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An Ostrich or a Phoenix

– the choice for Wales?

Kevin Anderson
University of Manchester
Jan 2014

Tyndall Centre®
for Climate Change Research

My headline conclusion:

Avoiding “dangerous climate change” (stabilisation at 2°C)
remains a feasible goal of the international community

just

… with economic (oikonimia), but not financial (chrematisitc), benefits

and only

… if we deliver a radical reduction in energy consumption now!

Fredag in Stockholm: IPCC science report released

- Offered neither surprise nor solace to our fossil-fuel hungry world
- The science message for policy-makers, business leaders and civil society has changed very little during the last twenty years
- Small adjustments and refinements have occurred – but this is a mature science

So what has changed?

- An additional 200 billion tonnes of CO_2 pumped into the atmosphere since last report (AR4 2007)
- Annual emissions ~60% higher than at time of the first report in 1990
- Atmospheric CO_2 levels higher than during past 800 thousand years

Yet we repeatedly recommit to:

… make our ***fair*** contribution to…

*"To hold the increase in global temperature **below 2 degrees Celsius**, and take action to meet this objective consistent with **science** and on the basis of **equity**"*

Copenhagen Accord, 2009

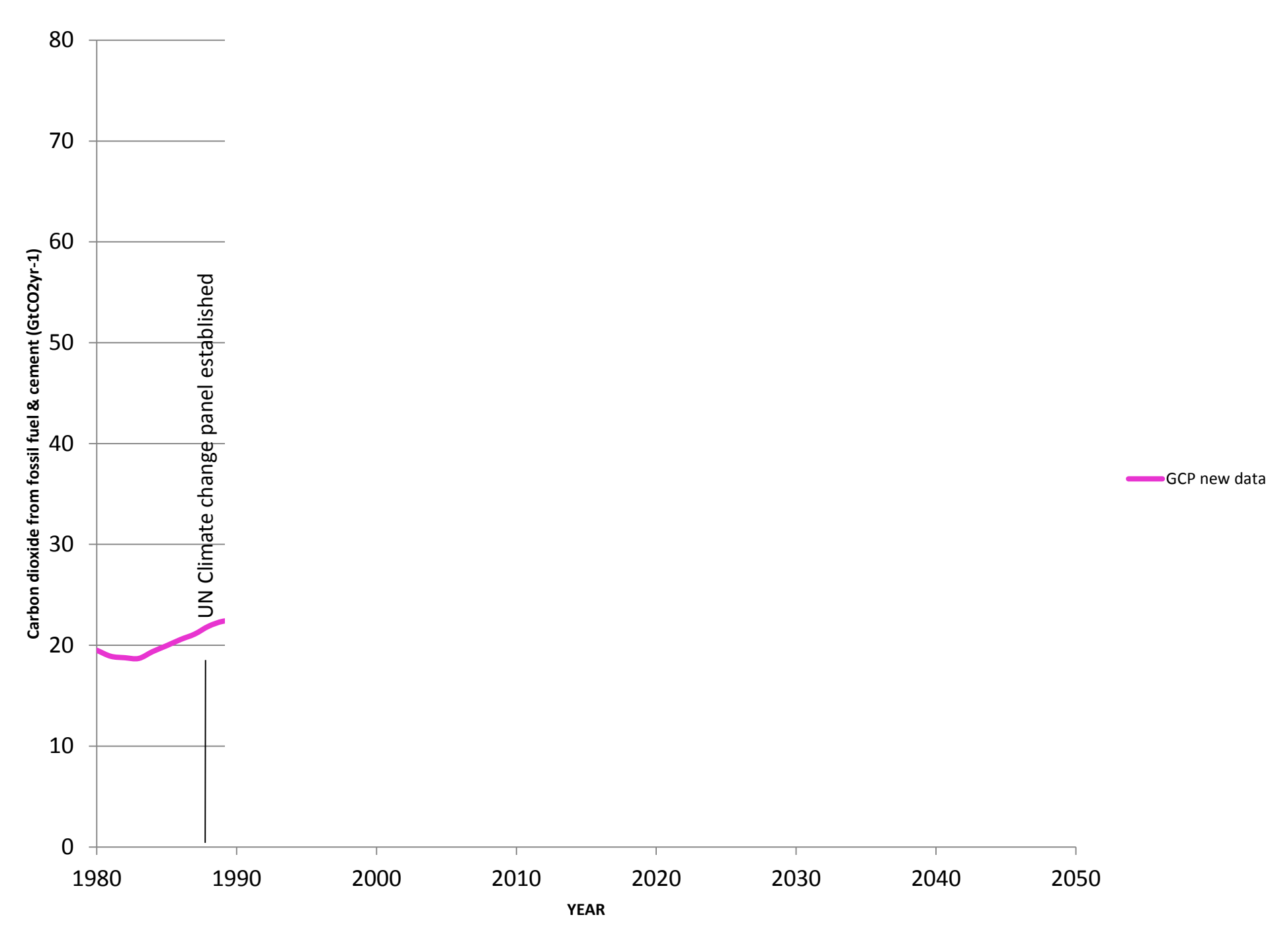
… but why radical reductions in energy demand?

Surely…

we can deliver 2°C mitigation through low-carbon energy supply?

… in 2014, it's all about timing!


