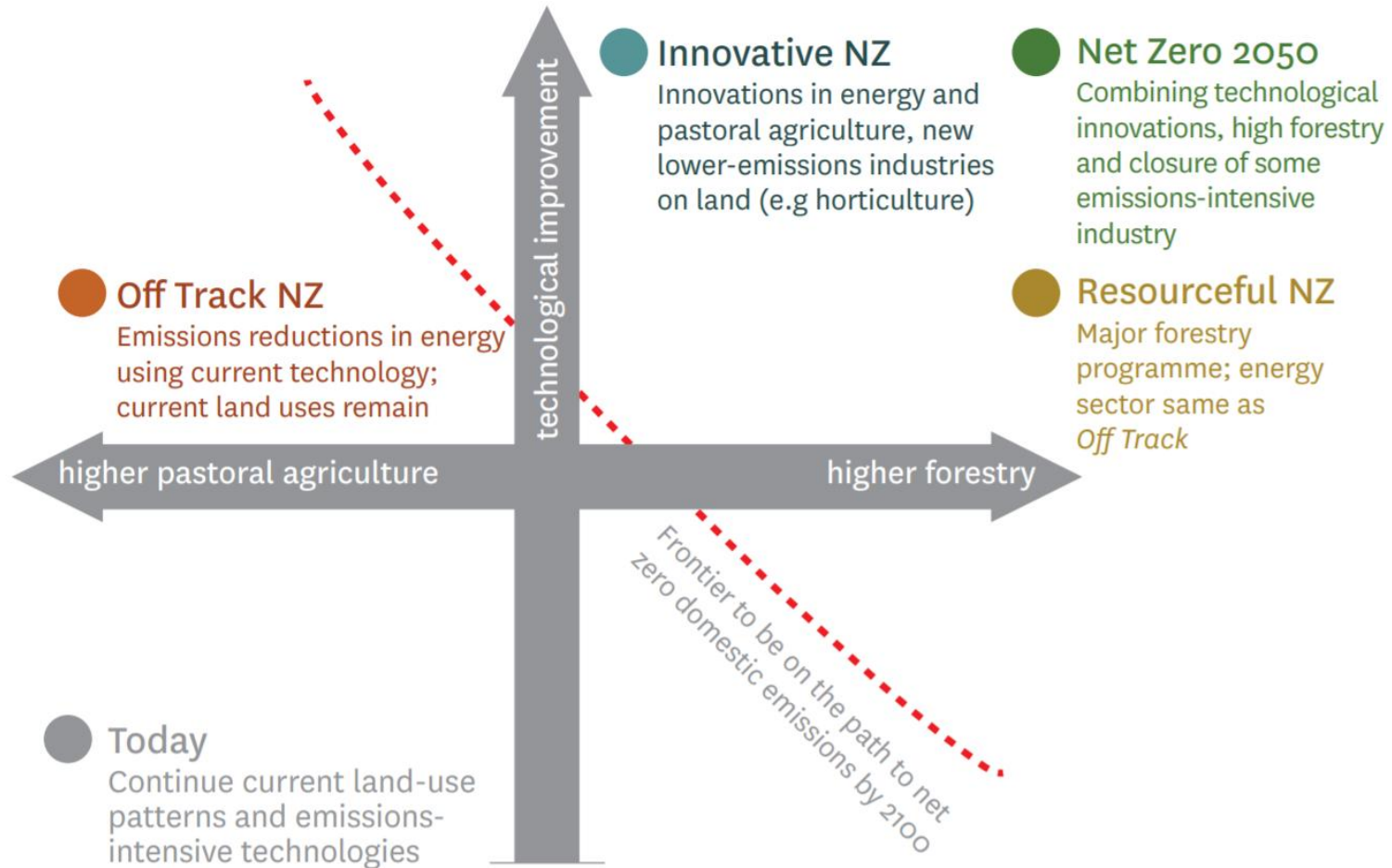
NON-CO₂ EMISSIONS (PRIMARYLY FROM LIVESTOCK) AS A SHARE OF TOTAL EMISSIONS



Source: PCE (2016) Climate Change and Agriculture, using OECD data

Scenario analysis is a useful tool to identify trade-offs and points of consensus

