

Is net zero any easier 'post'-COVID?

Glen Peters (CICERO Center for International Climate Research, Oslo, Norway)
POLET workshop on fossil fuel decline (Online, 11-12 January 2022)

Outline

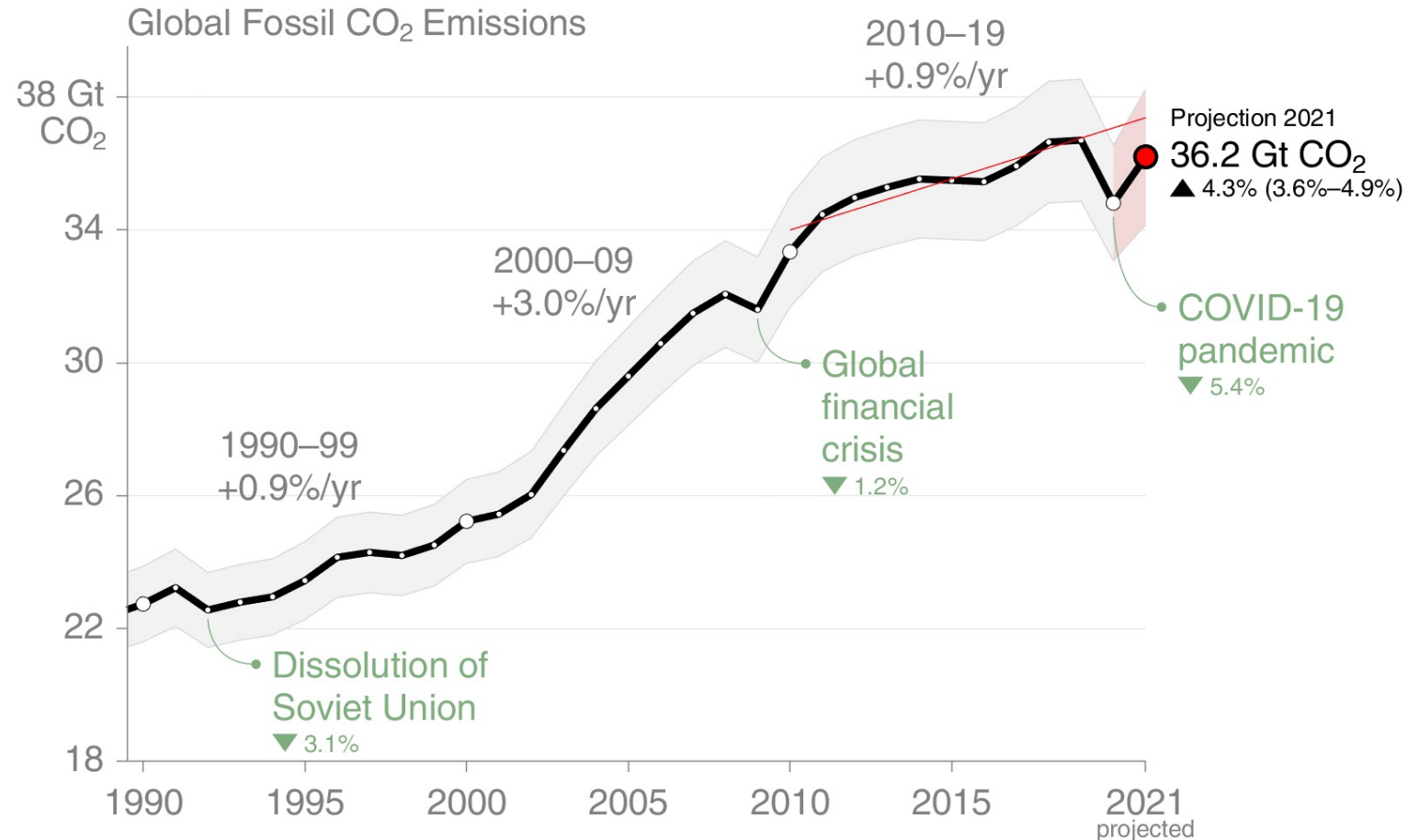
- Historical emissions: Is the curve bending?
- Pledges & promises: Where will we be in 2030?
- Getting to *net* zero: Is there a free lunch?
- Fossil fuel contractions across scenarios

Is the curve bending?

Emission trends to 2021 and thoughts on 2022...

Global Fossil CO₂ Emissions

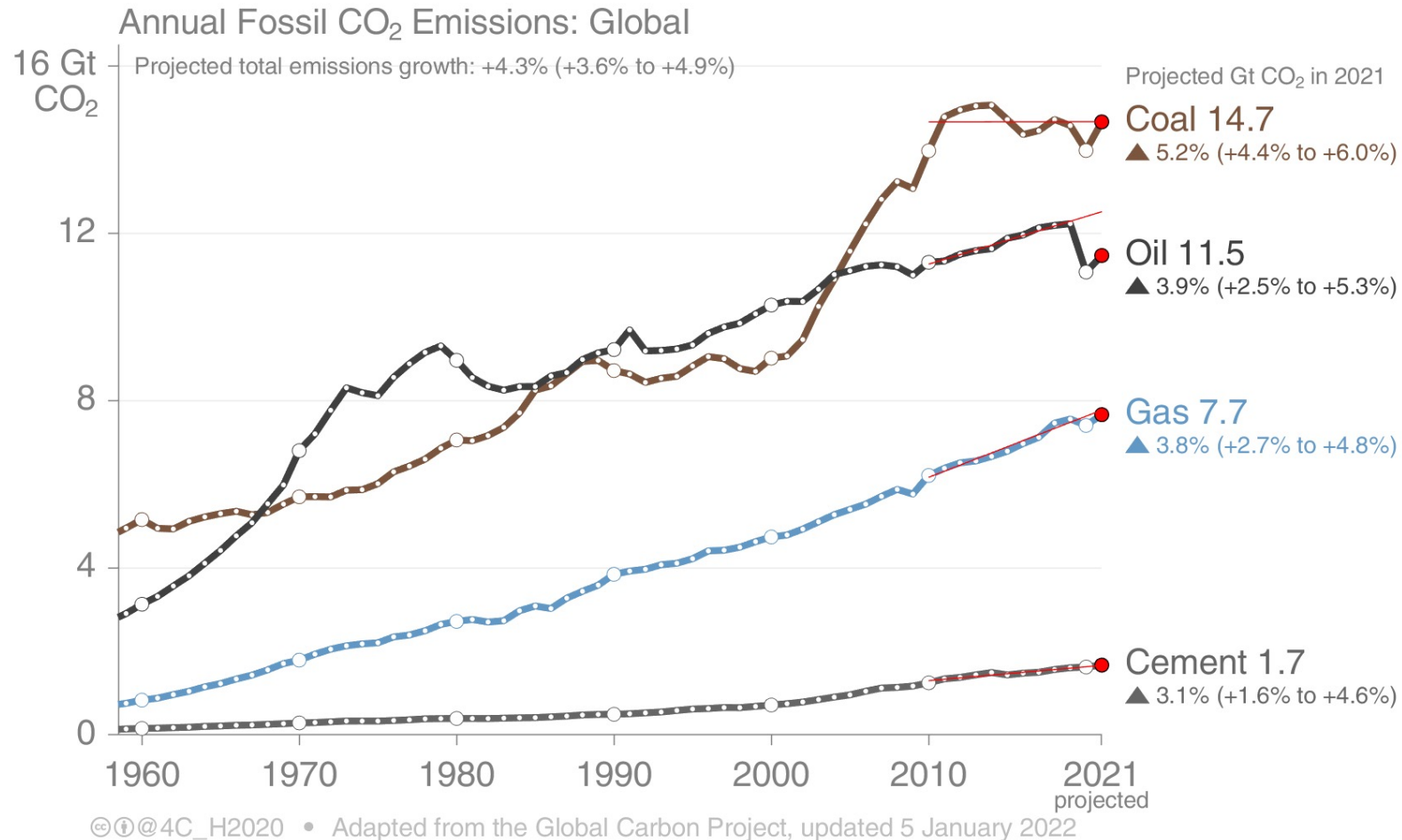
Global fossil CO₂ emissions up 60% since 1990, ~3% since the Paris Agreement in 2015, decade trend is upwards