Thinking about this
‘graphically’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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
UN Climate change panel established
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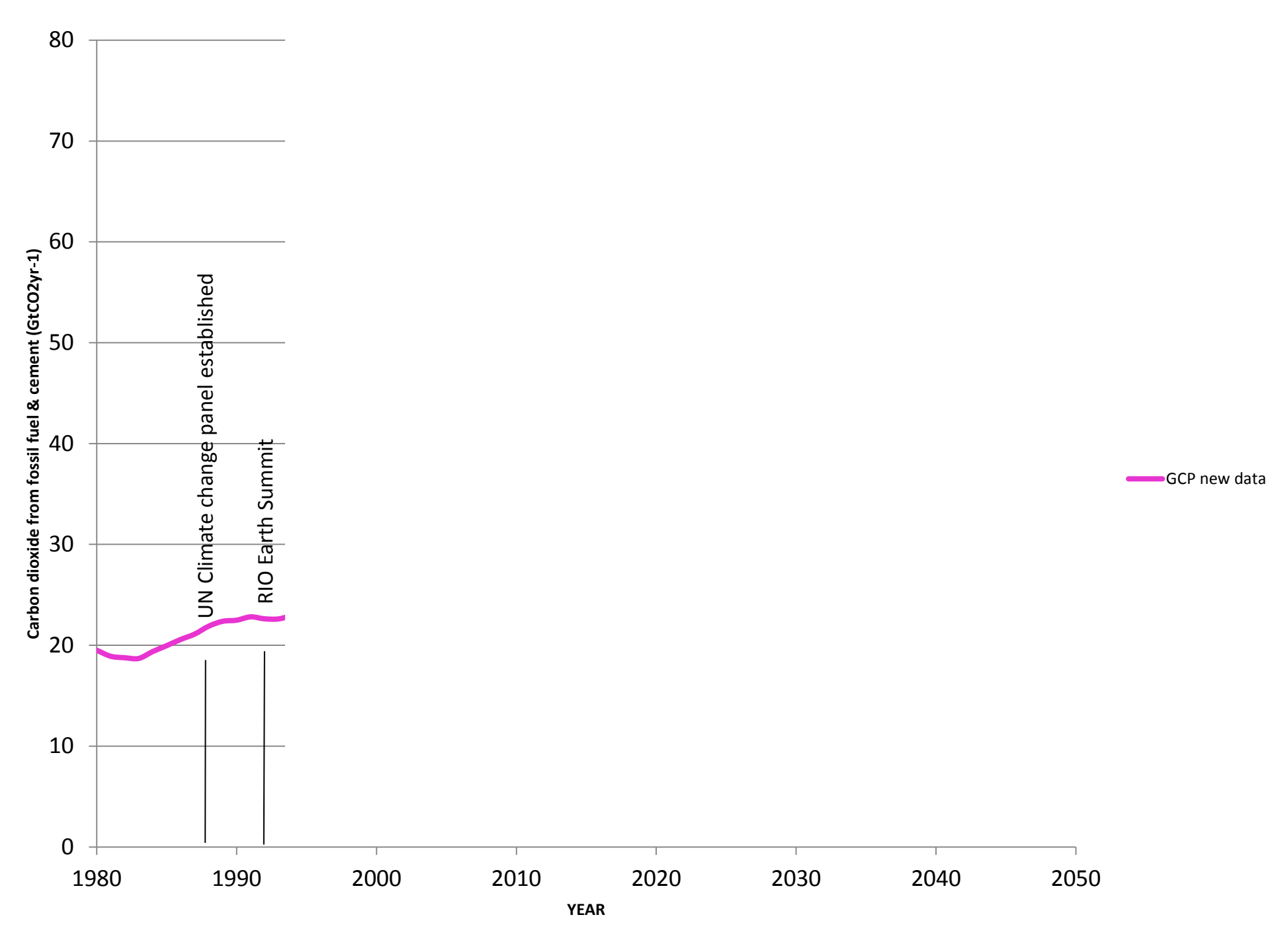
GCP new data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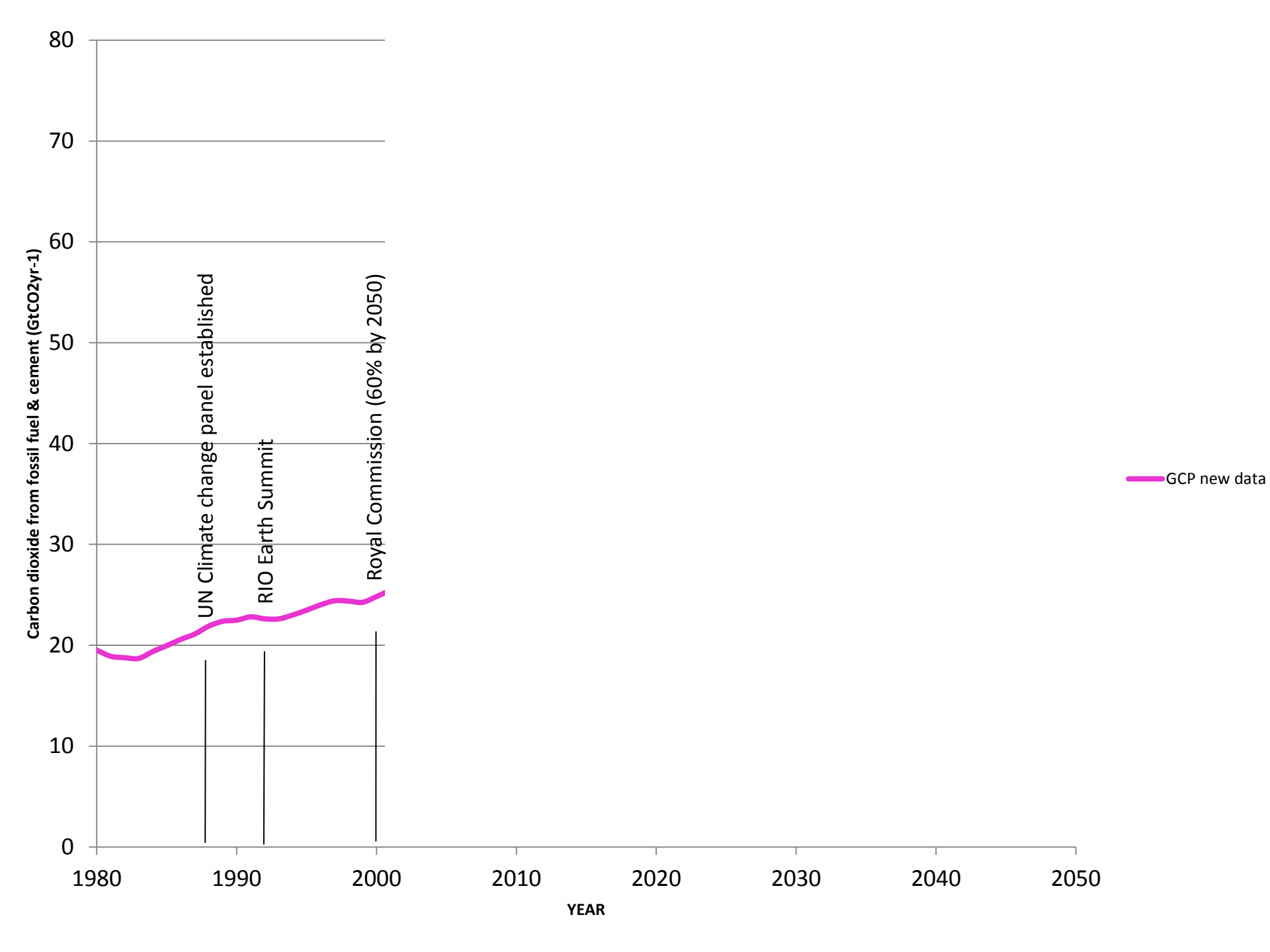
