

Pilliga



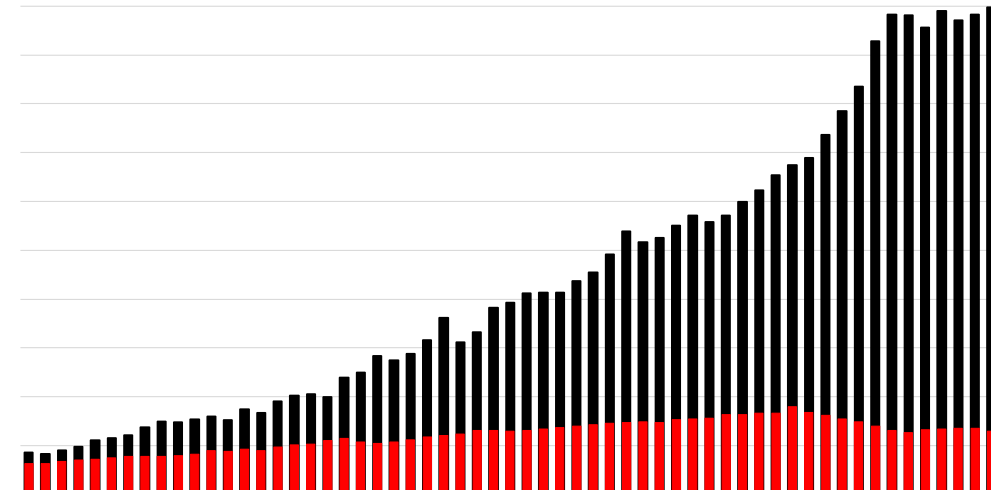
Lake Conjola

Lismore

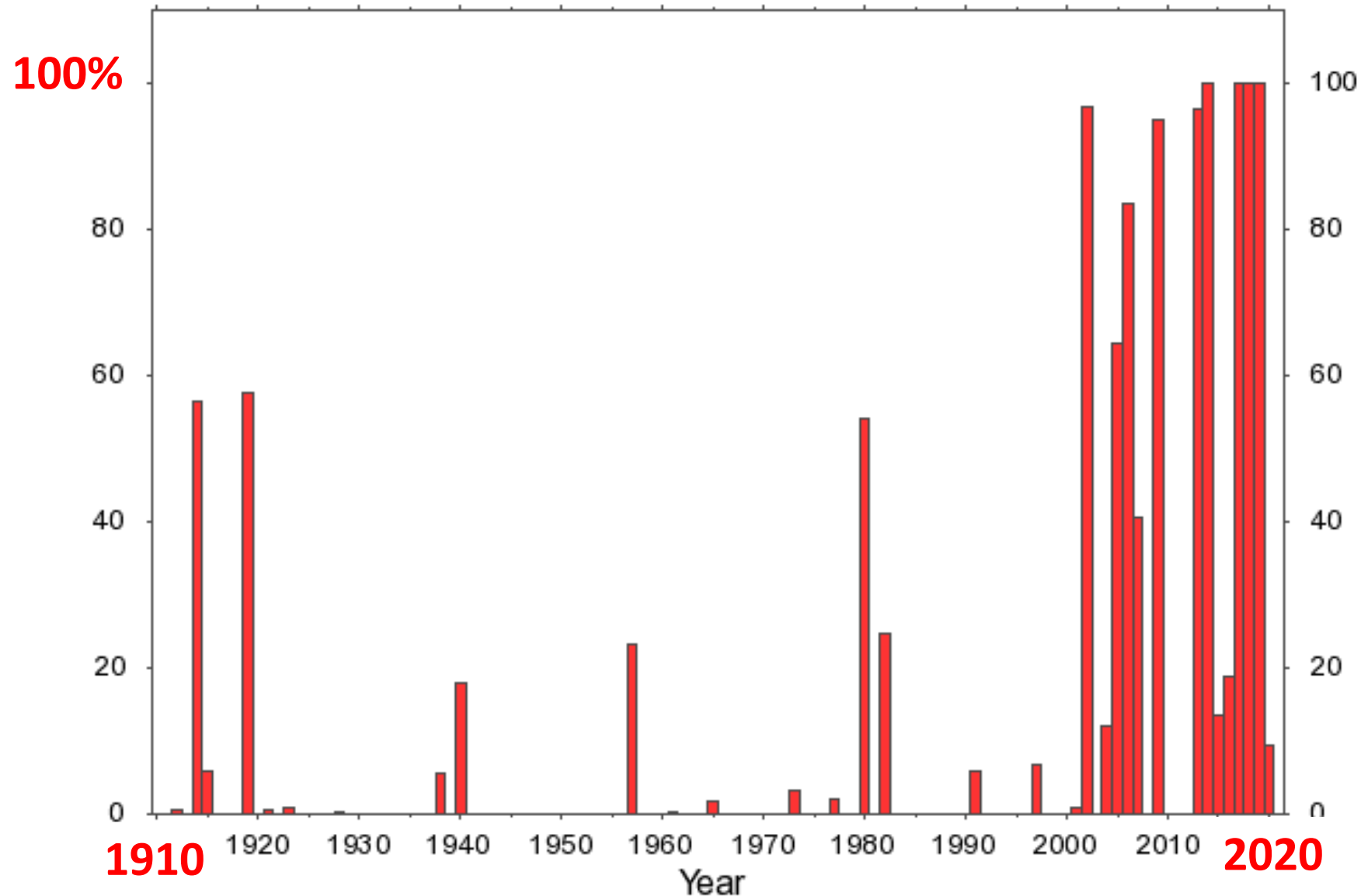


Glendell Extension (Mod 4) Project: Greenhouse Gas and Climate Implications

Professor Penny D Sackett
ANU Institute for Climate, Energy and Disaster Solutions
Presented to NSW Independent Planning Commission
21 March 2022