©@4C_H2020 • Adapted from the Global Carbon Project, updated 5 January 2022

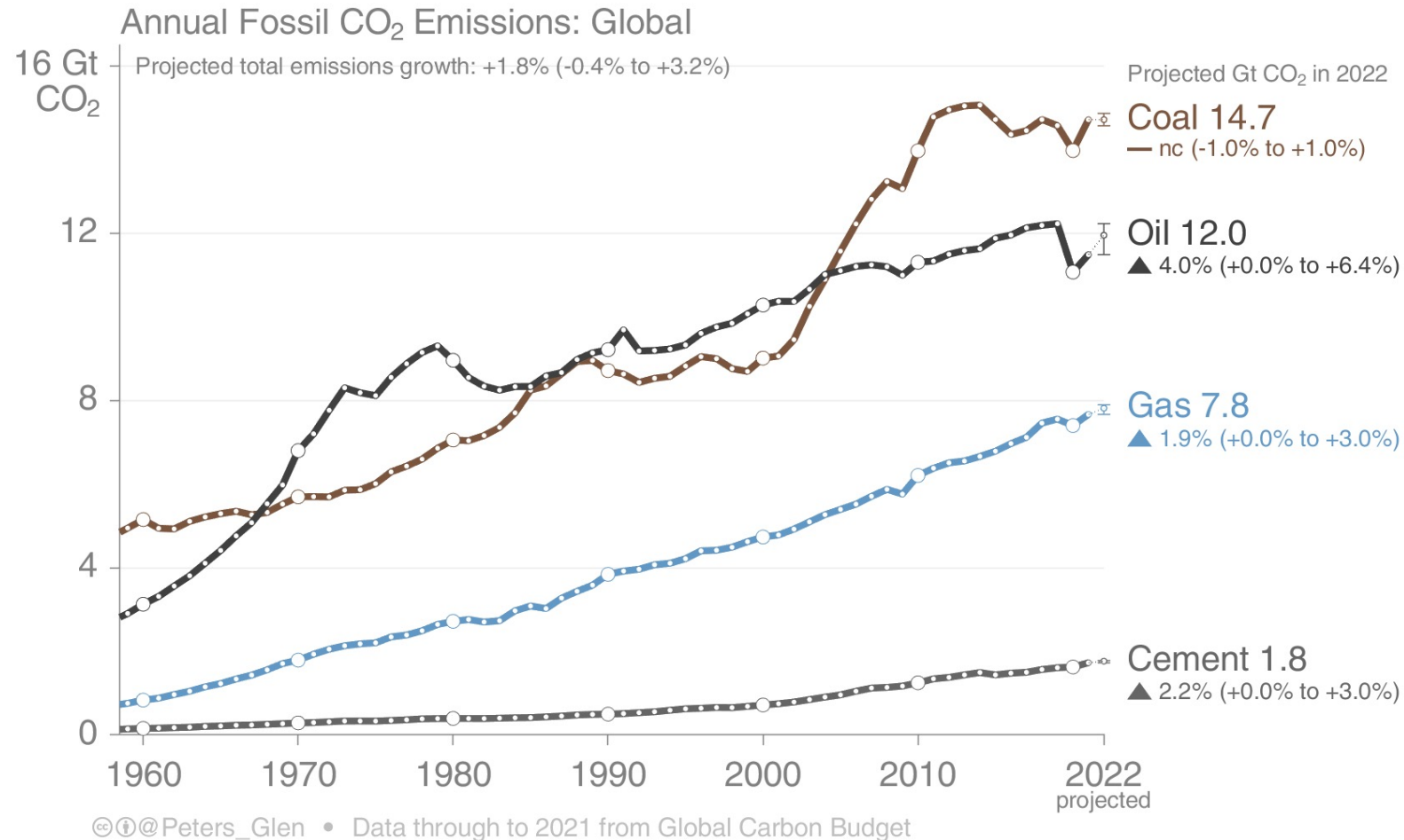
Emissions by fossil fuel

'Post-COVID' gas is back on trend, coal had a significant rebound (many regions) continuing decadal see-saw
Oil use remains suppressed. *If oil use rebounds, as expected, emissions will rise in 2021 unless coal has a big drop.*



Thoughts on 2022...

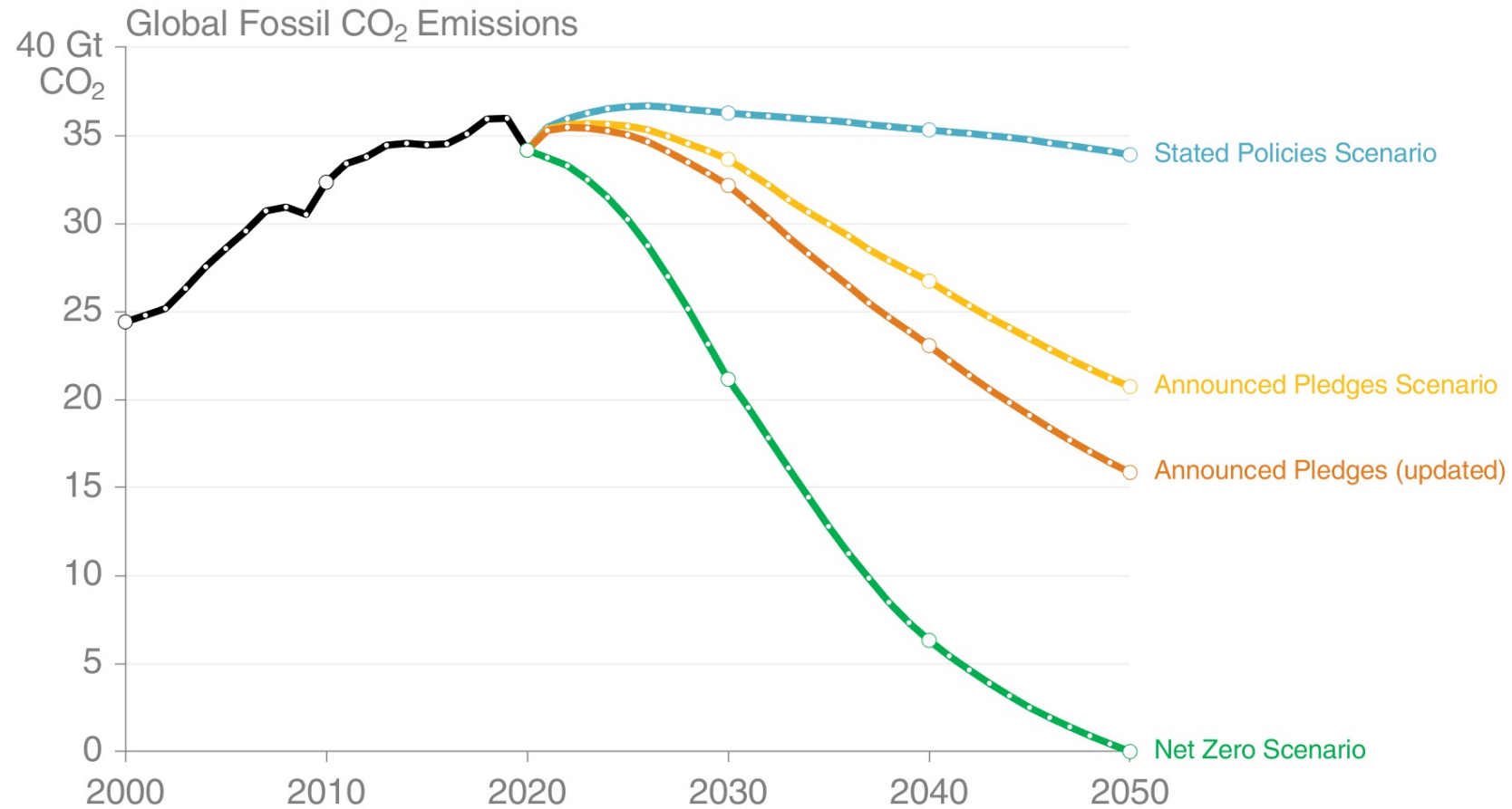
Oil is expected to continue to recover over the next few years: if oil recovers, emissions likely to rise...
Assumptions: coal flat (IEA Coal Report 2021), oil up 4% (EIA STEO), and gas & cement continue on trend!



Where will we be in 2030?

Measured in terms of 2100 temperature outcomes...

