Models and institutions for adaptive decision-making

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Unlocking our low-emission future

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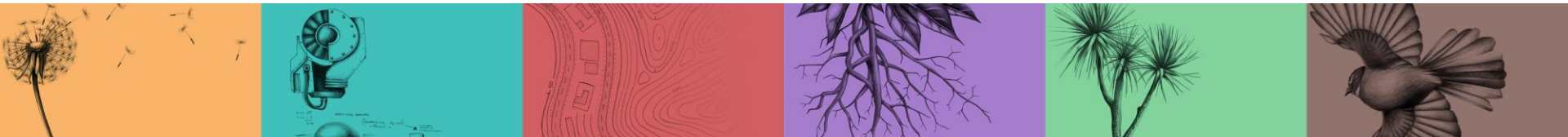
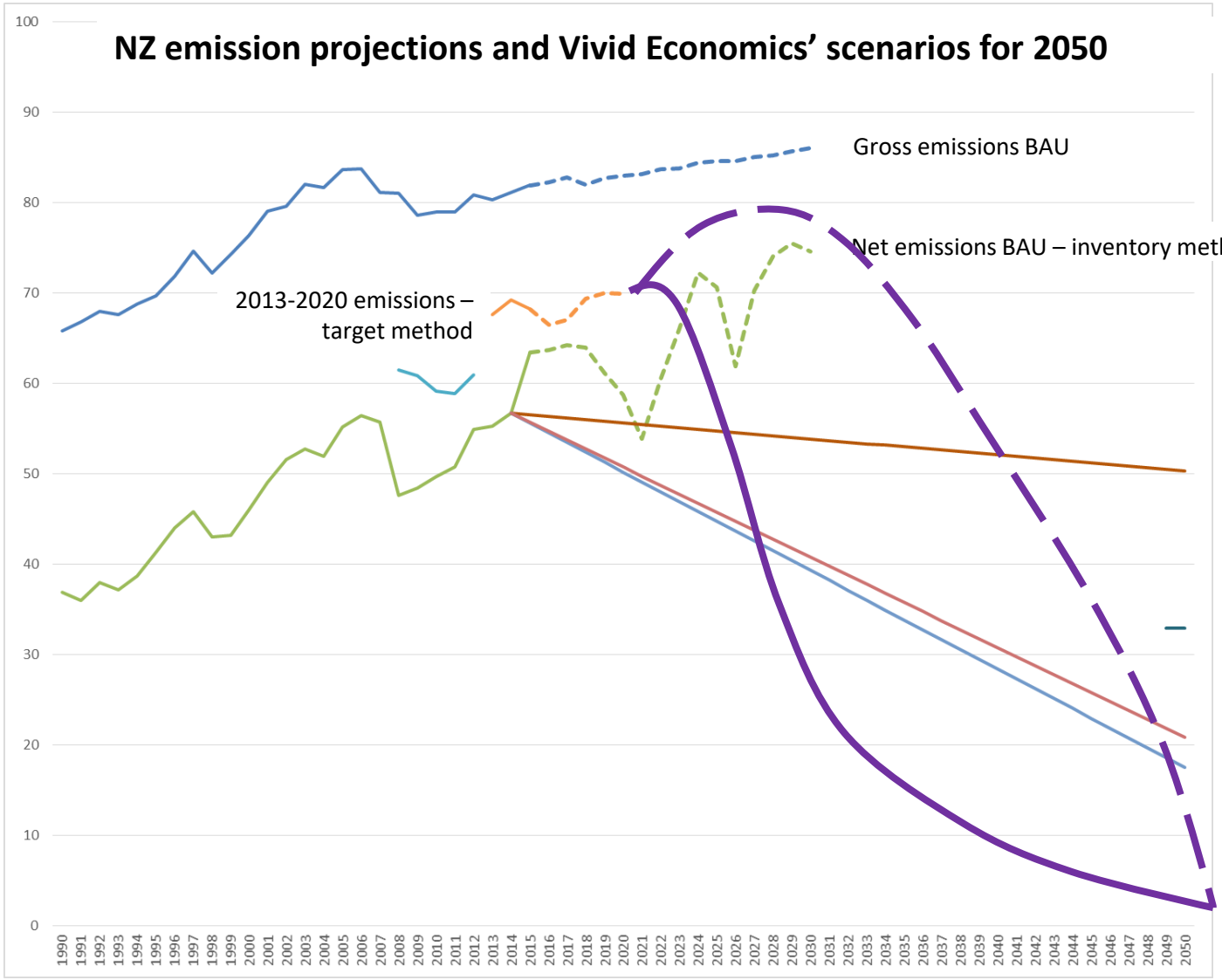


