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Opening address

His Worship Justin Lester

Mayor of Wellington City

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13 April 2018

Keynote Address

Prof. Cameron Hepburn

Oxford University

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Policy for a net zero NZ

E-MISSION POSSIBLE ROUNDTABLE

Professor Cameron Hepburn
INET at Oxford Martin School
New College and Smith School,
University of Oxford

Grantham Research Institute, LSE

By videoconference, 13 April 2018

Agenda

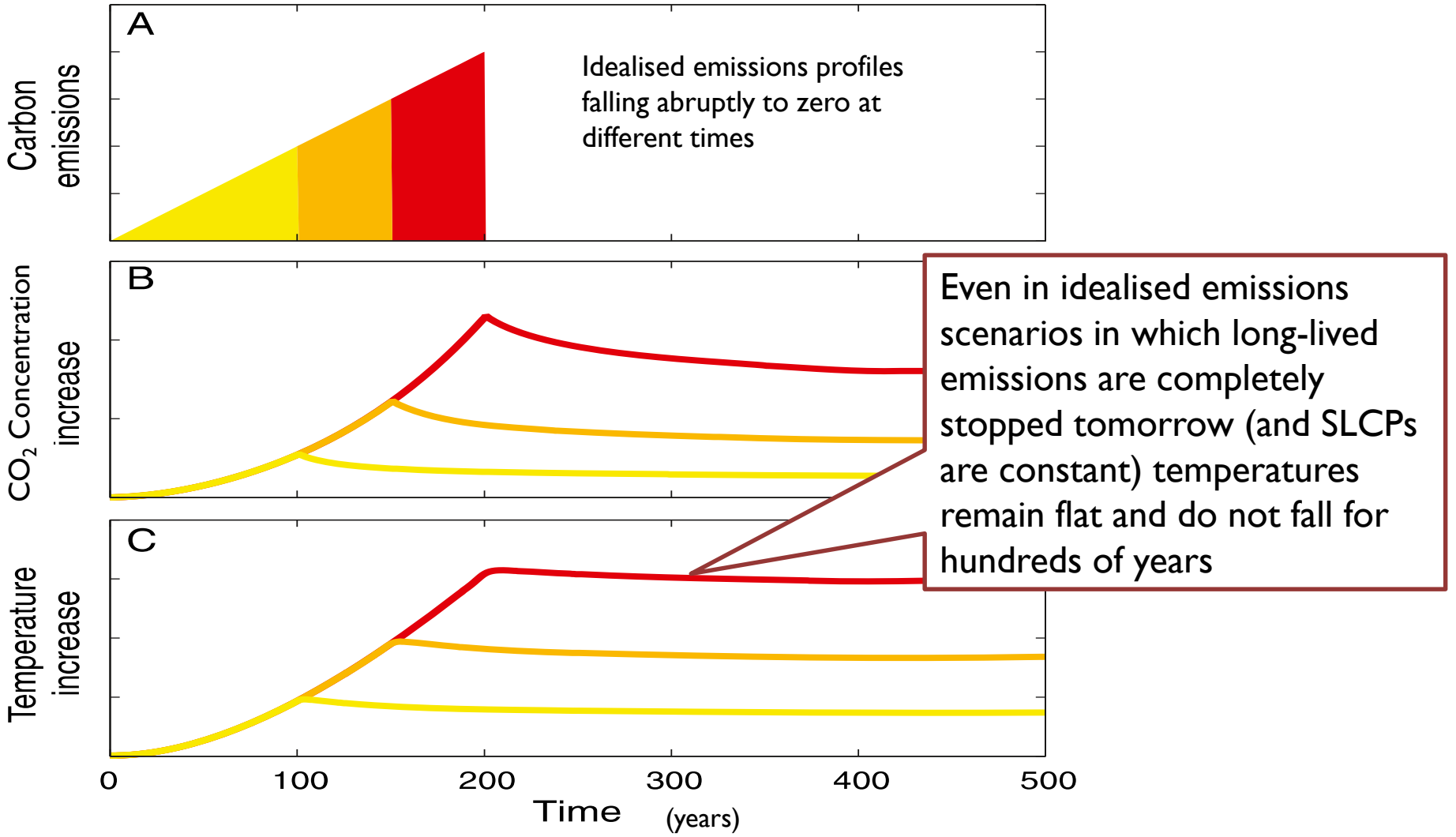
1. Pathways to net zero
2. Policy for net zero
3. Experience in the UK
4. Net zero heat and transport
5. Negative emissions policies
6. Conclusions

The Paris Agreement agrees to (try to) achieve net zero emissions by 2050-2100

- "…holding the increase in the global average temperature to **well below 2°C** above pre- industrial levels and **pursuing efforts to limit** the temperature increase **to 1.5°C**,…"

- "…to achieve **a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases** in the second half of this century…"

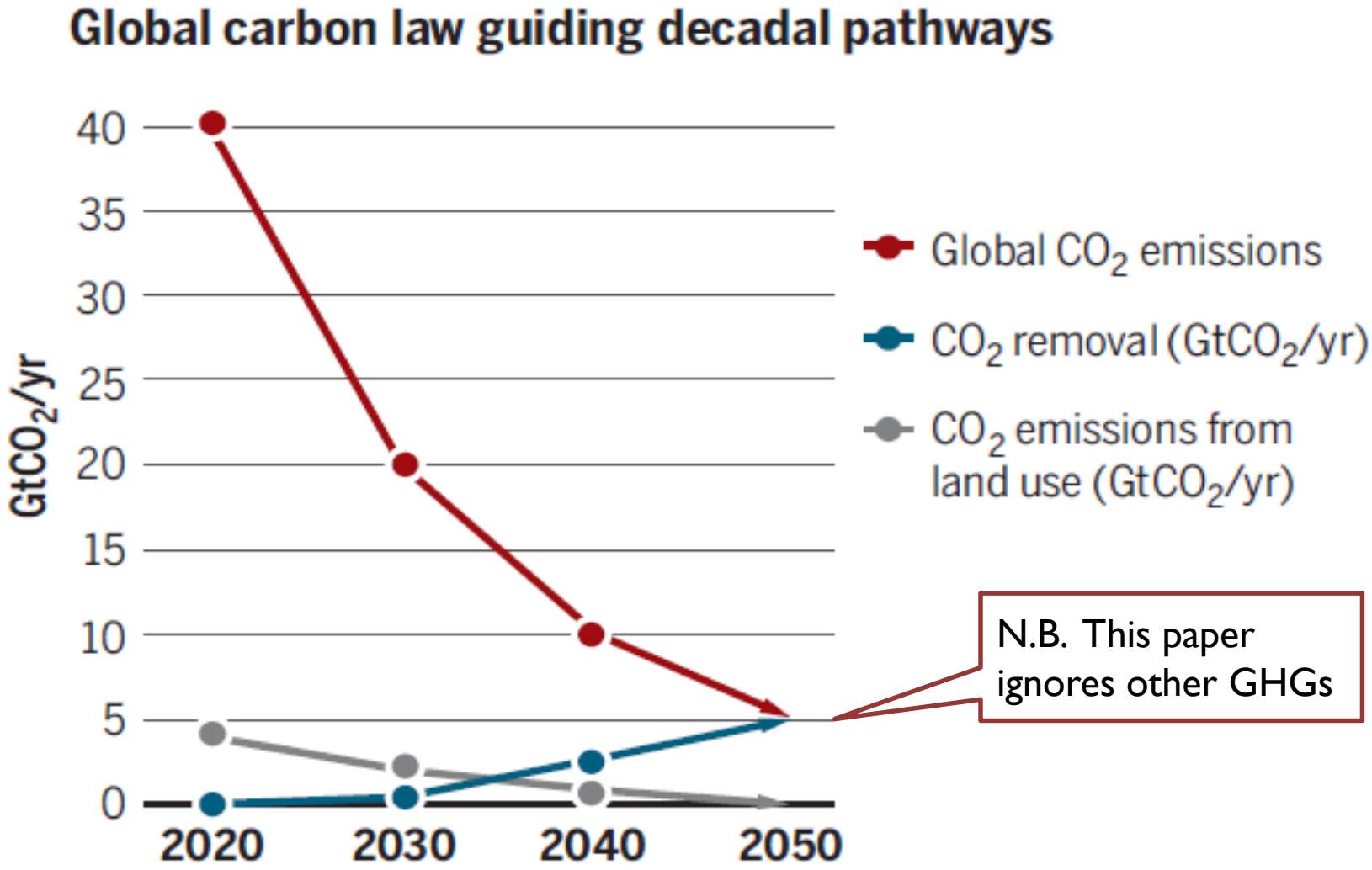
Stabilising temperatures implies **net zero emissions of long-lived GHGs**



Even in idealised emissions scenarios in which long-lived emissions are completely stopped tomorrow (and SLCPs are constant) temperatures remain flat and do not fall for hundreds of years

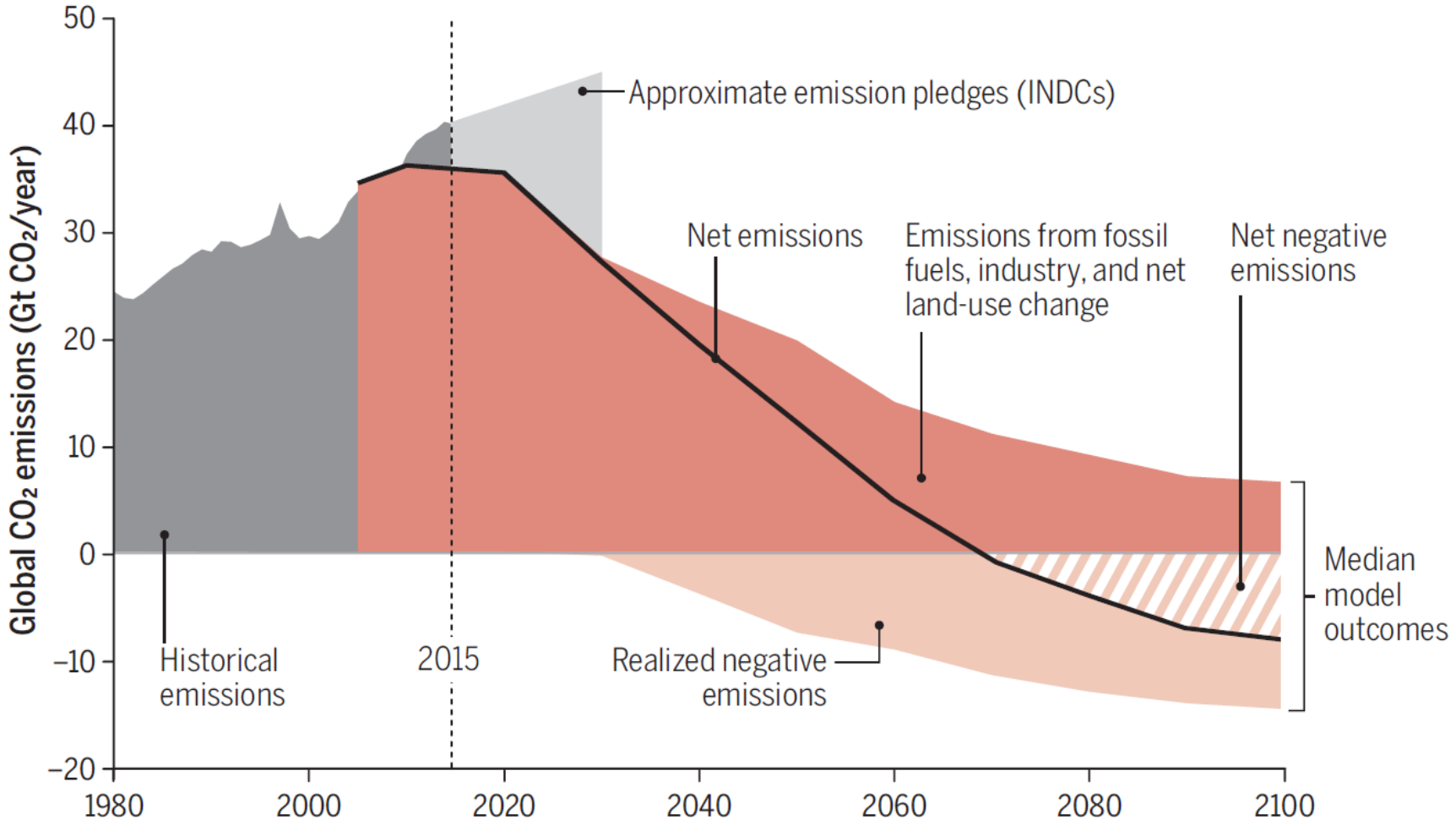
Source: Knutti & Rogelj (2015)

One interpretation of this is that the target is net zero globally by 2050 (with 5 $GtCO_2$ removal)



Source: Rockström et al (2017, Science)

Another interpretation is net zero by 2070, with around 10 $GtCO_2$ p.a. CO_2 removals



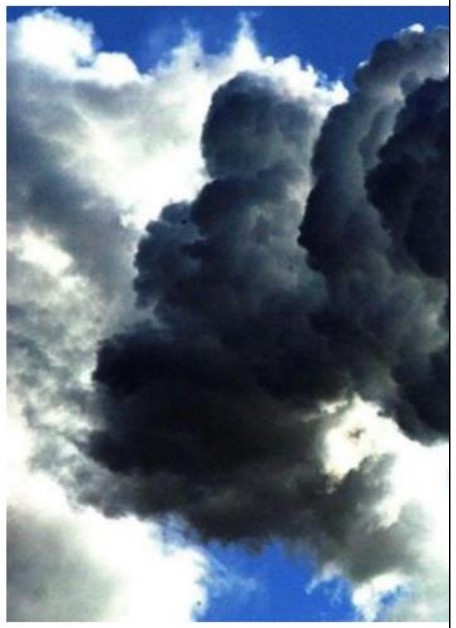
Source: Anderson and Peters (2016, Science)

A domestic net zero commitment by 2050 has been promised by both UK and NZ politicians

Climate change d
promised by gov

By Roger Harrabin
BBC environment analyst

15 March 2016 | UK



Climate laws will be tightened to c
government has said.

Jacinda Ardern commits New Zealand to zero carbon by 2050

Published on 20/10/2017, 11:15am

New leader says government will be "absolutely focused on the challenge of climate change" and sets out goal that puts country at forefront of emissions cuts

Jacinda Ardern, leader of the NZ Labour party, and newly elected prime minister (Photo: Ulysse Bellier)

By Karl Mathiesen

10.2k
Shares

g Paris

Source: BBC News; Guardian

Agenda

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Meeting targets that are 30 – 50 years into the future requires thinking ahead

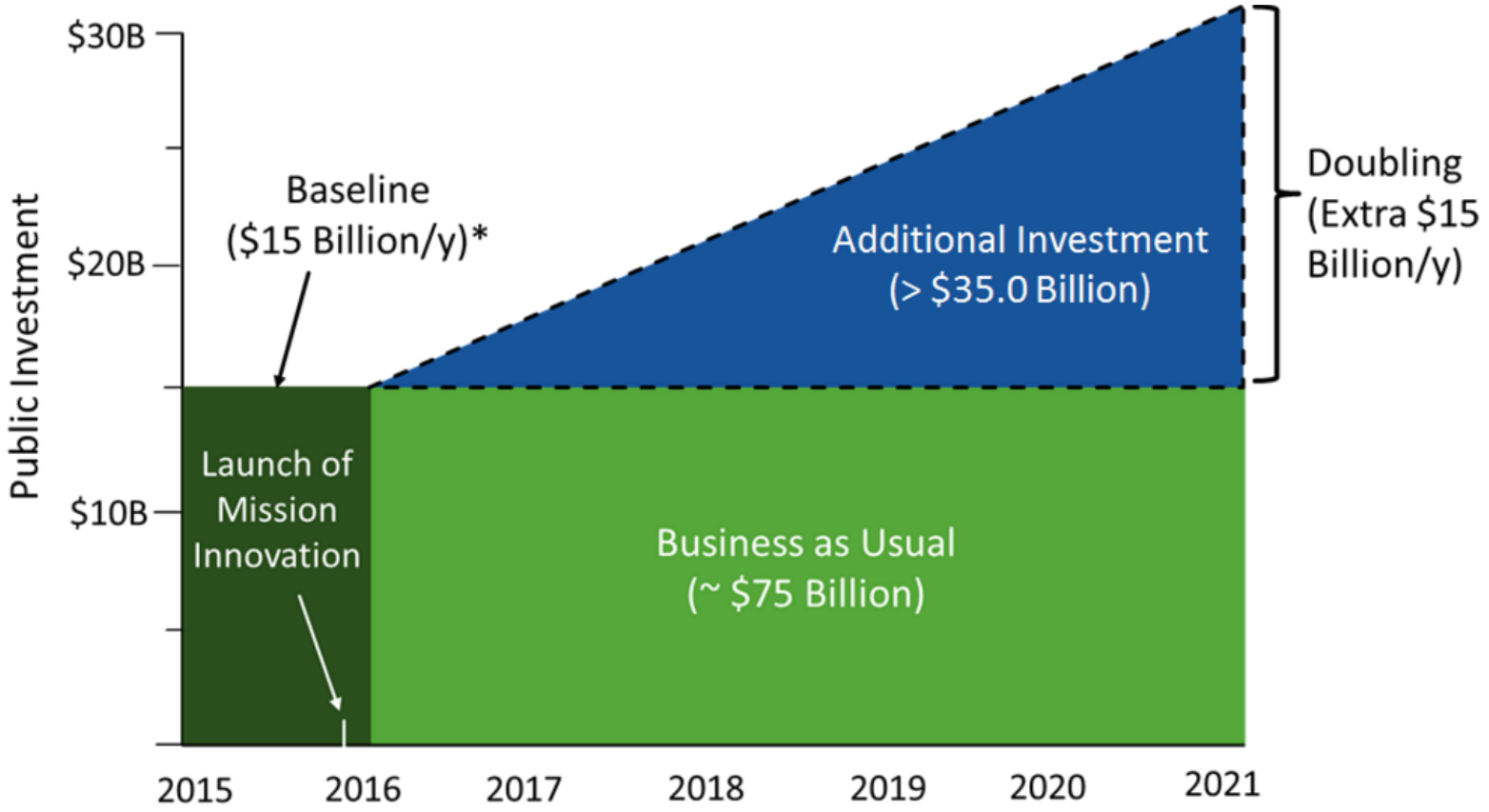
Long-term thinking is needed across five policy areas, with a coherent policy package on:

1. **Technology:** larger portfolio of early stage technological "bets"
2. **Infrastructure:** investment fit for a net zero world
3. **Economics:** incentives in various guises (especially carbon pricing)
4. **Finance:** ensuring sensible long-term flows, avoiding stranded assets
5. **Carbon removal:** We also need NETs

1. Technology: Hitting long-term net zero targets is likely to be much cheaper with 2x brainpower

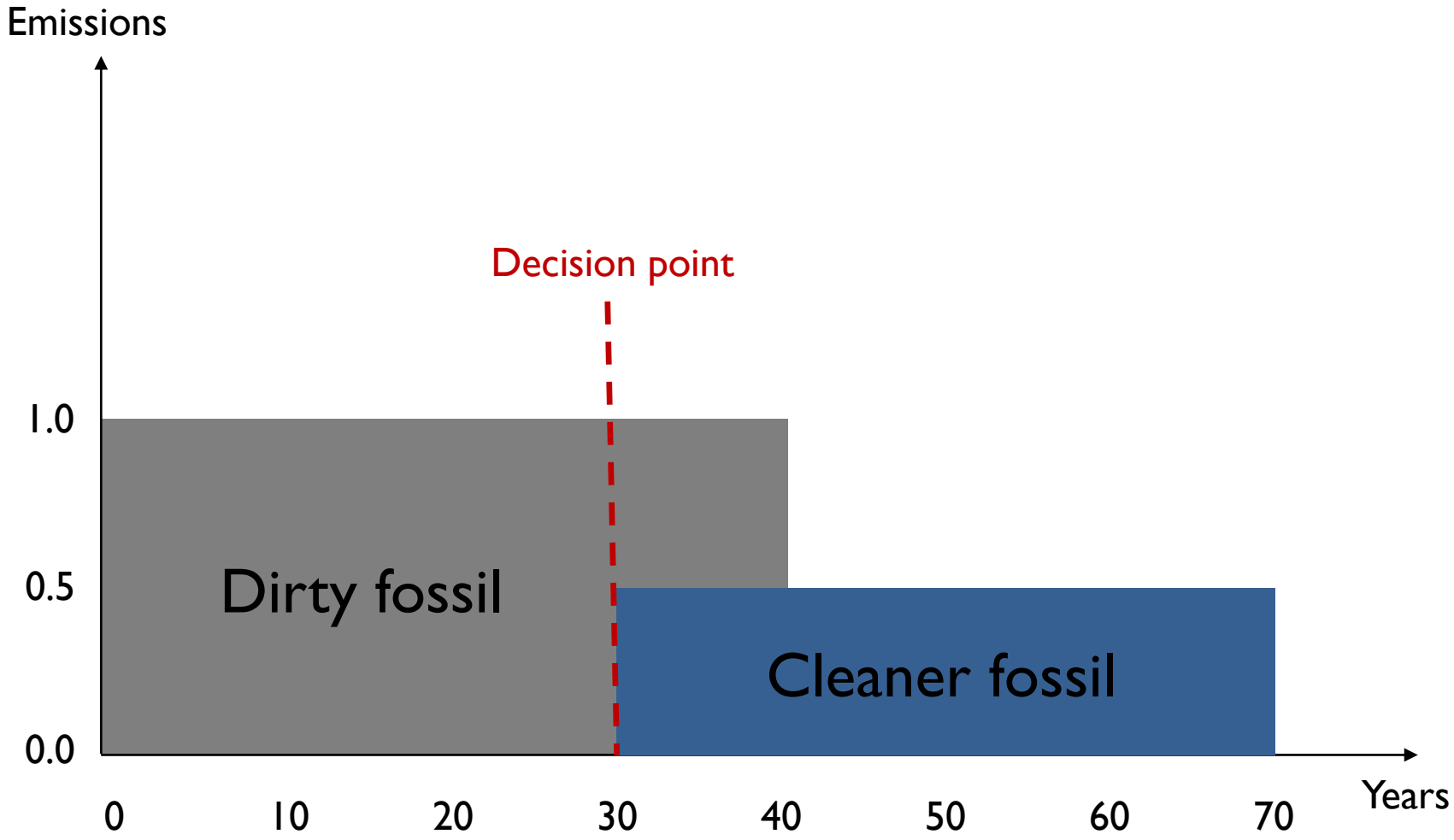
Mission Innovation (M:I)

- 20 large countries to double clean energy R&D



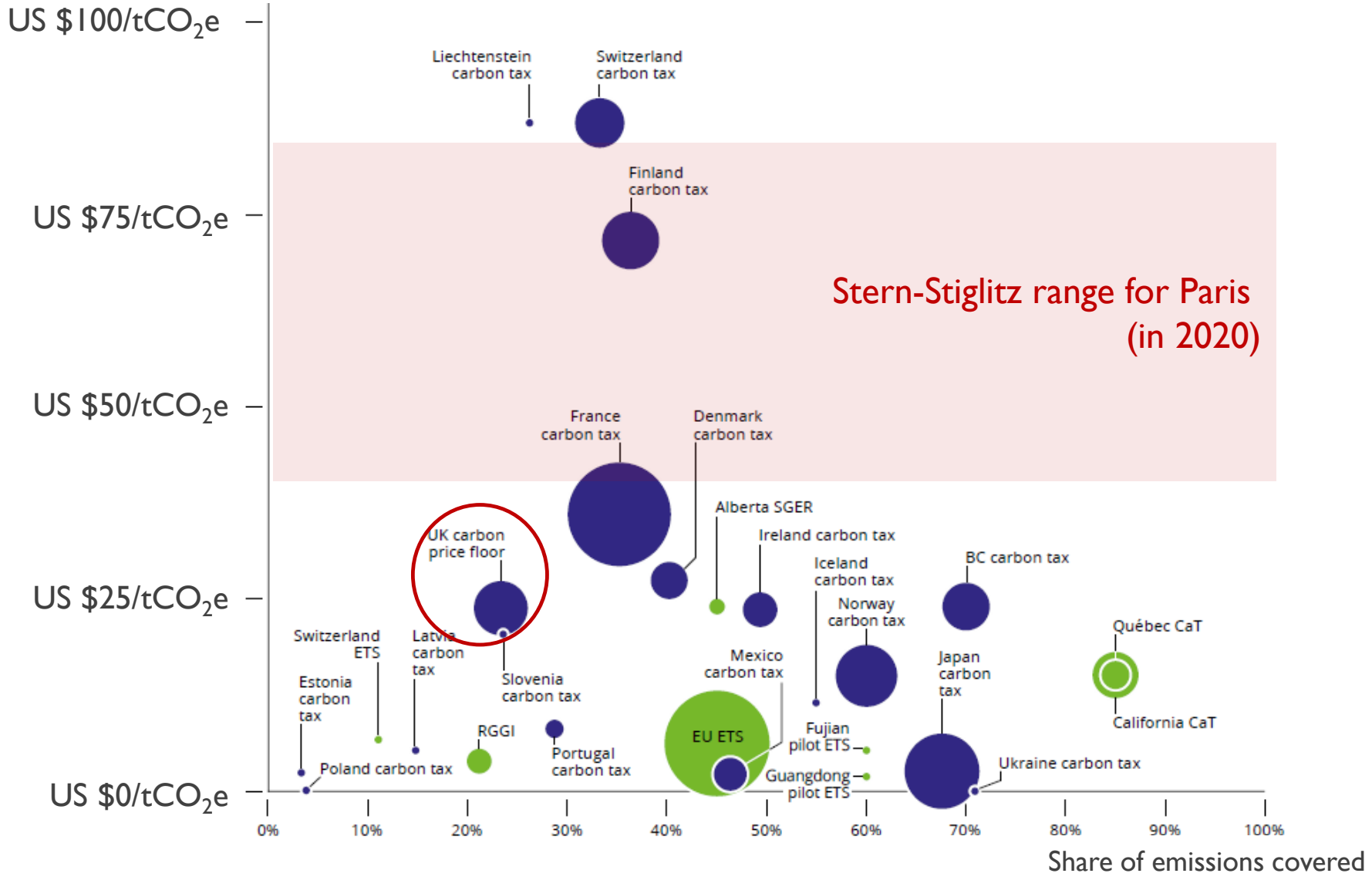
Source: breakthroughenergycoalition.com

2. Infrastructure: avoid building assets that may need to be written off early (e.g. new fossil)



Source: Based on Pfeiffer et al (2016)

3. Economic: a credible long-term carbon price signal can work wonders…but we don't have it yet



Source: World Bank (2017) State and Trends of Carbon Pricing

4. Financial: investors need to have clarity over business strategies to make their own decisions

Source: Oxford Martin School

Oxford has published principles for disclosure to guide investors on the risks and returns of investment in fossil fuel focused companies.

