



ClimateWorks Australia was co-founded by Monash University and The Myer Foundation
and works within the Monash Sustainable Development Institute

Climate and Carbon Challenges

Presentation to Sustainable Engineering Society, Engineers Australia

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Thursday April 11 2019



ClimateWorks
AUSTRALIA



ClimateWorks Australia is an expert, independent adviser, acting as a bridge between research and action to enable new approaches that accelerate the transition to net zero emissions by 2050 alongside economic growth, for Australia and our region.

In 2008, The Myer Foundation commissioned a feasibility study asking how philanthropy could effectively tackle climate change. It revealed a need to bridge the gap between research and tangible action. And so The Myer foundation partnered with Monash University to create ClimateWorks Australia.



MONASH
University

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INSTITUTE

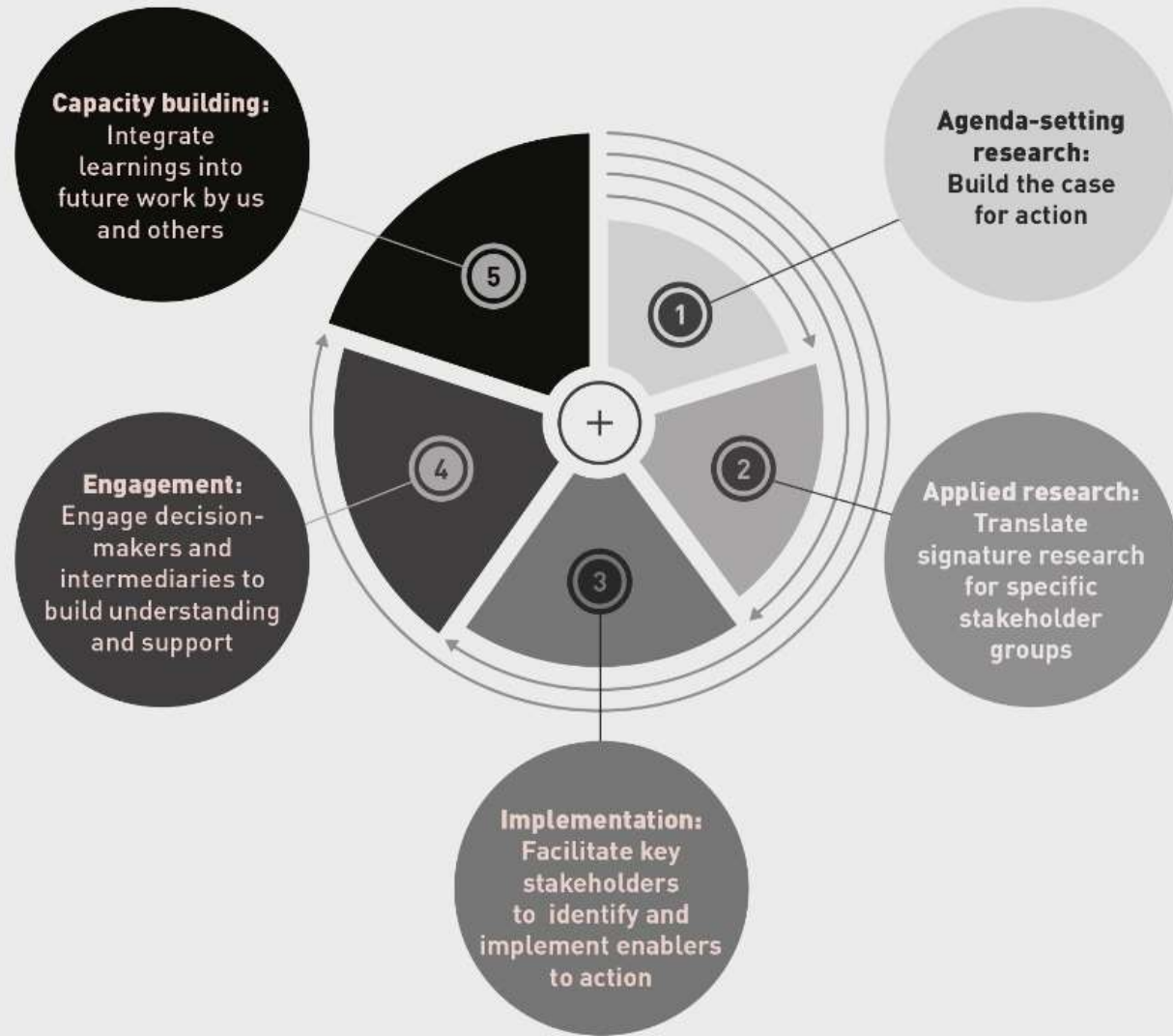


THE MYER
FOUNDATION

*The Myer Foundation recently described ClimateWorks as their
“...most successful grant over the 60 years of the Foundation’s work”*