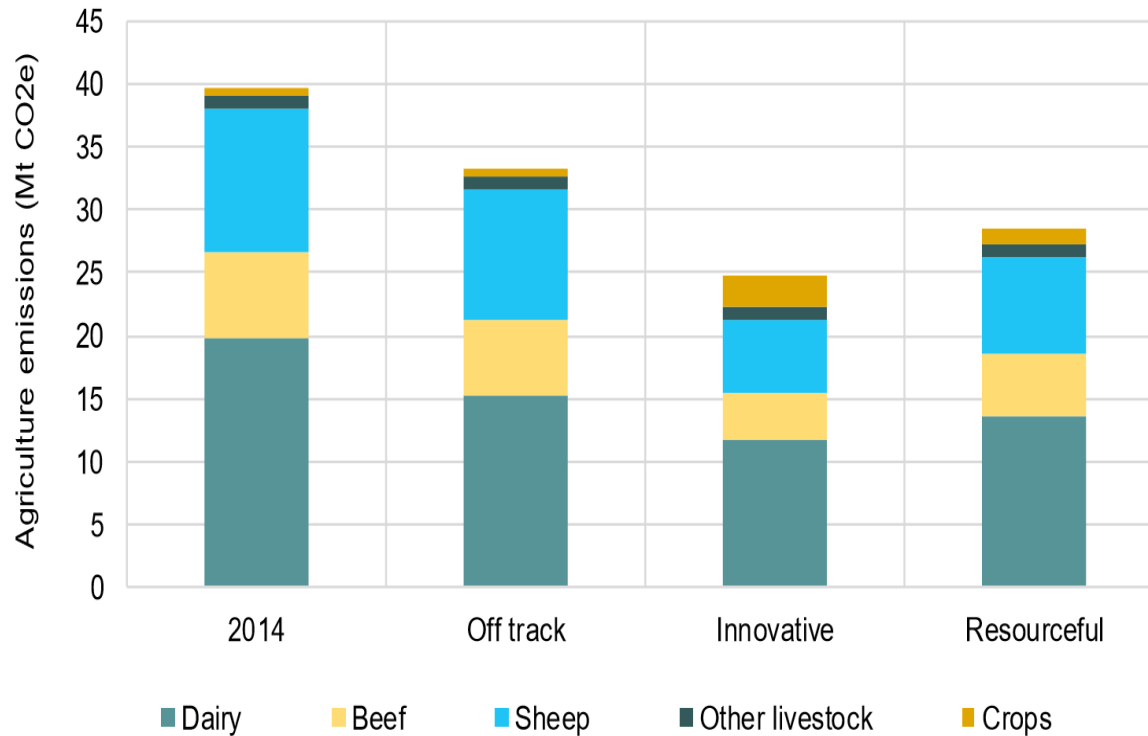
NET ZERO EMISSIONS SCENARIOS FOR NEW ZEALAND



It is possible for New Zealand to move onto a pathway consistent with net-zero emissions, but only if it alters its land-use patterns

	2014	Off Track 2050	Innovative 2050	Resourceful 2050
No of dairy cattle	6.7	6.7	5.4	6.0
Dairy productivity (Index)	100	115	125	115
No of beef cattle	3.7	3.7	2.6	3.0
Beef productivity (index)	100	115	115	115
No of sheep	29.8	29.8	19.7	22.5
Sheep productivity (index)	100	115	115	115
Average new planting rate exotics (ha per year)	n/a	9300	27,709	37,936
Average new planting rate natives (ha per year)	n/a	0	9,091	18,182