IEA World Energy Outlook 2021



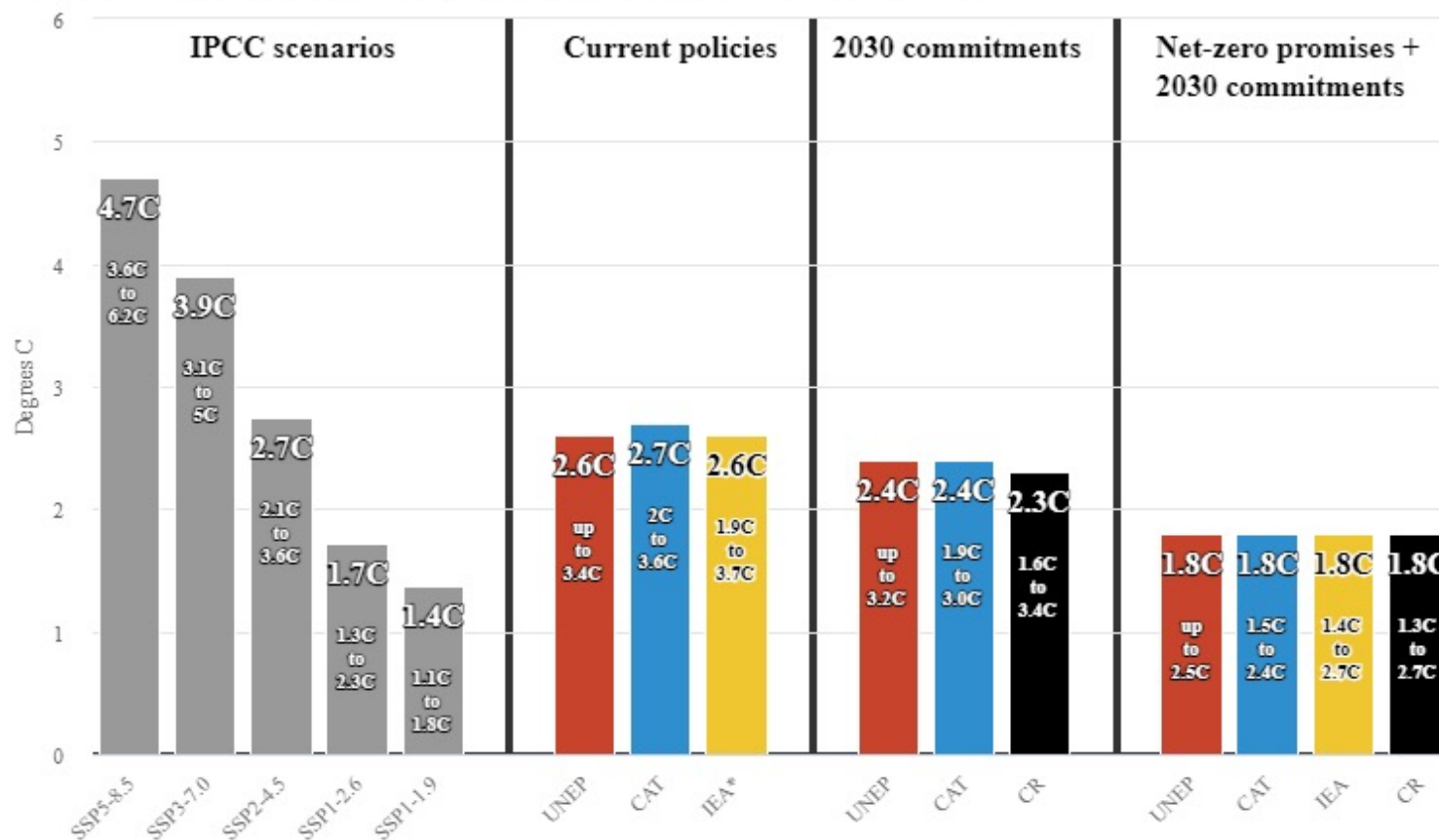
©@Peters_Glen • Data: IEA World Energy Outlook (2021) updated during COP26

Progress in 2030 measured in 2100!

There is a 'tradition' to extend 2030 emission estimates into 2100 temperature outcomes, with high precision!
There has been progress (warming outcomes getting lower), because of data, methods, and also some policy...

Comparing the latest 2100 warming projections for different scenarios

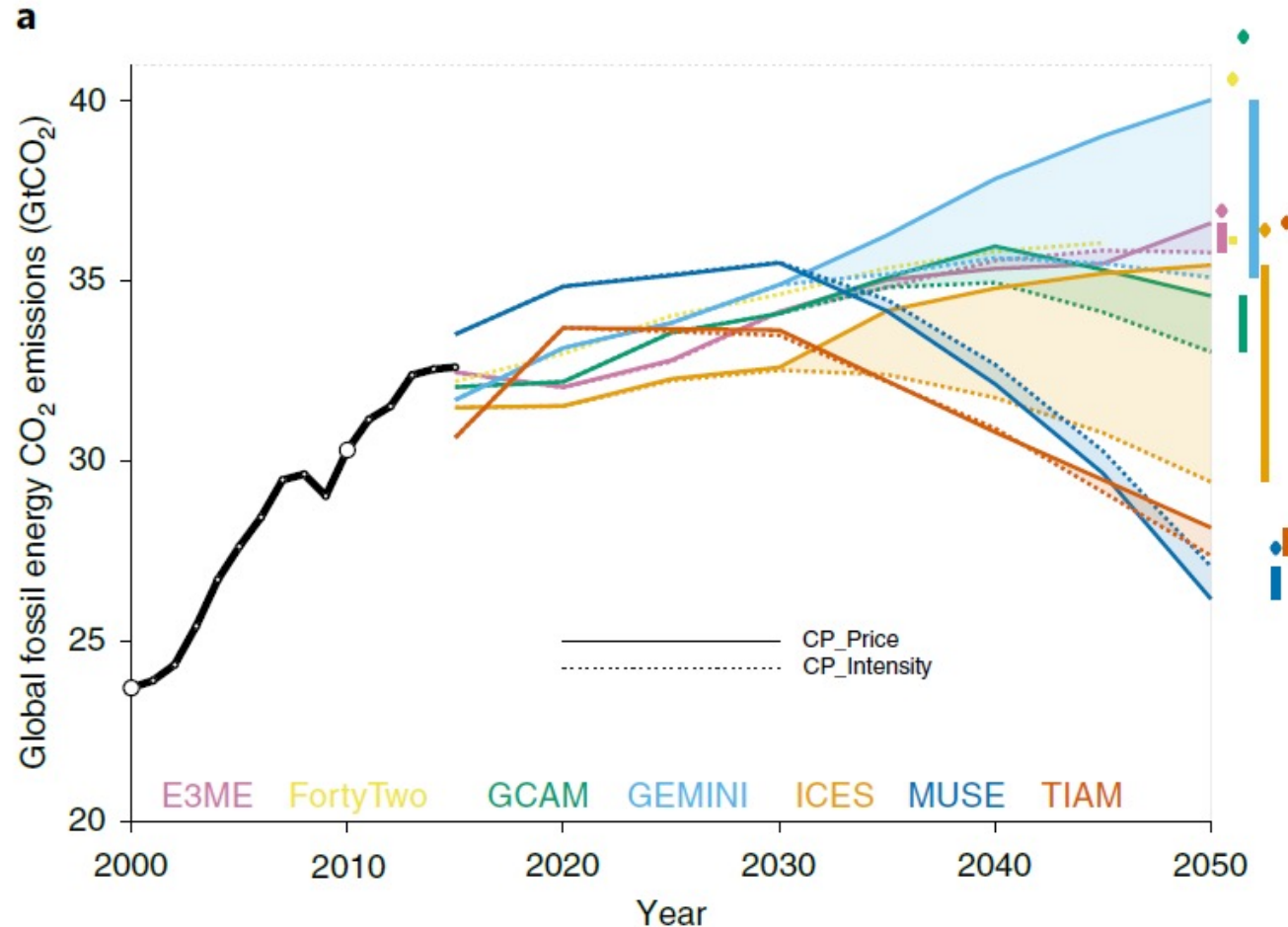
Warming in 2100 relative to preindustrial. 50th percentile temperature outcomes and uncertainties shown.



Uncertainty is much larger (obviously)

The headlines “current policies give 2.7C in 2100” hide much of the uncertainty and choices.

Emissions are more sensitive to the choice of integrated assessment model than to the assumed mitigation effort!