ClimateWorks takes a unique end-to-end approach

This involves building an evidence base for strong climate action, ensuring it is well understood and supported by decision-makers, addressing any barriers to implementation, and building capacity in ourselves and others to inform future work.



Agenda

- The problem
- Our current emissions situation
- The transition
- Sectoral level strategies/actions



A bit about me – Tom Yankos

Joined in 2014:



Studied engineering at:



My interests include:



From the floor:

Put up your hand, all the:

- Environmental engineers?
- Mechanical engineers?
- Electrical engineers?
- Civil engineers?
- Others?

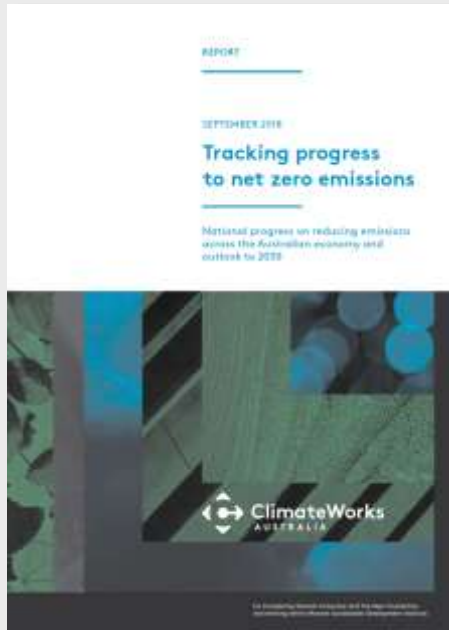
Paris Agreement

Actions

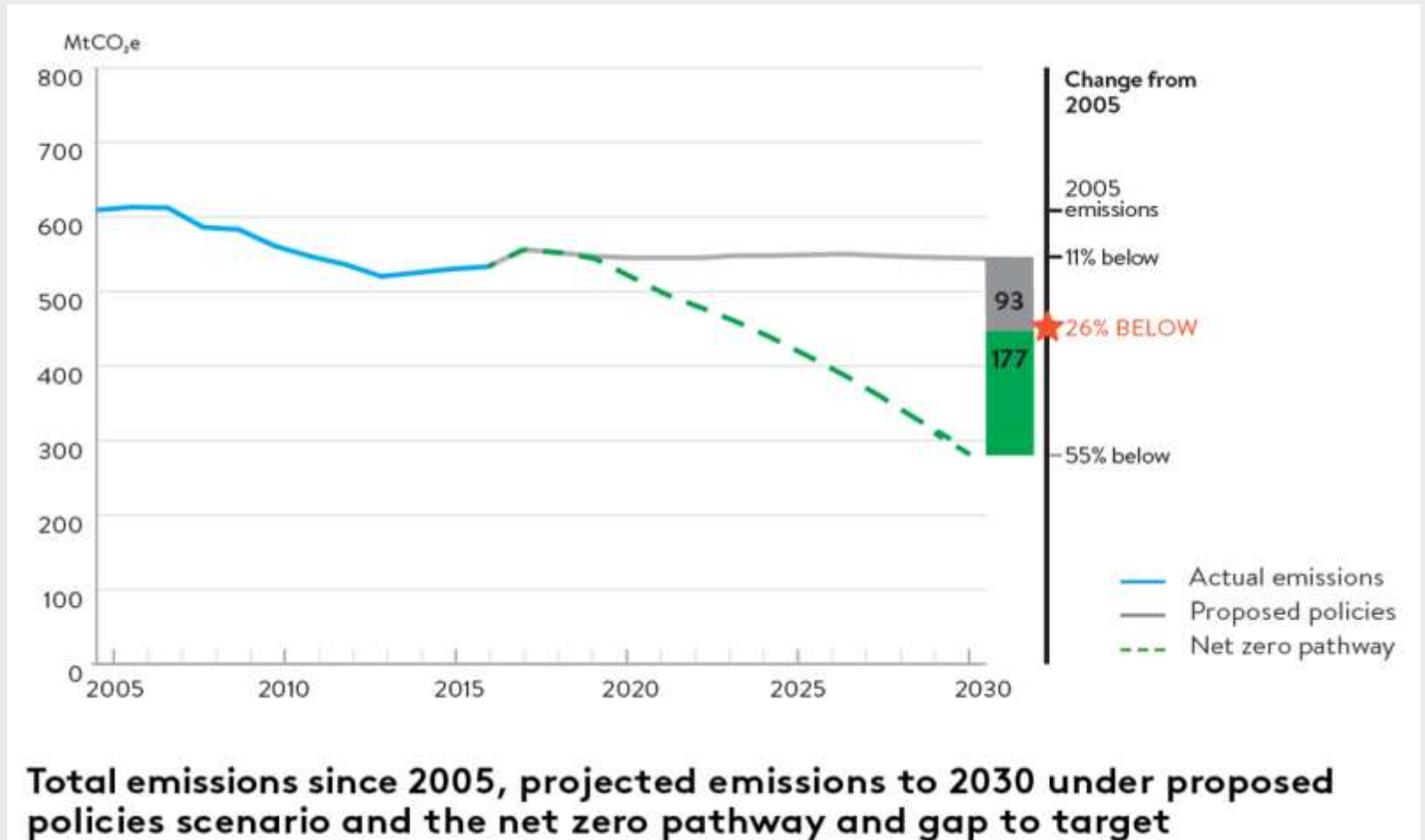
1. Commits all countries to keep global temperature risk to well below 2 degrees, aiming for 1.5 degrees
2. Acknowledges that below 2°C means net zero emissions by the second half of the century
3. Countries must 'ratchet up' pledges every 5 years
4. Urges all countries to develop mid-century decarbonisation strategies