Fraction of NSW area that experienced maximum annual temperature in top 10% of all records since 1910



**Climate Change
has arrived.**

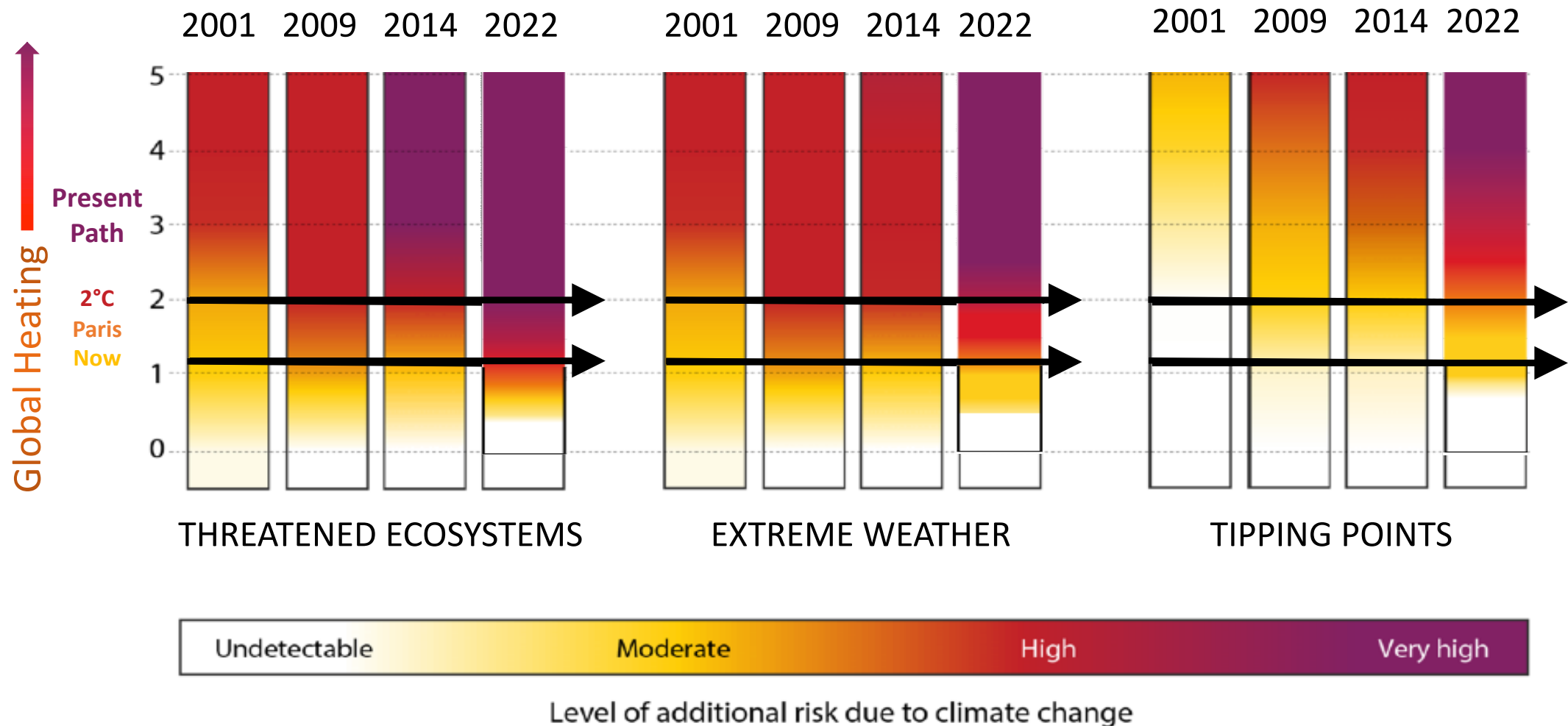
It will get **worse**.

How much
worse depends
on decisions we
make this
decade, this year,
today.

The more we know, the more we realise . . .

how dangerous even a small amount of warming can be.

Risk estimates at different warming levels from IPCC reports over time



Small rise in global temperature: Huge consequences

1.1° - 1.2°C: (now) Black Summer, 38°C in Siberia,
47% of local extinctions around world caused by climate change,
Runoff water for NSW agriculture reduced by 15% on average.

1.5°C: (virtually inevitable by ~2035) Once-in-30-year heatwaves happen every 3 years, Summer temps of 2019/20 will be an 'average summer.'

2.0°C: (beyond Paris) Black Summer fire weather 4x more likely than in 1900,
50°C summer days in Sydney, 99% of all world's coral reefs gone,
Complete ecosystem transformation on 13% of Earth's surface.

3.0°C+: (where world – and particularly Australian – action is taking us.)
Most world ecosystems destroyed or heavily damaged.
Large areas of world uninhabitable. Entire global economy damaged.

Irreversible Changes are Happening Now

- Changes global ocean temperature, deep ocean acidification, and deoxygenation are irreversible on **centennial to millennial** time scales.
- Mountain and polar glaciers are committed to continue melting for **decades or centuries**.
- Loss of permafrost carbon following permafrost thaw is irreversible at **centennial timescales**.
- Sea-level is committed to rise for **centuries to millennia** due to continuing deep ocean warming and ice sheet melt, and will remain elevated for thousands of years.