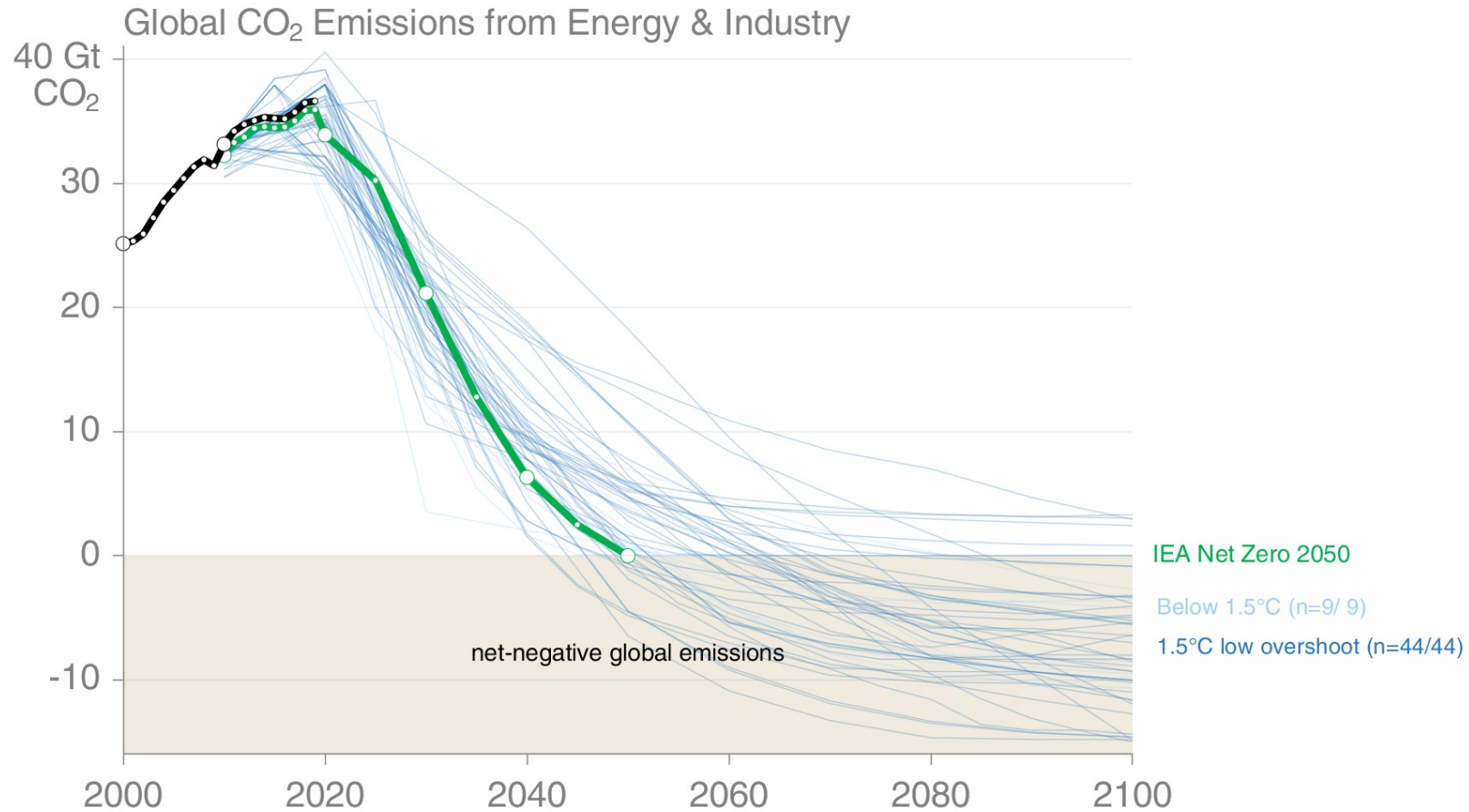


Getting to net zero emissions

Is there a free lunch?

Net Fossil CO₂ emissions

Many scenarios consistent with 1.5°C (with no or low temperature overshoot) reach net-zero emissions ~2050



© Peters_Glen • Data: IAMC 1.5°C Scenario Explorer Release 2 (hosted by IIASA)

Net emissions

=

Emissions (e.g., fossil fuels)

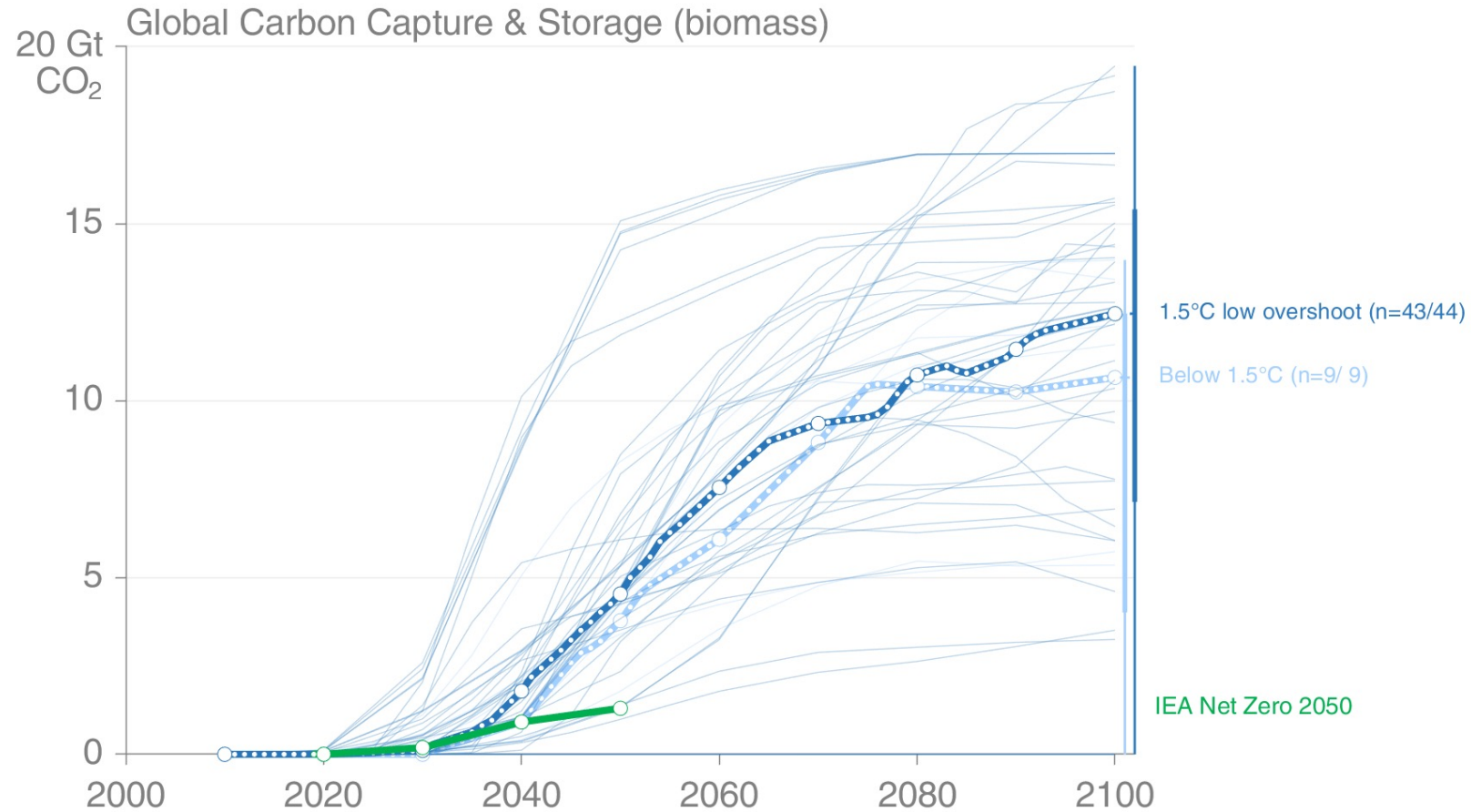
+

Removals (e.g., direct air capture)

afforestation not shown here

Carbon Dioxide Removal (BECCS)