Transformational change under deep uncertainty



Navigating toward a Net-Zero-Emissions Future

1. Investing over time under uncertainty
   delay, flexibility, options, adoption, adjustment costs
2. Modelling to inform decisions under uncertainty
3. Policy under uncertainty
4. Governance for social decision-making

Transformation can take very different forms

Technology breakthrough

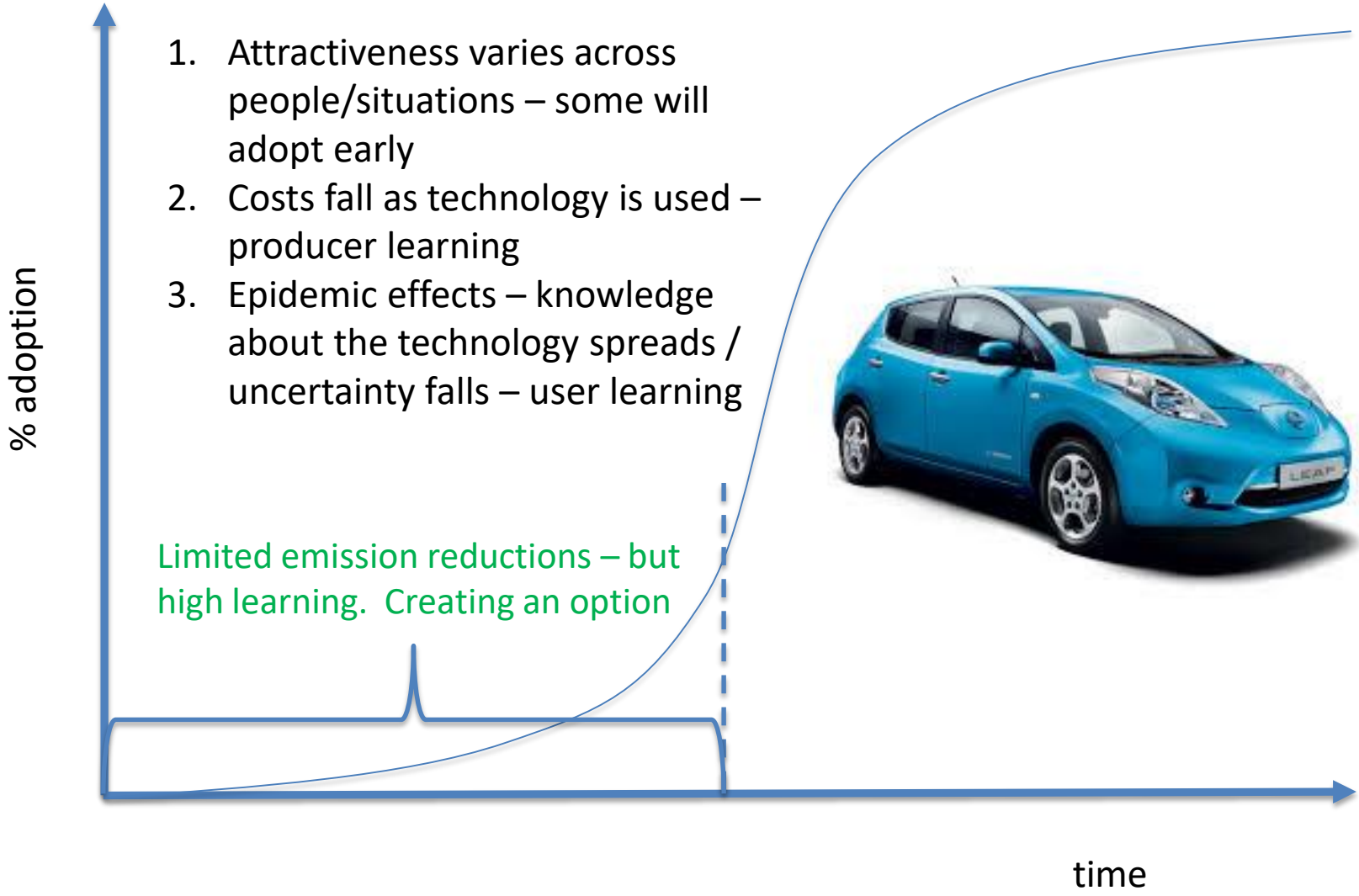
Social breakthrough

How should we invest (or encourage investment) under uncertainty?