Earth System Elements at risk of 'tipping'

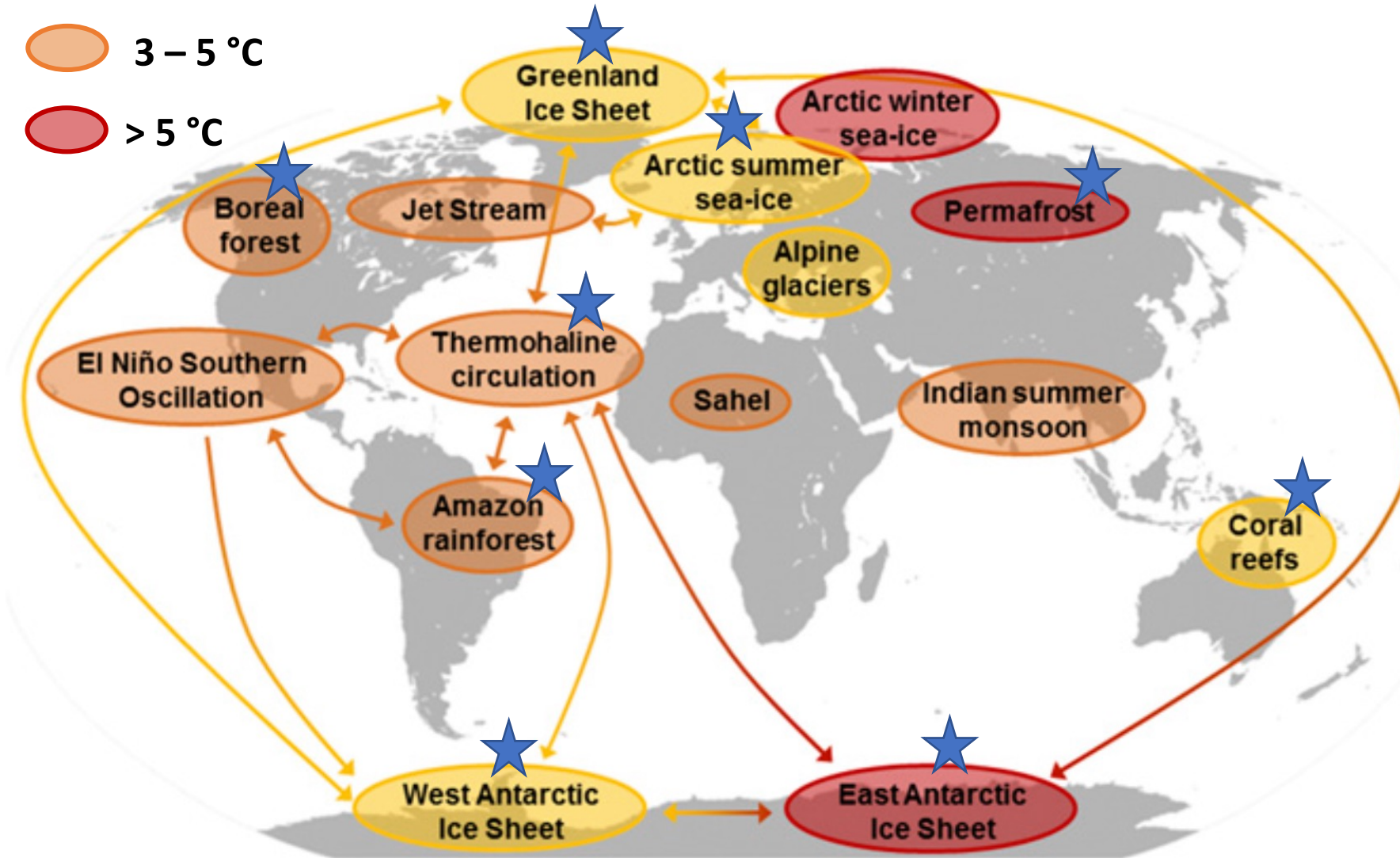
[Steffen et al \(2018\) PNAS, www.pnas.org/content/pnas/115/33/8252.full.pdf](https://www.pnas.org/content/pnas/115/33/8252.full.pdf)

[Lenton et al \(2019\) Nature, www.nature.com/articles/d41586-019-03595-0](https://www.nature.com/articles/d41586-019-03595-0)