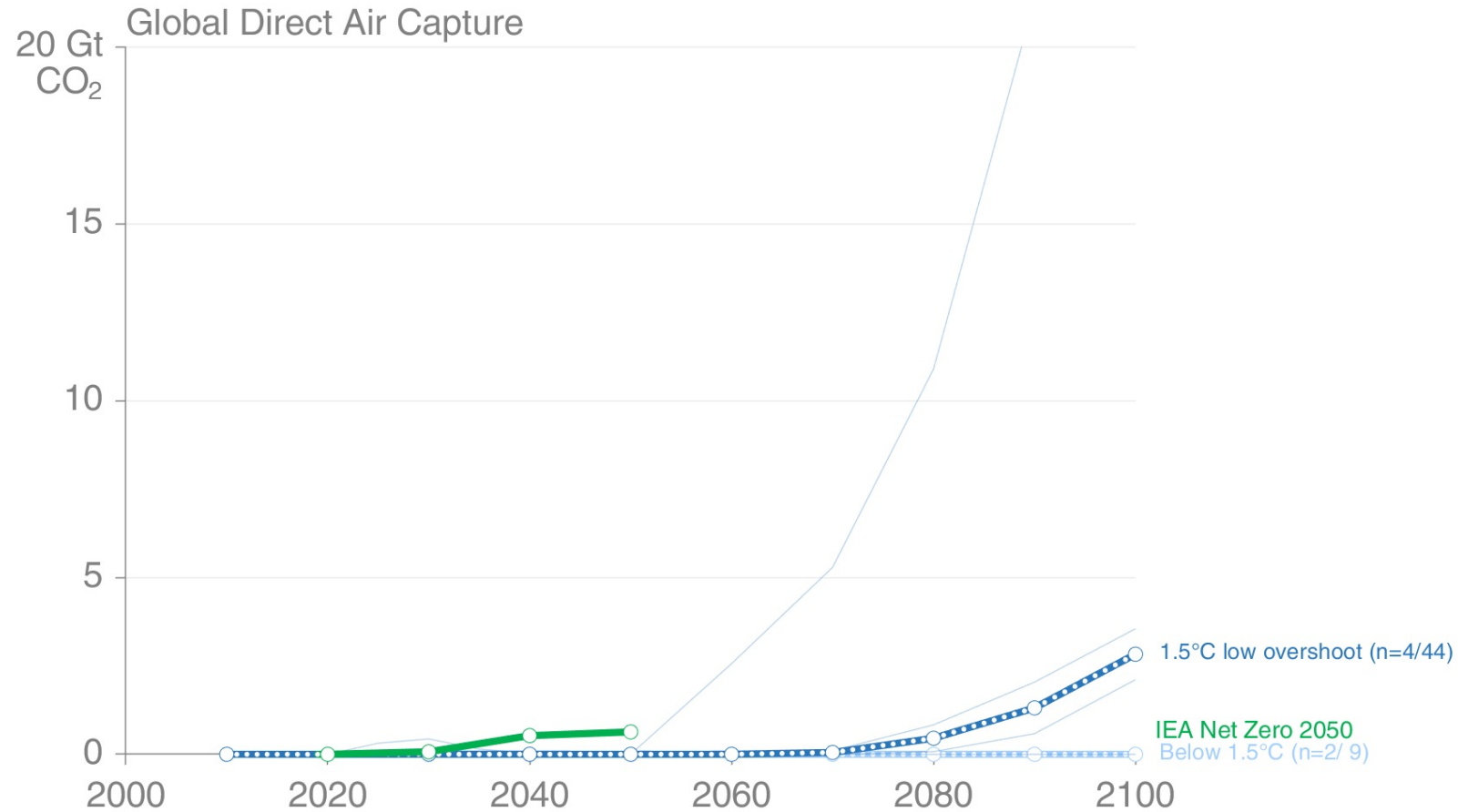
Many scenarios depend on Bioenergy with Carbon Capture & Storage (BECCS) for carbon dioxide removal



©@Peters_Glen • Data: IAMC 1.5°C Scenario Explorer Release 2 (hosted by IIASA)

Carbon Dioxide Removal (DACCS)

Very few scenarios *currently* use DACCS, though the potential is significant & focus is increasing



©@Peters_Glen • Data: IAMC 1.5°C Scenario Explorer Release 2 (hosted by IIASA)

Emissions (e.g., fossil fuels)

=

Net emissions

–

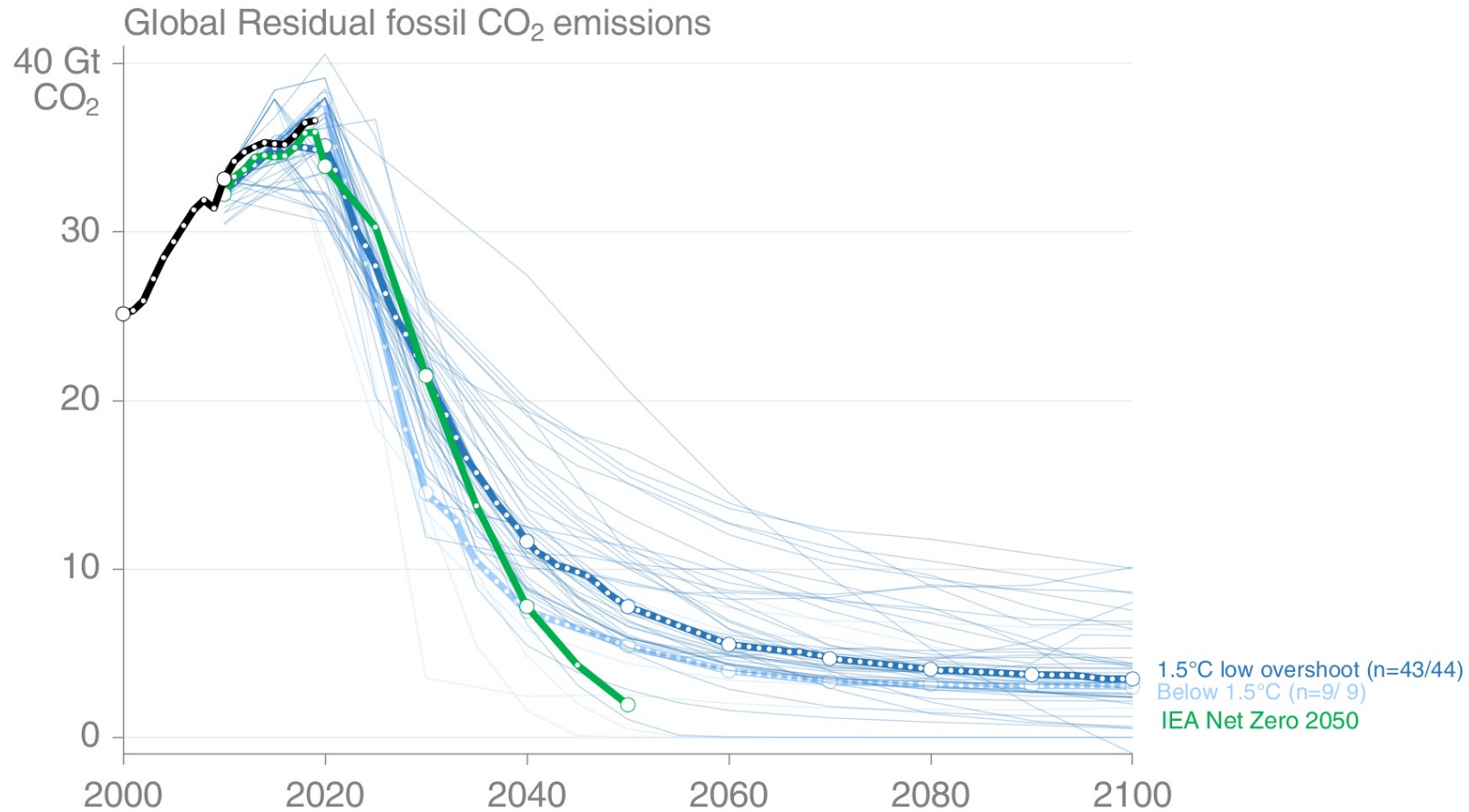
Removals (e.g., direct air capture)