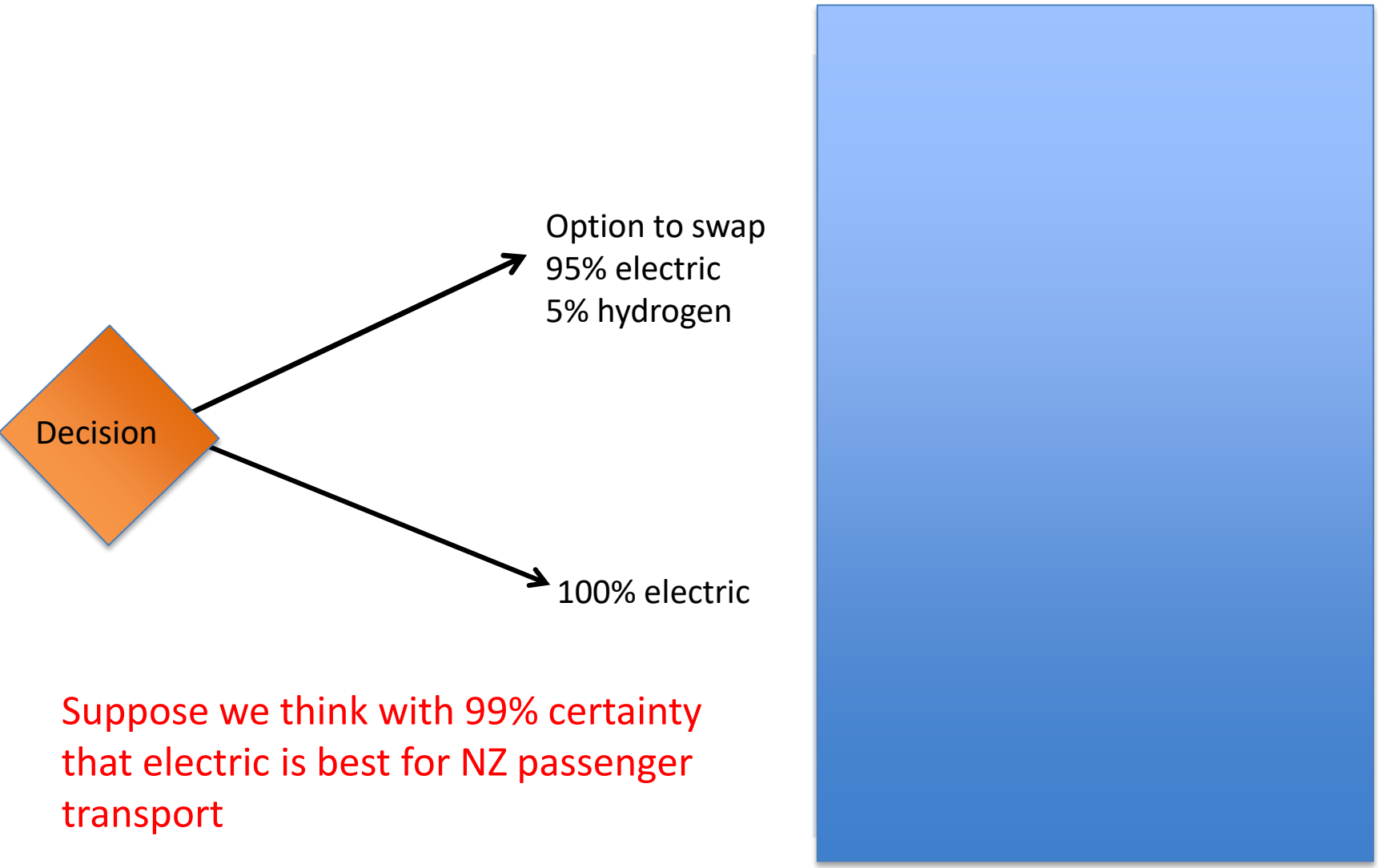
1. Delay investment (in green and brown technologies) if new information is likely to be revealed soon
    - don't replace existing assets as early as you might
2. Invest in shorter-lived or more adaptable options
3. Focus on different type of investment - learning

Adoption processes… and time

1. Attractiveness varies across people/situations – some will adopt early
2. Costs fall as technology is used – producer learning
3. Epidemic effects – knowledge about the technology spreads / uncertainty falls – user learning



Buying a real hydrogen transport option



Suppose we think with 99% certainty that electric is best for NZ passenger transport

Overconfidence effect?

Convex costs of adjustment – it's hard to change fast

$

Create options for faster action later, by beginning with lower cost options now

MAC – 10 years

MAC – 30 years

oats
(*Avena sativa*)

Emission reductions

Modelling under uncertainty

Crystal ball predictions 30 years out are of limited value

- For long-term modelling focus on understanding technical feasibility, sources of mitigation and timing of changes under current options

What should we be doing now to make sure these paths are possible?

Test performance of different short-term strategies under fundamentally different assumptions about technology, targets and prices

Roles for government (under uncertainty)

- Target setting
  - International
  - Domestic – multi-faceted
- ETS settings
- Government's own low-emission investments
  - e.g. infrastructure, car fleet, buildings, education
- Support learning
  - Research and development
    - fundamental research where NZ could be a leader
    - targeted research for adaptation to New Zealand
  - Support for early adoption
- Coordination and facilitation (e.g. regulatory change) of new options implemented by private sector
- Engaging with Iwi around options in the Māori economy
- Phase out of old technologies – e.g. diesel vehicles

Adaptive emissions pricing

Emissions pricing enables low-emission investments and activities to compete

An ETS can provide useful signals to investors and other actors about the value of mitigation at each point in time

Key decisions are cap and price bands – how fast do we push the NZ economy?