1 – 3 °C

3 – 5 °C

> 5 °C



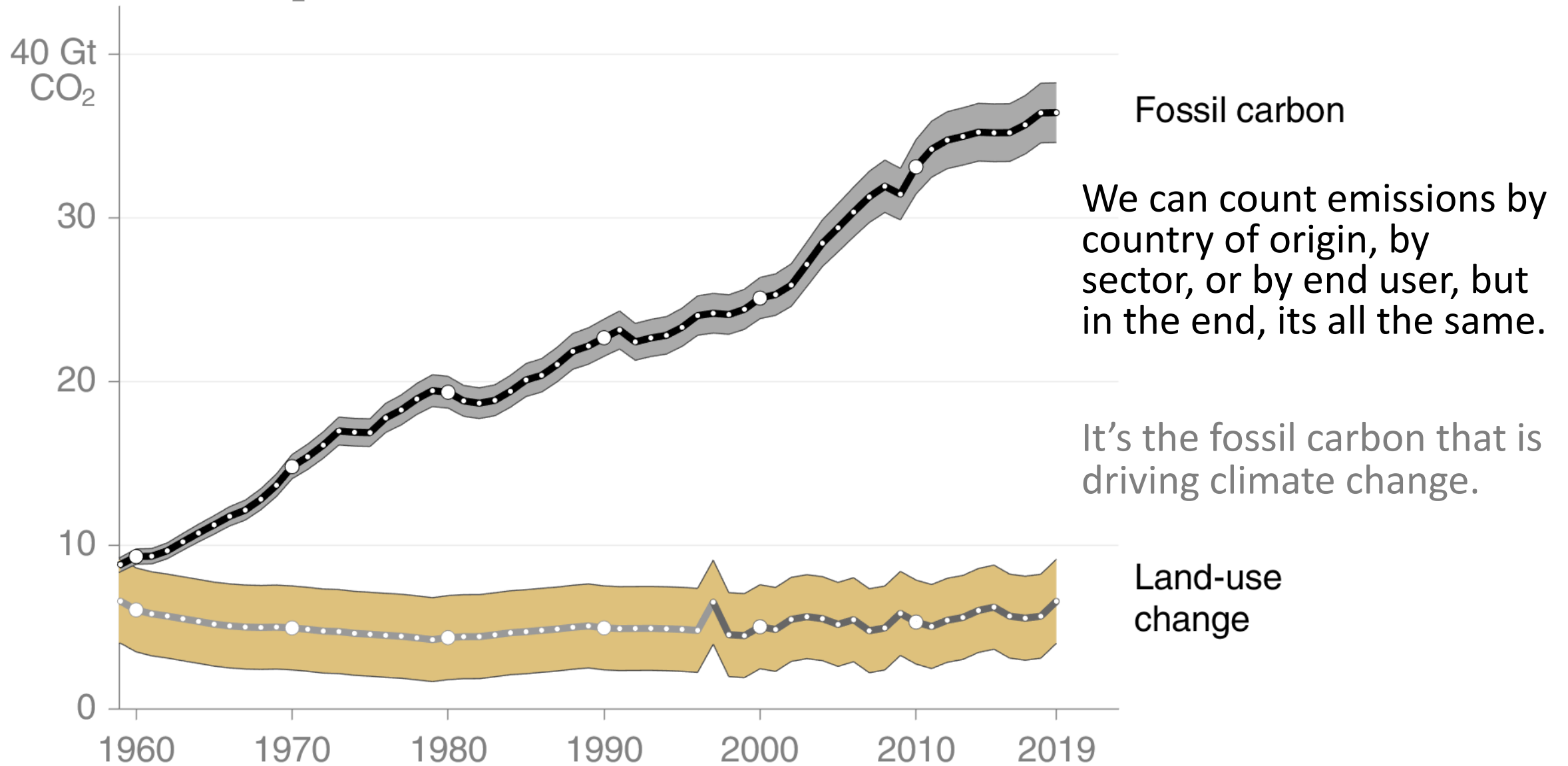
If these elements tip and then cascade in a domino effect,

the result could be a 'Hothouse Earth'

with temperatures and sea levels not seen since the Stone Age, millions of years ago.

★ 'On the move'

Global Annual CO₂ Emissions



Fossil carbon

We can count emissions by country of origin, by sector, or by end user, but in the end, its all the same.

It's the fossil carbon that is driving climate change.

Land-use change

But what about the Paris Agreement?

- Nations that have committed to reducing emissions by 2030 have done so on average by only 7.5% (on 2010 levels), whereas a
- 30% reduction by 2030 is needed to limit warming to 2°C and
- 55% reduction by 2030 is needed to limit warming to 1.5°C.
- Based on current policies as opposed to Paris Agreement pledges, warming could go as high as 3.6°C.
- Australia's 2030 emissions reduction target is consistent with global warming of 4°C if all other countries followed a similar level of ambition.

Think carbon budget (rather than net zero)

About **8 years remain** at current emission levels before the remaining global carbon budget to hold warming to 1.5°C with at least a 67% chance is exhausted.

That's one reason why what we do between now and **2030** is so important.