afforestation not shown here

Residual fossil CO₂ emissions

Net emissions = (residual) emissions + removals

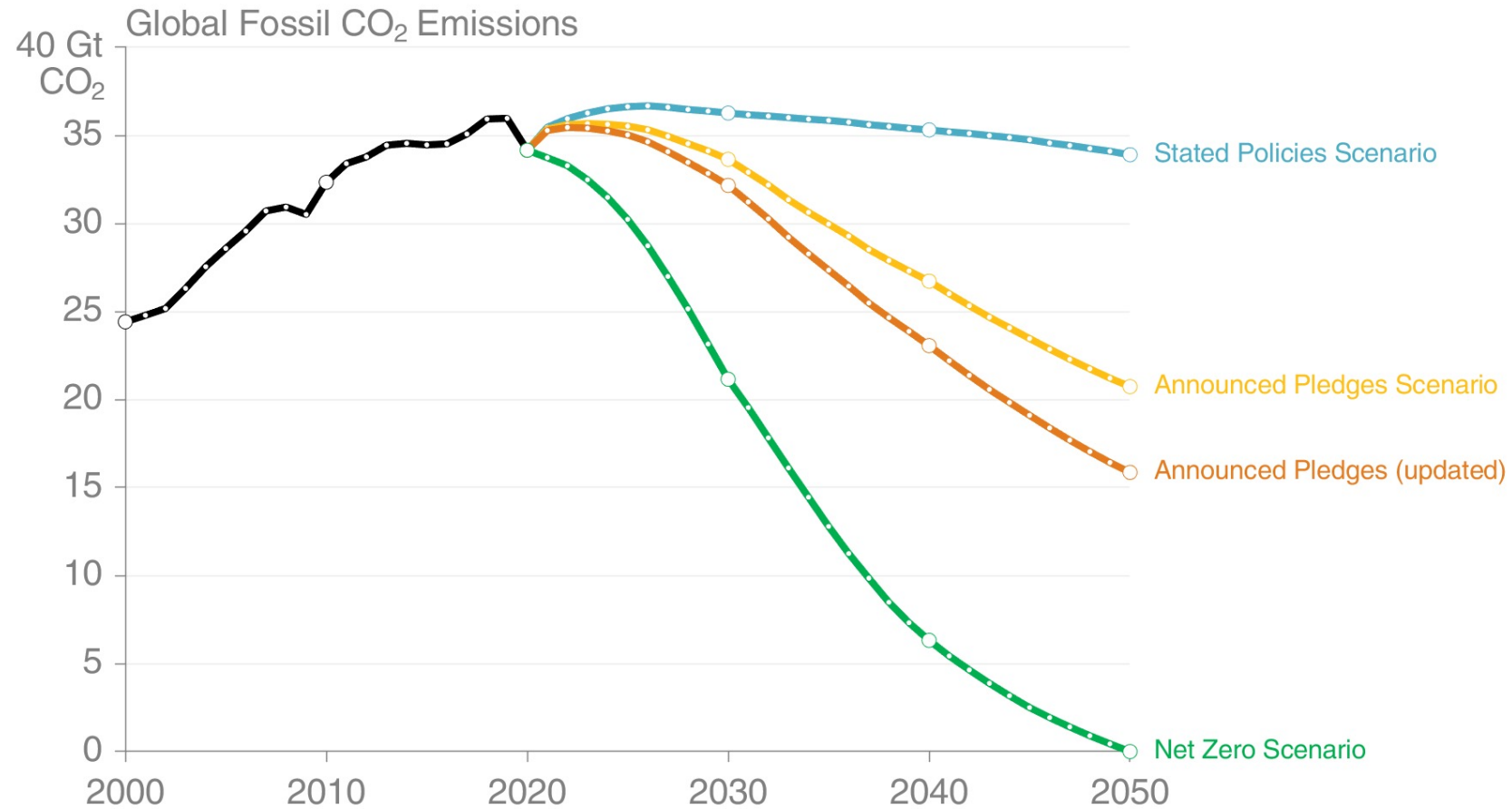
The use of carbon dioxide removal means that fossil CO₂ emissions do not need to go to zero



©@Peters_Glen • Data: IAMC 1.5°C Scenario Explorer Release 2 (hosted by IIASA)

Fossil fuel decline (via IEA)