Australia is not yet on track to a net zero pathway – but has the potential to get there



climateworksaustralia.org

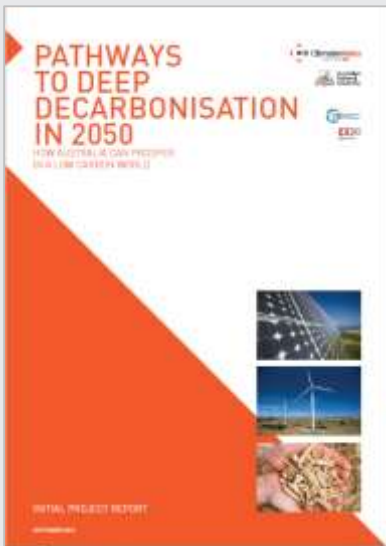


Emissions performance vary greatly across sectors, and the reductions have been heavily dependent on the land sector

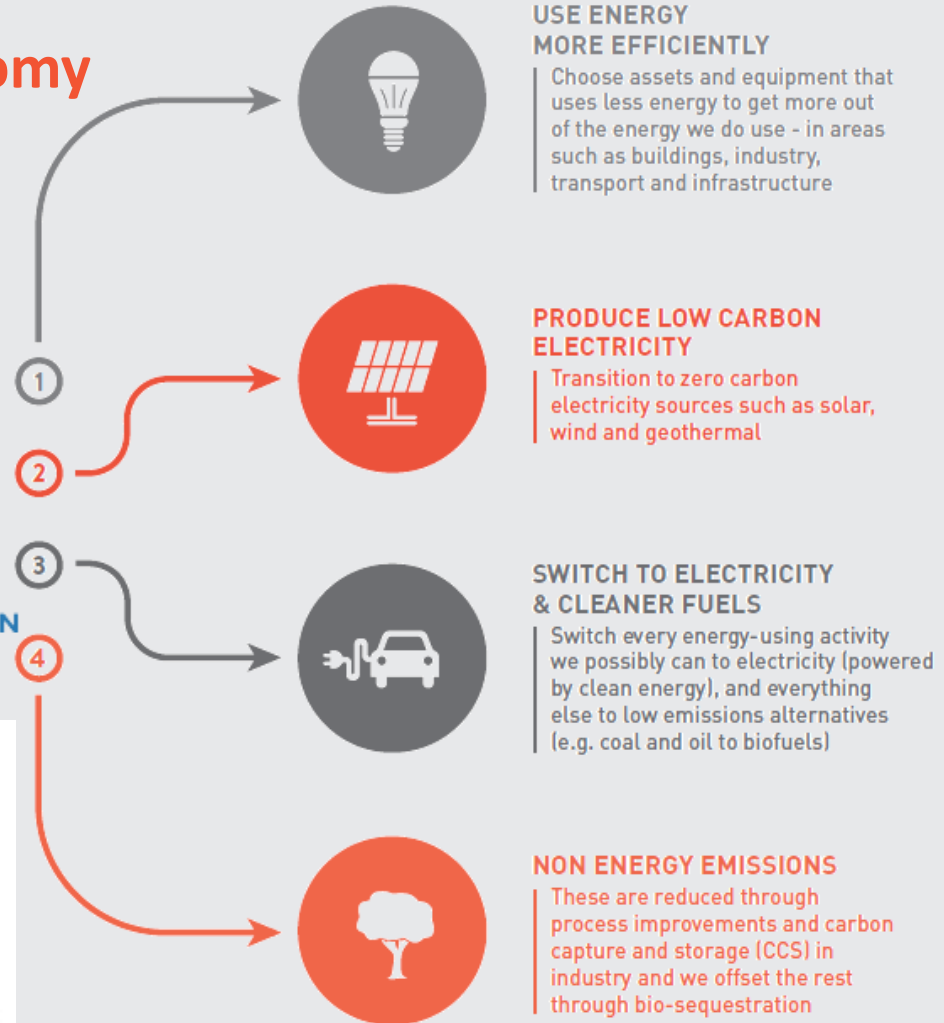
Sector	Change in emissions from 2005 to latest year of data	Share of emissions in 2016	Share of emissions excluding electricity use
Electricity	3% below (2017) ▼	37% (includes end use by other sectors)	n/a
Industry	8% above (2016) ▲	42%	29%
Buildings	5% above (2016) ▲	21%	3%
Transport	19% above (2016) ▲	19%	19%
Land and agriculture	64% below (2016) ▼	12%	12%
Australia	11% below (2017) ▼	<i>Emissions 533 MtCO₂e</i>	

ClimateWorks has developed expertise in ambitious climate scenarios for the Australian economy

We demonstrated it is possible for Australia to transition from one of the world's most emissions intensive economies to net zero emissions in 2050, while our economy continues to grow.