The Fossil Fuel Gap

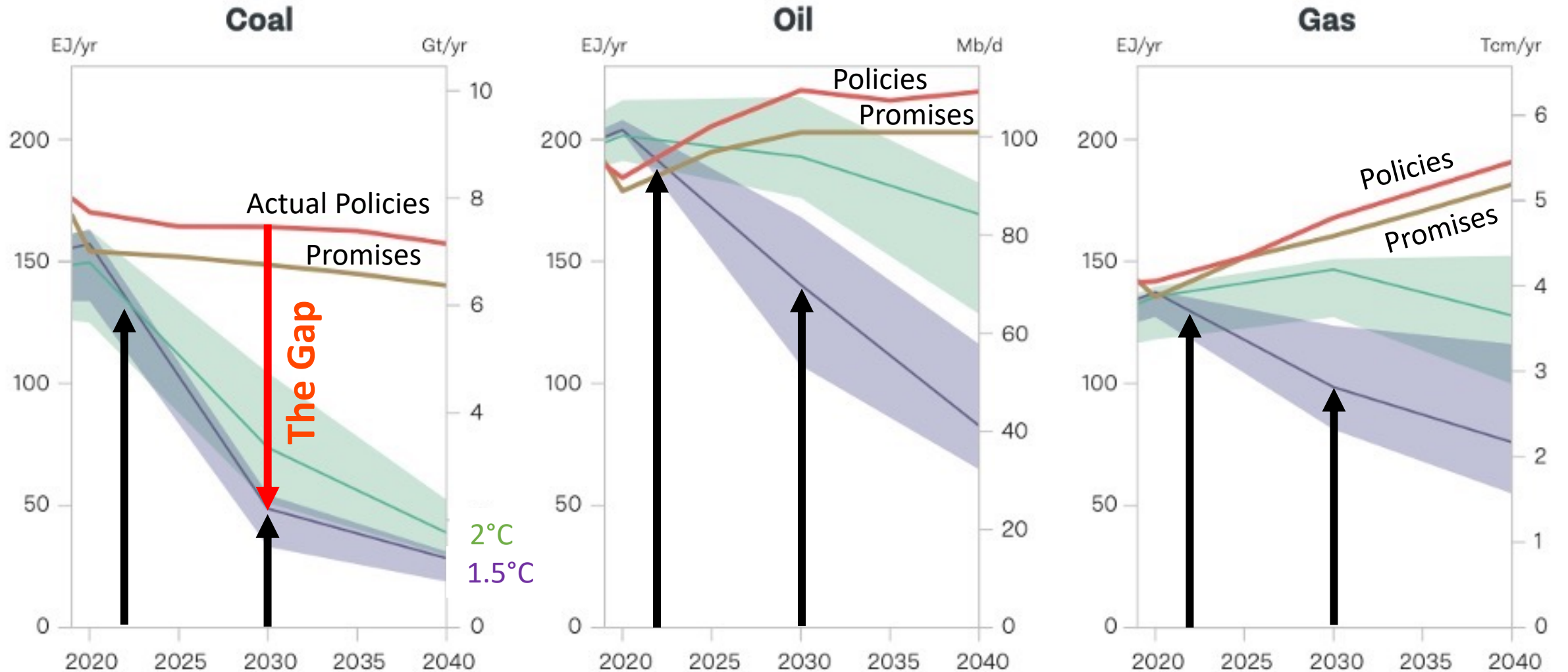
Joint 2021 Report from:

Stockholm Environment Institute, International Institute for Sustainable Development, ODI, E3G, and UN Environment Programme

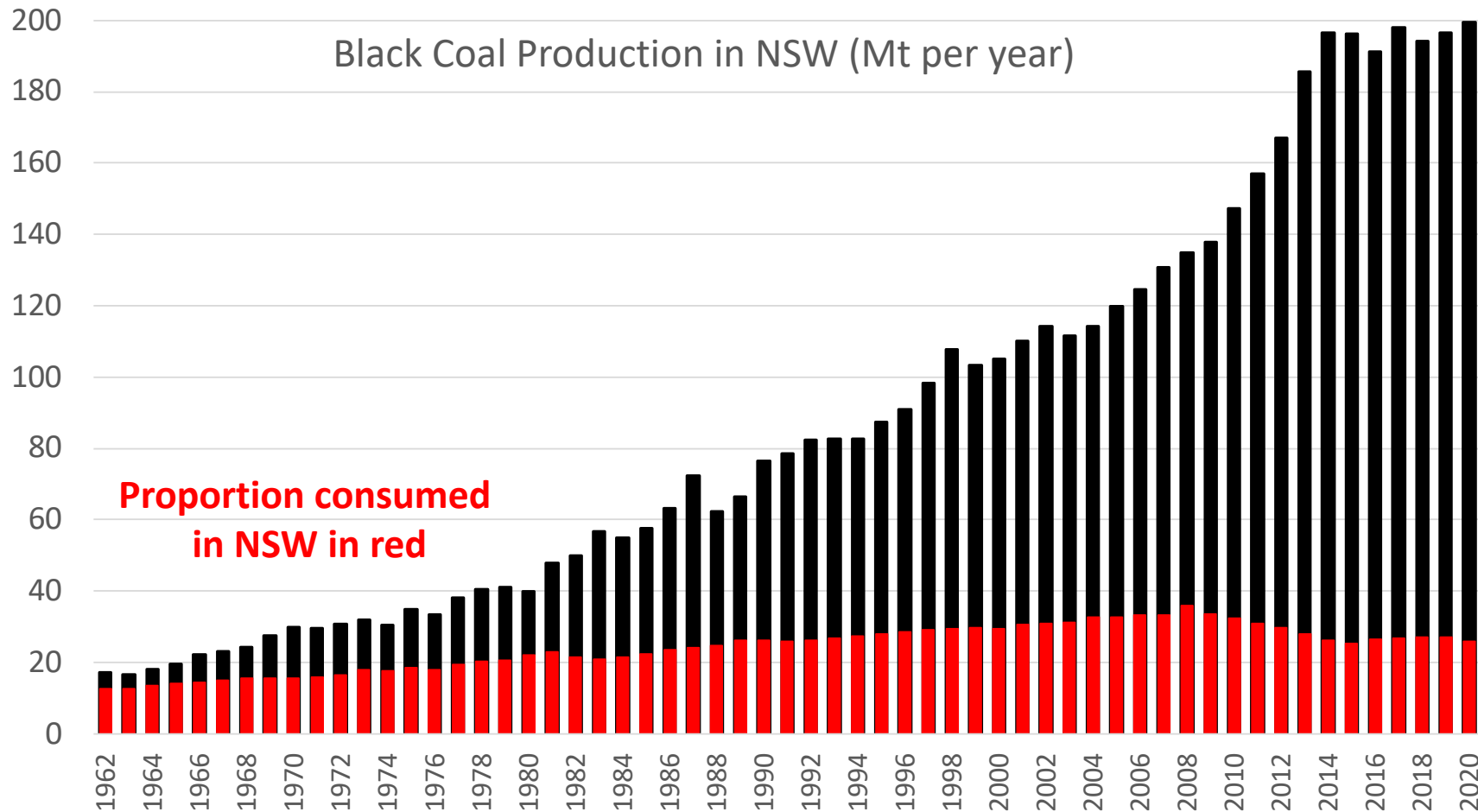
<https://productiongap.org/2021report>

50% Chance of Holding Global Warming to 1.5°C

66% Chance of Holding Global Warming to 2°C



This trend must reverse starting now in order to be consistent with a future of 1.5°C to 2.0°C global warming