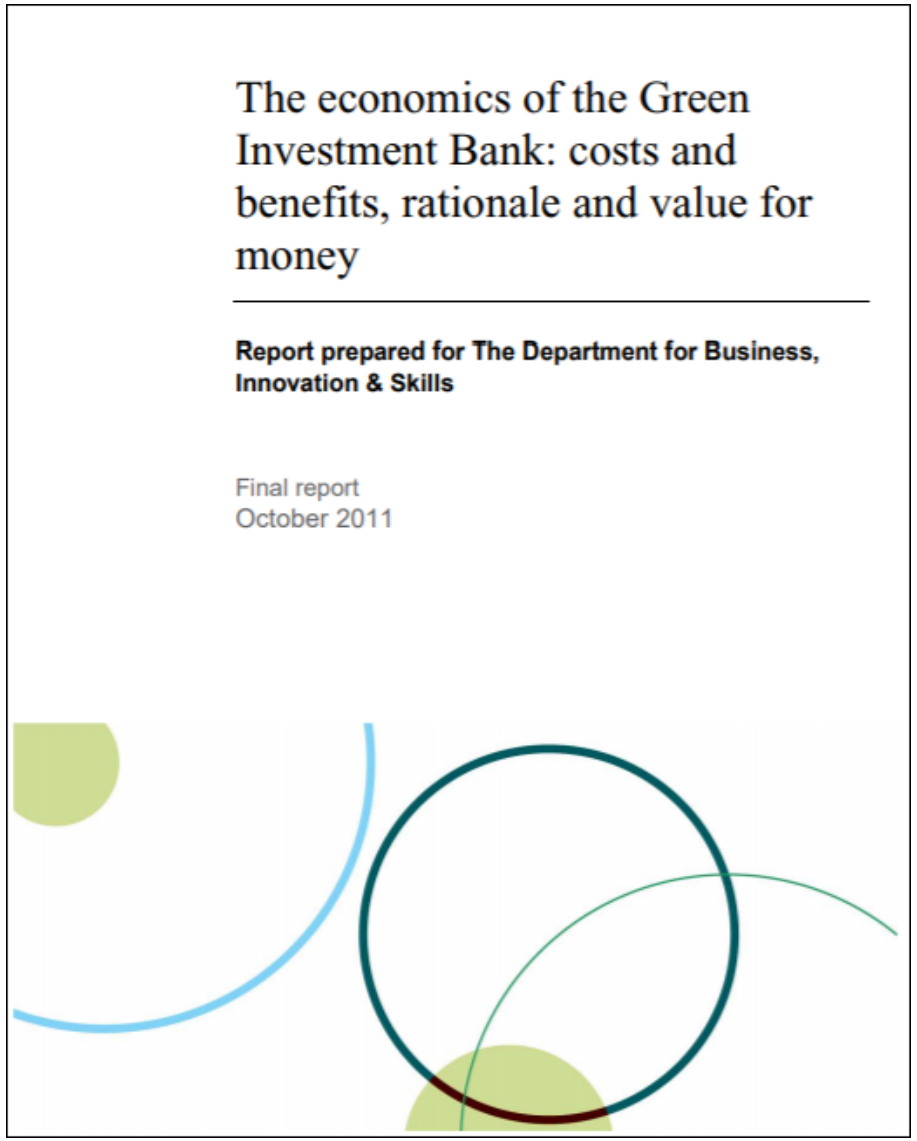
- The three principles are:

1. **Commitment to net-zero emissions:** When (year or temperature) does the company plan to hit net zero emissions?

2. **Profitable net-zero business model:** What does it's business plan look like in an NZE world?

3. **Quantitative mid-term targets:** How will the company measure progress?

4. Financial: some initial temporary state support to redirect financial flows may be justified



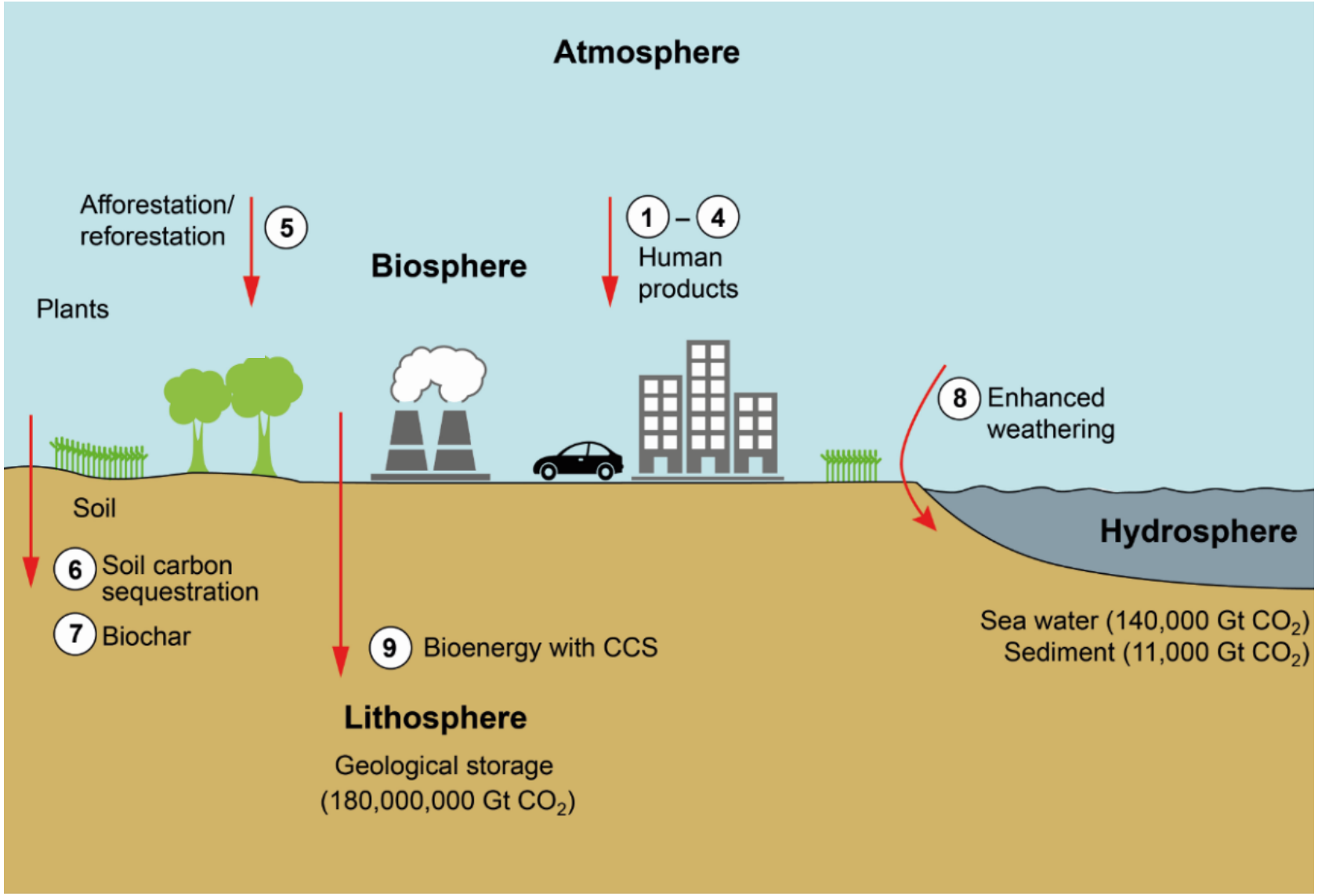
Source:Vivid Economics (2011)

It may make sense to establish a state-supported Green Investment Bank or capability:

1. **What sectors?**
2. **What instruments?**
3. **How to avoid crowding out the private sector?**

- UK National Infrastructure Commission looking again, given privatisation of GIB and loss of EIB post Brexit

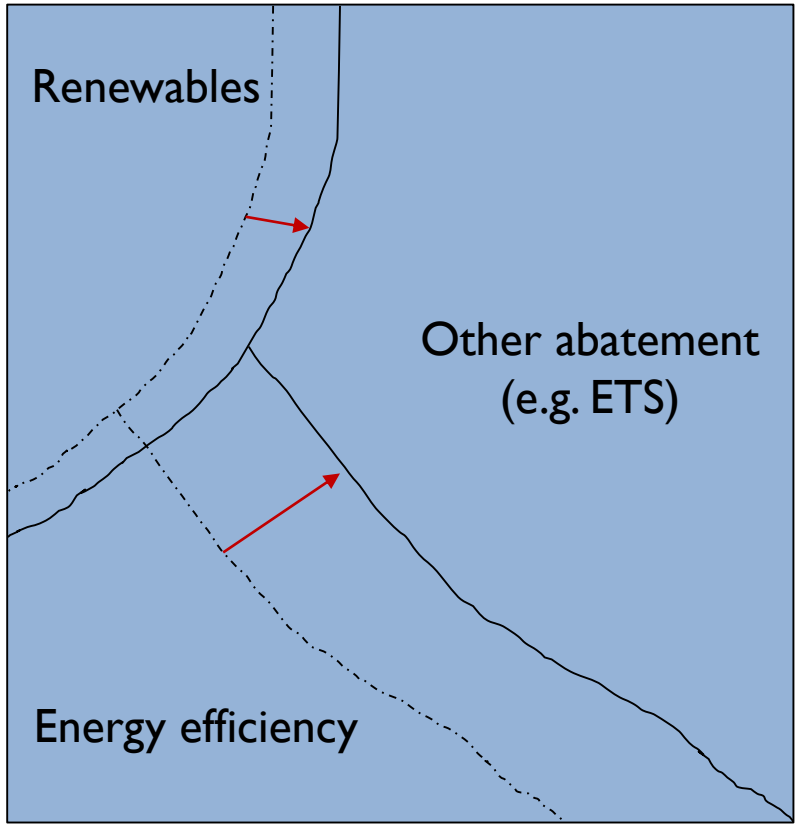
5. Carbon removal: Some negative emissions will be necessary to reach net zero



Source: Hepburn et al (2017) Use it or lose it

The "policy package" needs to be designed with care to avoid killing **no** birds with **two** stones

ILLUSTRATION



Box = Total abatement

With an overall cap, effort in one area can reduce effort in another area

To avoid problems with multiple policies:

- Increase public support for **quality**, not quantity, of policies
- Understanding economics, so Ministers avoid announcing overlapping policies
- Create realistic alternatives to 'announceables' meet Ministers need to be seen to be "doing something"
- Policy coordination by civil service

An ETS with a floor and a ceiling is a good idea; one implementation option might use a tax to provide the floor

See: Fankhauser et al (2011)

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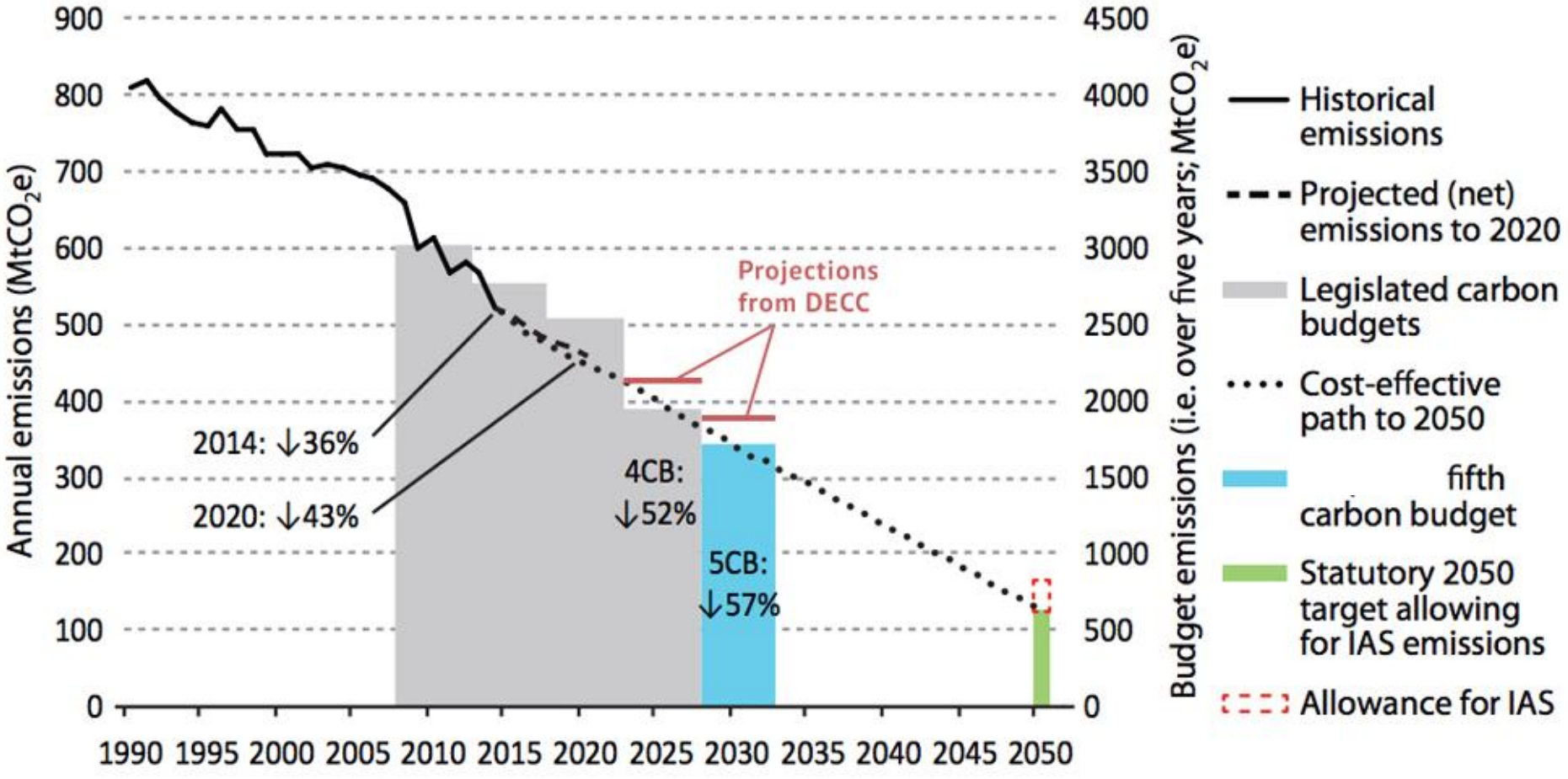
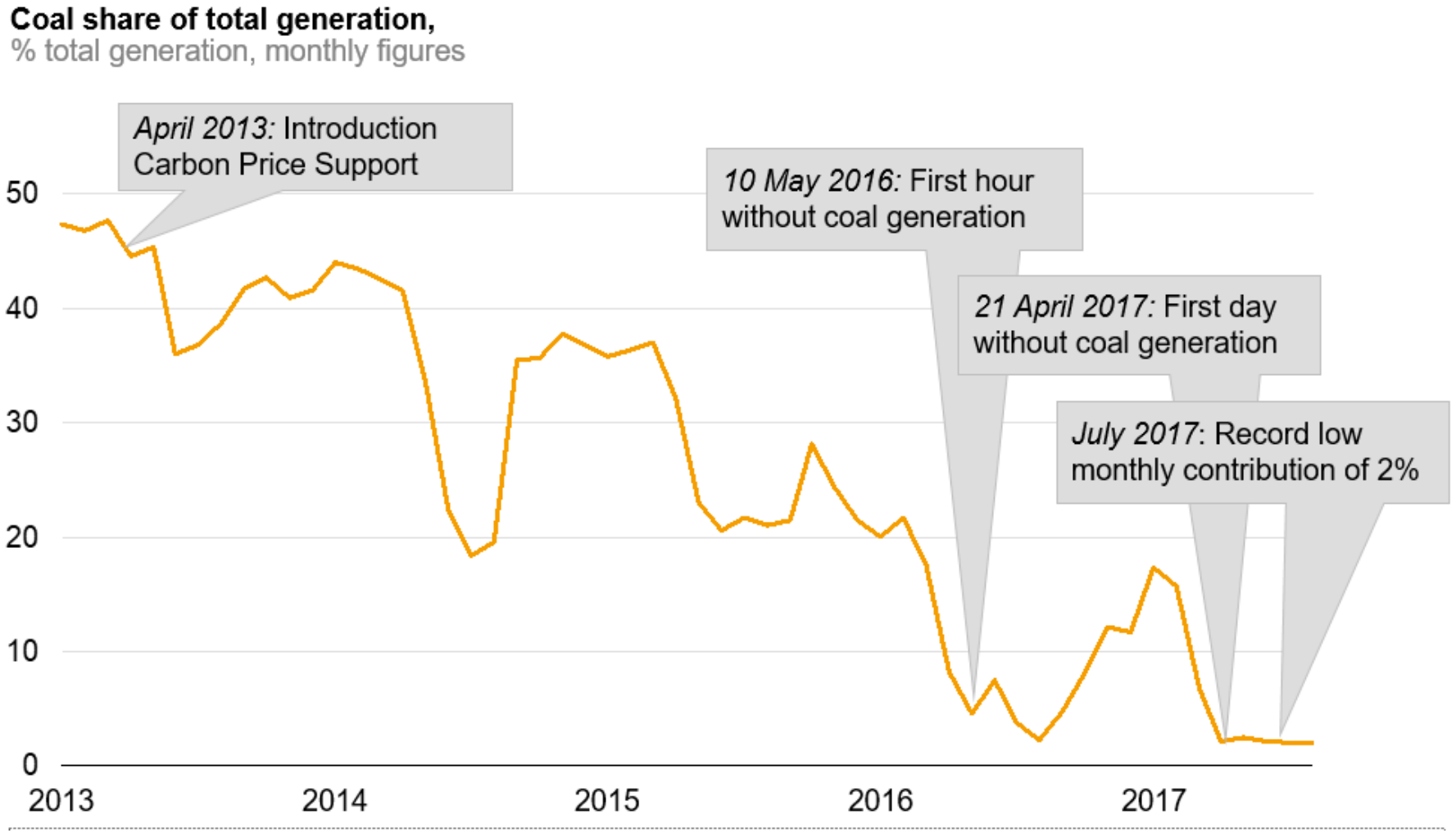
The UK legislated the legally-binding fifth carbon budget after the 2016 EU referendum

- The UK has been reducing its emissions, meeting targets so far
- But we were not on track to meet 4th and 5th CBs, even before Brexit



Source: CCC analysis based on DECC (2015); Carbon Brief

A big win has been the **carbon price floor**, which has all but removed coal from the electricity grid



Source: Aurora (2017)

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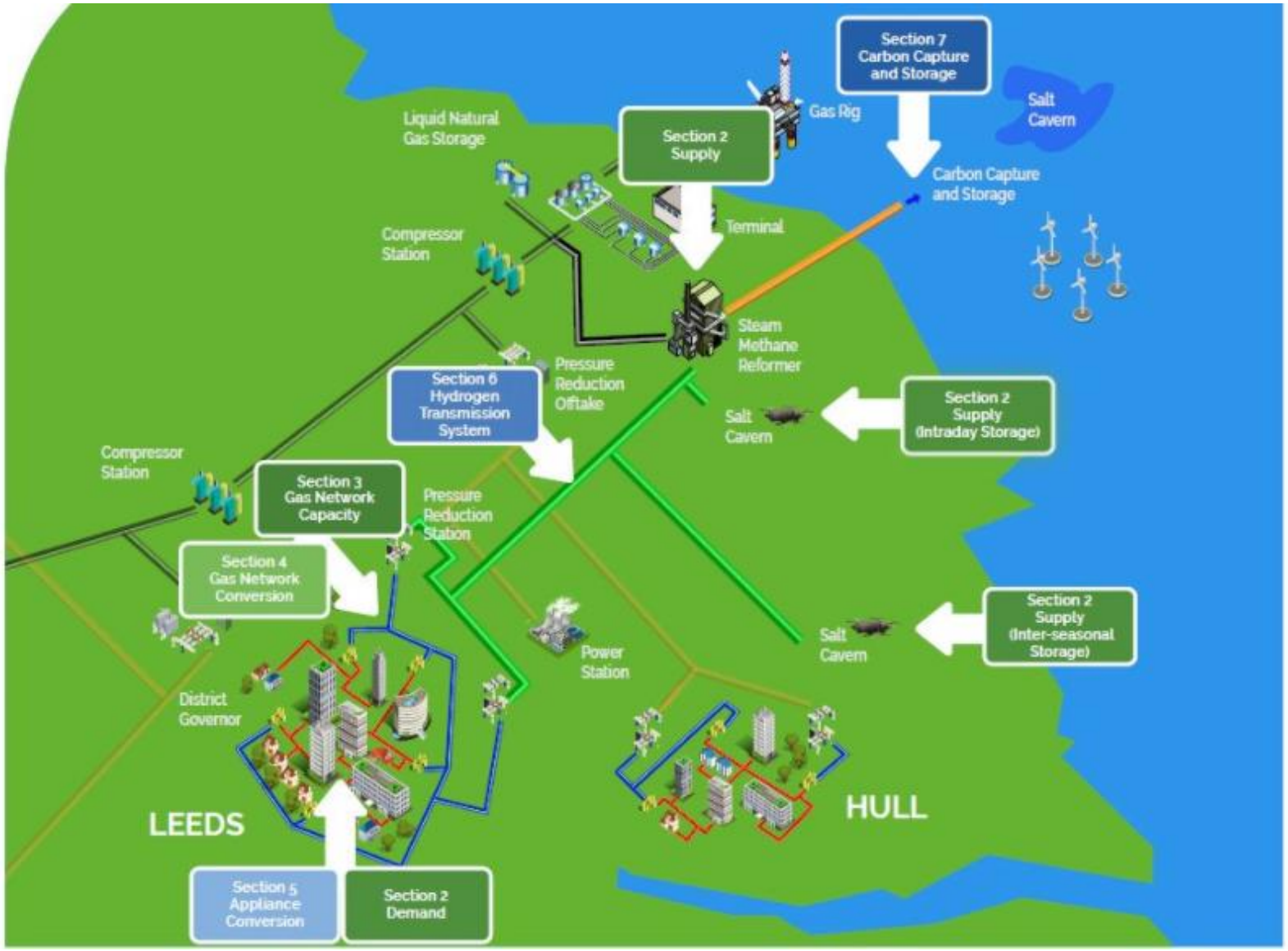
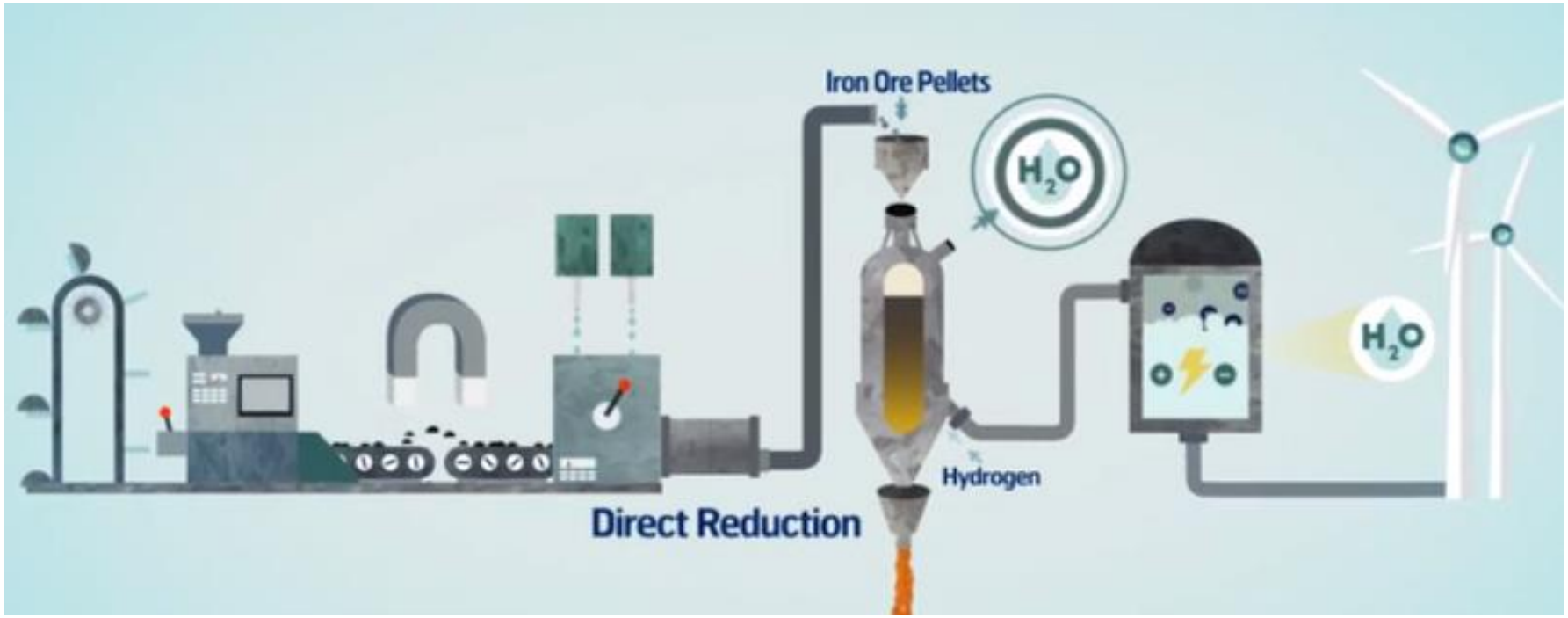
In the UK, Leeds is working on converting the gas grid back to 100% Hydrogen (via SMR or electrolysis)