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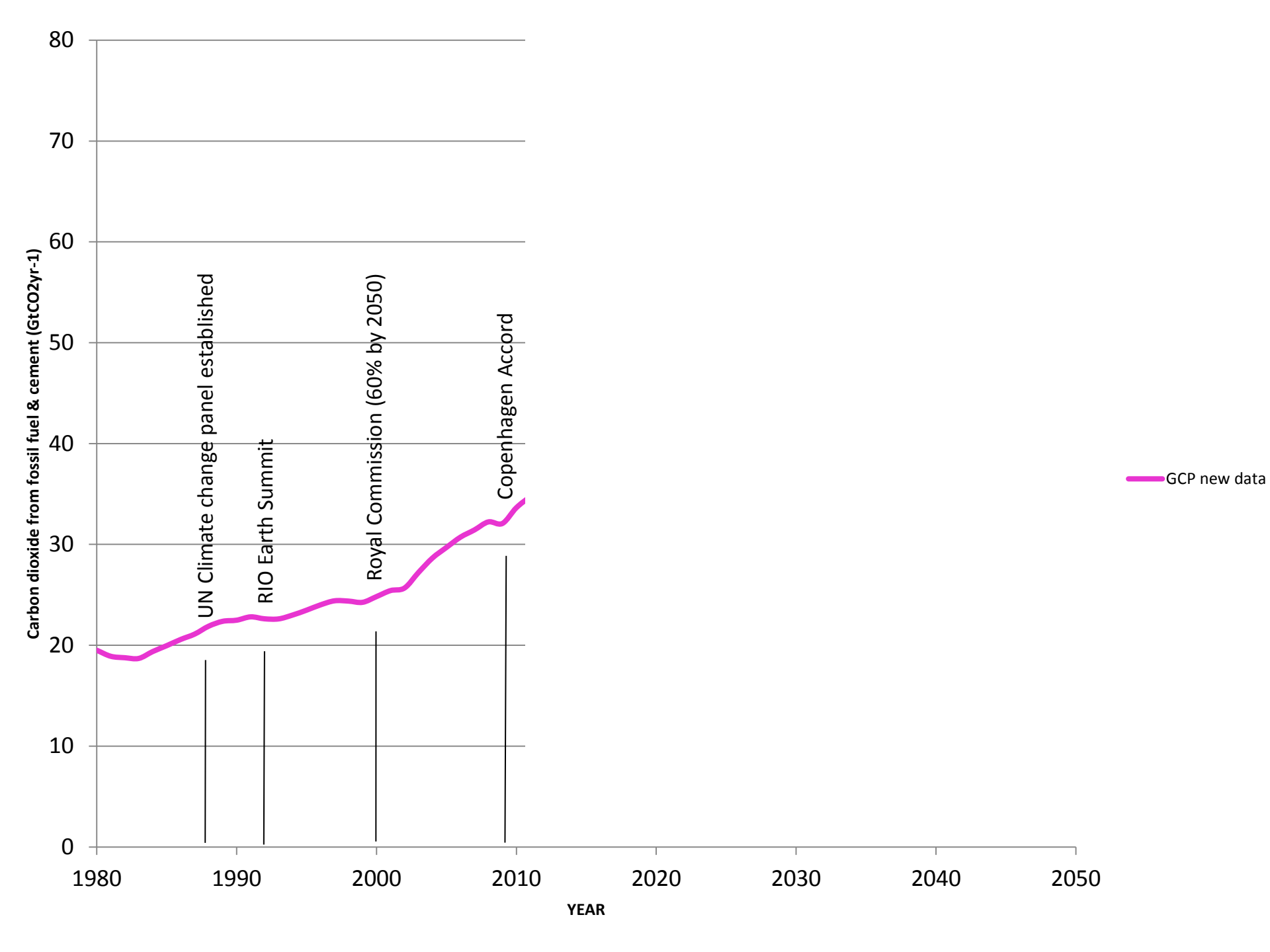
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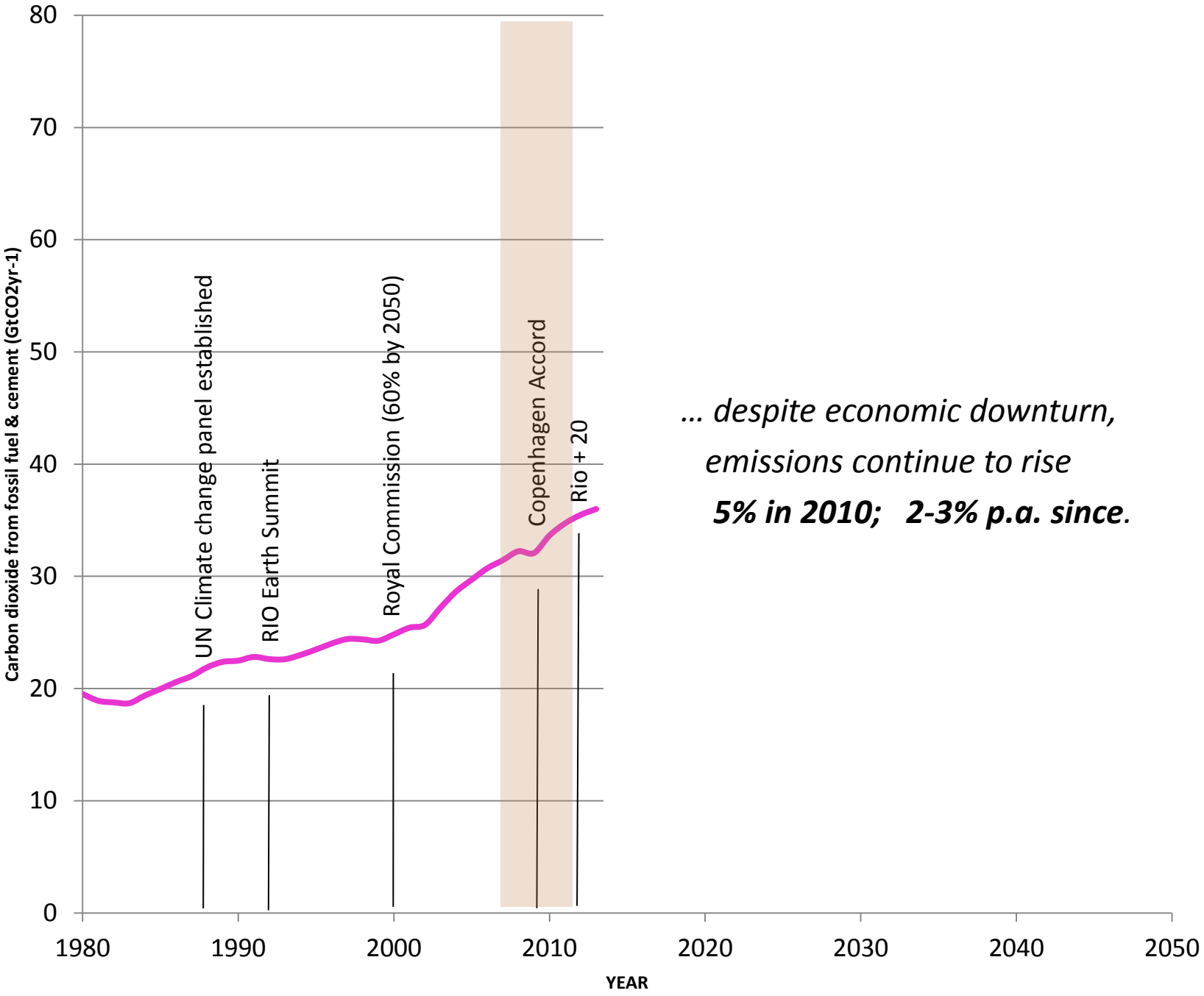
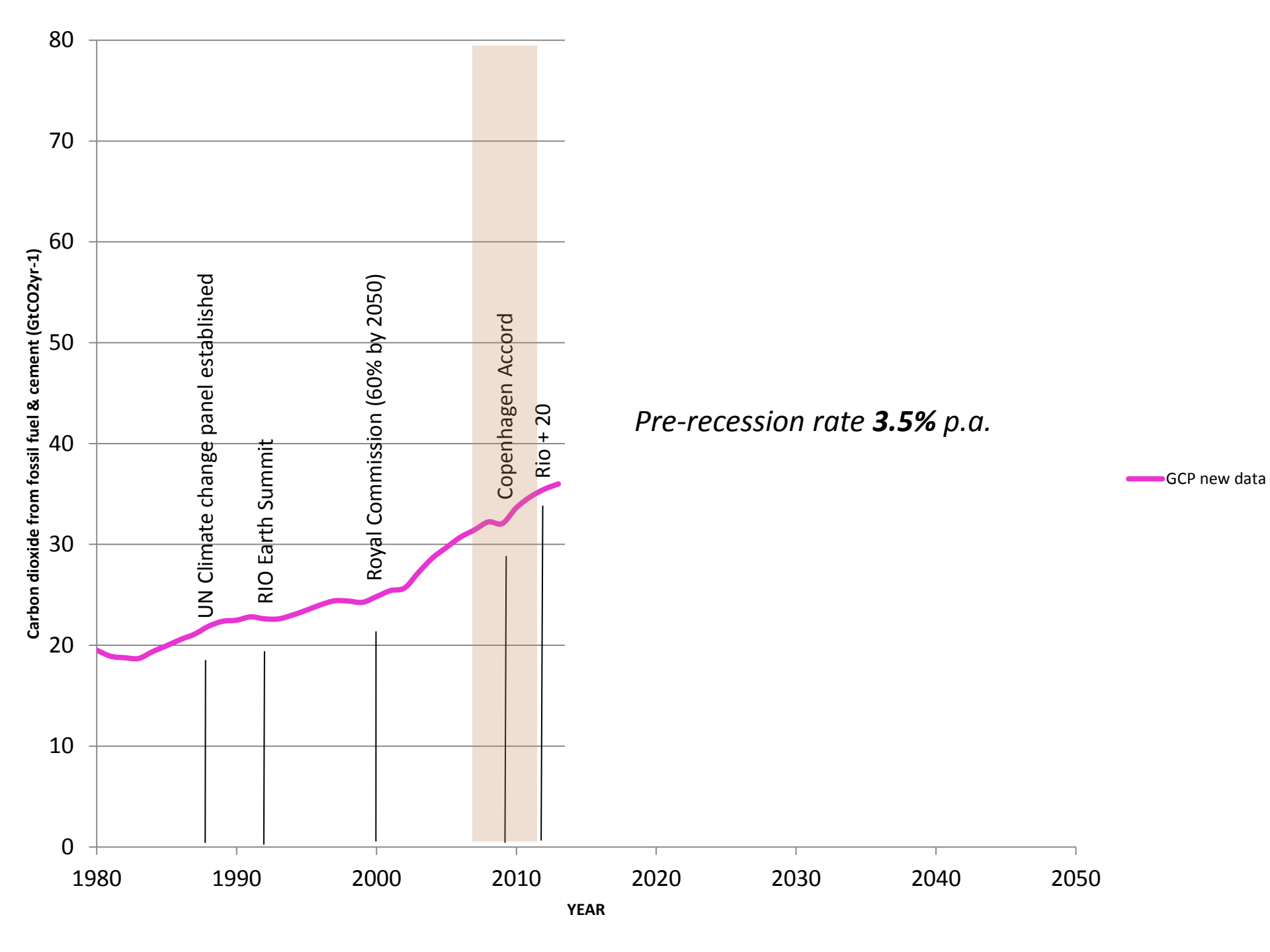