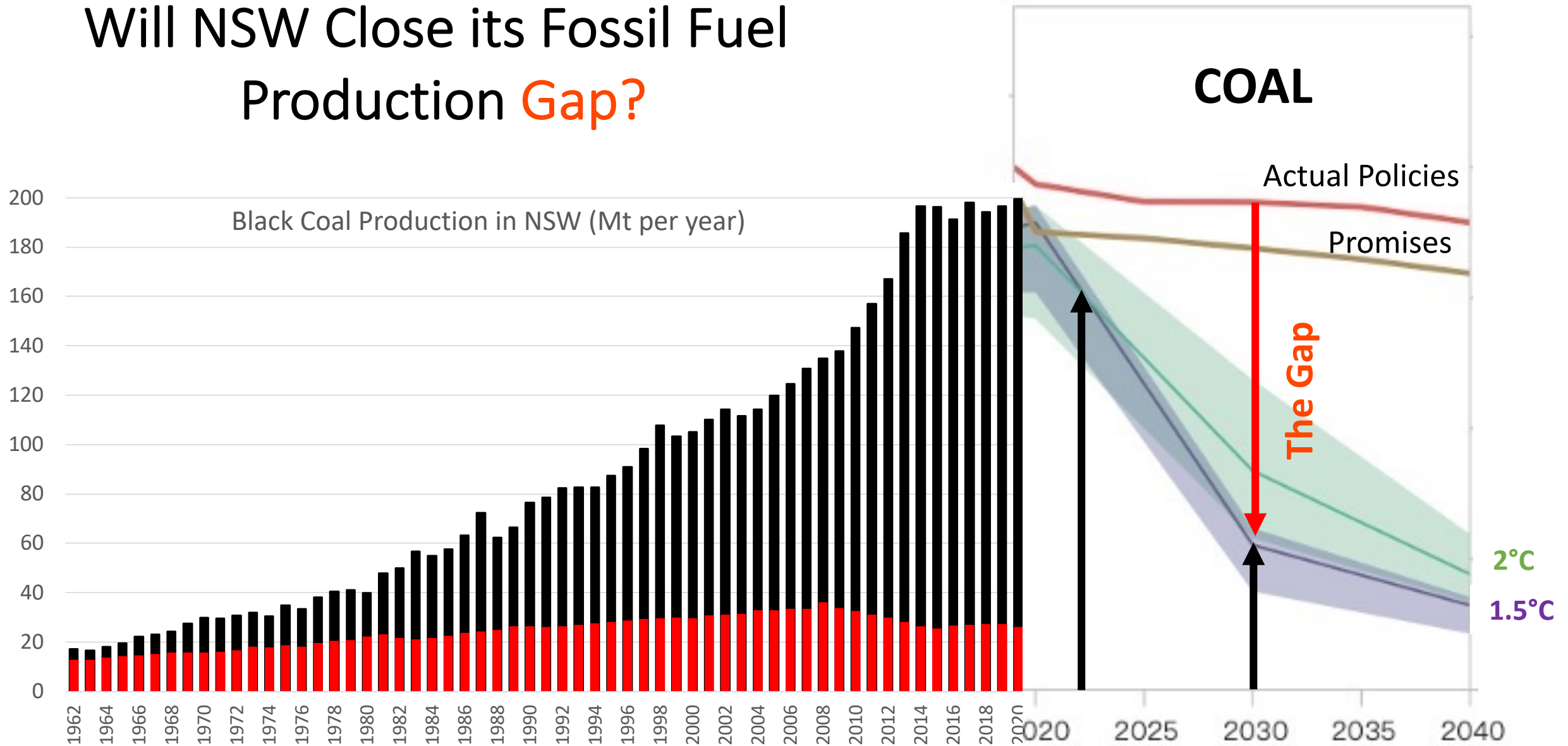


GHG emissions from the combustion of NSW coal (Scope 3)