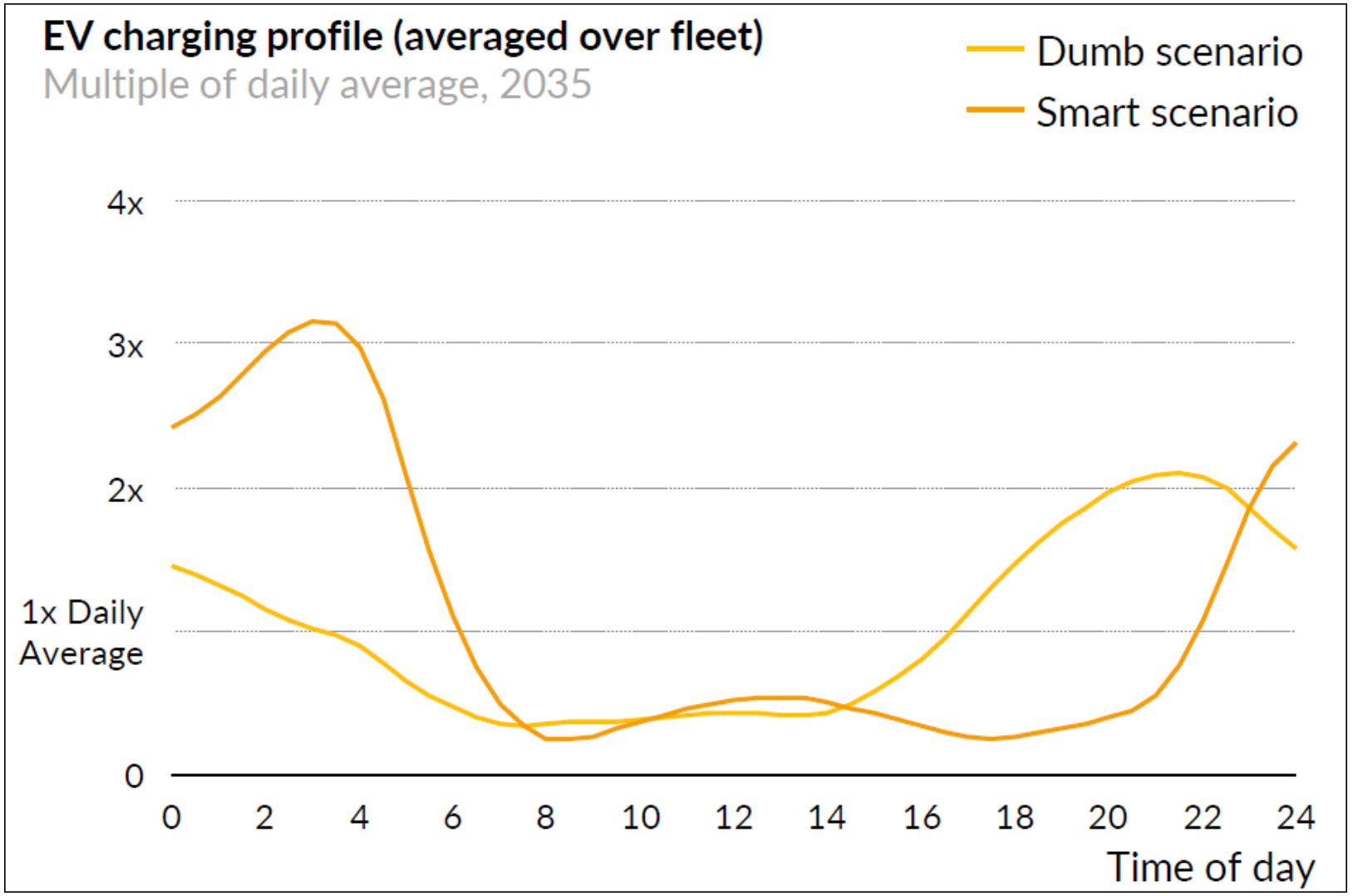


And a group of Swedish companies are developing a carbon-free steel making process based on H_2

The project (HYBRIT) would work with H_2, generated from wind power and the electrolysis of water, provided by Vattenfall



EVs: Is an ICE ban plausible from 2030? Vivid: Yes
Can charging be smarter / cheaper / helpful? Aurora: Yes



Source: Aurora Energy Research (2017)

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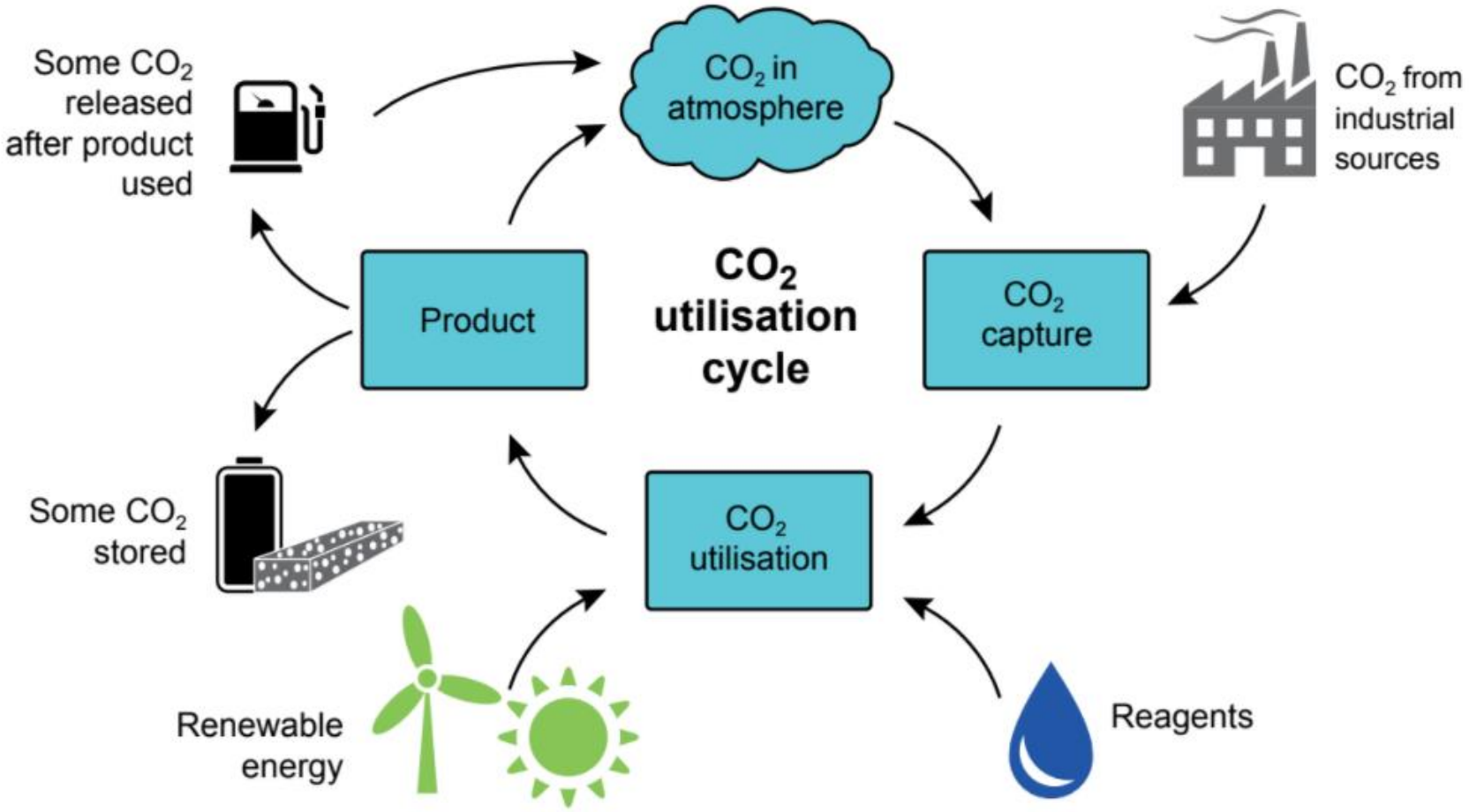
NETs are needed; CO_2 utilisation could reduce costs with changes in regulation and land use policy



Source: Hepburn et al (2017) Use it or lose it

Agenda

1. Pathways to net zero
2. Policy for net zero
3. UK performance thus far
4. Addressing the policy gap
5. Negative emissions policies
6. Conclusions

Conclusions

1. A 2050 net zero target for NZ is around the right ambition
2. This requires forward thinking across 5 policy areas:
    1. **Technology:** larger portfolio of early stage technological "bets"
    2. **Infrastructure:** investment fit for a net zero world
    3. **Economics:** incentives in various guises (especially carbon pricing)
    4. **Finance:** regulation to manage risks of stranded assets
    5. **Carbon removal:** Support for NETs
3. Avoid killing no birds with two stones
4. Key priorities include planning ahead for heat and transport to avoid later regret, start assessing the strategic options for NETs now

Institute for
New Economic Thinking
AT THE OXFORD MARTIN SCHOOL

Thank you

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Directing Mitigation Policy and Action for Results:

13 April 2018

Keynote Address

Jason Gray

California Air Resources Board

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Funders:

California Climate Policy Update

E-MISSION POSSIBLE: DIRECTING MITIGATION POLICY AND ACTION FOR RESULTS

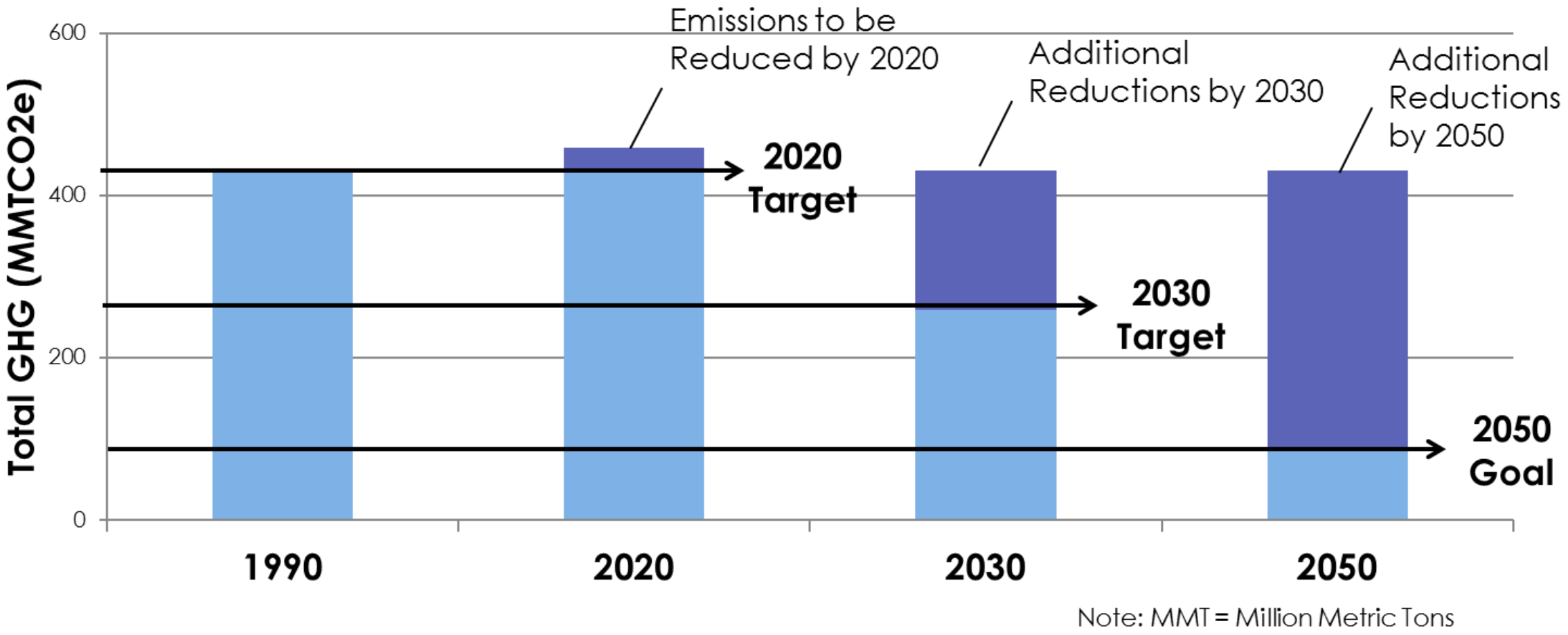
JASON A. GRAY, ESQ.

APRIL 13, 2018

Background

- Assembly Bill (AB) 32 (2006) requires greenhouse gas (GHG) emissions be reduced to 1990 levels by 2020 and Senate Bill 32 (2016) codified the 2030 GHG target of 40% below 1990 levels
- AB 32 requires a regularly-updated Scoping Plan to describe how California will achieve emissions targets
  - Initial Scoping Plan (2008) and First Update (2014)
  - Model for national and international climate change efforts
  - Coordinates efforts across government agencies
  - Improves air quality and public health
  - December 2017 – adopted Scoping Plan update on achieving 2030 target

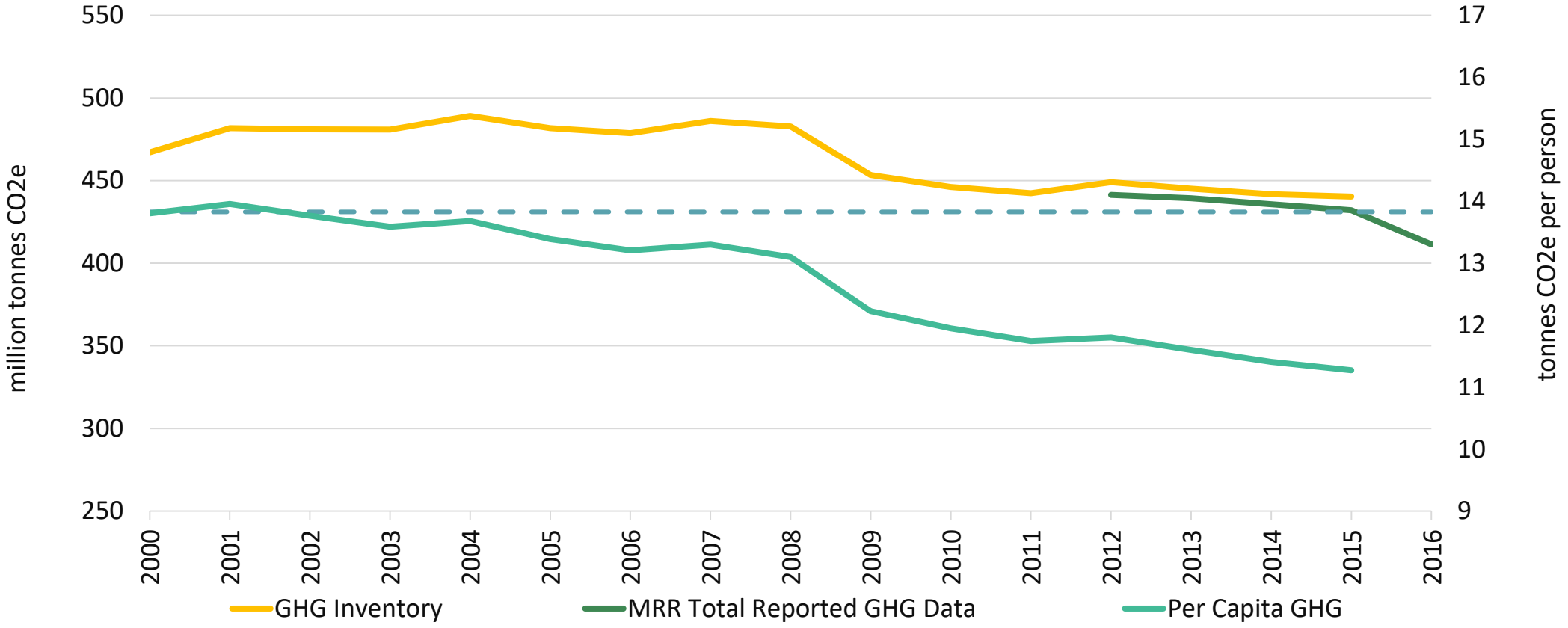
California's Emission Reduction Targets



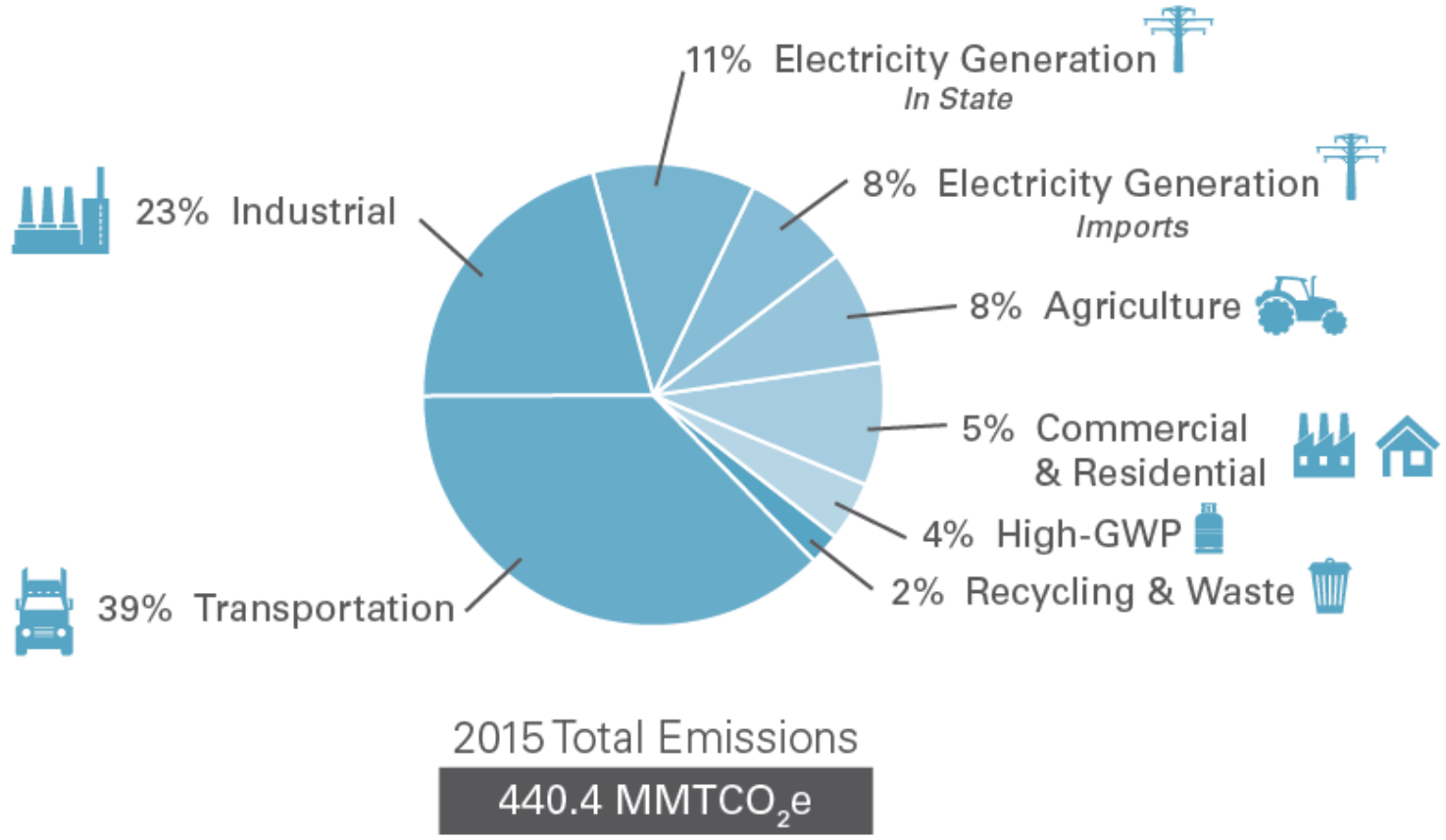
Note: MMT = Million Metric Tons

Progress to Date Reducing GHGs

Current modeling shows GHG emissions will be below the 2020 target



GHG Emissions Sources by Sector



- Natural & working lands are **not** included in the scope of the statewide limit
- ~898 MMT carbon in “live stocks” – forests, grasses, scrub

Objectives of Scoping Plan Update

- Achieve 2030 target
- Provide direct GHG emissions reductions
- Provide air quality co-benefits
- Protect public health
- Minimize emissions “leakage” – increase to non-CA GHG emissions
- Support climate investment in disadvantaged communities
- Facilitate sub-national and national collaboration
- Support cost-effective and flexible compliance
- Support Clean Power Plan and other federal action

Scoping Plan Strategy: A Suite of Complementary Measures

- SB 350 - increase renewable energy and energy efficiency
- SB 1383 - Short-Lived Climate Pollutant Plan
- Mobile Source Strategy - help State achieve its federal and state air quality standards
- Enhanced Low Carbon Fuel Standard
- Sustainable Freight Action Plan
- SB 375 – support sustainable community development
- Post-2020 Cap-and-Trade Program

Based on an evaluation of alternatives and an uncertainty analysis, this suite of policies has the highest certainty of achieving the 2030 target.

Recent Legislation

- Last year the legislature passed AB 398 and AB 617
  - AB 398 provides direction on the post-2020 period of the Cap-and-Trade Program and required CARB to update the Scoping Plan by Jan. 1, 2018
  - AB 617 requires CARB to develop and implement a program to reduce exposure to criteria and toxic pollutants in California's most burdened communities

Cap-and-Trade Program Goals

- Ensure GHG targets are realized through a strict limit
- Provide compliance flexibility to achieve cost-effective reductions
- Allow price signals to motivate long-term investment in cleaner fuel and energy efficiency
- Complement existing programs to reduce smog and air toxics
- Facilitate integration of regional, national, and international GHG reduction programs

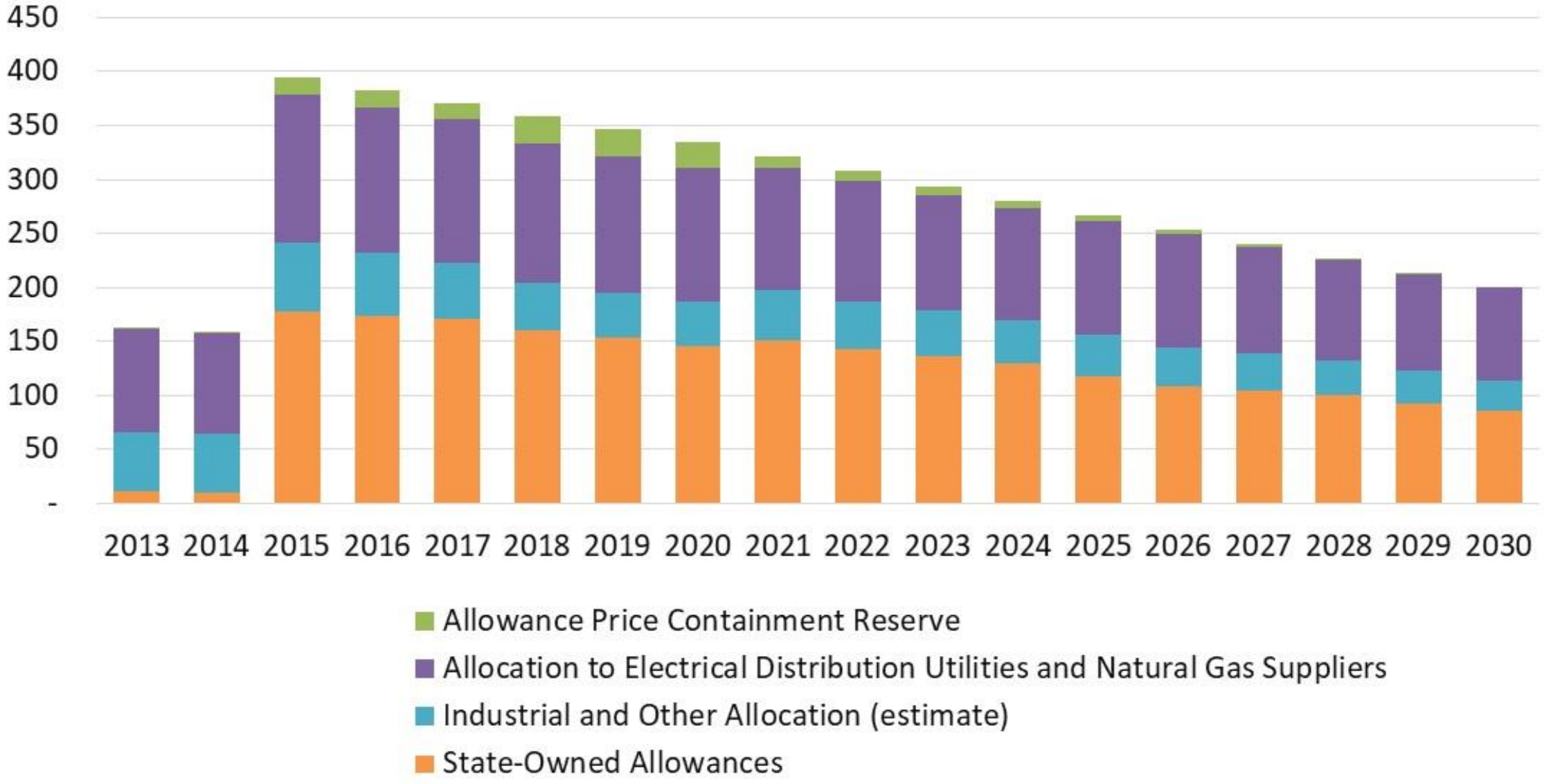
Cap-and-Trade Program Overview

- Program Coverage (~80% of State's Emissions)
  - Stationary sources with emissions ≥25,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year
  - Importers of electricity
  - Emissions from the combustion of supplied fuels, including natural gas and transportation fuels
  - Covered GHGs include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)
- Covered entities must acquire and surrender compliance instruments that match emissions at the end of each compliance period
  - Multi-year compliance periods offer Program flexibility