… despite economic downturn, emissions continue to rise

5% in 2010; 2-3% p.a. since.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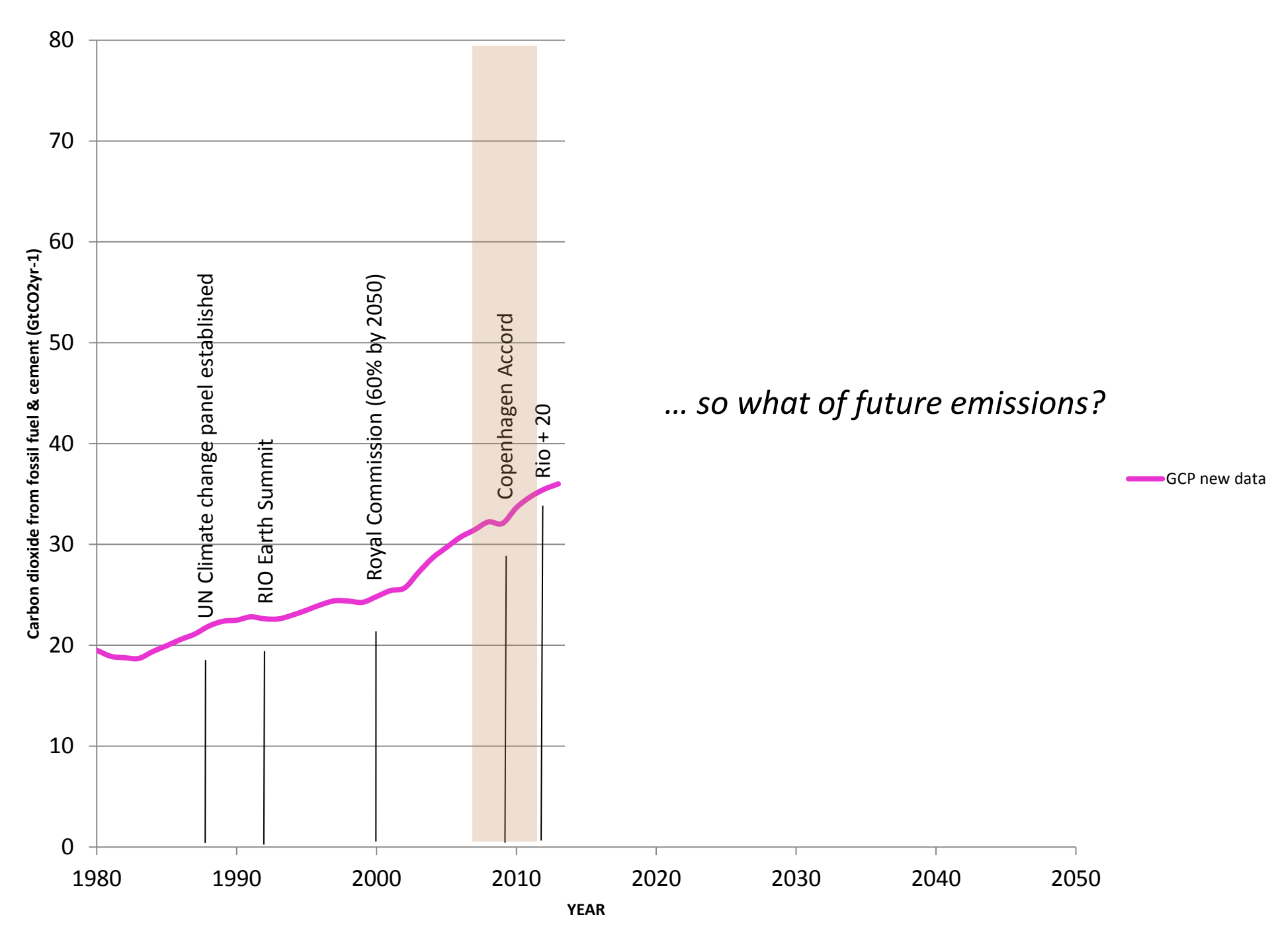
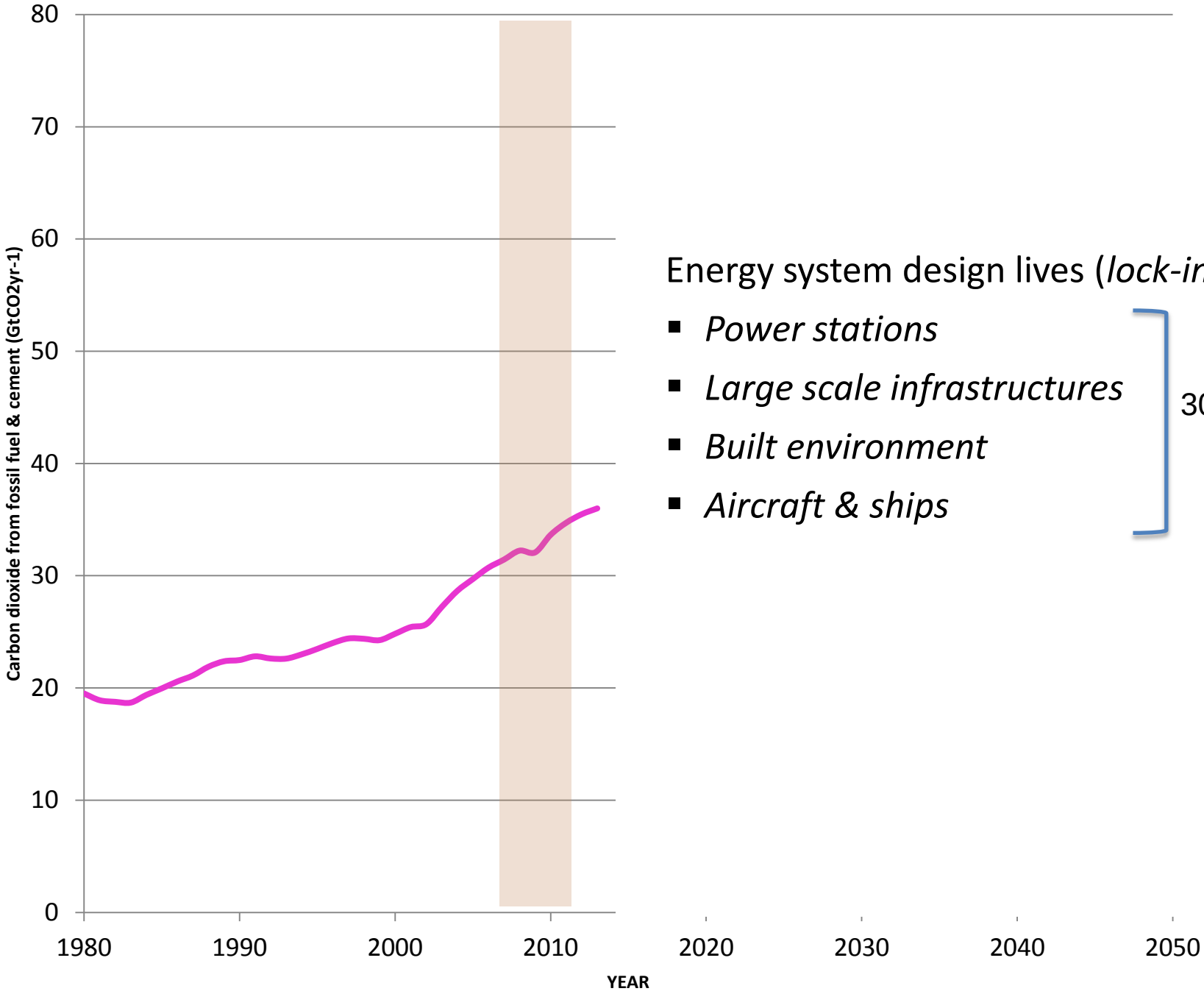
Copenhagen Accord
Rio + 20
Pre-recession rate 3.5% p.a.
GCP new data