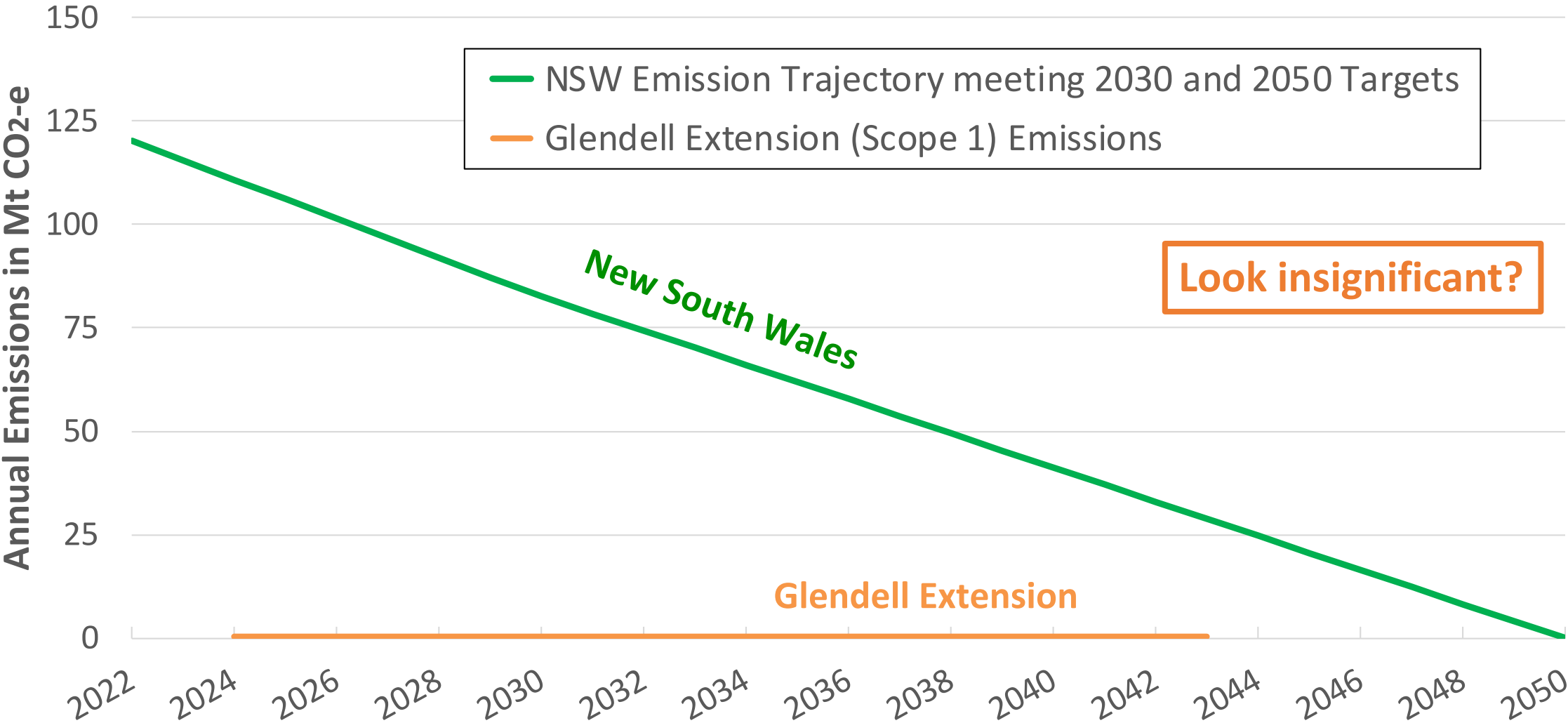
is 3 times more damaging to the NSW environment

than all of the State's direct emissions (Scope 1) combined

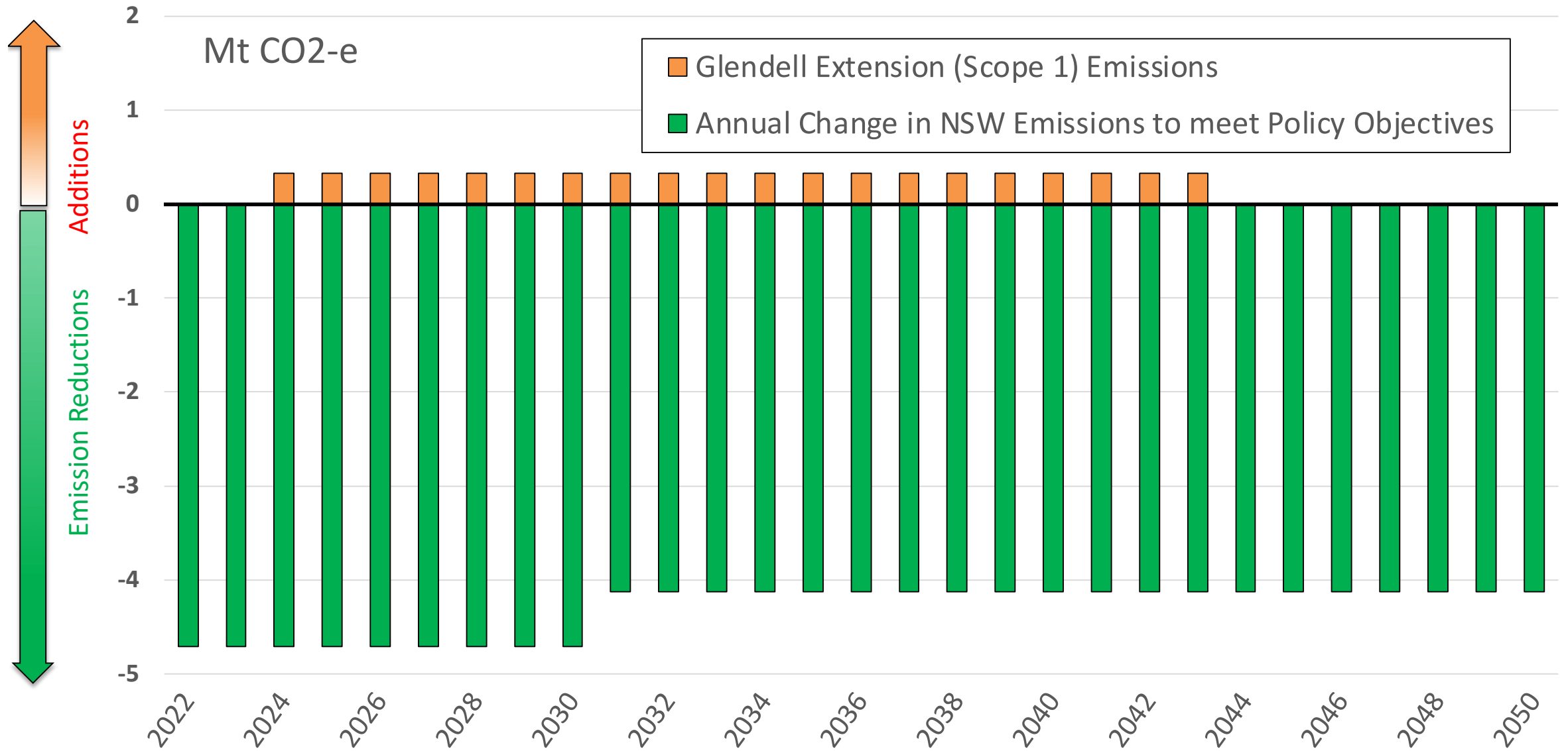
Will NSW Close its Fossil Fuel Production Gap?