Policy driven uncertainty: Policy stability and commitment

All government face incentives to free-ride internationally and to have inconsistent policy over time

Use financial instruments to give government a greater stake in higher emission prices and provide price protection to some key investors

Use strong governance structures to stabilise policy and support social decision making

Supporting social decision-making

Technical advice

- Clusters of research, modelling and policy development initiatives
- Climate change advisory body on technical and economic feasibility of targets, mitigation options and policies

Agreement on goals and strategies

- Clusters of discussions on mitigation goals/strategies within and across sectors
- Large, centralised, representative cross-sector process to deliver consensus
- Political climate leaders group

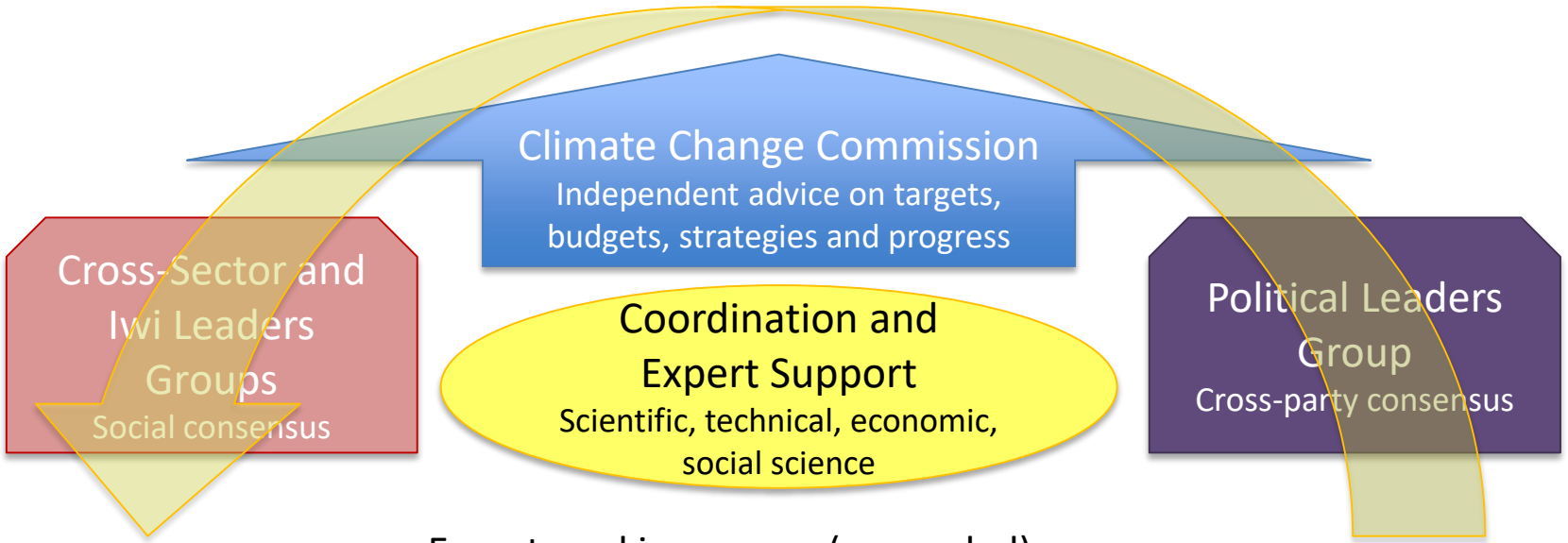
Collaboration on action

- Sector and cross-sector working groups focused on pathway finding, technical problem solving and cooperation
- Education and public awareness campaigns

Ferry?

Flotilla?

Straw man prototype



Expert working groups (as needed):

- Accelerating EV uptake
- Biofuels
- Industrial heat
- Low-emission food on Māori land
- Boosting ag efficiency
- ETS reform
- Smart grid
- Innovation for mitigation
- Changing social norms
- Linking to developing countries

Ongoing networks across businesses, researchers/academia, Iwi, NGOs, civil society:

- Research
- Information sharing
- Experimentation & problem solving
- Public awareness
- Collaboration

How do we get to low emissions?

Look back from success

- Generates more ideas, and avoids despair

A multitude of actions and actors

We can't predict the path

- Balance creativity and analysis
- Create, maintain and enhance options

Need for broad, stable, social process

- Transparent and trusted
- Well-informed
- Wide range of perspectives

Through focused intent
Even small countries can be
Forces for great change