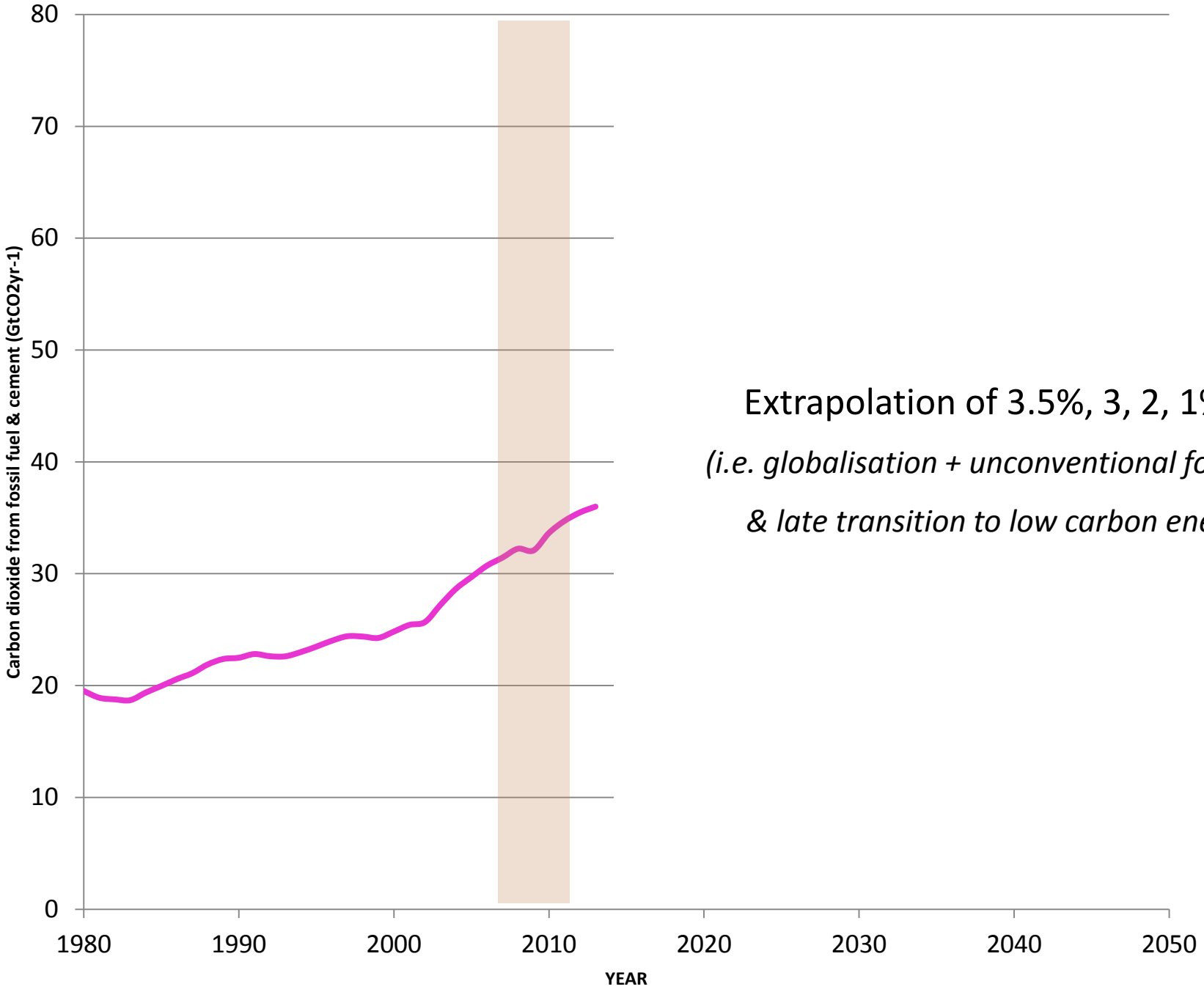
… so what of future emissions?