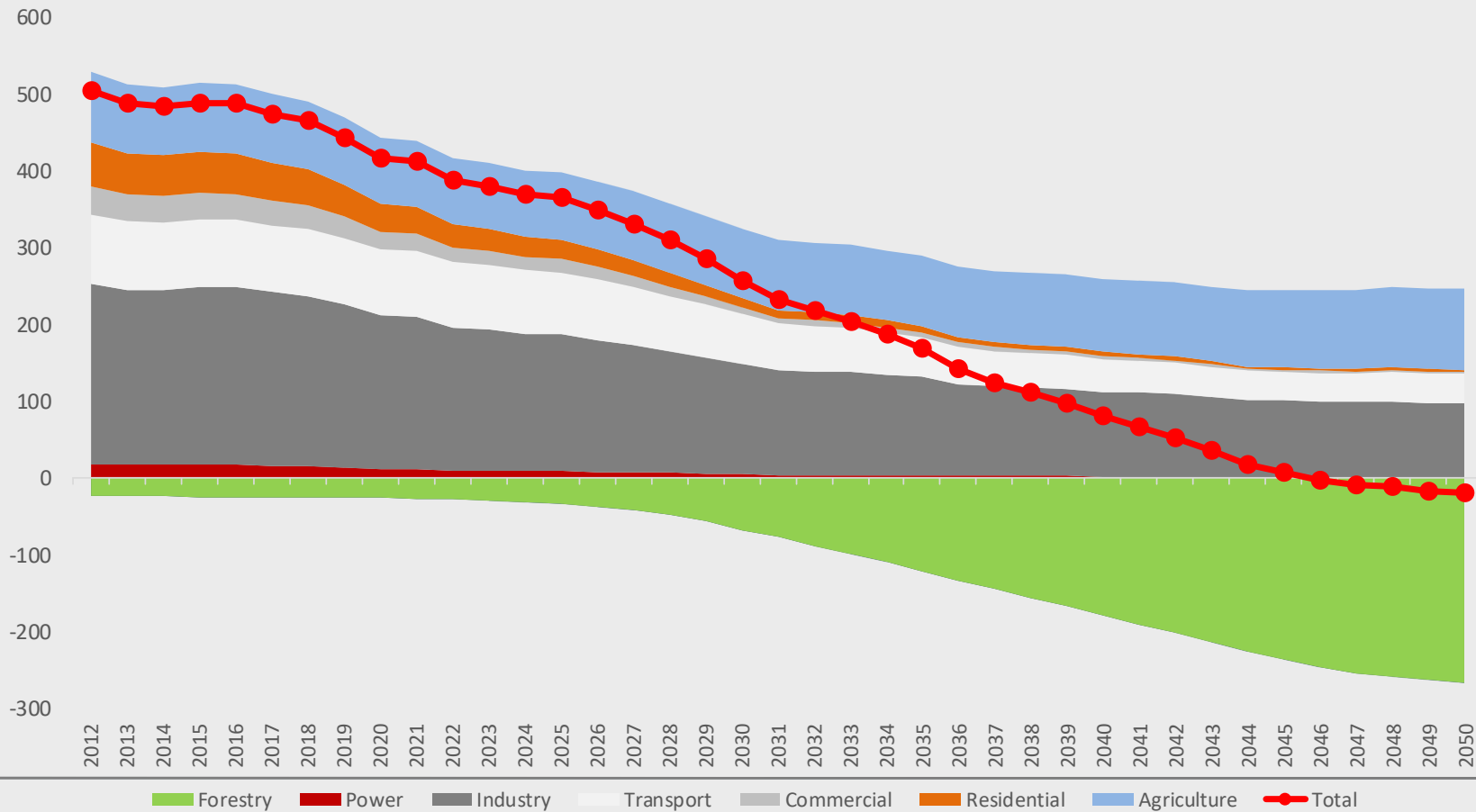


DDPP DEEP DECARBONIZATION PATHWAYS PROJECT



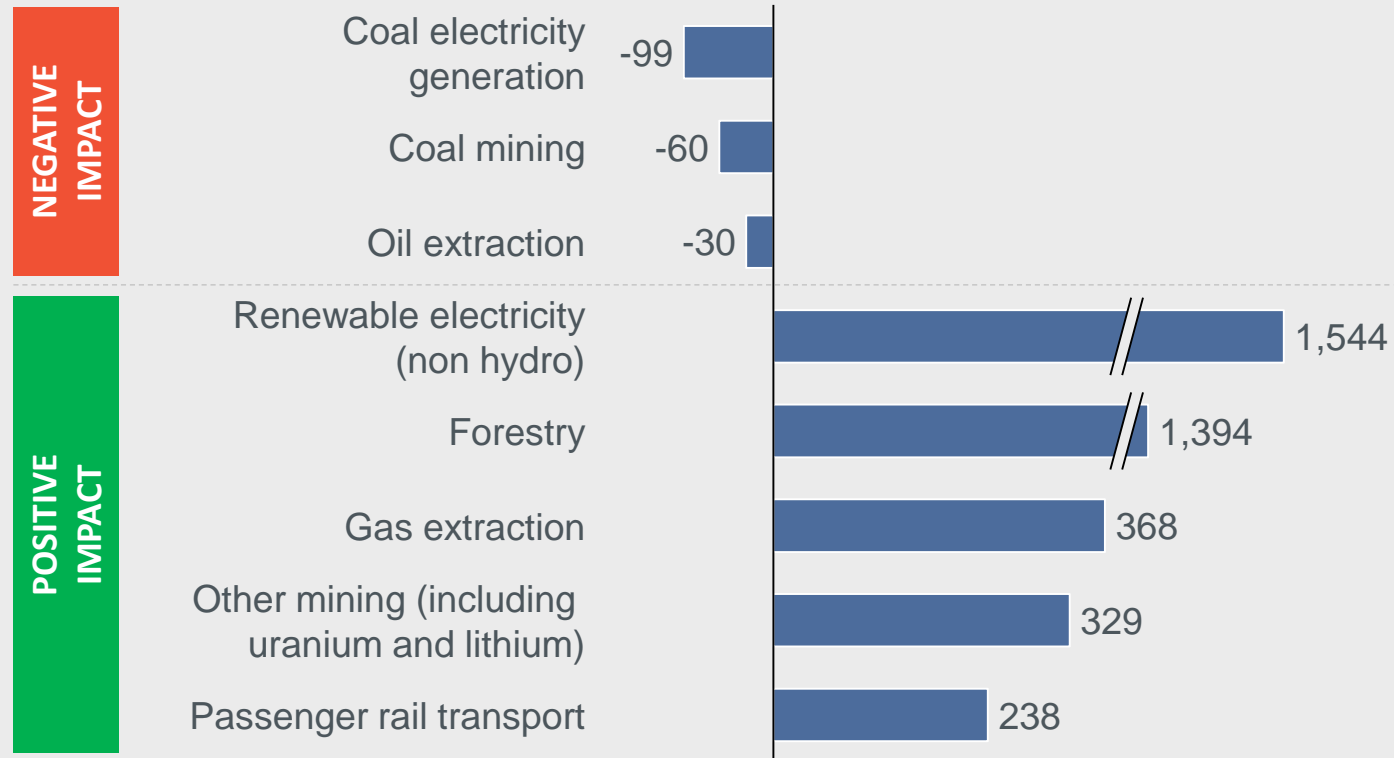
Net zero emissions in 2050 is achievable, but the transition requires a concerted effort across all sectors of the economy