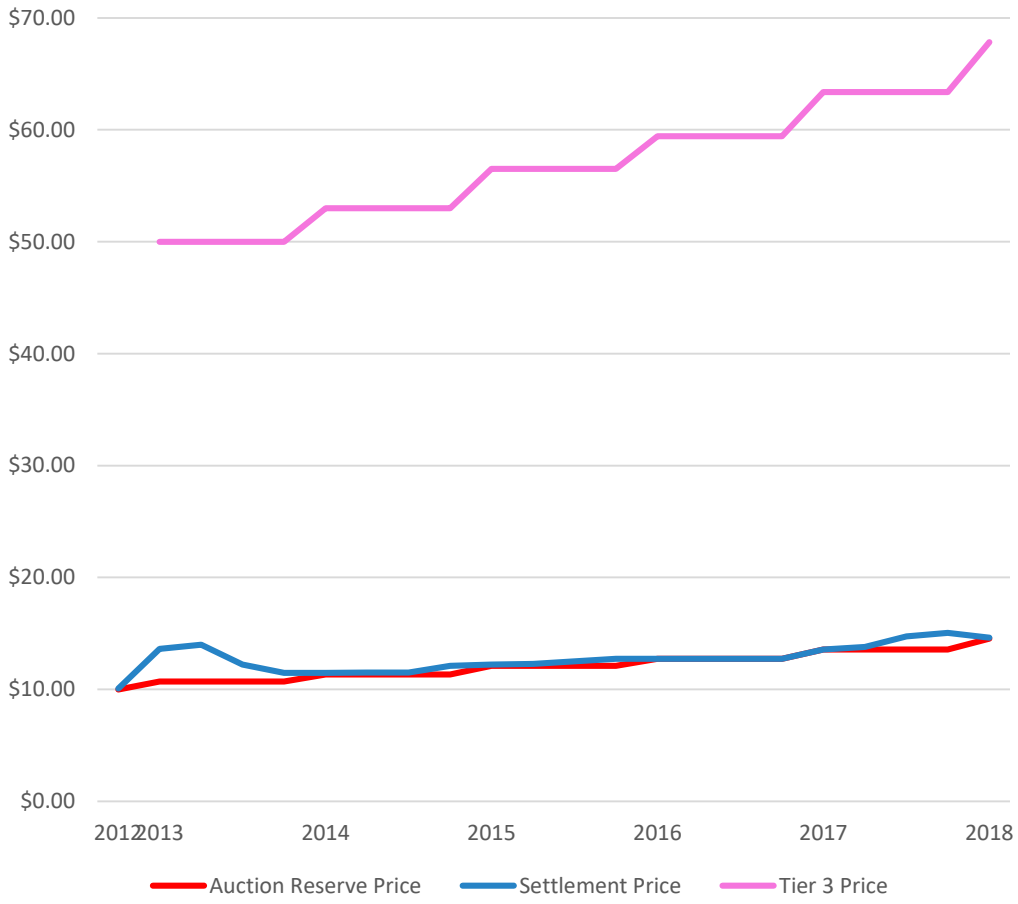
California Allowance Budget

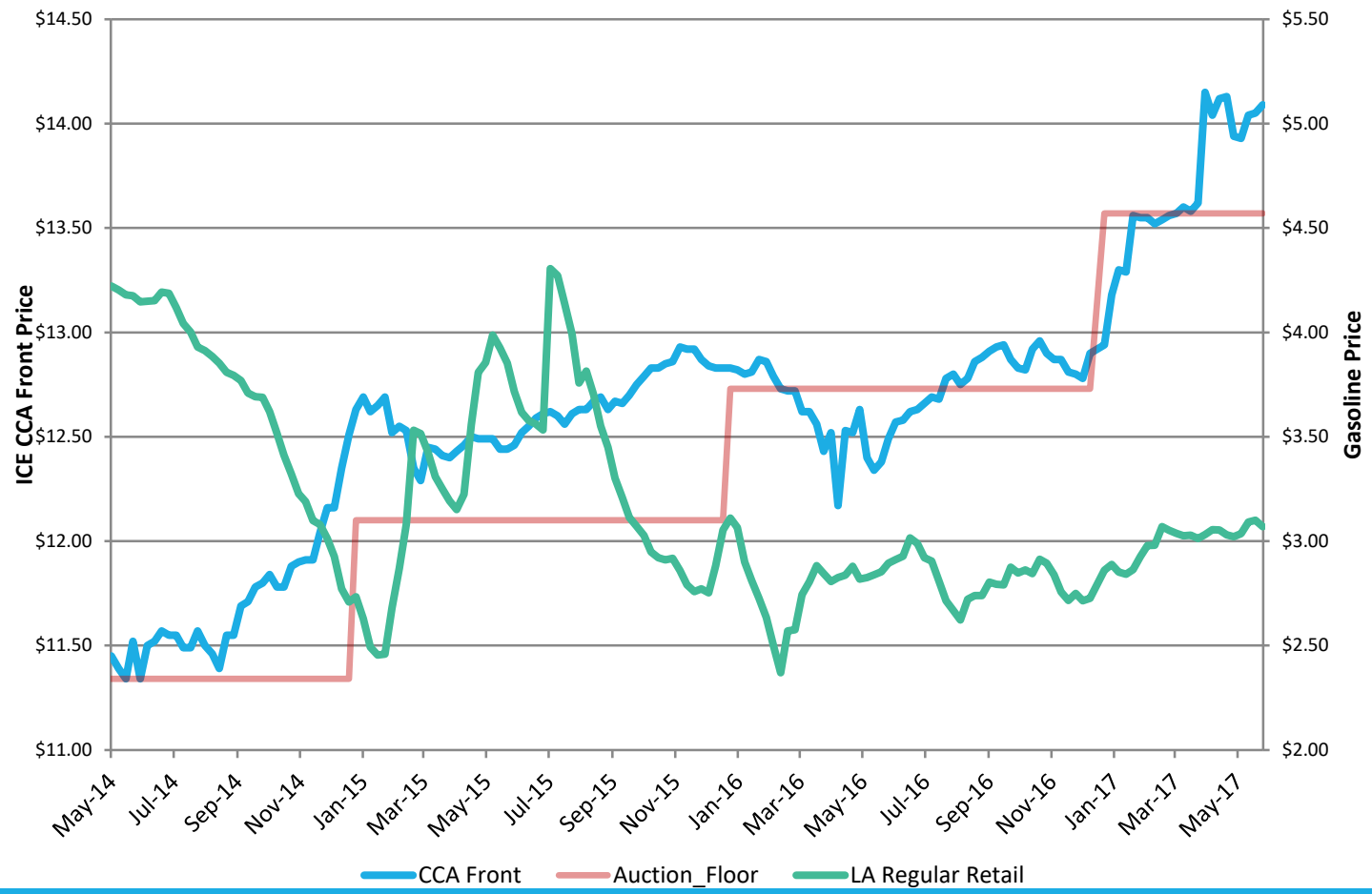
- Allowance budgets (caps) decline each year
- Allowance: a limited tradable authorization to emit up to one $MTCO_2e$
- Distribution of State-owned Allowances
  - Direct allocation (free allowances)
    - Industrial producers for purpose of emissions leakage prevention and transition assistance
    - Electrical distribution utilities and natural gas suppliers for purpose of ratepayer protection
  - Allowance Price Containment Reserve
  - State-held quarterly auctions
    - Auction reserve price (floor price): $14.53 (2018)

2013–2030 Allowances by Year ($MMTCO_2e$)



Auction Reserve, Settlement, and Allowance Price Containment Reserve Tier 3 Prices to Date

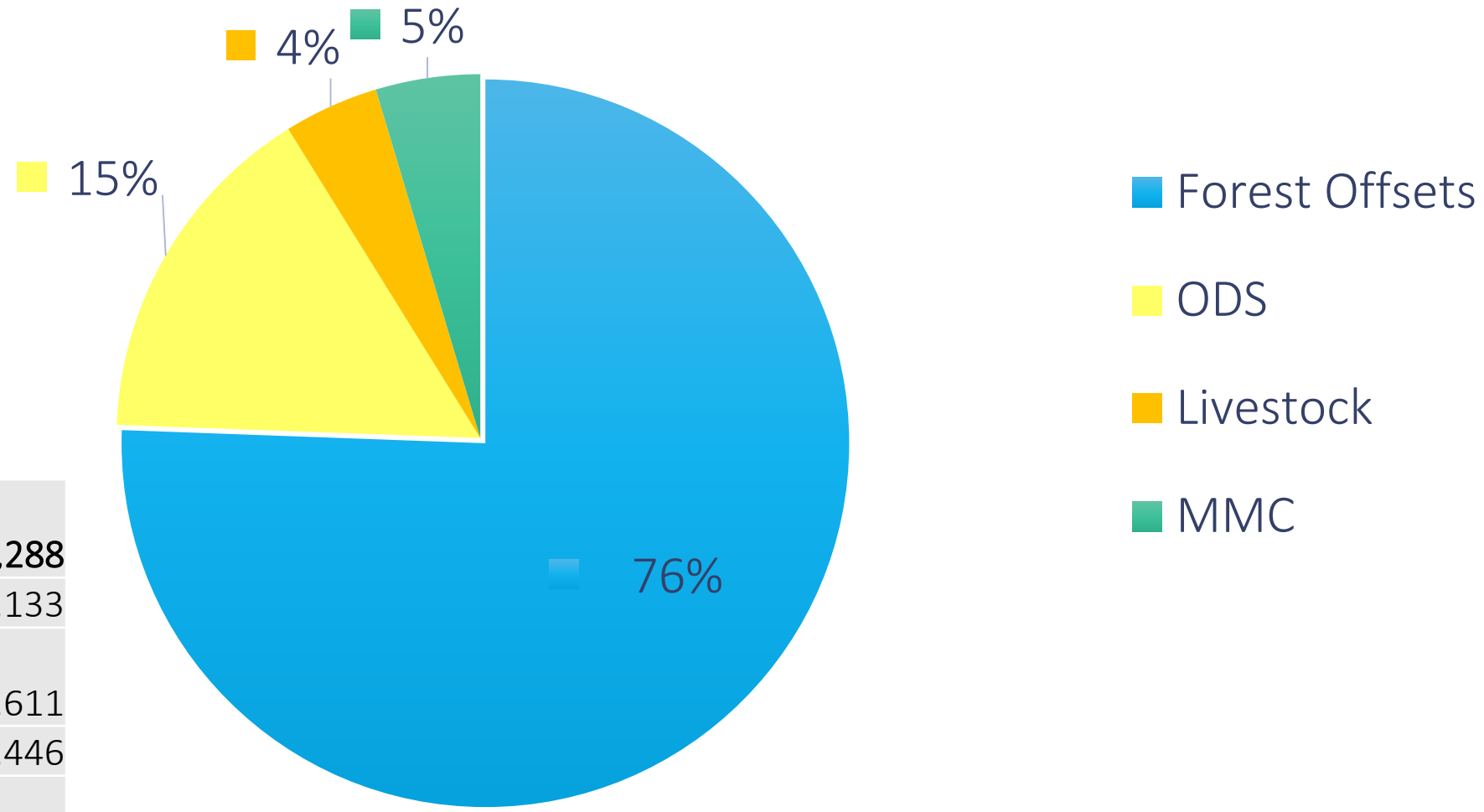




Offset Credits

- Tradable compliance instruments that represent verified GHG emissions reductions or removal enhancements made in sources outside of Program (uncapped sectors)
  - Can be used to satisfy up to 8% of compliance obligation
  - AB 398 specifies limits of 4% for 2021-2025 and 6% 2026-2030
- Must meet statutory criteria: real, permanent, quantifiable, verifiable, enforceable, additional
- Offset credits issued directly by CARB or linked jurisdiction
  - 6 offset protocols adopted
  - >105 million offset credits issued

Total Offsets Issued To Date



Total Issuance by project type	105,196,288
Forest	79,512,133
Ozone Depleting Substances (ODS)	16,376,611
Livestock	4,429,446
Mine Methane Captures (MMC)	4,878,098

Program Linkages

- Process of approving the use of compliance instruments issued by another jurisdiction's climate program in California, approving the use of California's compliance instruments in another jurisdiction's climate program, or both
- Current full linkages with Québec, Canada (2014) and Ontario, Canada (2018)
- Statutory Requirements for Linkage
  - Program is equivalent to or stricter than California's
  - California maintains legal authority of enforcing AB 32
  - Linking jurisdiction has a legally enforceable program
  - Linking imposes no significant liability for California

Market Integrity

- Mechanisms for ensuring market integrity
  - Tracking system
  - Registration and disclosure requirements
  - Purchase and holding limits
  - Financial penalties
- Oversight: Coordinate with federal agencies such as U.S. Commodity Futures Trading Commission (CFTC) and Federal Energy Regulatory Commission (FERC)
- Enforcement: Coordinate with California Department of Justice

Program Milestones

Date	Event
November 2012	First auction
January 2013	First compliance period began
January 2014	Program linked with Québec
November 2014	First joint auction with Québec
January 2015	Emissions from the combustion of supplied fuels began to incur a compliance obligation
November 2015	First compliance period compliance event (99.8%)
January 2018	Program linked with Ontario
February 2018	First joint auction with Québec and Ontario
November 2018	Second compliance period compliance event

Program Facts & Figures

- ~450 covered entities in the Cap-and-Trade Program
- 22 auctions held to date (14 joint-auctions)
  - First joint auction with Québec and Ontario February 21, 2018 (sold all current vintage allowances offered)
- >1.5 billion compliance instruments held in private accounts (~$23 billion in value)
- >$7.1 billion generated for California Climate Investments
- High levels of compliance with Program requirements
- Carbon price is being incorporated into compliance, investment decisions, and electricity market

Cap-and-Trade Post-2020

- AB 398 provides direction on a post-2020 Cap-and-Trade Program
- CARB currently evaluating changes to program design features to address AB 398 requirements, among other changes
  - Allocation to minimize leakage
  - Reductions in the offset usage limit
  - Establishing price containment points and a price ceiling
- Changes will be subject to a public process and coordinated with linked partners
- AB 398 requires that changes be in effect by January 1, 2021
- CARB planning final Board hearing December 2018

Scoping Plan Key Points Summary

- Plan provides an achievable path for reaching the 2030 GHG target
- 2030 target is a milestone on the way to achieve greater reductions needed to stave off the catastrophic impacts of climate change
- CARB will continue to evaluate and incorporate additional opportunities to reduce GHGs, criteria, and air toxics emissions as they become cost-effective and technologically feasible
- Implementation of the Scoping Plan measures must not disproportionately impact low-income communities
- Continue to monitor, adjust, and enforce existing air quality programs, in addition to implementing AB 617

Next Steps

- Implementation of Scoping Plan Measures
- Continuing collaboration with subnational and national partners of WCI, GCF, Under2MOU, ZEV Alliance, Pacific Coast Collaborative, and others
- Process underway for regulatory amendments to Cap-and-Trade Program to meet AB 398 requirements

UPCOMING EVENTS

- GCF Annual Meeting (tropical forest partnership) – September 10-12, 2018

https://gcftf.org/

- Governor's Global Climate Action Summit – September 12-14, 2018

https://globalclimateactionsummit.org/

Additional Resources

California Air Resources Board:
https://www.arb.ca.gov/homepage.htm

California's Climate Change Scoping Plan:
https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

Cap-and-Trade Program: https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

Allowance Allocation:
https://www.arb.ca.gov/cc/capandtrade/allowanceallocation/allowanceallocation.htm

Compliance Offset Program: https://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm

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13 April 2018

Productivity Commission Presentation

Murray Sherwin and Geoff Lewis

"Emerging insights on New Zealand's low-emission transition"

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NEW ZEALAND
PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa

An inquiry into New Zealand's transition to a low-emissions economy

13 April 2018

What is the inquiry about?

What opportunities exist for the New Zealand economy to maximise the benefits and minimise the cost that a transition to a lower net-emissions economy offers, while continuing to grow incomes and wellbeing?

How could New Zealand's regulatory, technological, financial and institutional systems, processes and practices help realise the benefits and minimise the costs and risks of a transition to a lower net emissions economy? (ToR, April 2017)

What does the new Government want?

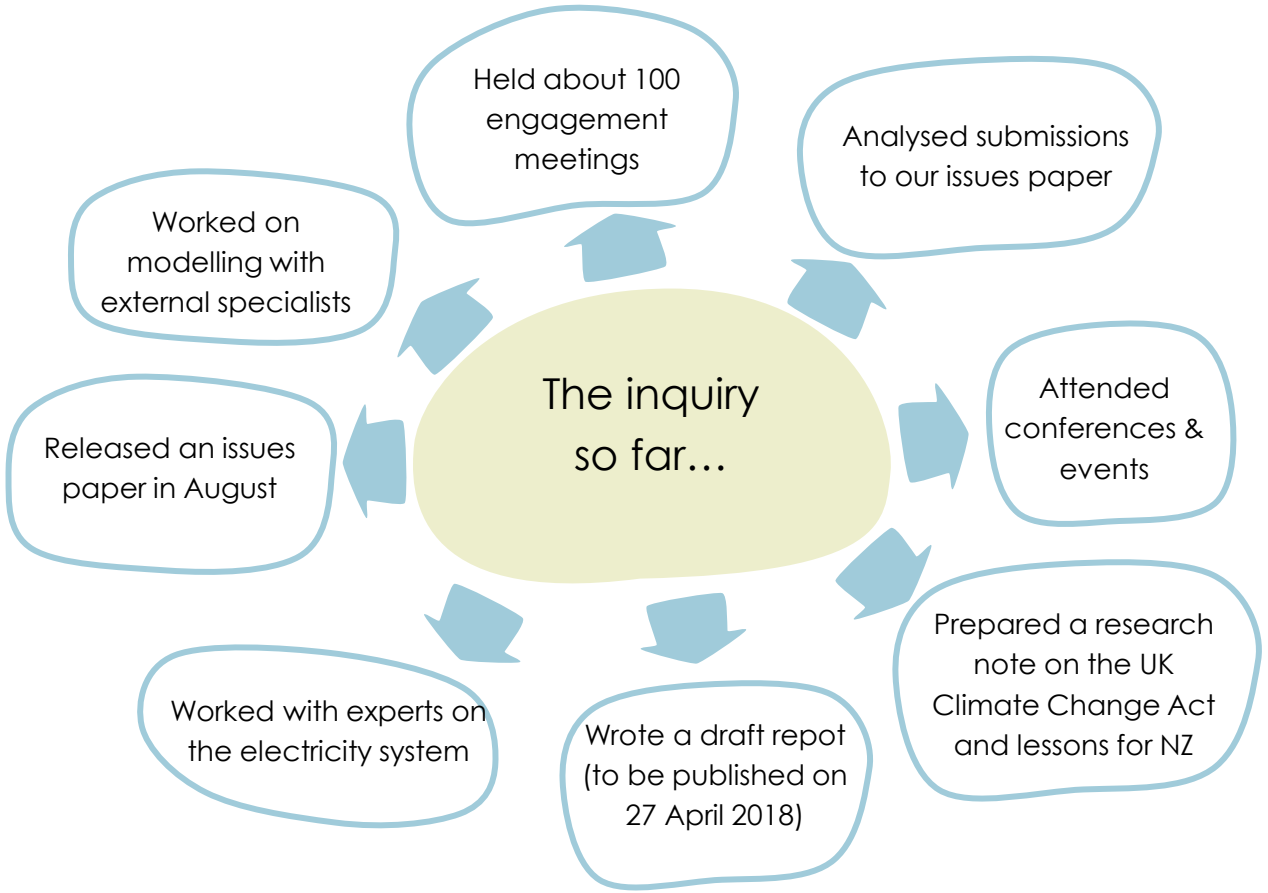
For the inquiry to carry on!

Letter from Hon James Shaw, Minister of Climate Change

"While the Government is yet to define the … emissions target for 2050, it would be helpful for the Commission to take into consideration the Government's intention to set a more ambitious emissions target for 2050. This may include setting a zero net emissions target for 2050."

"I encourage your inquiry to consider the full range of potential benefits and opportunities which might arise from New Zealand taking the global lead on reducing emissions."

What have we done so far?



What will the draft report cover?

NEW ZEALAND PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa

Parts 1 & 2: Setting the scene and low-emission pathways

- About the inquiry
- The Commission's approach
- New Zealand's current emissions: A profile
- Modelled pathways to low-emissions targets in 2050

Part 3: Policies and institutions

- Emissions pricing
- Short-lived and long-lived gases
- Innovation and technology
- Laws and institutions
- Finance and investment
- Policies for an inclusive transition

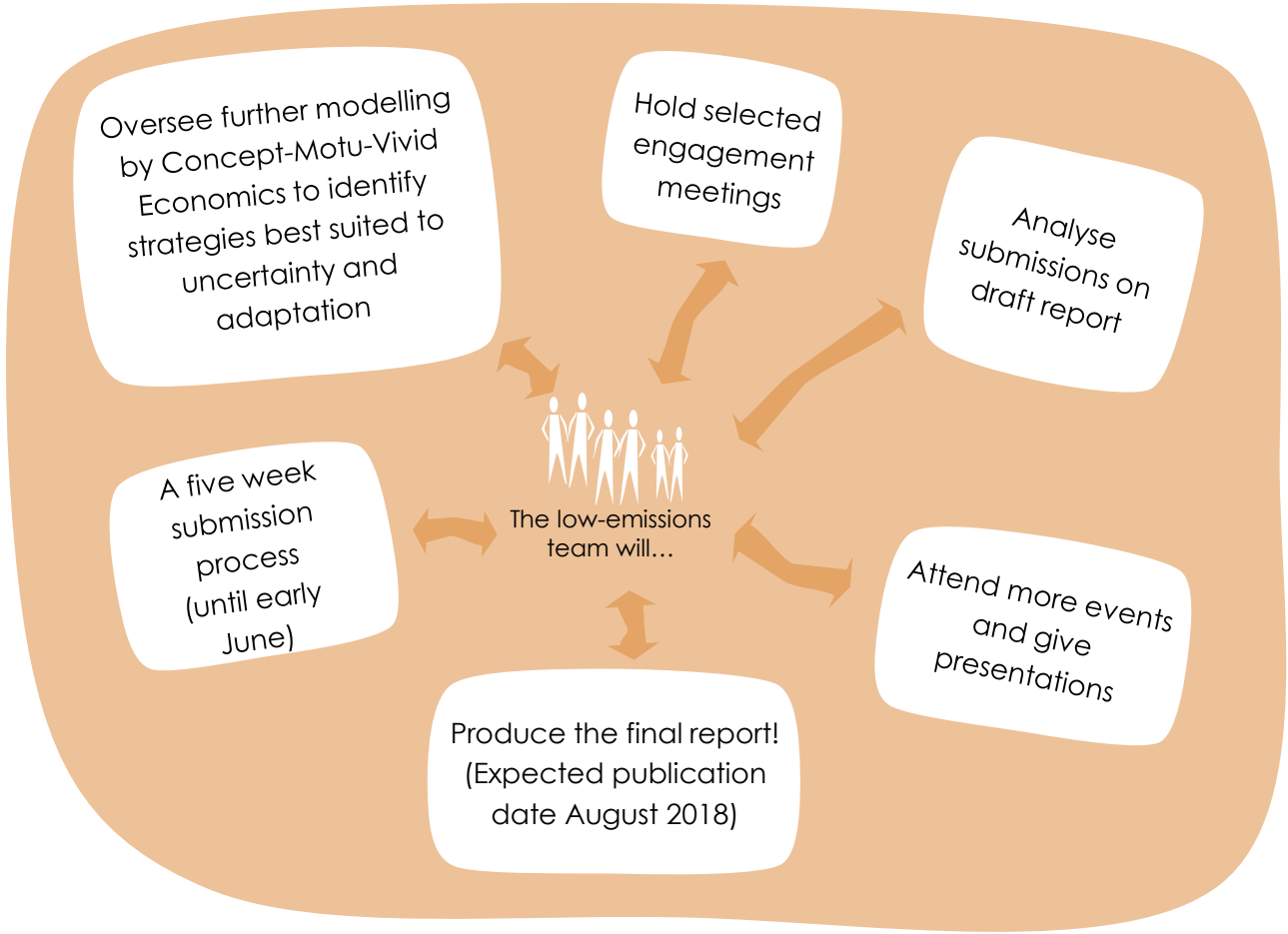
Part 4: Emission sources and opportunities

- Land use
- Transport
- Electricity
- Heat and industrial processes
- Waste
- The built environment

Part 5: Achieving a low-emissions economy

- A strategy for New Zealand's transition to low emissions

What happens after the draft report?



Modelling pathways to low emissions

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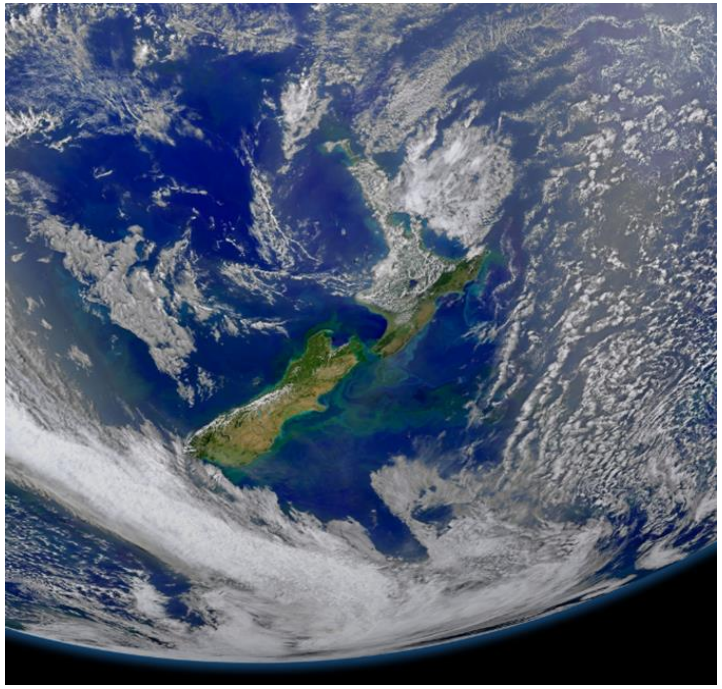

concept

:videconomics

Motu
Motu Economic and Public Policy Research

Ministry for the Environment
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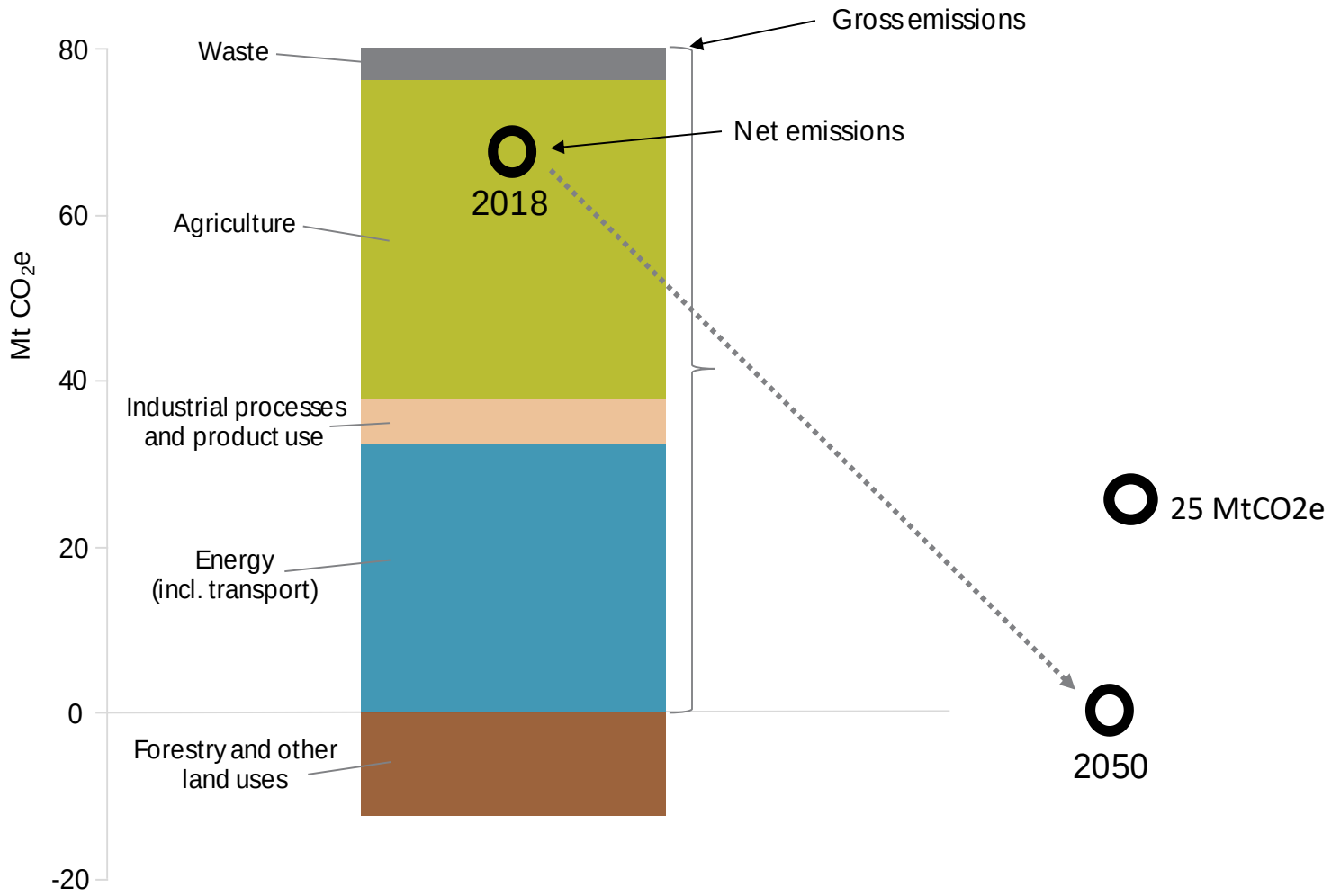
NZ's challenge to get to net-zero emissions



What can this modelling tell us?