Energy system design lives (*lock-in*)

- *Power stations*
- *Large scale infrastructures*
- *Built environment*
- *Aircraft & ships*

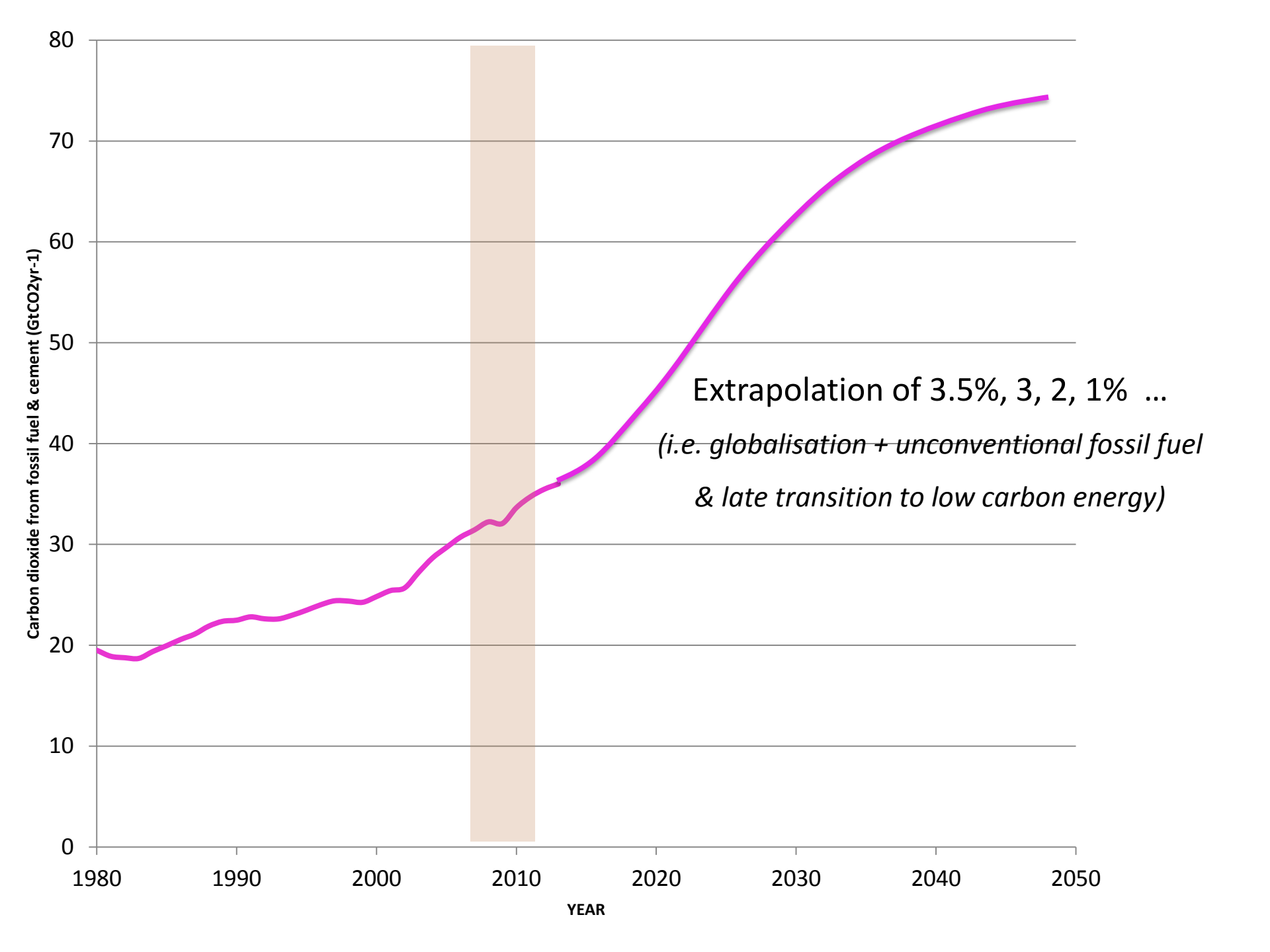
30-100 years



Extrapolation of 3.5%, 3, 2, 1% …

(i.e. globalisation + unconventional fossil fuel