Greenhouse gas emissions trajectory by sector of use, MtCO₂e, 2012-2050



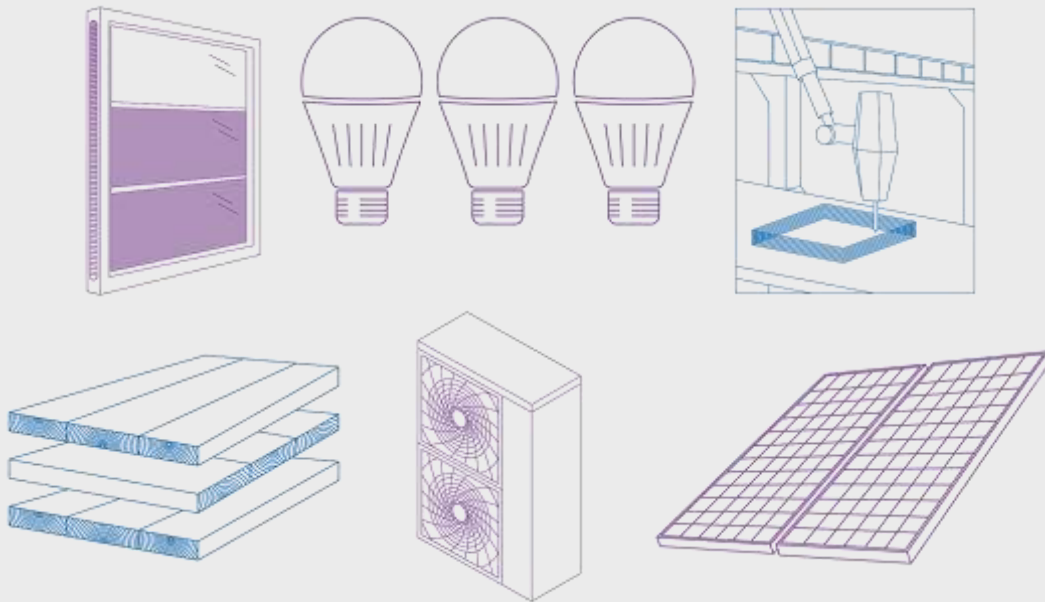
Decarbonisation presents many opportunities for Australia, with the benefits counterbalancing the negative impacts

Key sectors impacted by decarbonisation,
Growth in value added between 2012 and 2050 in %



Innovations could dramatically impact the pathway to decarbonisation, so the tools and regulations must be flexible and supportive

DECARBONISATION FUTURES



Electricity generation

Long-term transition:
Renewables

Opportunities:

- ↑ Available, mature techs.
- ↑ Decarbonise other sectors
- ↑ Allow for electrification

Risks:

- ↓ Policy not yet on track
- ↓ Technical challenges at high VRE penetration

Near term actions:

- Continue RE deployment
- Improve integration
- Avoid lock-in, and stranded assets

Built environment (Buildings and Infrastructure)

Long-term transition:
**Zero carbon
buildings**

Opportunities:

- ↑ Energy \$ savings, health
- ↑ Demonstrated achievability
- ↑ Electricity generation and network support

Risks:

- ↓ Technology deployment
- ↓ Lock-in of long-life assets

Near term actions:

- Increase deployment & integration
- 'Zero carbon ready' buildings
- Consider climate risks in planning to avoid lock-in:
What is the lifespan of the project you're currently working on?

Transport

Long-term transition:

Electrification & Alternative fuels

Opportunities:

- ↑ Fuel \$ savings
- ↑ Health
- ↑ Fuel security

Risks:

- ↓ Australia continues to lag
- ↓ Barriers to EV uptake:
cost, availability, recharging,
consumer awareness
- ↓ Uncertainty surrounding
Autonomous vehicles

Near term actions:

- **Prepare for EV cars:**
*~1 product cycle of ICE
development remaining!*
- **Develop and prepare for
alternative fuels**

Industry

Long-term transition:
**Energy efficiency,
electrification and
low carbon fuels**

Opportunities:

- ↑ Improved productivity
- ↑ Harnessing safety-driven improvements
- ↑ Low-carbon competitiveness

Risks:

- ↓ No clear solutions in many 'hard to abate' sectors

Near term actions:

- Awareness and deployment of existing clean tech.
- Prepare solutions development for 'hard to abate' sectors
- Investigate circular economy principles

Bonus round!

Cross-cutting opportunities

Hydrogen

- ↑ Local and export opportunities
- ↑ Enables 'green' industrial products
- ↑ Leverages Australia's plentiful renewable resources
- ↓ Cost uncertainty
- ↓ Development required

Other drivers

- Finance
- Insurance
- Strategy: Consideration of uncertainty, opportunities/risks
- New business models, new sectors, blurring the line between sectors

Engineering achievements



Climate Change?

Thank you for your time!

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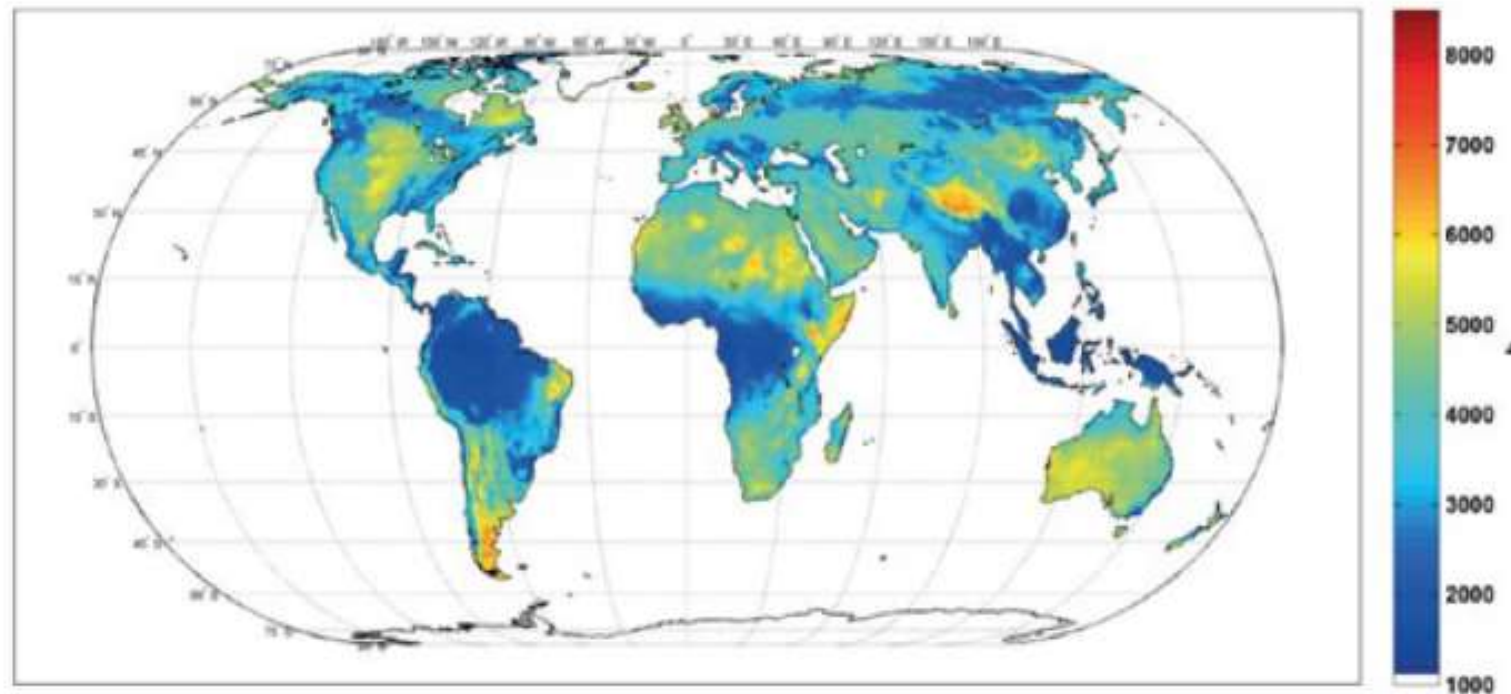