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- Prediction is tricky – especially when it's about the future
- So not prediction, but it can throw light on:
  - whether an emissions target is feasible?
  - measures to achieve a target
  - alternative pathways that might be possible
  - what's likely in terms of the numbers?
  - What opportunities, tough choices and risks lie ahead?

Our modelling explores 3 scenarios …

…about possible technological changes that reduce GHG emissions

1. The Policy Driven scenario
   - Technological change is slow
   - So need to rely on high emissions prices to drive behaviour change …
   - to stop doing emissions-intensive things; & start doing low-emissions things (largely using existing technologies)

The 2nd scenario is Disruptive Decarbonisation

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- Rapid technological change that disrupts current economic structures

The 3rd scenario is Techno-optimist

- Rapid technological changes that "preserve" existing industries by reducing their emissions

3 scenarios and 2 targets give us 6 pathways that the modelling describes

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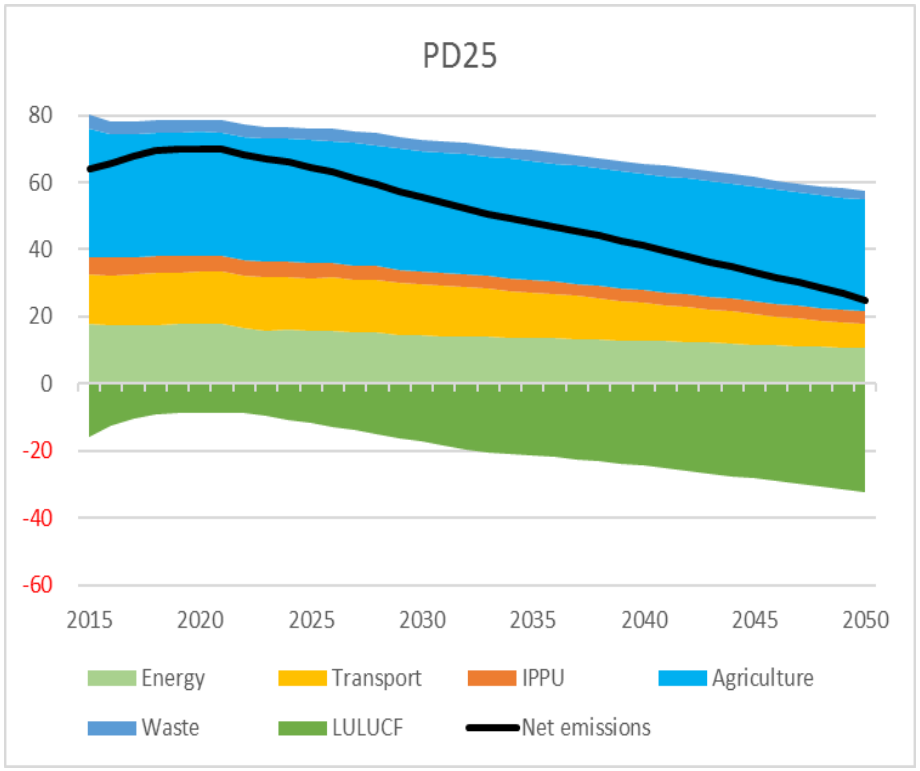
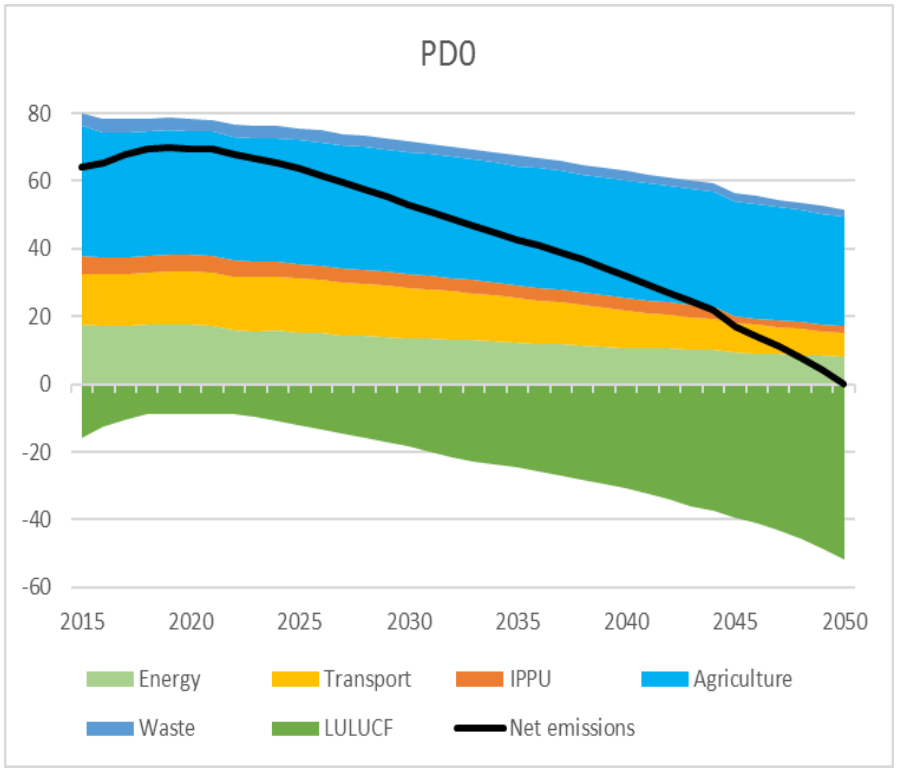
	Scenario	Net emissions target in 2050	Pathway
1.	Policy Driven	25 $MtCO_2e$	PD25
2.	Policy Driven	Net zero	PD0
3.	Destructive Decarbonisation	25 $MtCO_2e$	DD25
4.	Destructive Decarbonisation	Net zero	DD0
5.	Techno-optimist	25 $MtCO_2e$	TO25
6.	Techno-optimist	Net zero	TO0

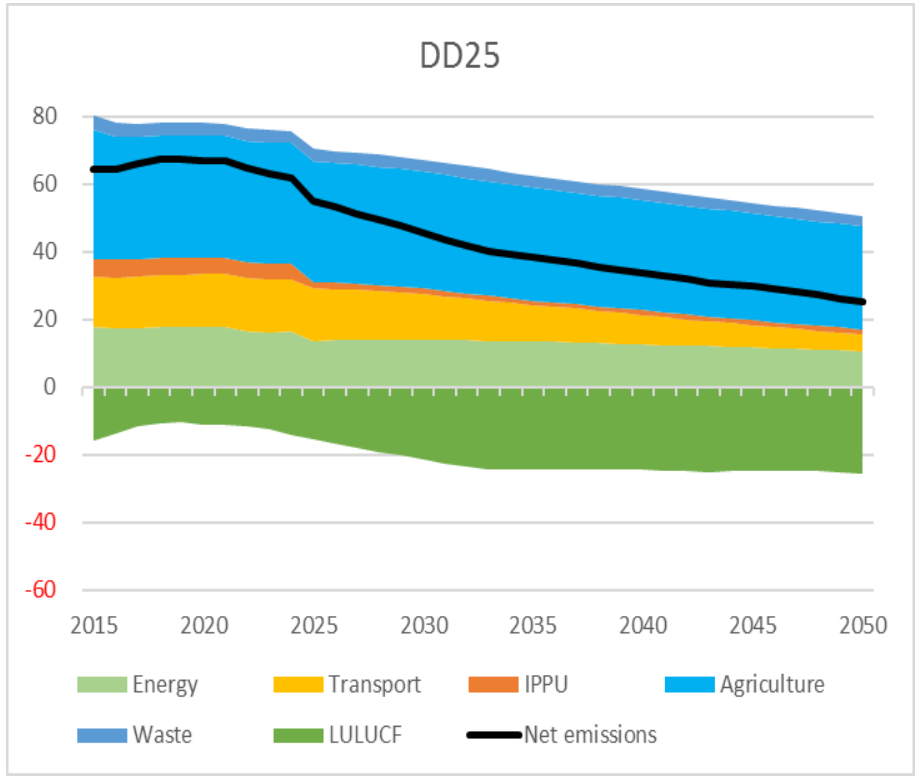
Insight 1: Both targets look feasible (PD)

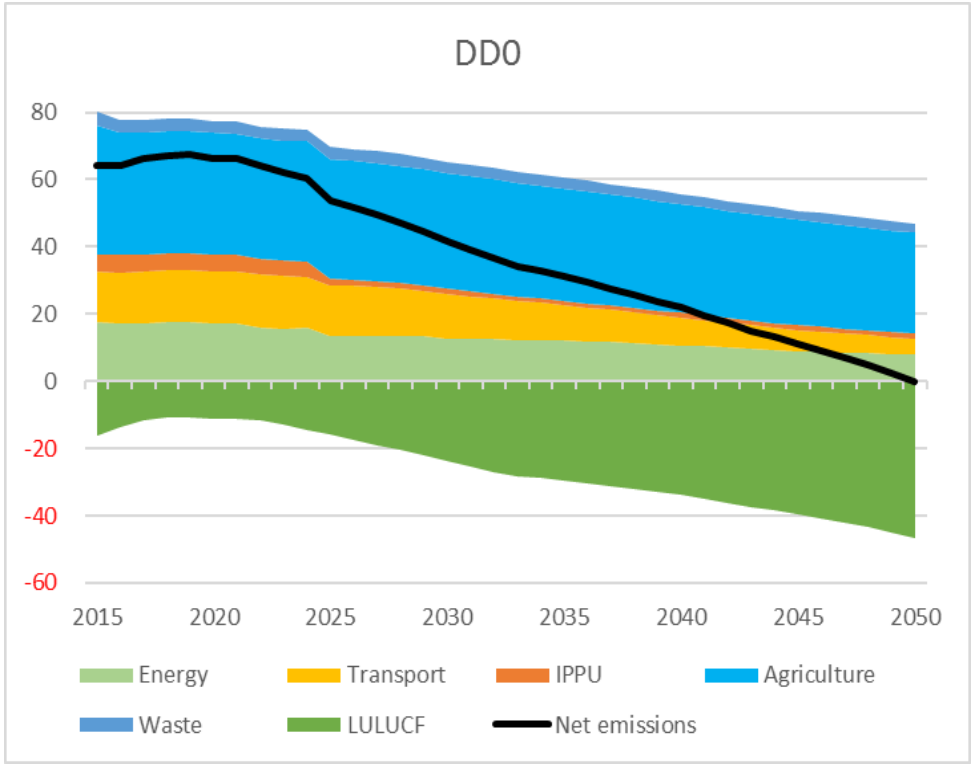




Vertical axis is $MtCO_2e$

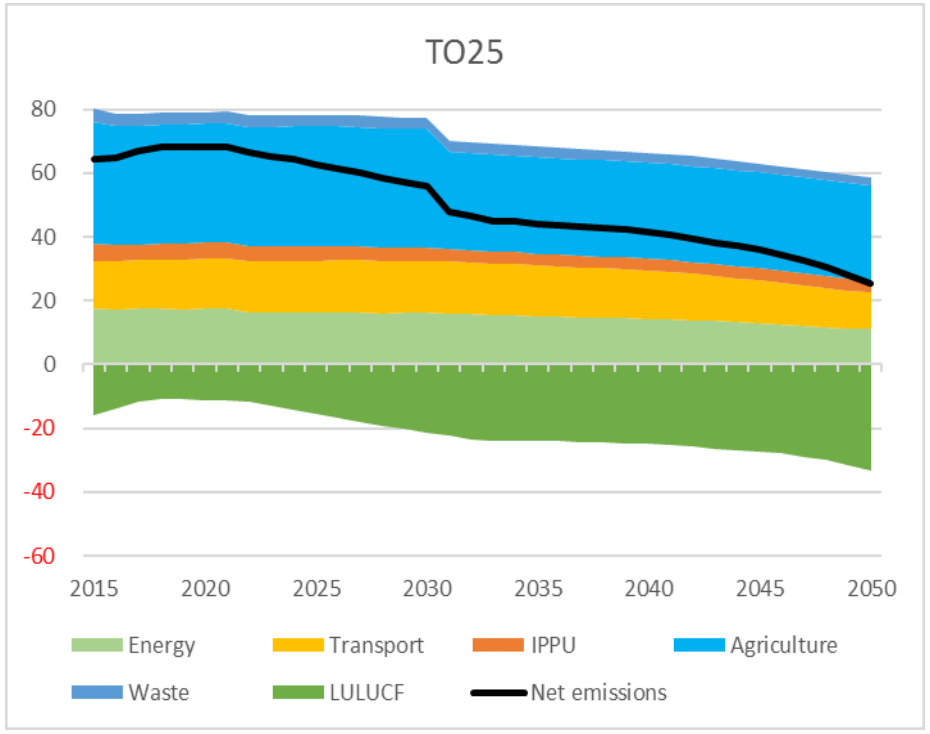
Insight 1: Both targets look feasible (DD)

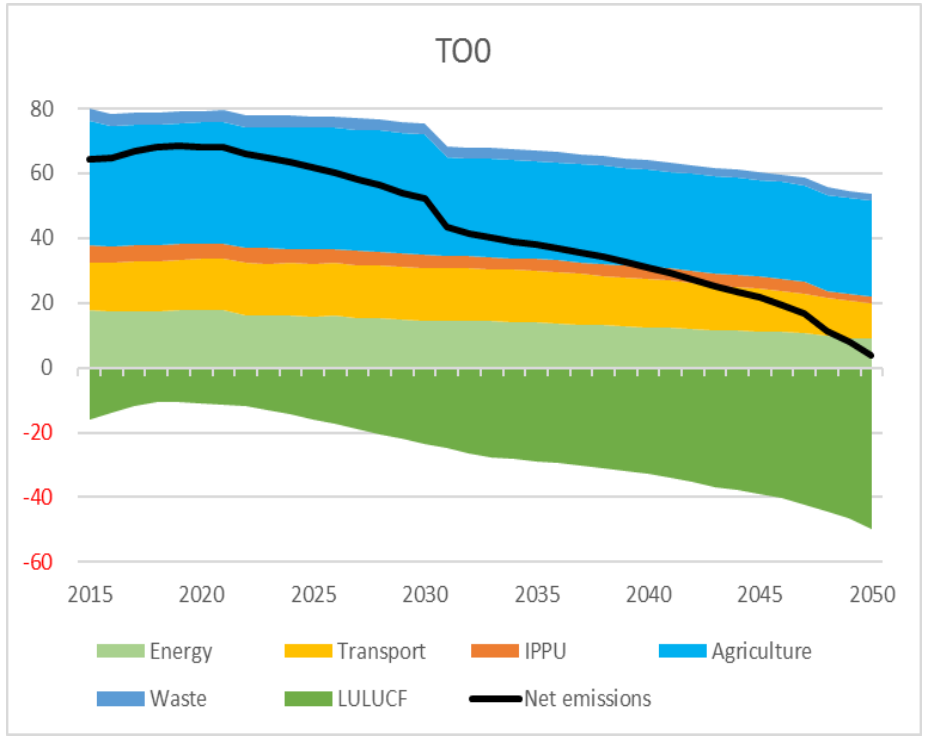




Vertical axis is $MtCO_2e$

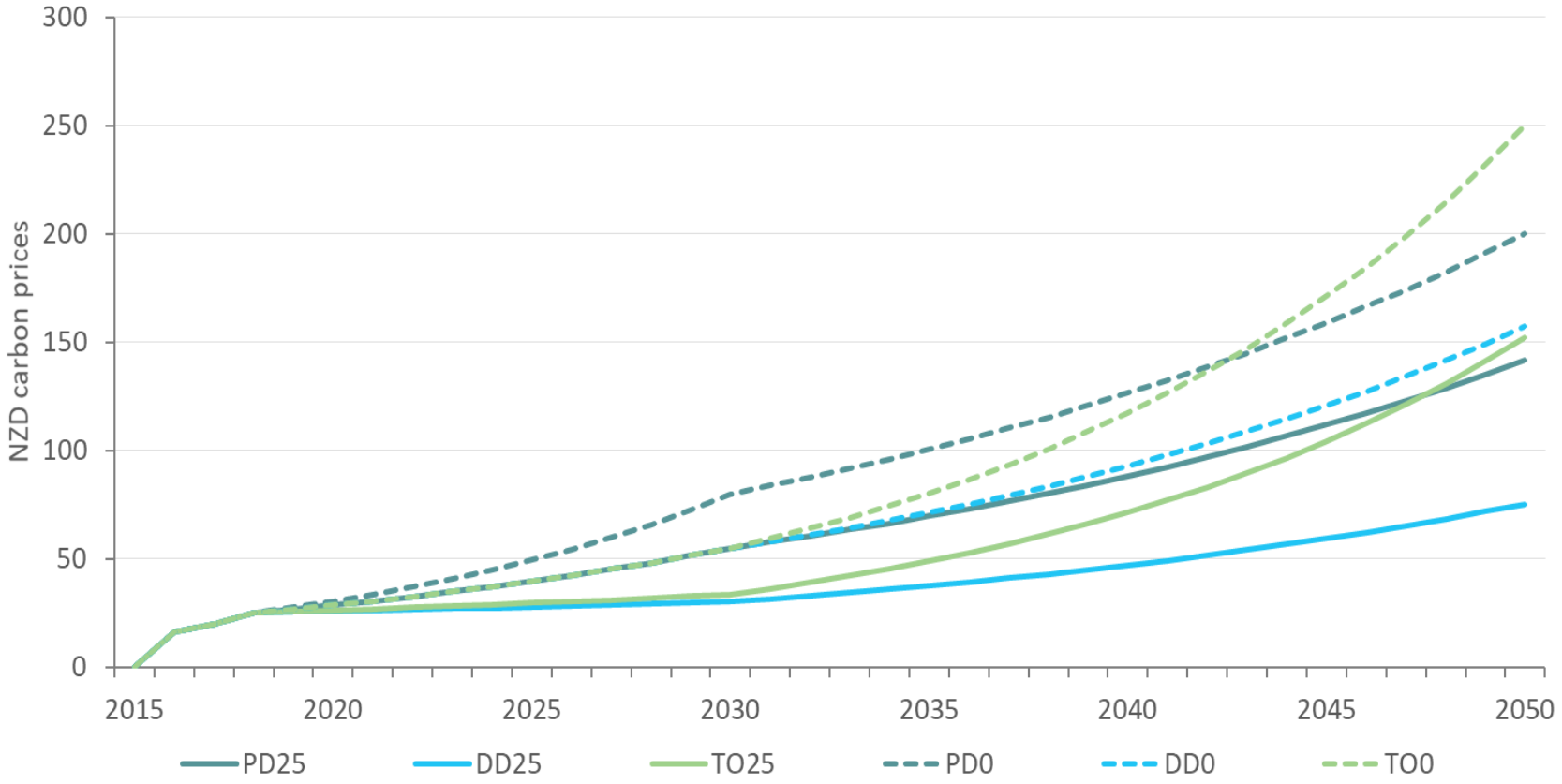
Insight 1: Both targets look feasible (TO)