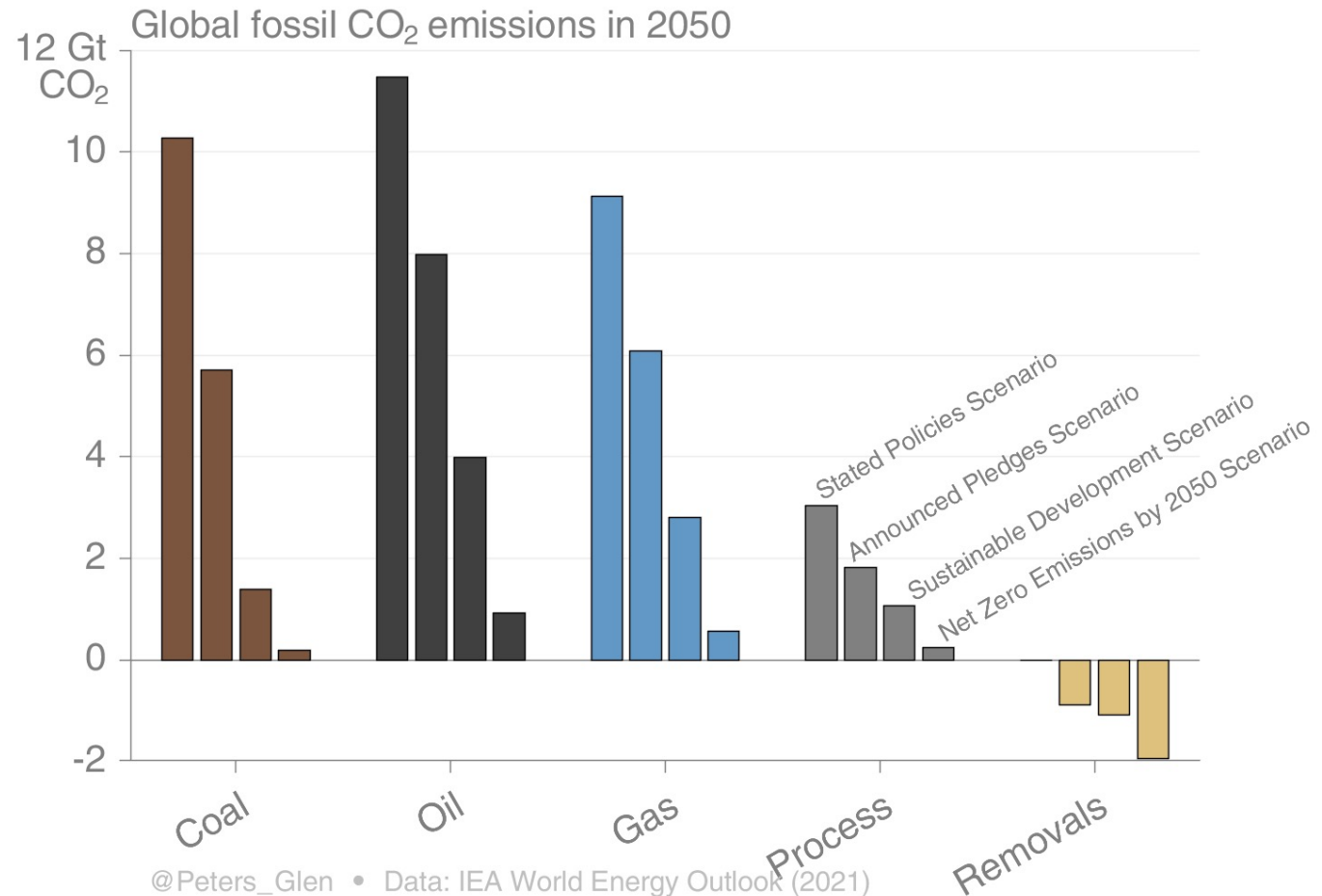
IEA World Energy Outlook 2021



©@Peters_Glen • Data: IEA World Energy Outlook (2021) updated during COP26

Fossil CO₂ emissions in 2050

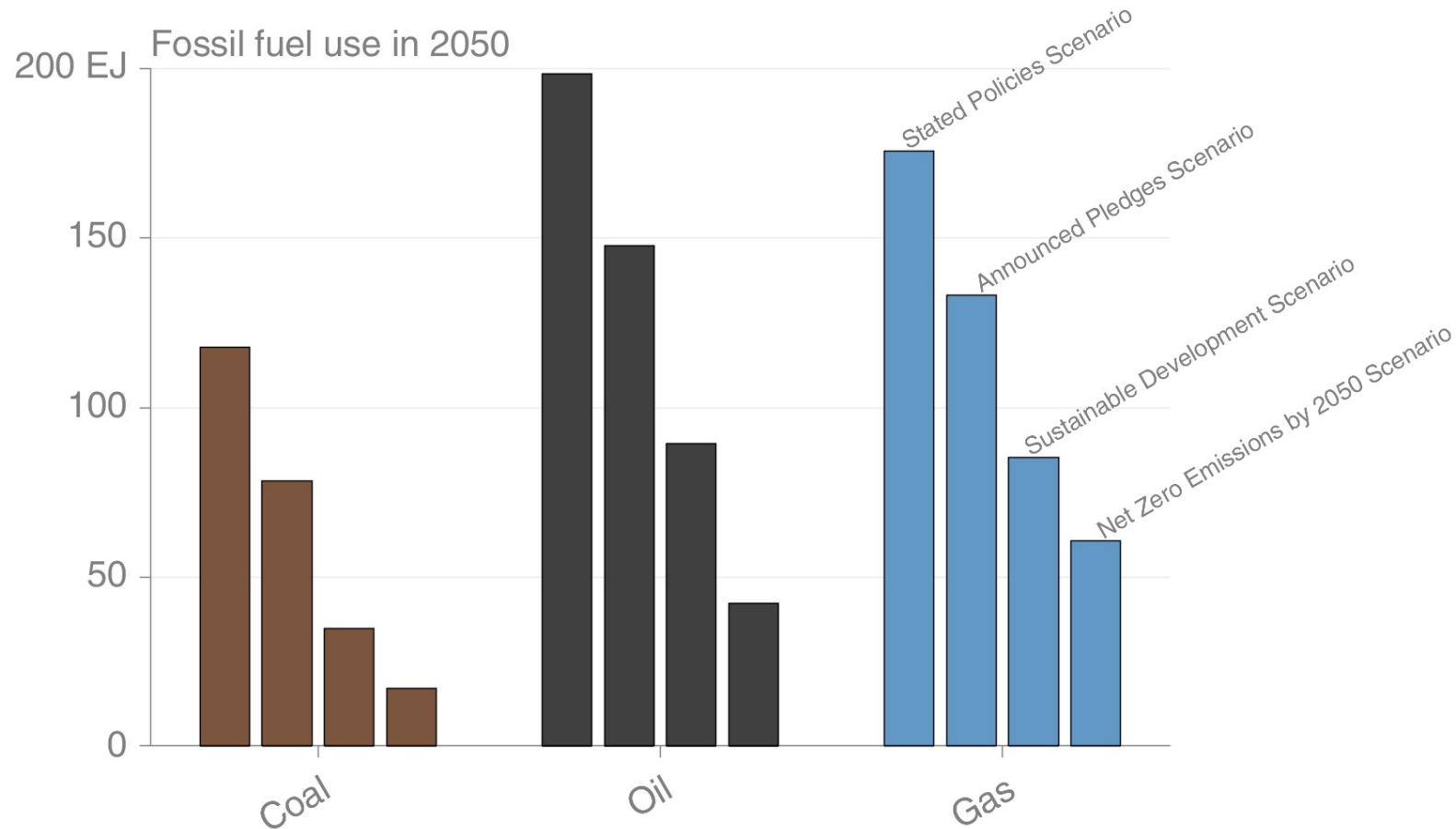
For Net Zero Emissions 2050, fossil CO₂ emissions go close to zero (and removals grow).
But does fossil fuel use fall the same amount?



Data: [IEA WEO 2021](#)

Fossil fuel use in 2050

The fossil fuel use may be more than implied by CO₂ emissions because of non-energy use (oil) and CCS (coal, gas)

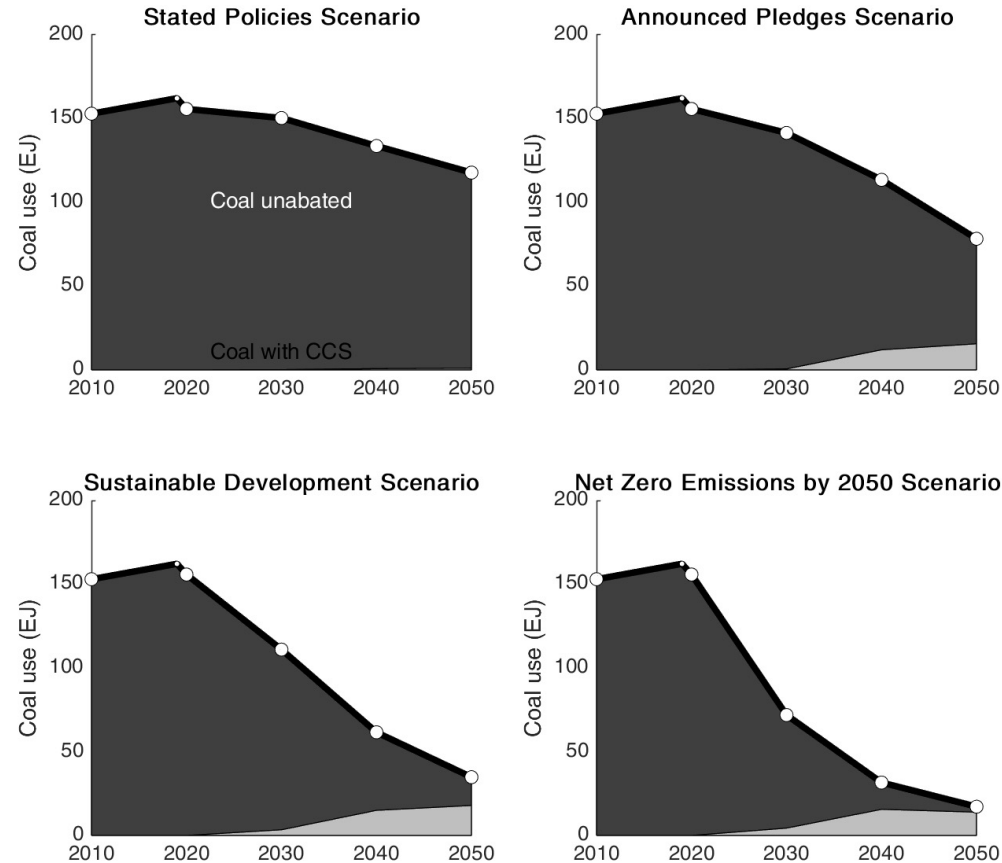


©@Peters_Glen • Data: IEA World Energy Outlook (2021)

Data: [IEA WEO 2021](#)

How much CCS on coal?

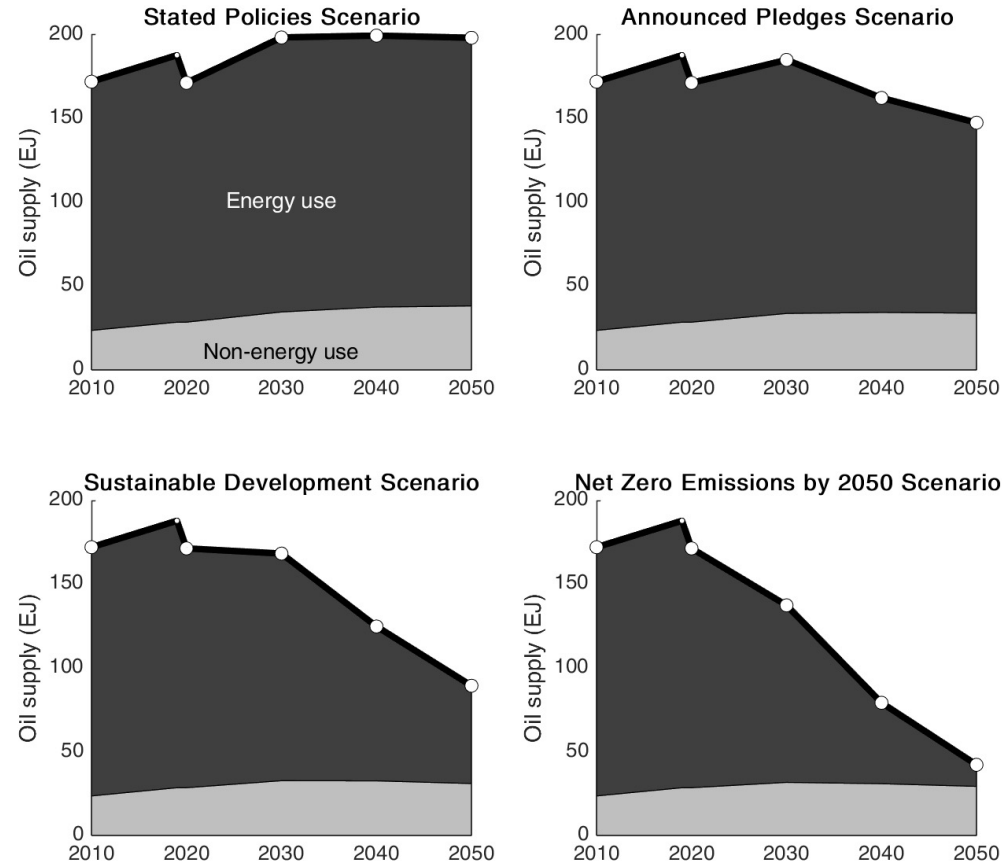
In Net Zero Emissions 2050, there is virtually no unabated coal in 2050. The level of CCS is similar in each of the mitigation scenarios.