All scenarios suggest that significantly lower emissions are possible

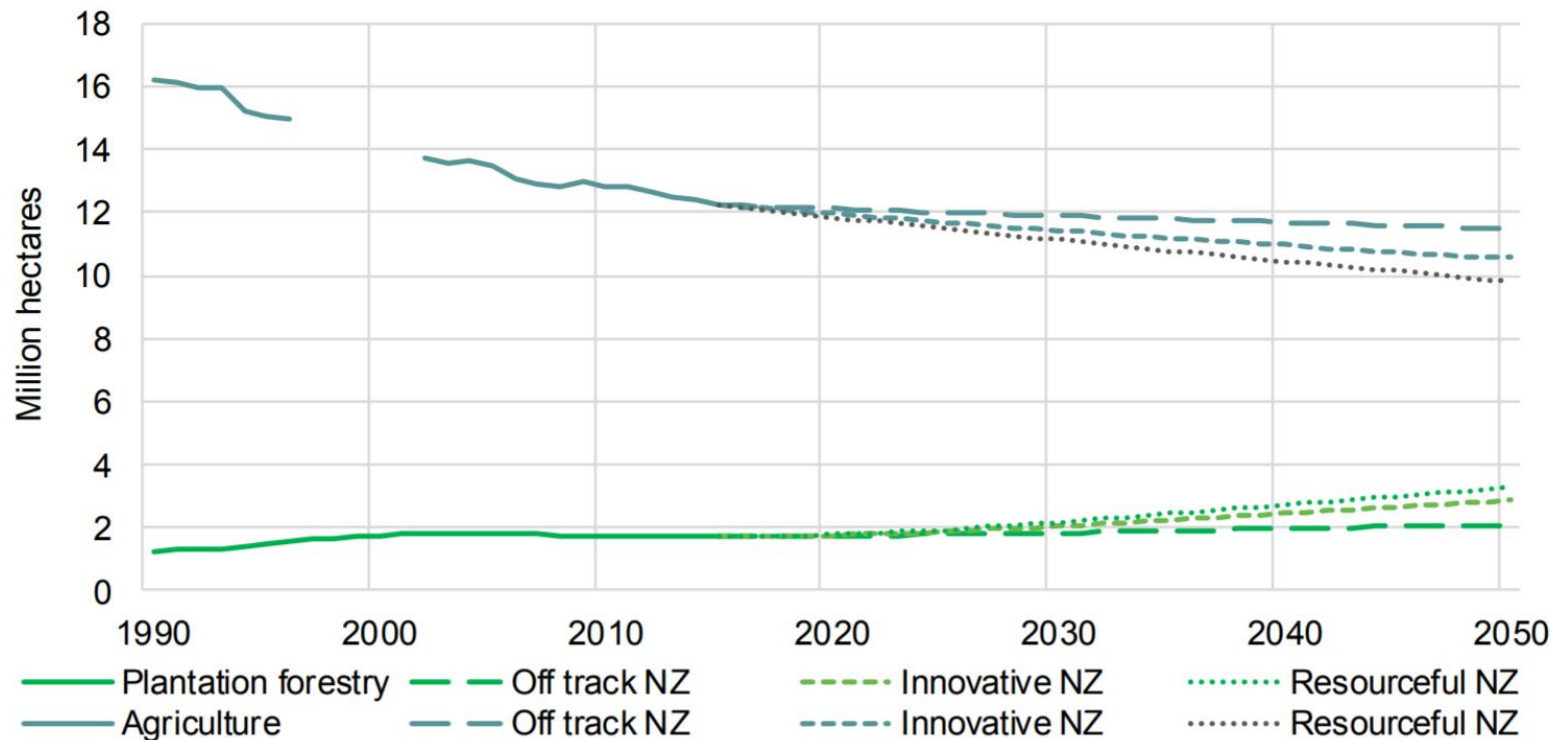


Major options:

- ↓ animal numbers and land use change
- improved farm and animal level efficiency
- improved feeding regimes
- better management of wastes
- vaccinations and inhibitors for methane

While the required shifts are significant, so are those of recent history

HISTORICAL LAND USE CHANGE SINCE 1990, AND PROJECTED CHANGE TO 2050



New Zealand is better prepared to manage the transition than almost any other emissions intensive exporter