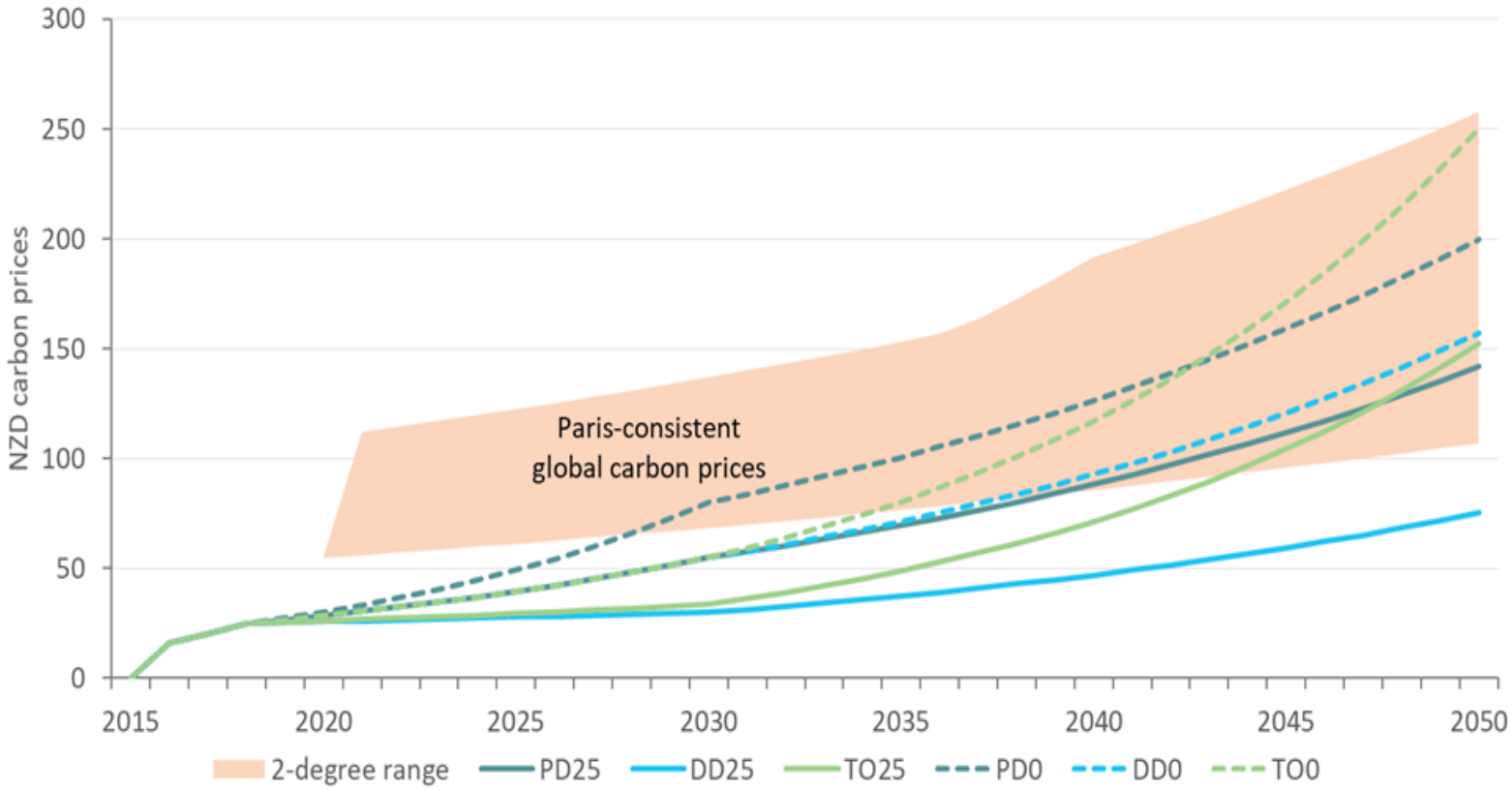


Vertical axis is $MtCO_2e$

Insight 2: Emissions prices climb steadily from current levels …

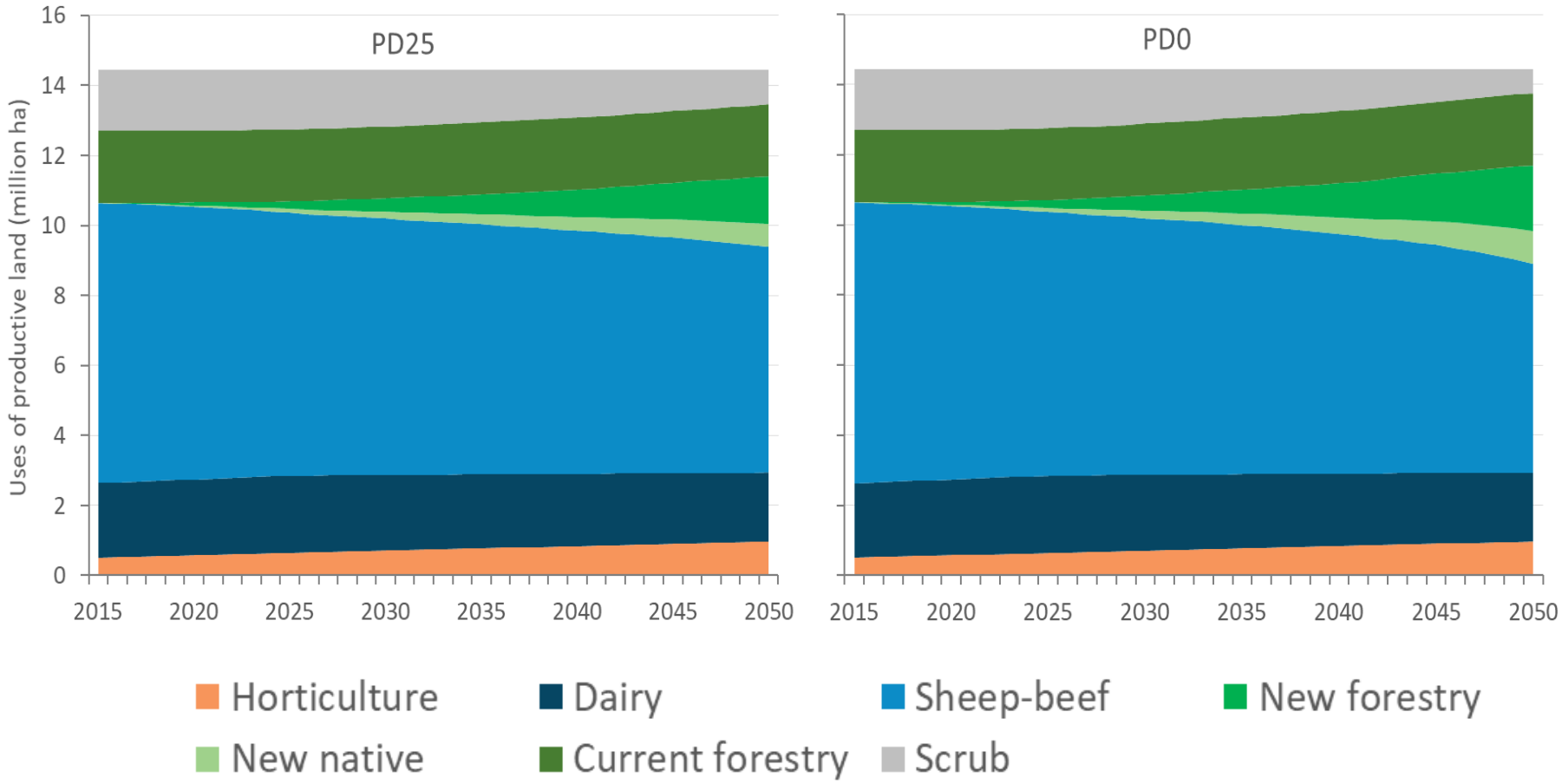


Emissions prices are mainly in the range expected in other developed countries

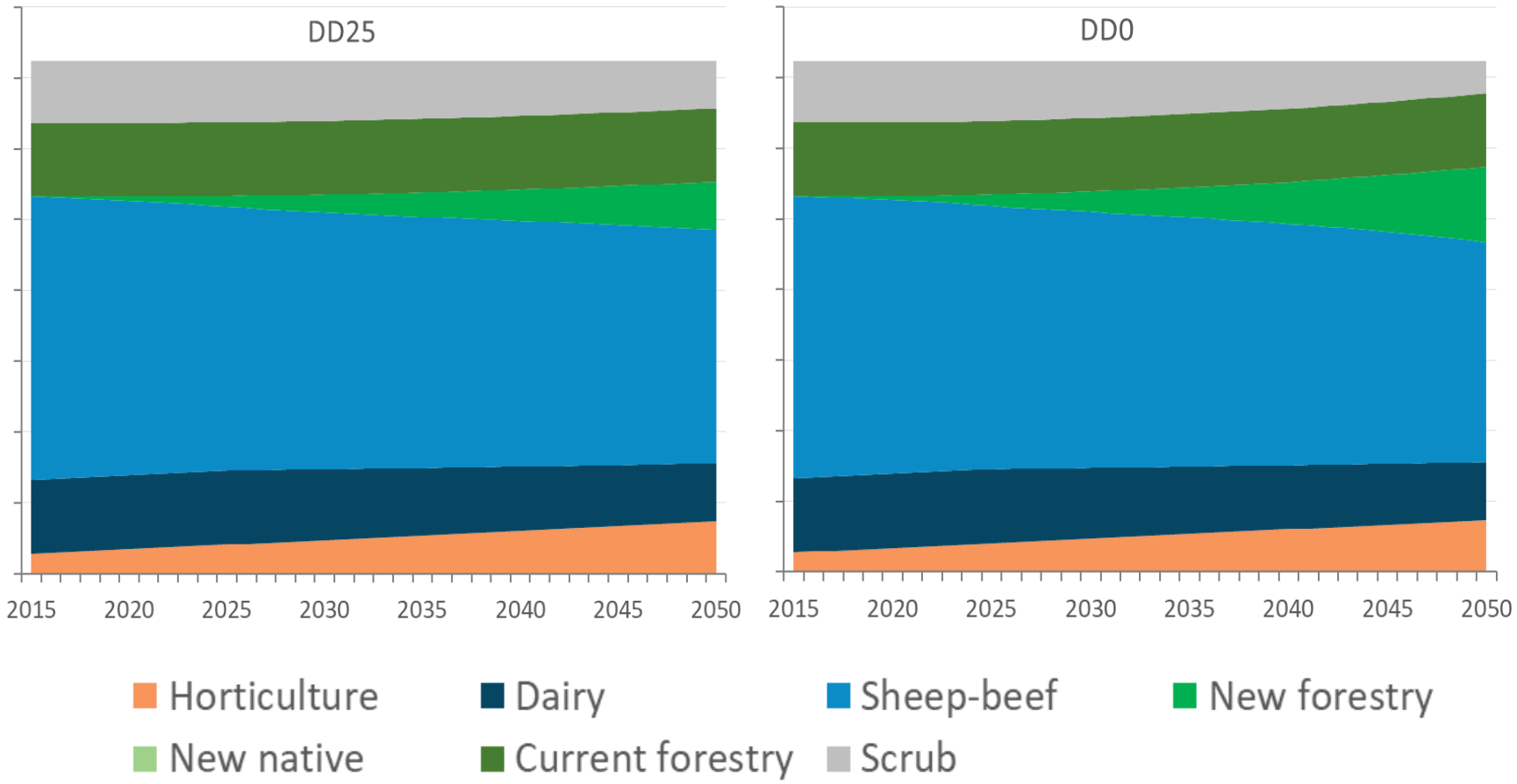


Insight 3: Transformational technology number one is…

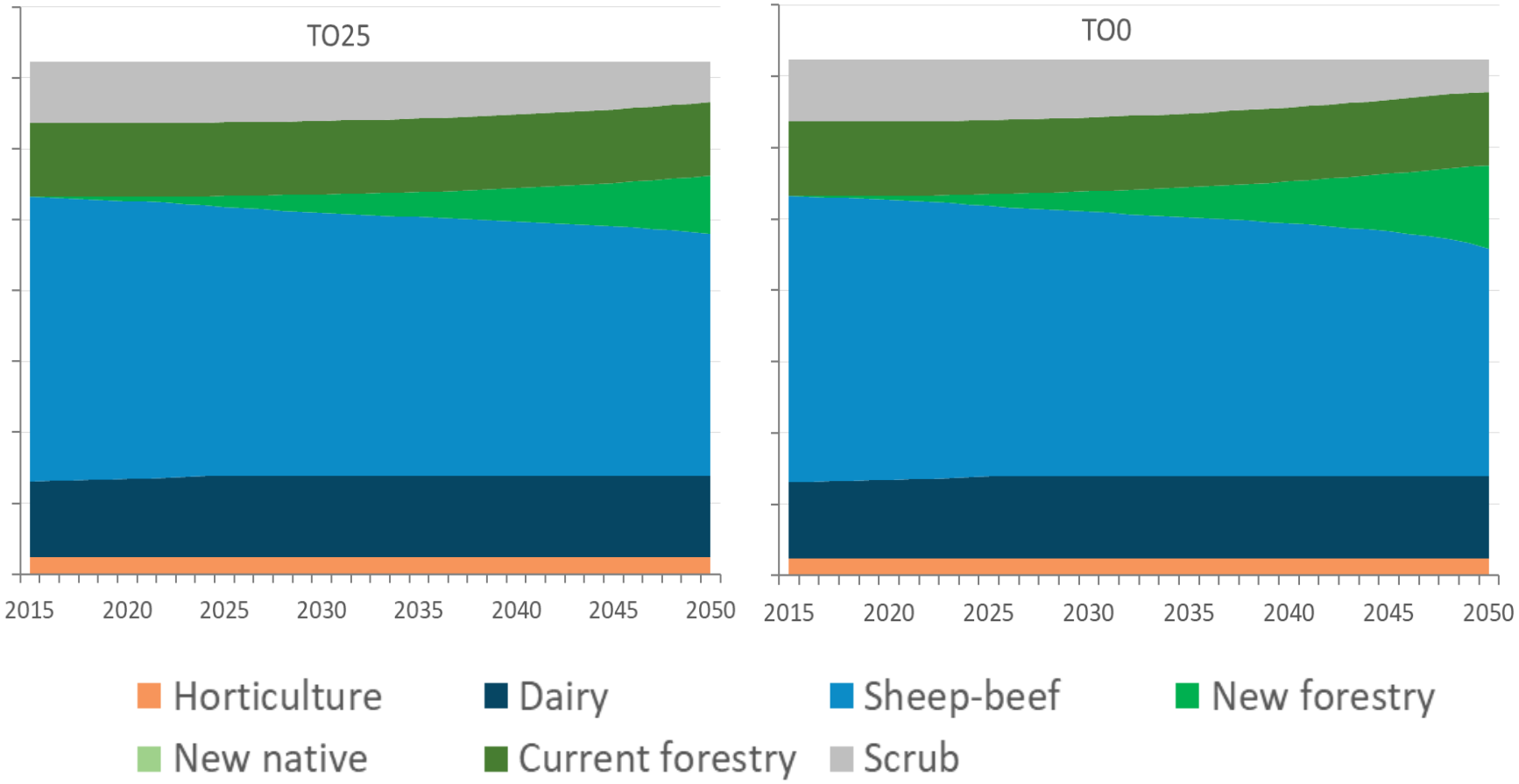
Insight 4: Extensive land-use change is required (PD)



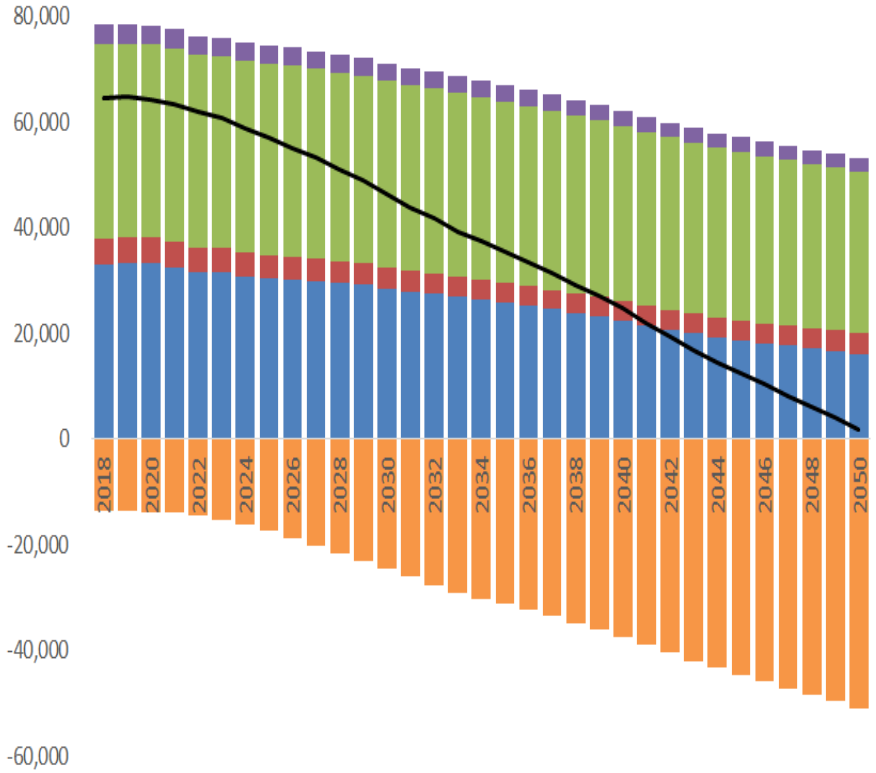
Insight 4: Extensive land-use change is required (DD)



Insight 4: Extensive land-use change is required (TO)



Forestry is not a ‘get-out-of-jail-free’ card



Forestry credits principally accrue when we add land area under forestry

If we stop planting new trees …

…our sequestration from tree growth will eventually stop, and net emissions will jump right back up to gross emissions

So how do we achieve our net zero emissions after 2050?

Insight : Transformational technology number two is…

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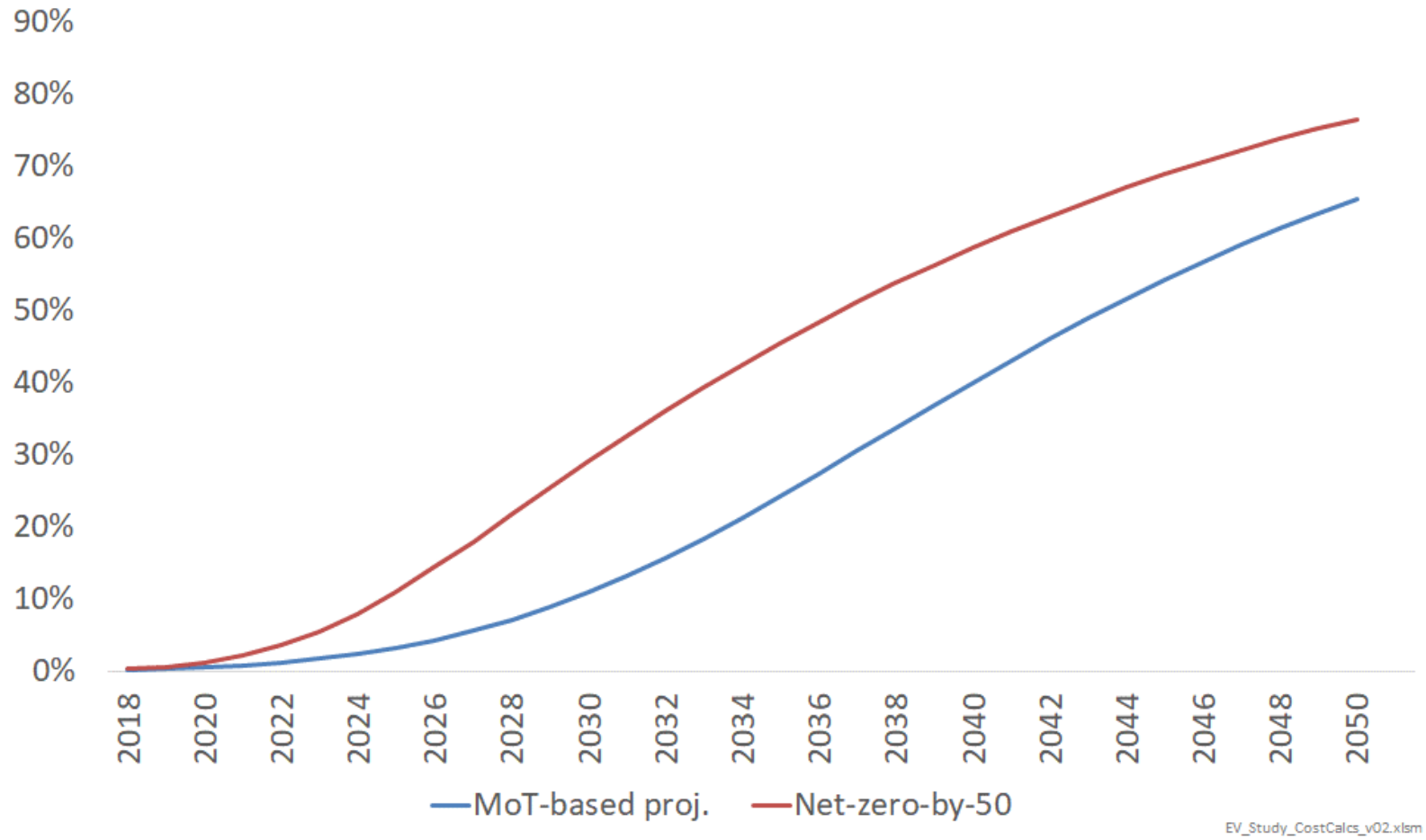
EVs are coming anyway but will they come fast enough?



The pace of change needs to be rapid

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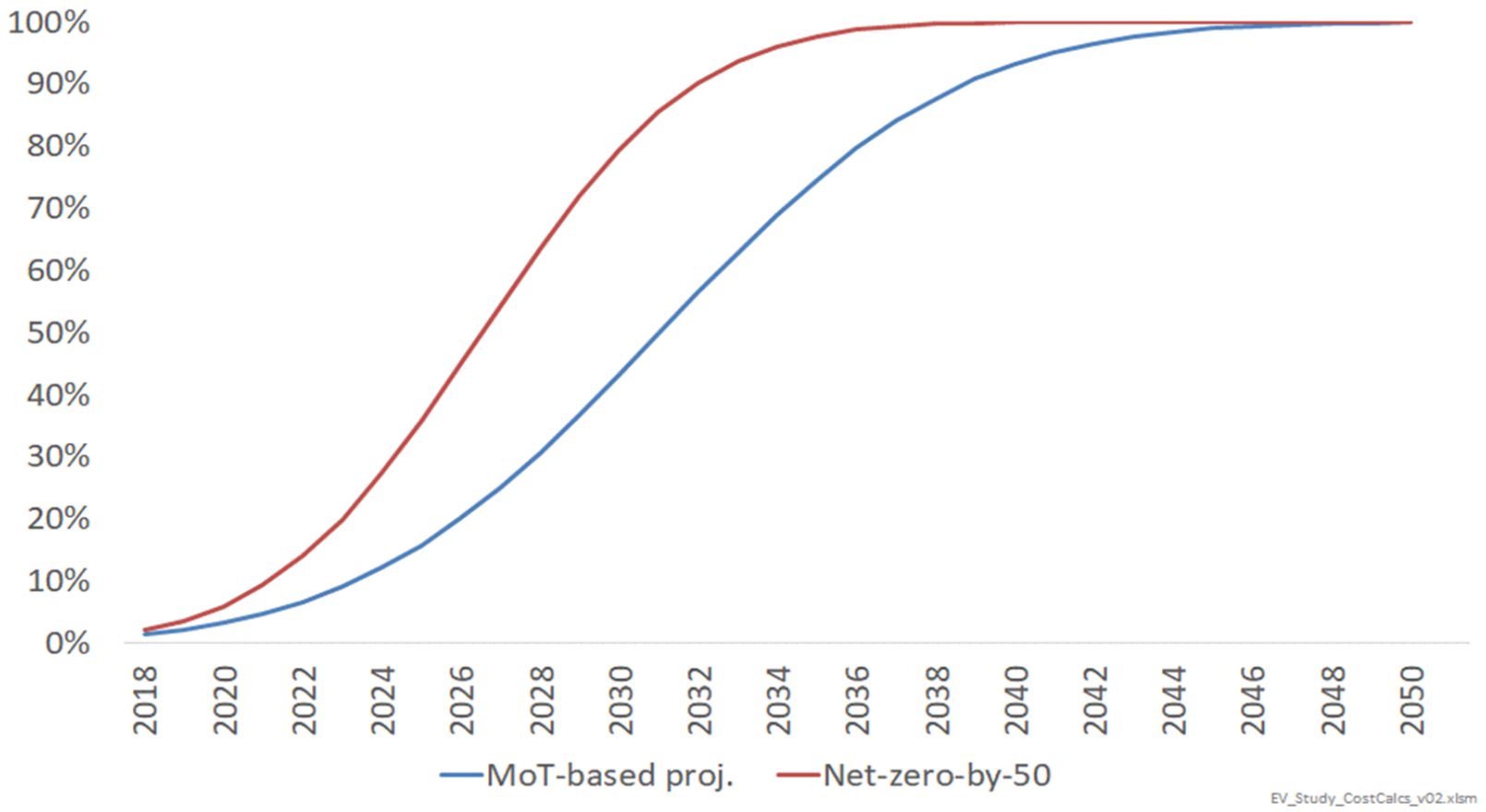
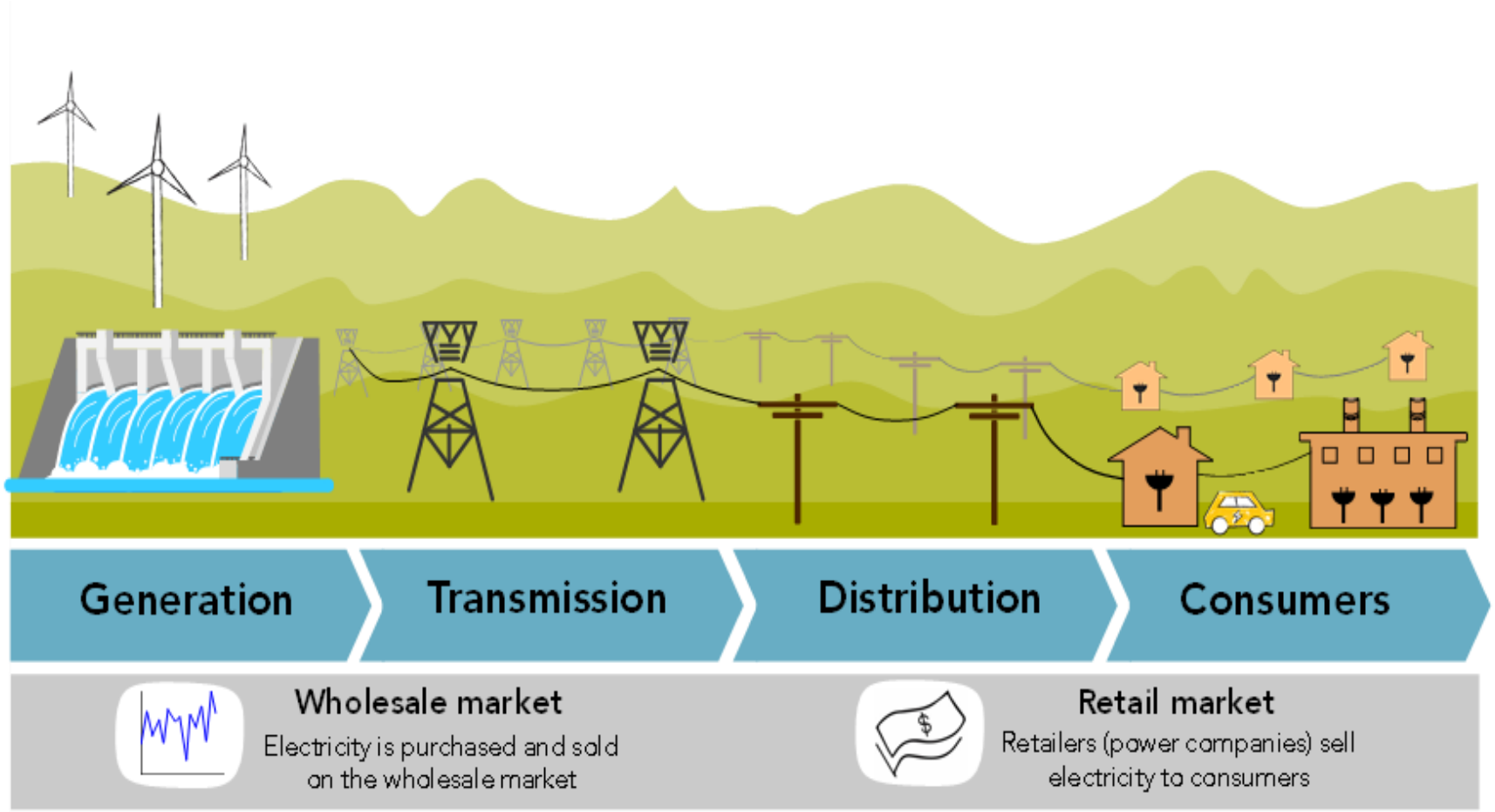
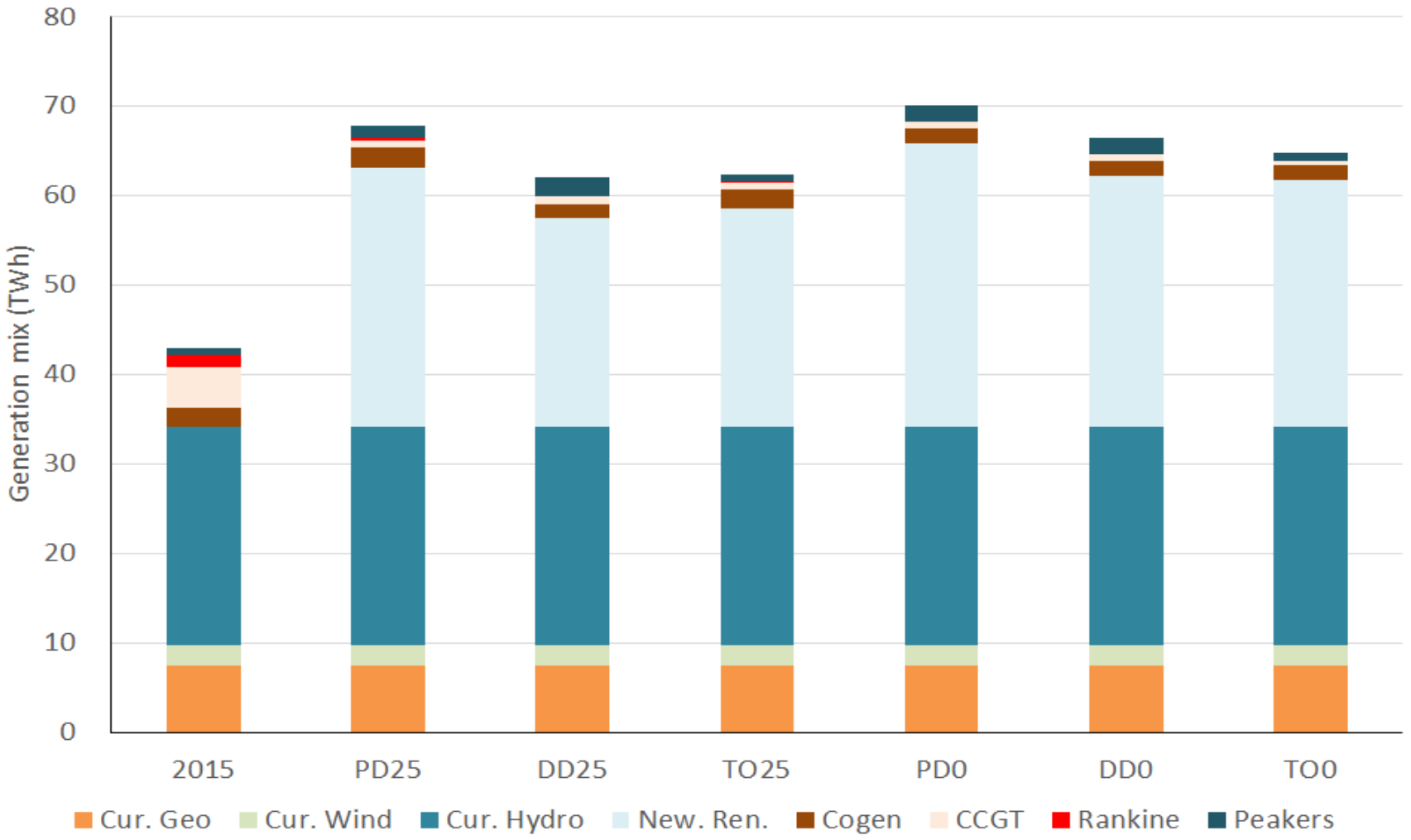
Proportion of light passenger vehicles entering NZ which are EVs



Insight 6: Electricity is key, and capacity will need to expand a lot



Insight 6: Electricity is key, and capacity will need to expand a lot



Summarising the insights from the modelling …

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- Achieving net zero by 2050 is possible but, without help from technology, will require very high emissions prices
- Expansion of forestry is key, but poses a challenge after 2050
- Dairy output does not change much, but sheep & beef sees a significant decline
- Expanding the light vehicle EV fleet and clean electricity generation also important (but don't aim for zero- emissions electricity!)