The Glendell Extension will make it more difficult for NSW to meet 2030 and 2050 emission targets



Materially significant compared to NSW emissions reduction task.



GHG Emissions from the Glendell Extension

Effect on
NSW 2030 Target

All Scopes Affect
NSW Environment

Category of Emissions (Mt CO ₂ -e)	Total in period 2022 – 2030 inclusive	Lifetime 2022 – 2044 inclusive
Scope 1	2.264	6.457
Scope 2	0.1783	0.5094
Scope 3	77.27	220.3

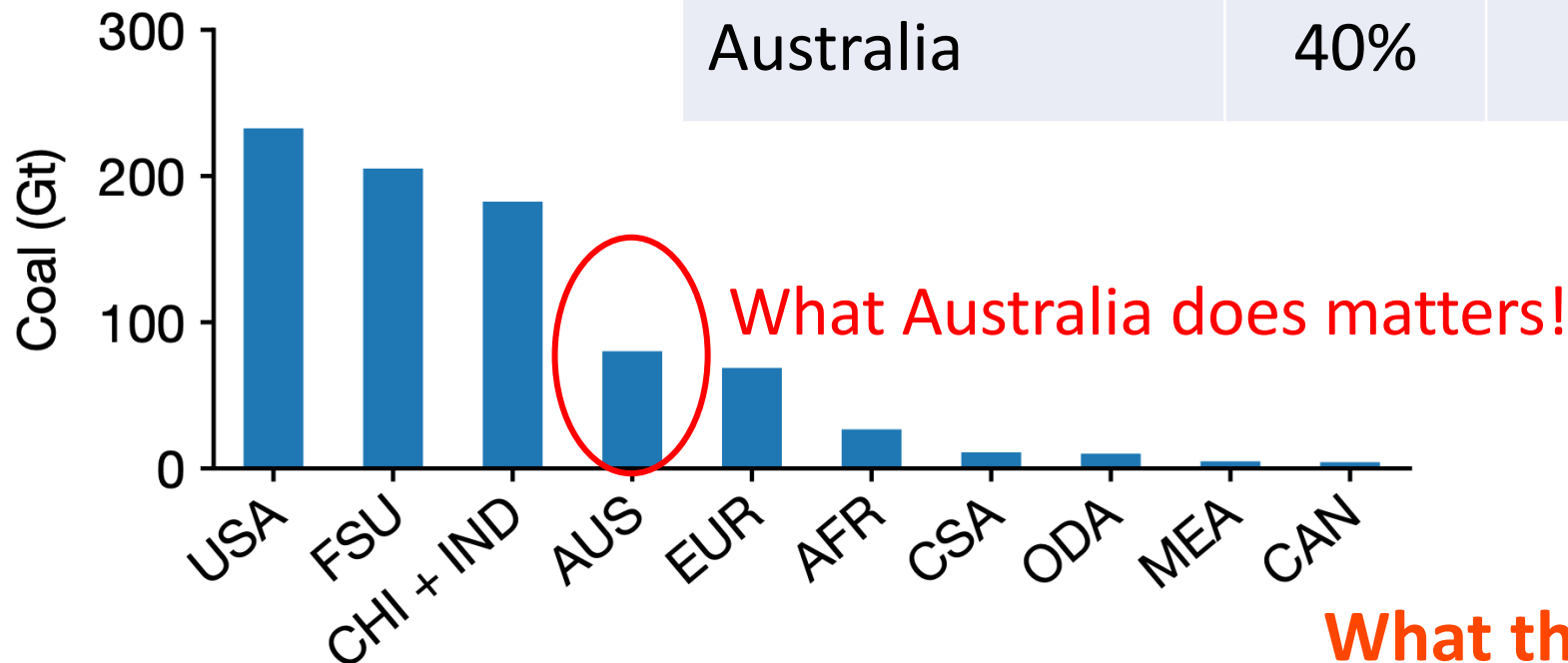
is more than
35x Scope 1 alone

NB: I have used current NGER values for methane and nitrous oxide

For at least a 50% chance of **holding warming to 1.5°C**

How much fossil fuel* must stay in the ground?

	Oil	Methane Gas	Coal
Globally	58%	59%	89%
Australia	40%	35%	95%



What this Commission does matters.

*Reserves in 2018 proven to be economically & technologically mineable. Details in [Welsby, Price & Ekins \(2021\) Nature, 597](#)

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Thank You

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