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Australia has one of the richest endowments of solar and wind resources globally, particularly compared to our region

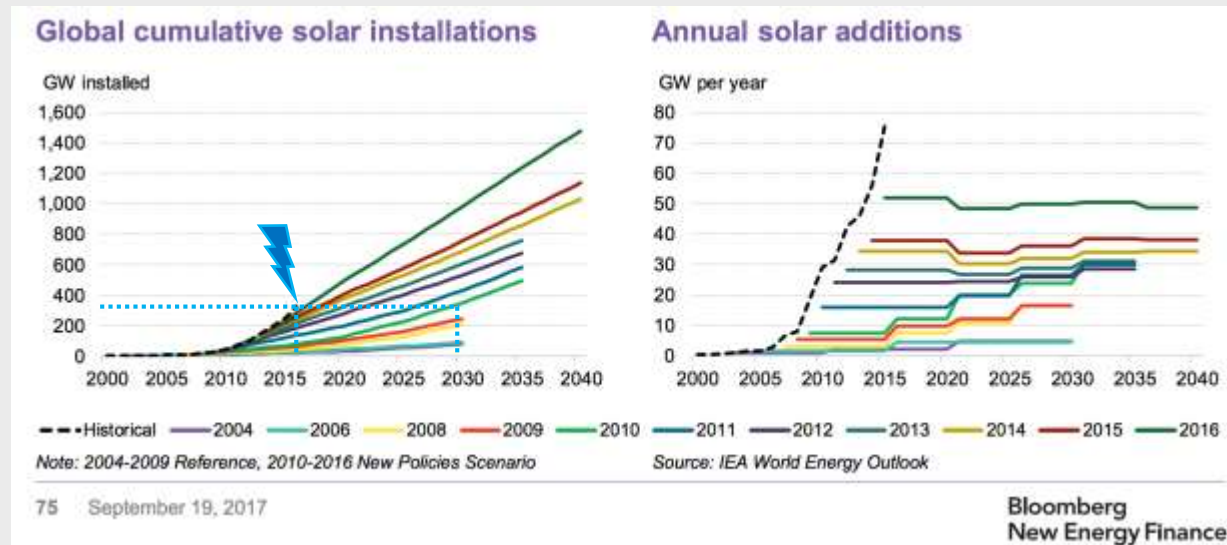
Availability of wind and solar resources differ significantly by region



Source: IEA (2017), *Renewable Energy for Industry* (Adapted and based on Fasihi, Bogdanov and Breyer (2016), *Techno-Economic Assessment of Power-to-Liquids (PtL) Fuels Production and Global Trading Based on Hybrid PV-Wind Power Plants*)

The rate of change of technology and innovation is rapid, so any one pathway is unlikely to capture the actual route to decarbonisation

Evolution of the IEA's forecast of solar PV installations and additions



Evolution of battery cost projections and achievement