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Thanks!

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Directing Mitigation Policy and Action for Results:

13 April 2018

Motu Presentation

Dr Suzi Kerr

"Challenges and priorities for integrated climate change policy solutions"

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Funders:

Unlocking our low emissions future

What are New Zealand's global roles and local aims?

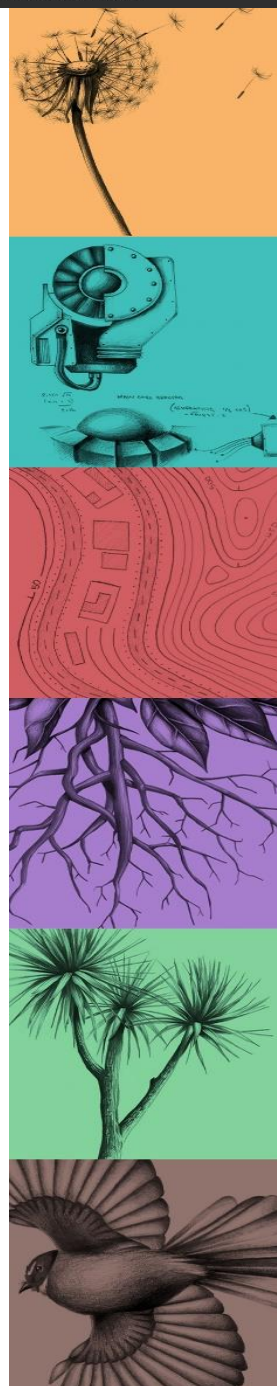
What we do matters most when it influences others and helps them act

What needs to change in New Zealand?

1. Investment, including in education
2. Technology and practice
3. Consumption patterns

What levers can facilitate and encourage change?

1. Politics and policy: help evolve and sustain society's vision and translate it into all aspects of government
2. Economic environment: emissions price and climate finance
3. Institutions: vision embedded in law, indigenous decision-making, civil society
4. Companies – innovation and leadership, manage structural shifts
5. Personal – leadership and cultural change



Low emissions in the land sector

It's not farmers' fault – but farmers must help solve it

We need to work with farmers and the rural community

Every emission that doesn't happen is a good emission.

All mitigation has value – including methane

New technology on dairy and sheep-beef farms will not be enough

But synthetic meat and milk might be

Need land-use change toward horticulture and native and exotic forests

This will take time if we want an attractive transition – start now

Effective emissions trading

The Emissions Trading Scheme can be made effective and is key to an effective transition.

An emissions price removes economic barriers and facilitates investment

Provide consistent signals of intent and allow flexible responses to genuine change

Emissions trading has to operate under:

genuine uncertainty (technology, international cooperation)

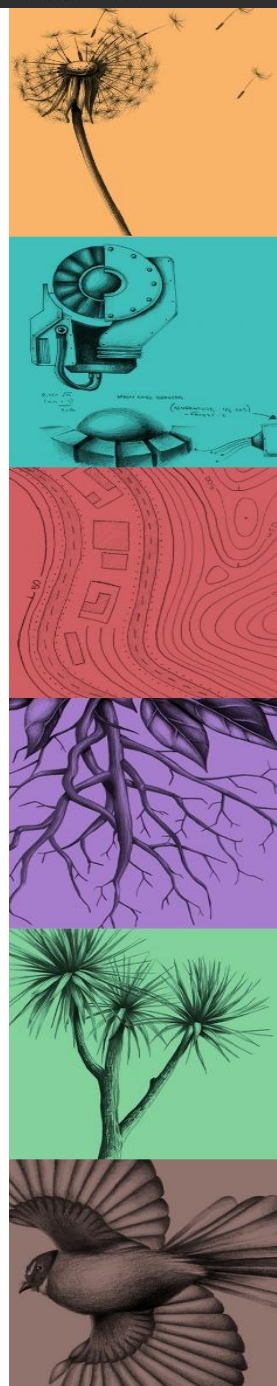
We know neither the correct price nor the correct quantity of emissions

and political uncertainty (free-riding)

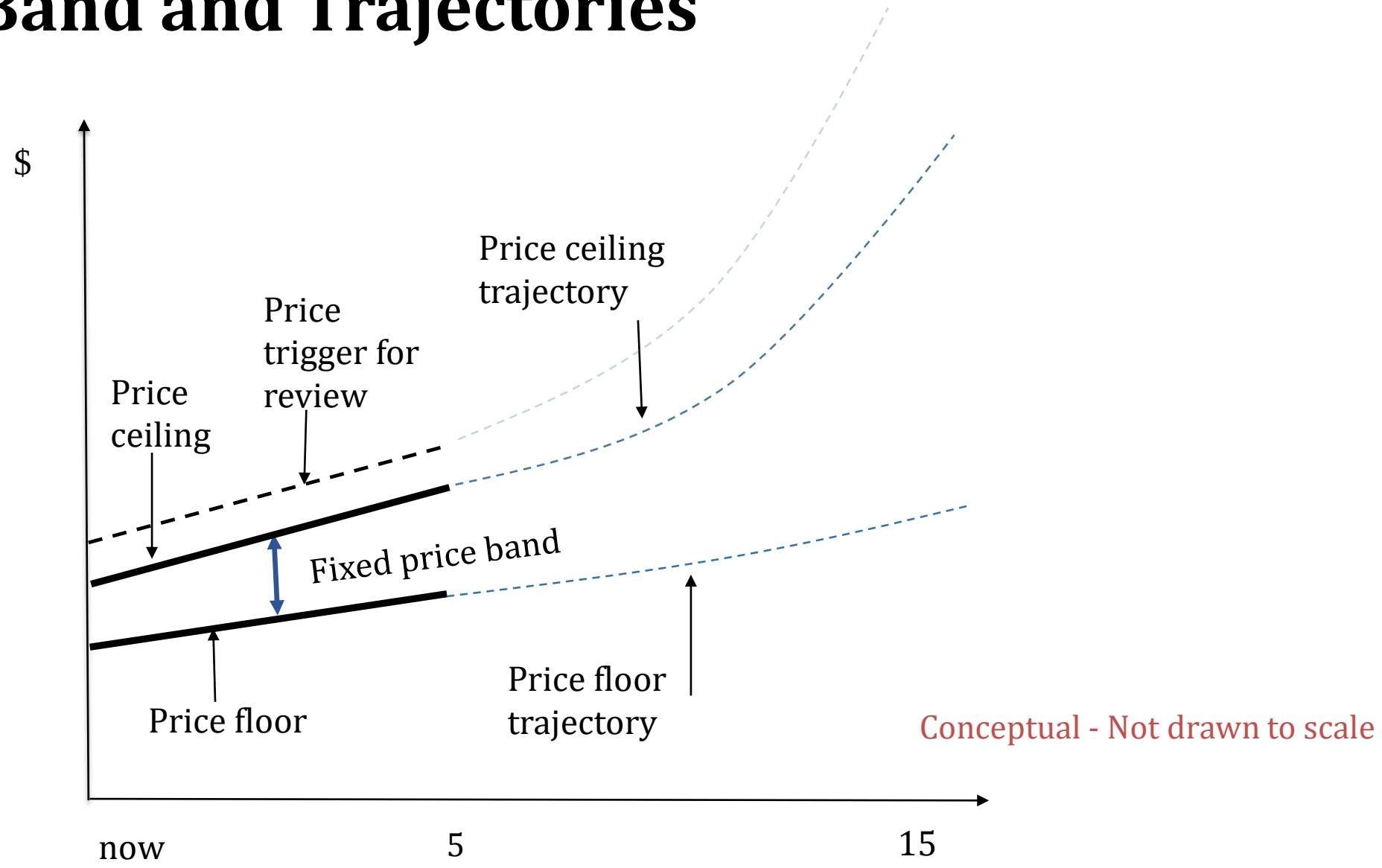
We need to set a floor price above a plausible minimum level to meet global targets

in a perfect world with full cooperation this would have no effect

in the real world, perceived political risk can freeze investment and raise costs



Price Band and Trajectories



Conceptual - Not drawn to scale

Effective emissions trading

Whether agriculture should be in the ETS is not the key issue for either agricultural emissions or the ETS.

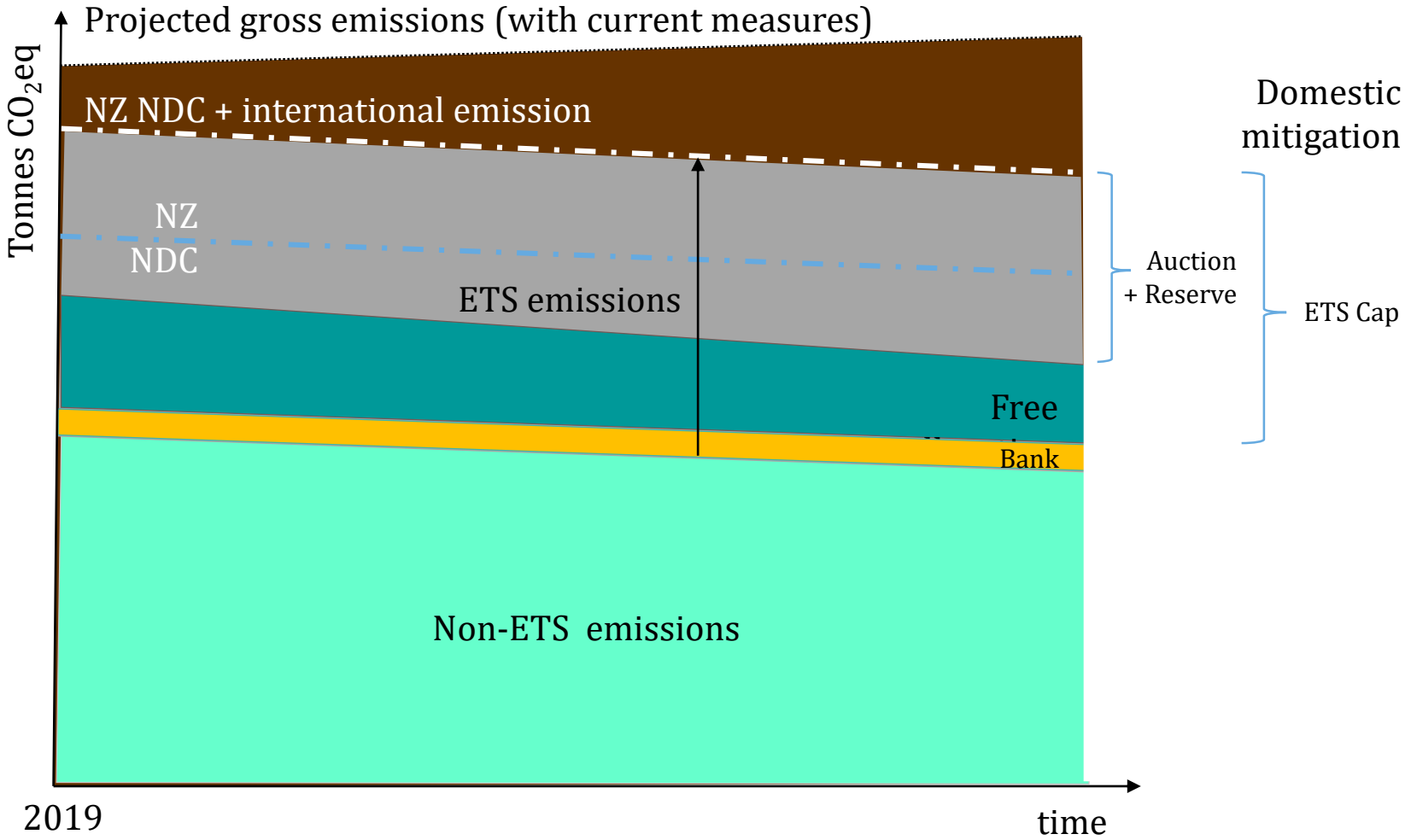
Sending clear signals that the ETS will be made consistent with domestic 2030 targets is urgent

proving the pessimistic models wrong is then the job of companies, investors and the public

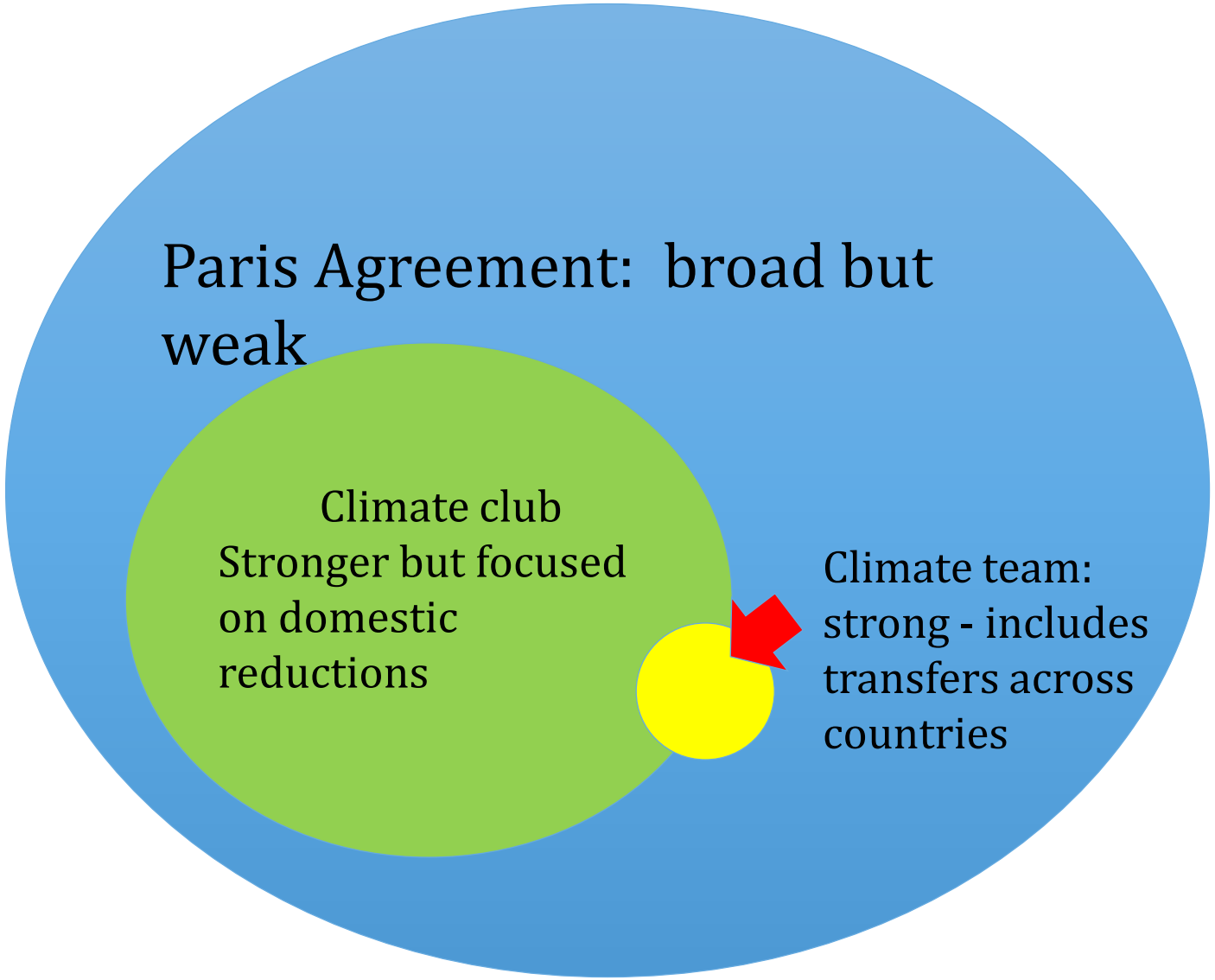
- with support from government

Align the Cap with targets – then adapt as we learn

Conceptual - Not drawn to scale



Innovate with how we support mitigation abroad



Getting a fast start – what do we do right now?

New Zealand resources are limited - focus on actions with impact and urgency

- that will potentially have large long-term impact globally;
- where delay will be costly either because of stranded assets or social transition costs or because of the need for learning

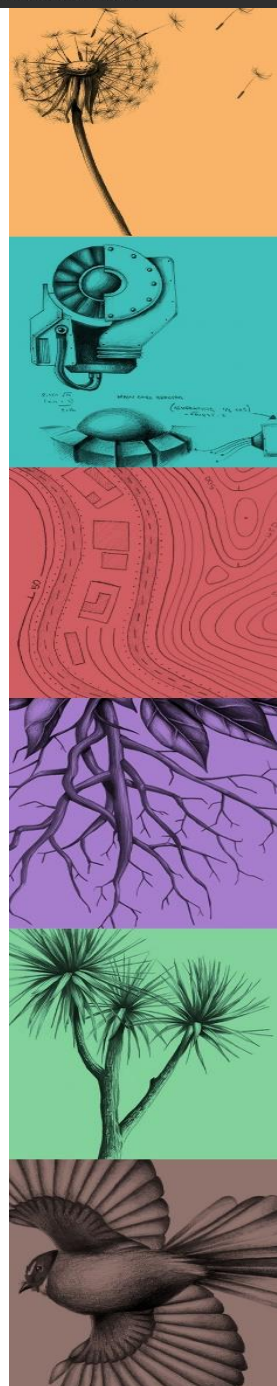
We don't know the best path – act under uncertainty

- Diversify efforts – but not at the expense of adequate depth in our areas of comparative advantage
- Create real options so we can do well in many scenarios
- Be responsive as we learn

Enable and encourage a wide set of actors – not a centrally planned solution

- ETS has a key role here – we can send initial signals and start auctioning now
- Shifts in education – for consumers, future innovators and workers
- Give permission to be bold and make mistakes

Leadership by all of us: Evolving and sharing a vision for a thriving low emissions New Zealand and world



Let's build our waka, see our island & paddle together

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Morning Tea

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John Carnegie
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British High Commission

TE AUAHA
NZ Institute of Creativity

E-mission possible roundtable

John Carnegie

BusinessNZ

13 April 2018

BusinessNZ

GROWING PROSPERITY AND POTENTIAL

I don’t know the future

“Prediction is very difficult, especially if it’s about the future”

Niels Bohr

Martin Cooper photographed in 2007 with his 1973 handheld mobile phone prototype

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Certainty

- I hate this word
- business needs predictability and stability
- business needs political durability

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Direction of travel

- if I were you, I wouldn't start from here…
- clarity needed
  - what does keeping global temperature increases below 2^{o} mean for New Zealand?
  - how do we determine what New Zealand's share of action should be?
  - what environmental gains should we pursue and at what cost?

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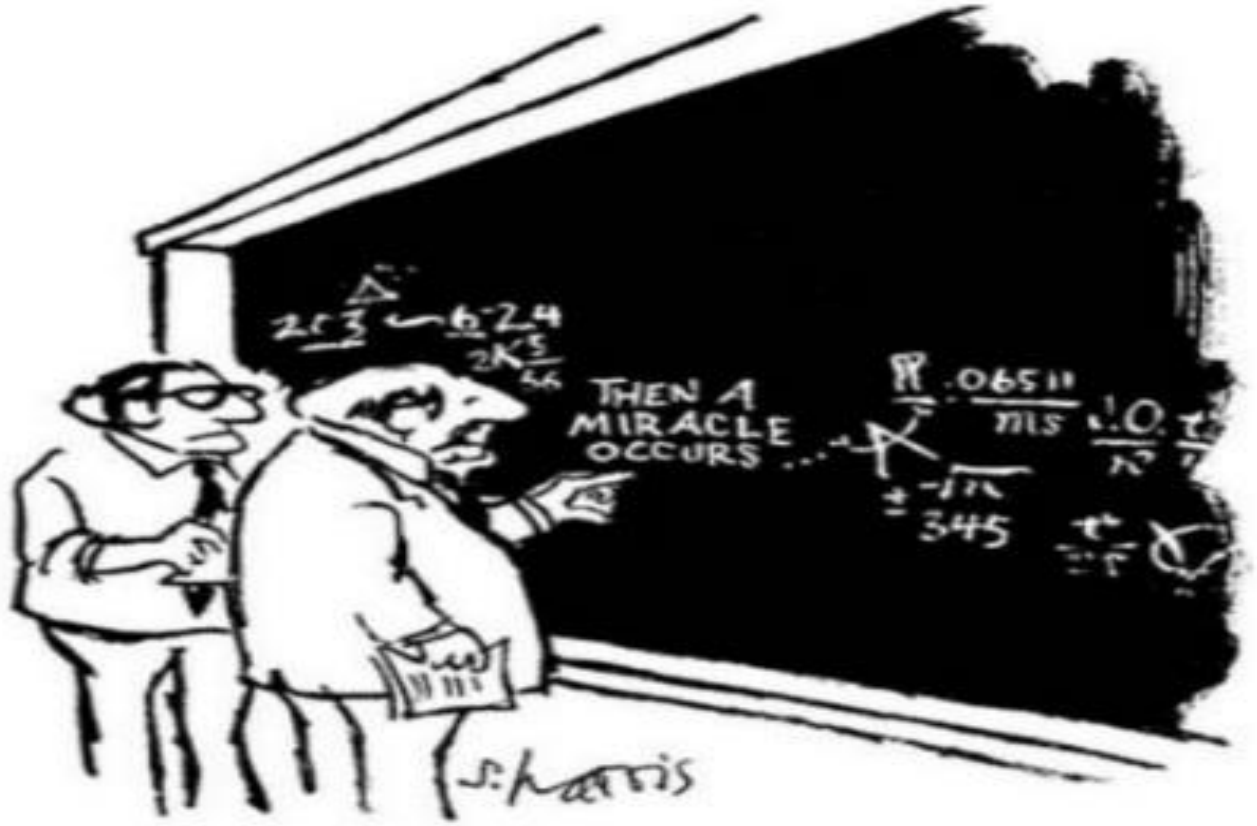
Otherwise we get this…



"I think you should be more explicit here in step two."

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Thank you

- Get in touch
  - jcarnegie@businessnz.org.nz
  - @JohnCarnegie7

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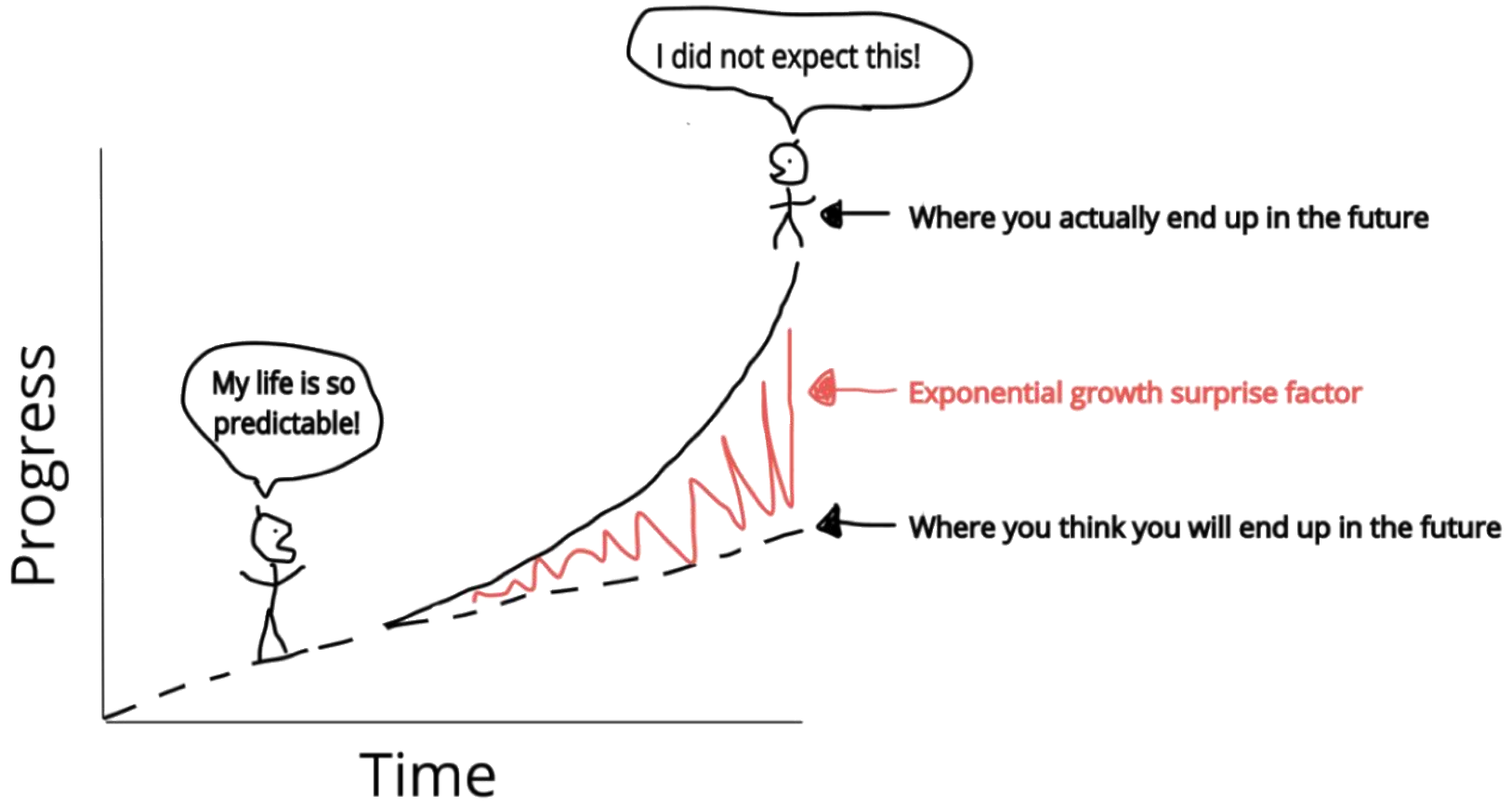
NEW ZEALAND SMART GRID FORUM

Architecting a future electricity system for all New Zealanders

Nirvana: Linear trends always lose to exponential

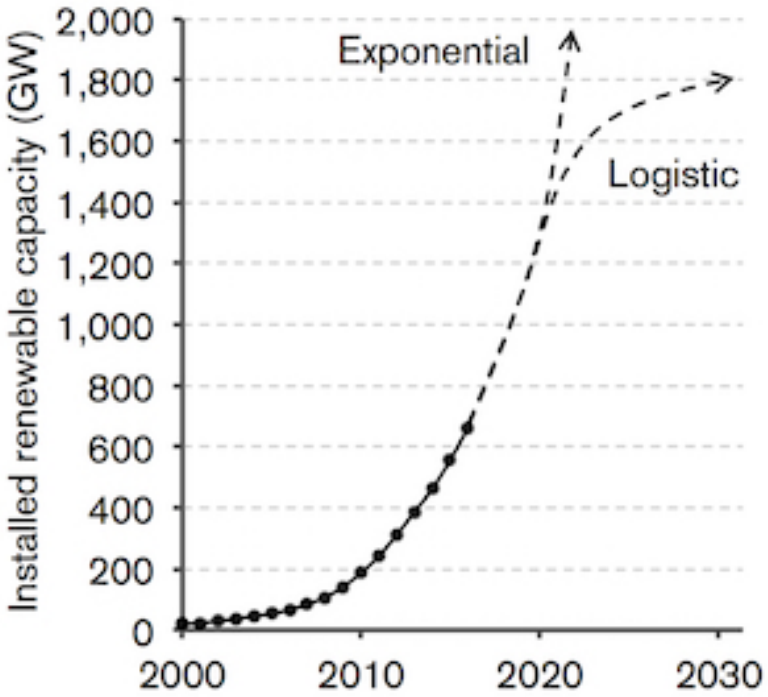


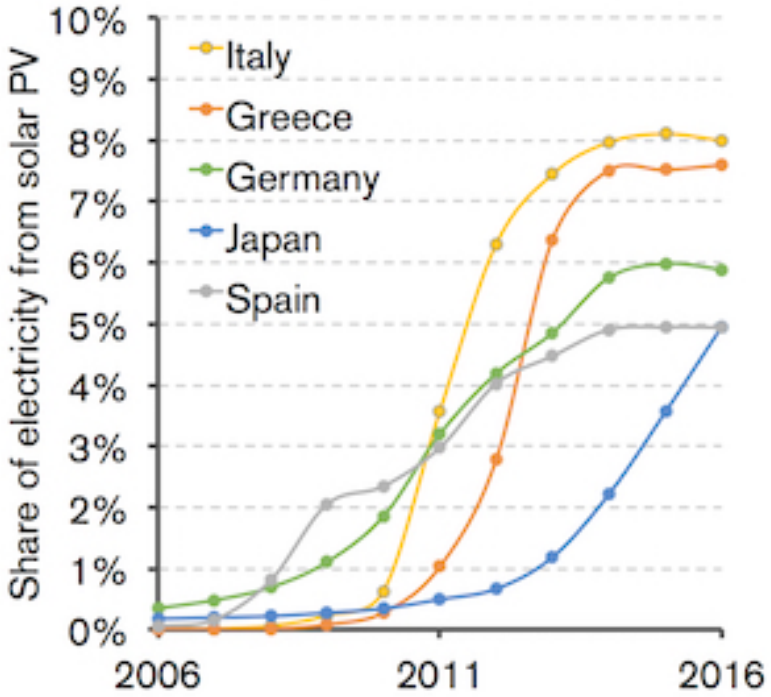
NEW ZEALAND SMART GRID FORUM

Architecting a future electricity system for all New Zealanders

Source: *How to Think Exponentially and Better Predict the Future*, Singularity Hub

Saṃsāra: We might not be on an exponential curve for long





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Architecting a future electricity system for all New Zealanders

Source: *BP Statistical Review of World Energy* & *Breakthrough Institute*

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Alison Dewes
Pamu

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SOLUTION: ALIGN TO + STRENGTHEN WATER POLICY

"FARM EMISSION POLICY"

Problem

- **Behaviours inside farm gate have been driven in counter intuitive direction** due to grandparented allocation of resources.
- N Loss using Overseer as allocation tool rewards Polluters with N emission rights(Waikato/Rotorua/Canterbury)
- Drives grabbing and peverse behaviours and is inequitable.
- N Toxicity in water as bottom line has protected business as usual and can indicate emission headroom.
- **Regional Council Capture** has resulted in watered down rules, monitoring, compliance & enforcement.
- Industry leadership (Fed Farmers, Dairy NZ, Fonterra, Irrigation NZ) supporting Single Nutrient Mgt and Nitrogen Toxicity in Waterways.