@Peters_Glen • Data: IEA World Energy Outlook (2021)

How much does oil use decline?

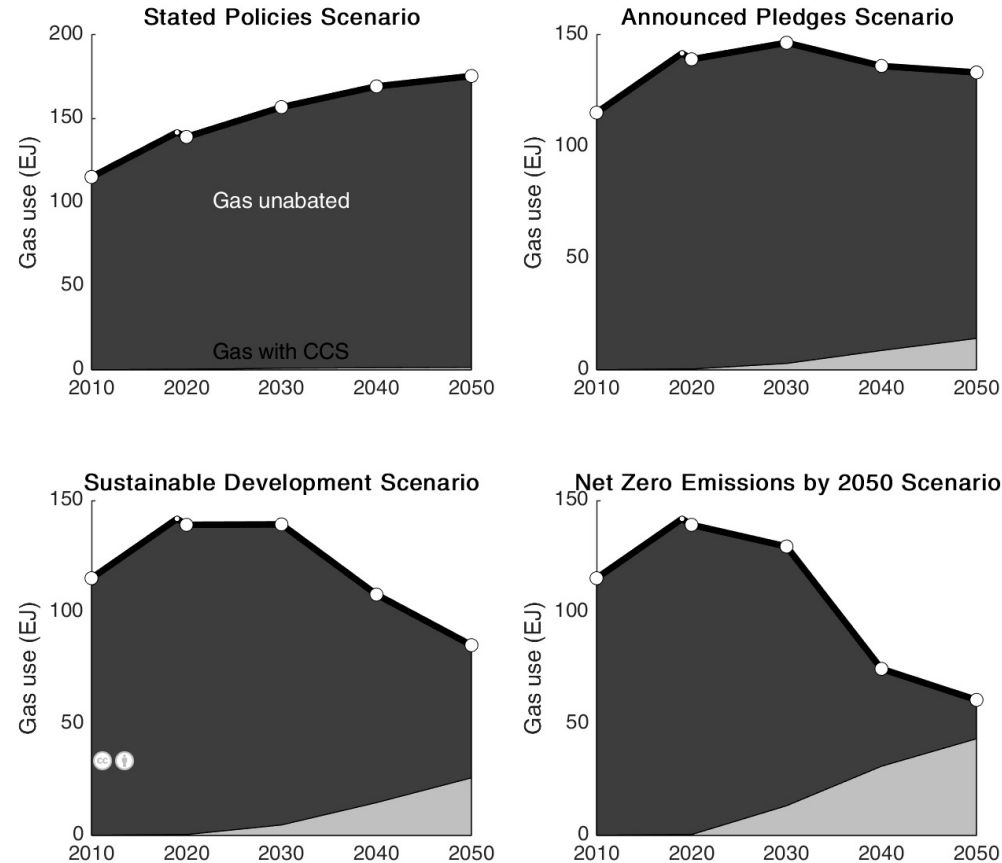
The use of oil for non-energy purposes is similar across all scenarios. In NZE2050, almost no oil for energy in 2050!
The non-energy use may later be combusted, e.g., as plastic in waste incineration...



@Peters_Glen • Data: IEA World Energy Outlook (2021)

How much CCS on gas?

Gas use is the highest of the fossil fuels in 2050, but most uses CCS.
The level of CCS is grows with the stringency of mitigation.

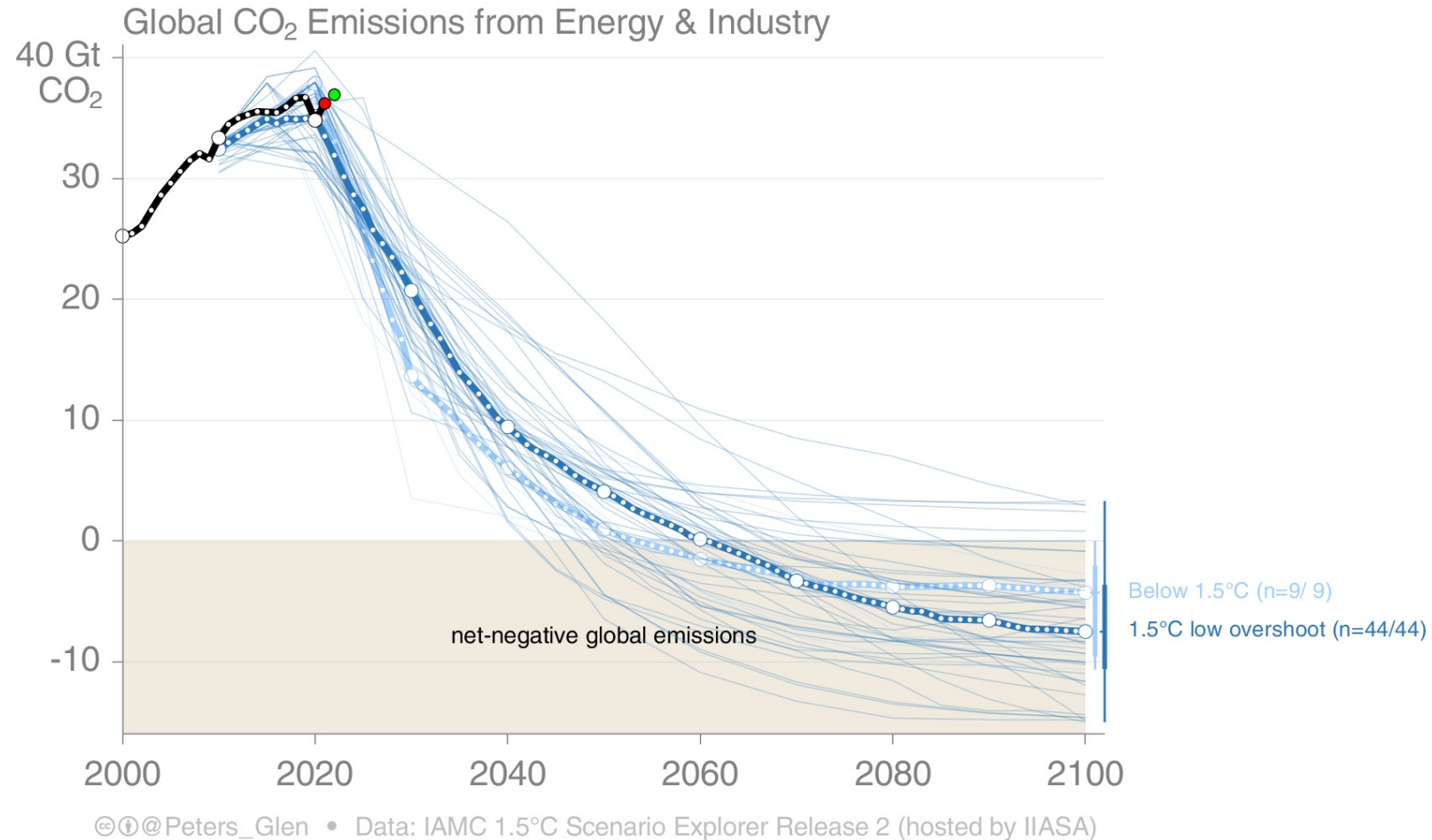


@Peters_Glen • Data: IEA World Energy Outlook (2021)

Was COVID a free lunch to net zero?

COVID increasing looks like a blip

There is little evidence CO₂ emissions will drop in the next few years, certainly not in line with 50% by 2030.



The climate problem is solved when
everyone
stops burning fossil fuels
(& stops cutting down forests)

°CICERO

Glen Peters

glen.peters@cicero.oslo.no

-
-  Peters_Glen
 -  cicero.oslo.no
 -  [cicerosenterforklimaforskning](https://www.facebook.com/cicerosenterforklimaforskning)
-