it is already more diversified than many other emissions intensive exporters

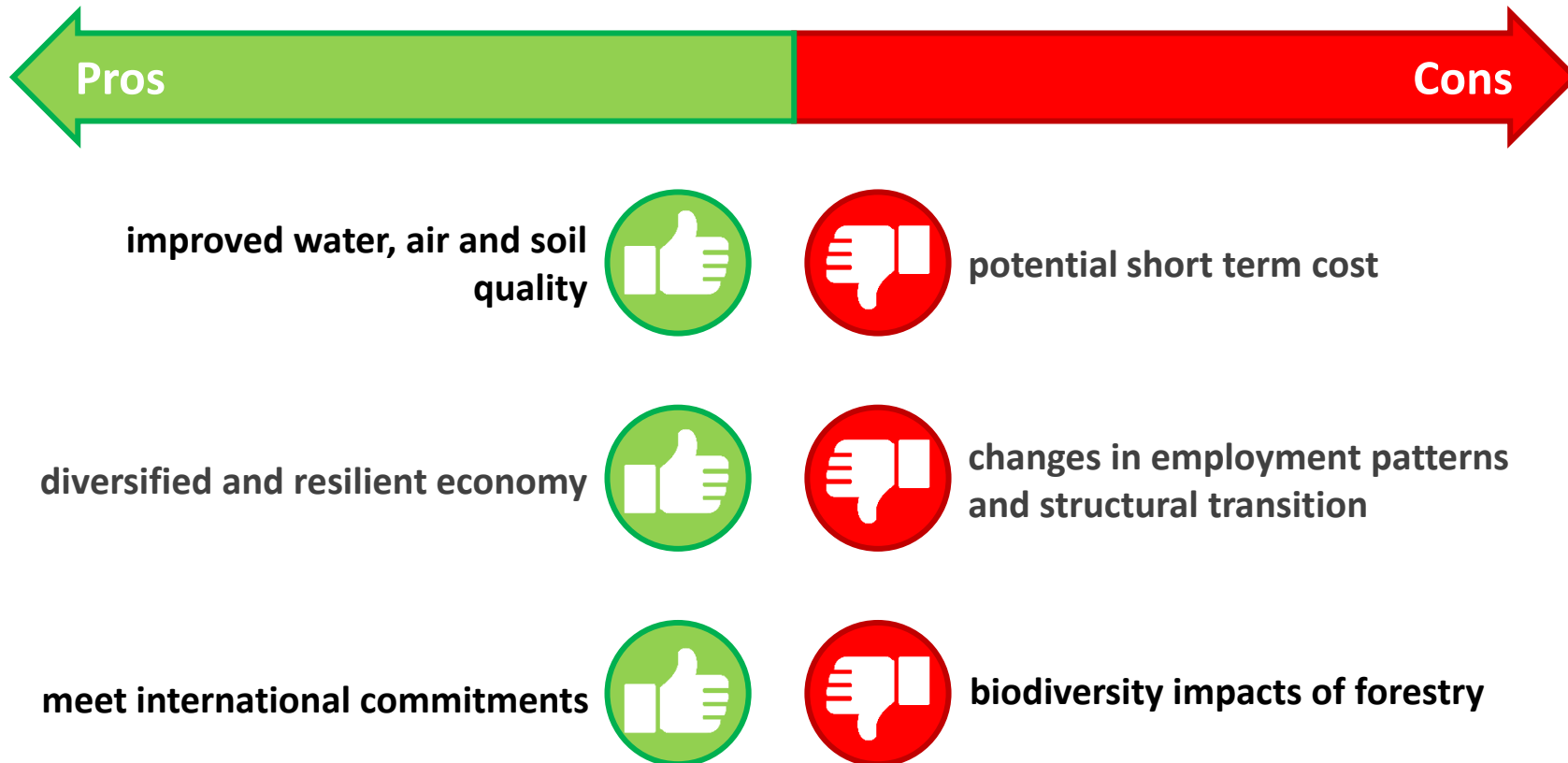
- export revenues of dairy, meat and wool account for <10% of GDP,
- Kuwait, Saudi Arabia, Qatar and Kazakhstan revenues from exports of fossil fuels are >50%

economic history shows that the ability to adjust rapidly in the face of structural change is driven by economic fundamentals such as:

- human capital
- knowledge capital
- infrastructure
- institutional quality and governance
- macroeconomic stability
- openness to technology

on all these NZ is superior to almost all emissions dependent exporters (except maybe Norway)

A national conversation can help navigate difficult trade offs associated with land use change



Where to from here?

- whatever the colour of government, consensus on (at least) domestic emissions path is vital
- build on scenarios to date, taking account of carbon farming and regional approaches
- recognise transformational nature of what is required
 - in energy sector: new high carbon plant are incompatible with 2C
 - in the land sector: where and how to position in terms of future rural production, taking account of
 - greater climate variability
 - potential disruption from meat and dairy substitutes
 - international competition from intensive agricultural systems

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