- **Solution:**
- Need to Strengthen N limits from Toxicity in NPS FW to Ecosystem Health.
- Overseer is good at farm level but NOT catchment level.
- Stop using Overseer as an Allocation method = Not Working.
- Align a GHG Reduction Policy to water emission reduction policy -Use ANZECC limits (10 times less vs Toxicity limits).
- Need to motivate and inspire farmers to do the right thing. Risk based scorecard system.

ASSIST AGRICULTURE (LEAST ABLE?) TO CHANGE

- **Generate a Farm Emissions Policy** (ecosystem health and GHG)

- **Monitor it without the use of self interested parties**. (Regional Councils need to regulate, monitor and enforce) –
- **Collaboration has not worked because resource allocation is a competitive process**.

- Grandparenting N loss to toxic levels in water plus using OVERSEER for allocation rewards polluters, but has penalised "good dairy," drystock, iwi and forestry.
- **Ethical Leadership in Ag has been penalised under current policies = Low N loss farms.** Don't want to repeat this.(100s of farms I have worked with)

- **Use Environmental Scorecard approach to reward innovators and penalise high risk activities.**
- Farming(dairy) in some regions can reduce N leach by 40% (Pamu – Canterbury/Waikato) + drop GHG emissions by 10% now.
- **Who has the gumboots on making change?**
- Promote and support – **Retire vulnerable land making better use of good land, reducing SR, reducing anthropogenic N and winter cropping, fewer better animals, optimised diets, more plants.**

DAIRY ENVIRONMENTAL IMPACT ASSESSMENT
Broadlands Dairy - 2015/2016

LANDCORP NEW ZEALAND

	DEFINITION	1. LOW RISK - EXCELLENT PERFORMANCE	2. LOW - MEDIUM RISK	3. MEDIUM RISK	4. MED- HIGH RISK	5. HIGH RISK- NEEDS ATTENTION	Risk Rating	National Best	Regional Best
Productivity Measures	EBIT per KG of N lost to water		$33.64				2	$97.08	$40.33
	KG MS per KG of N lost to water				21.49		4	126.25	31.15
Efficiency Measures	GHG KG per KG MS	10.77					1	10.04	10.04
	N conversion efficiency %			26			3	36	30
	KG fertiliser N applied per ha				219		4	82	129
Nutrient Risk Measures	KG N lost to water per ha				49		4	5	22
	KG P lost to water per ha					2.90	5	0.40	1.00
Effluent Management	KG N/ha applied as effluent on effluent block					149	5	20	20
	KG N/ha applied as effluent + fertiliser on effluent block			214			3	110	156
	% Effective Area receiving Effluent				15		4	45	28
	Dairy effluent storage risk assessment	1					1	1	1
Soil Quality & Protection	% Effective Area in Slope >7°	1.79					1	0.00	0.56
Waterway Management	% SDWA fencing completed	100					1	100	100
Sustainability	KG PKE per cow wintered				287.42		4	0.00	53.09
Biodiversity Support	% non-Effective Area					2.95	5	37.20	37.20
Adapted from: Dewes, A. M. (2014). Economic resilience and environmental performance of dairy farms in the upper Waikato region. (Masters Thesis).						**Risk Rating**	**47**	**24**	**40**

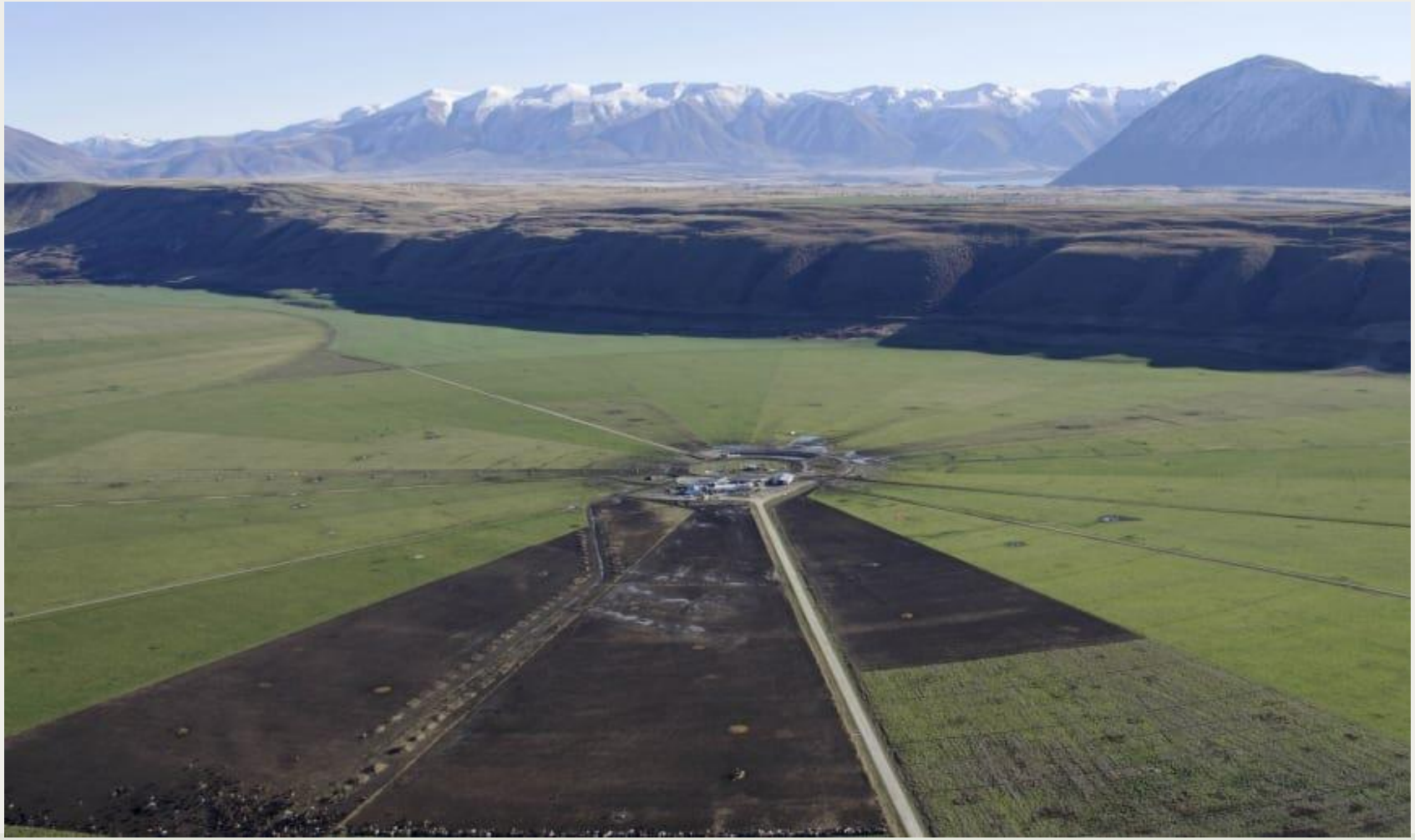
Internal Challenges = Economics vs Ethics

Social Licence
Shelter-Shade-Mud

Changing Landscapes

Climate Change
(storms and droughts)

Swim-ability,
Water Quality



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Tina Porou

Poipoia

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TE AUAHA
NZ Institute of Creativity

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Directing Mitigation Policy and Action for Results:

13 April 2018

Closing Remarks

Catherine Leining

Motu Economic and Public Policy Research

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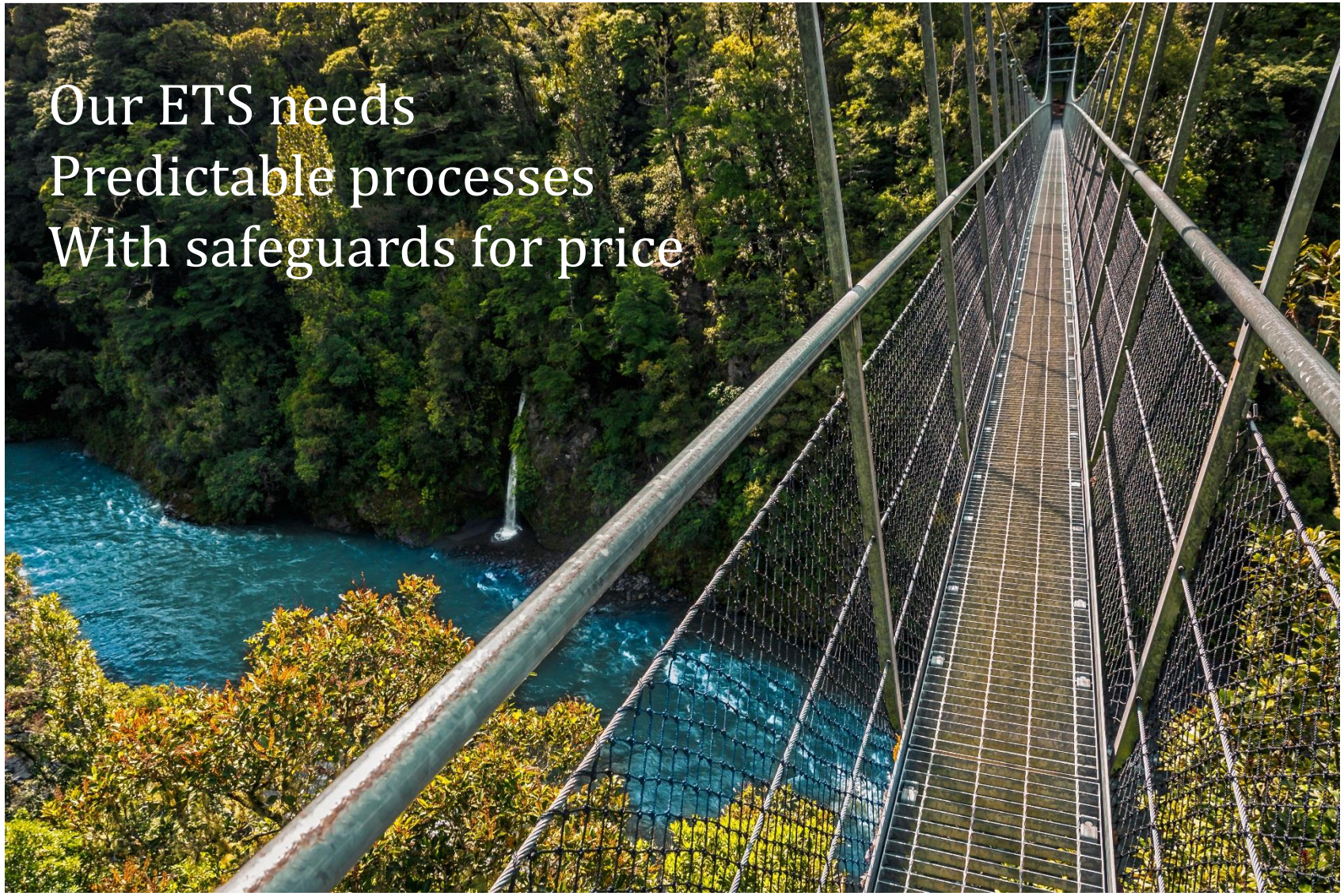
Funders:

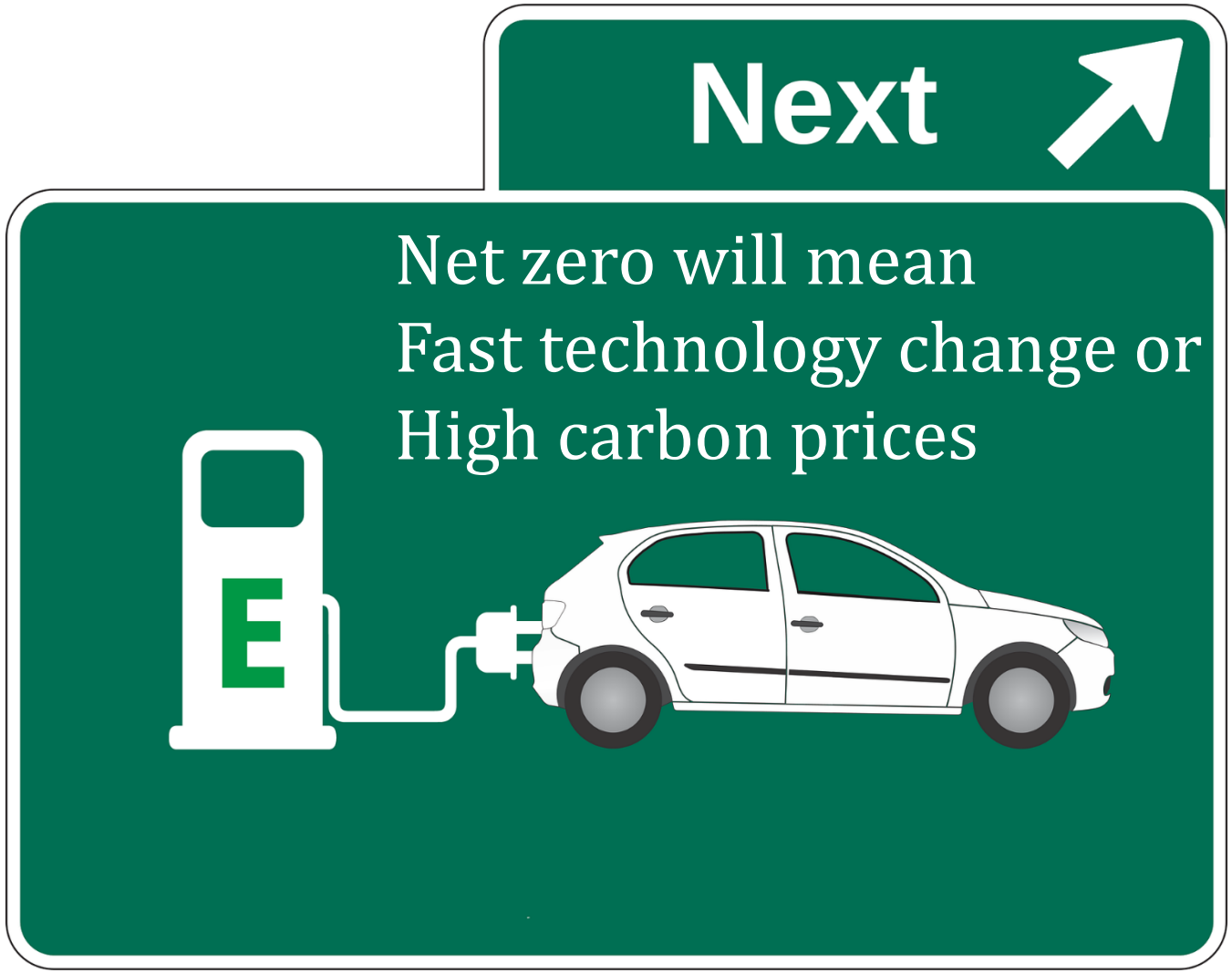
Roundtable 1: Unlocking our Low-Emission Future

Roundtable 2: Mitigation in the Land Sector

Roundtable 3: Low-emission investment and ETS reform



Roundtable 4: Directing policy and action for results



Roundtable 4: Directing policy and action for results

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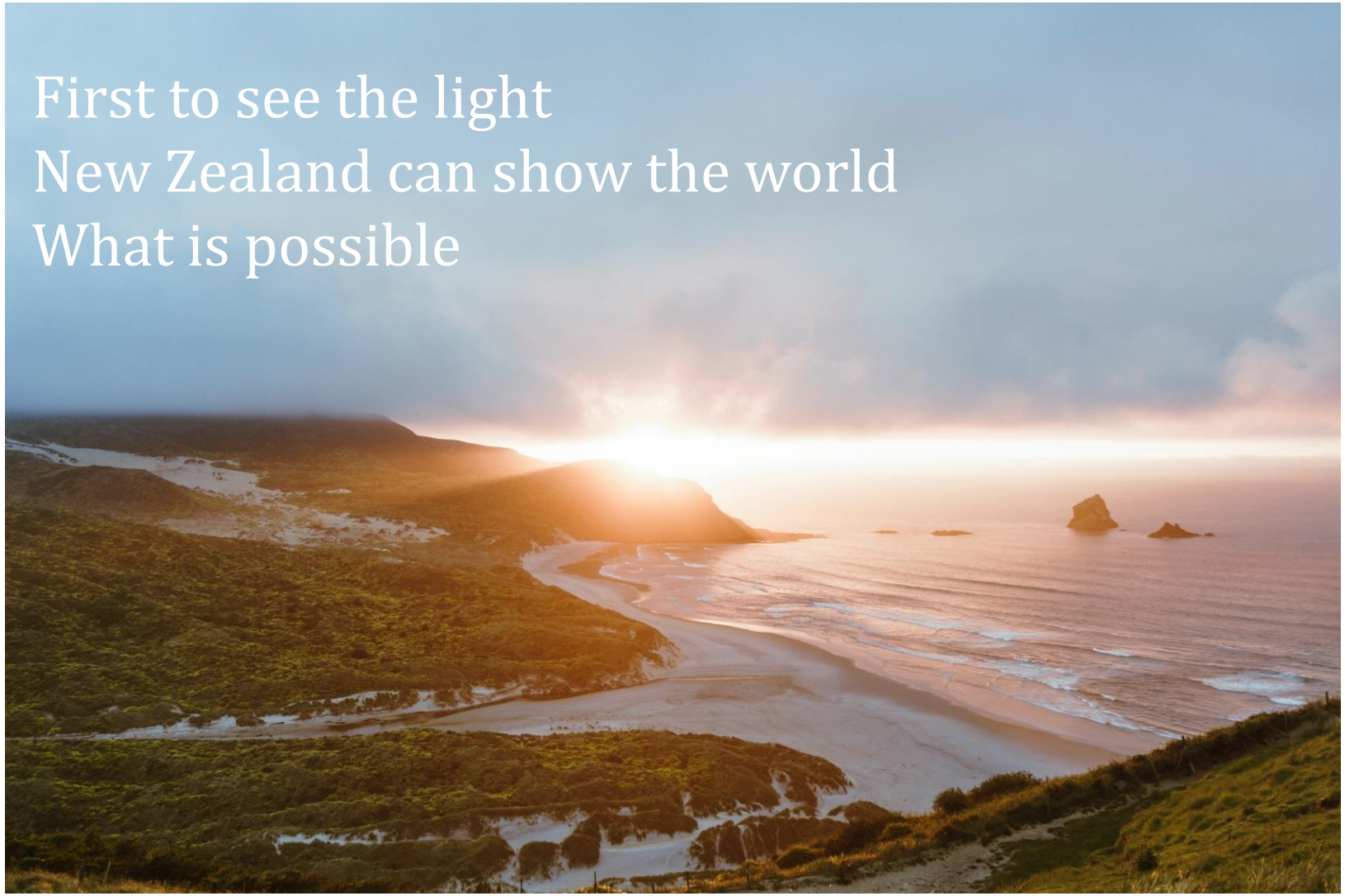
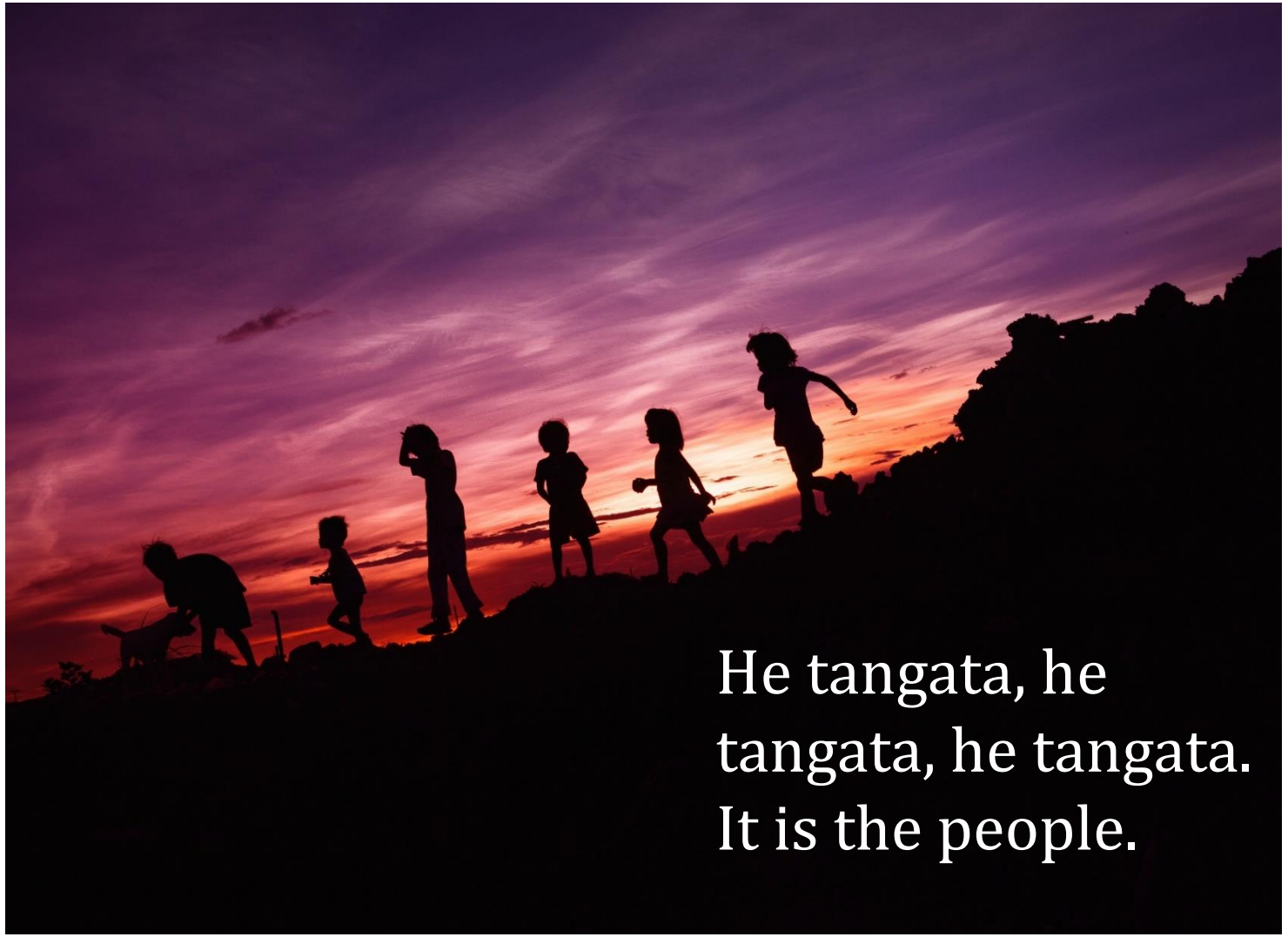


Roundtable 4: Directing policy and action for results



Warm thanks to…

Our keynote speakers and panellists

Cameron Hepburn, Jason Gray, Murray Sherwin, Geoff Lewis, John Carnegie, John Hancock, Alison Dewes and Tina Porou

Our funders

Aotearoa Foundation, Productivity Commission, Ministry for the Environment, The Treasury, and the British High Commission

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All of you for participating!

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