& late transition to low carbon energy)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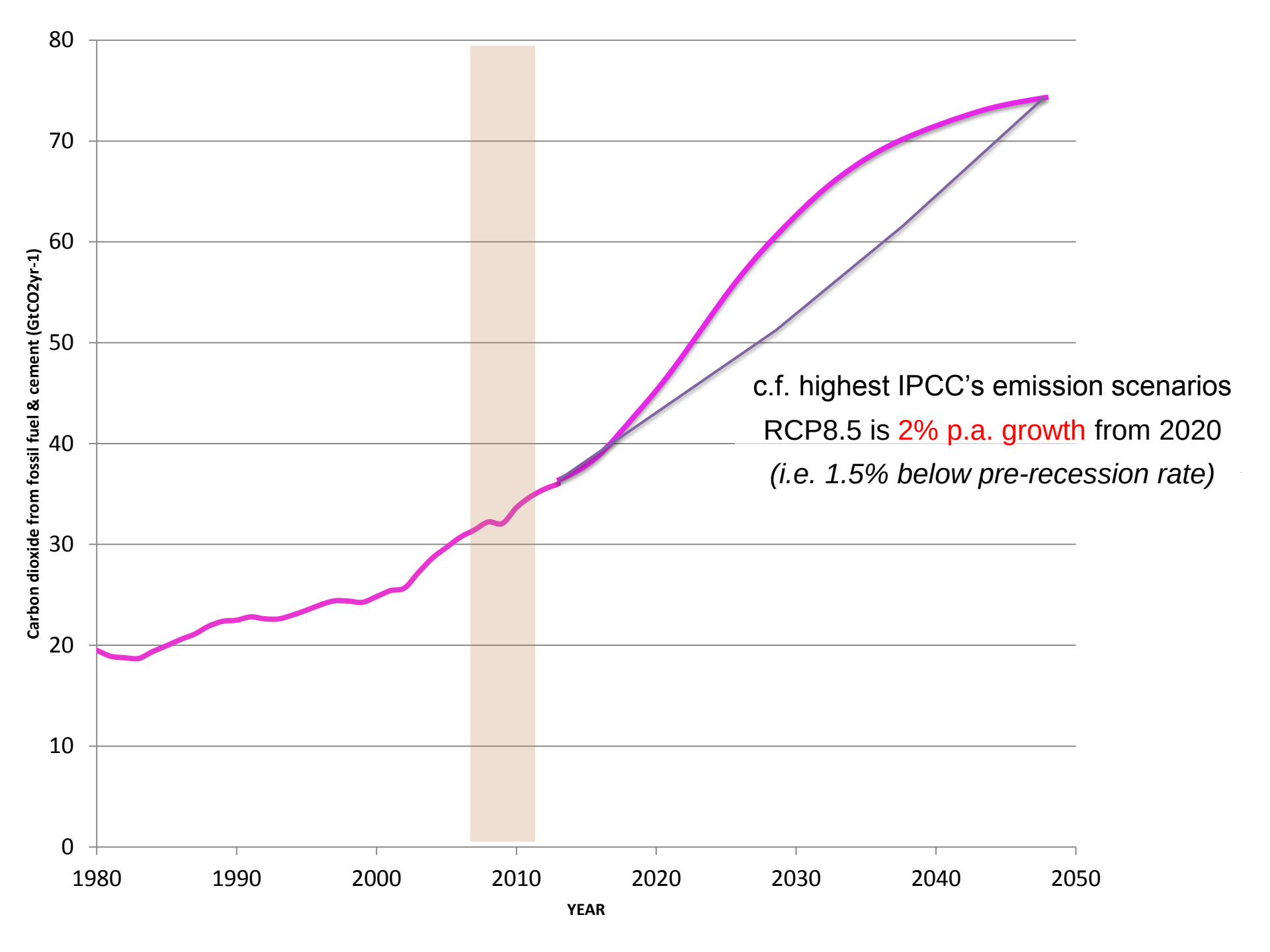
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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
1980
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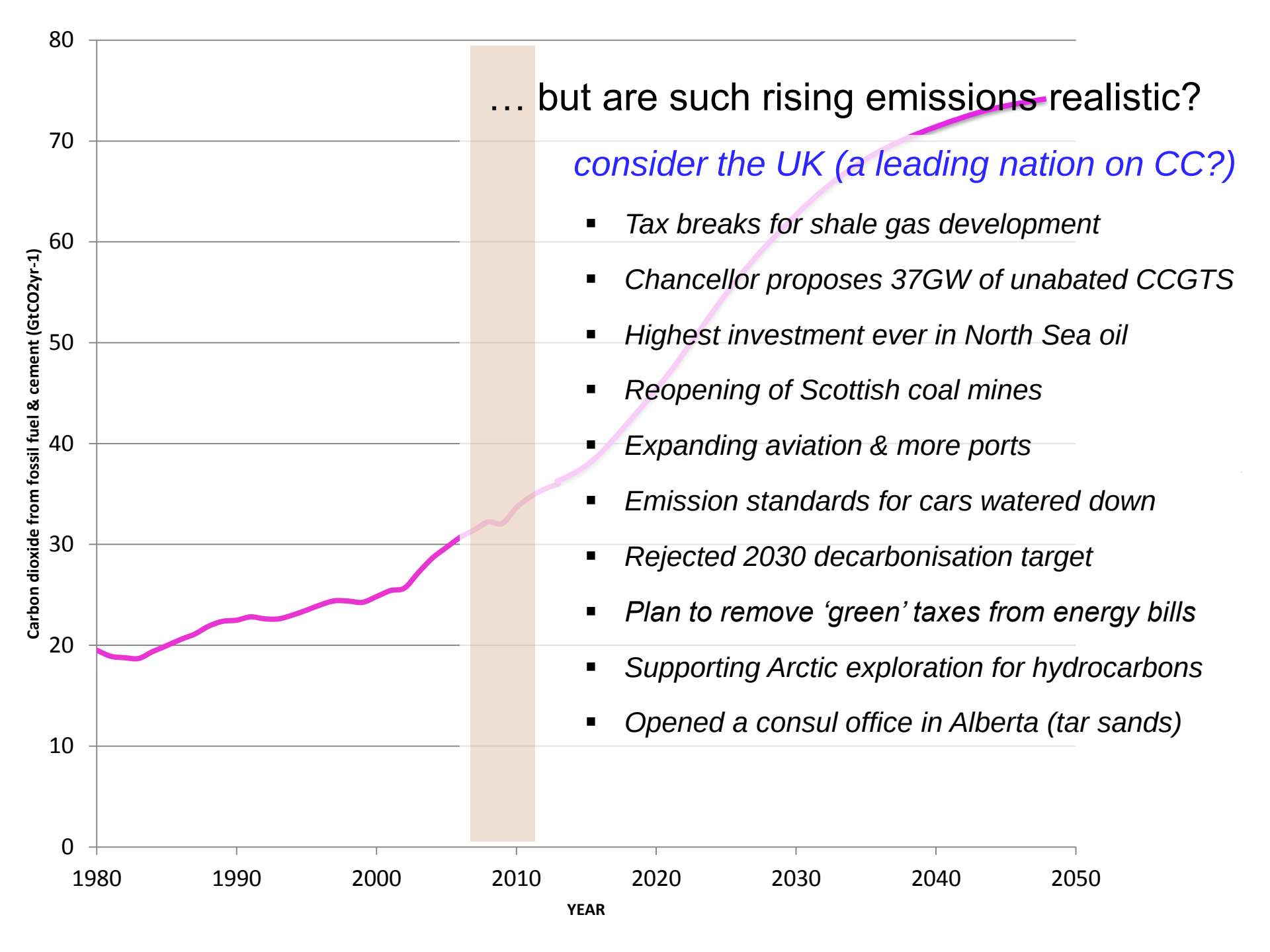
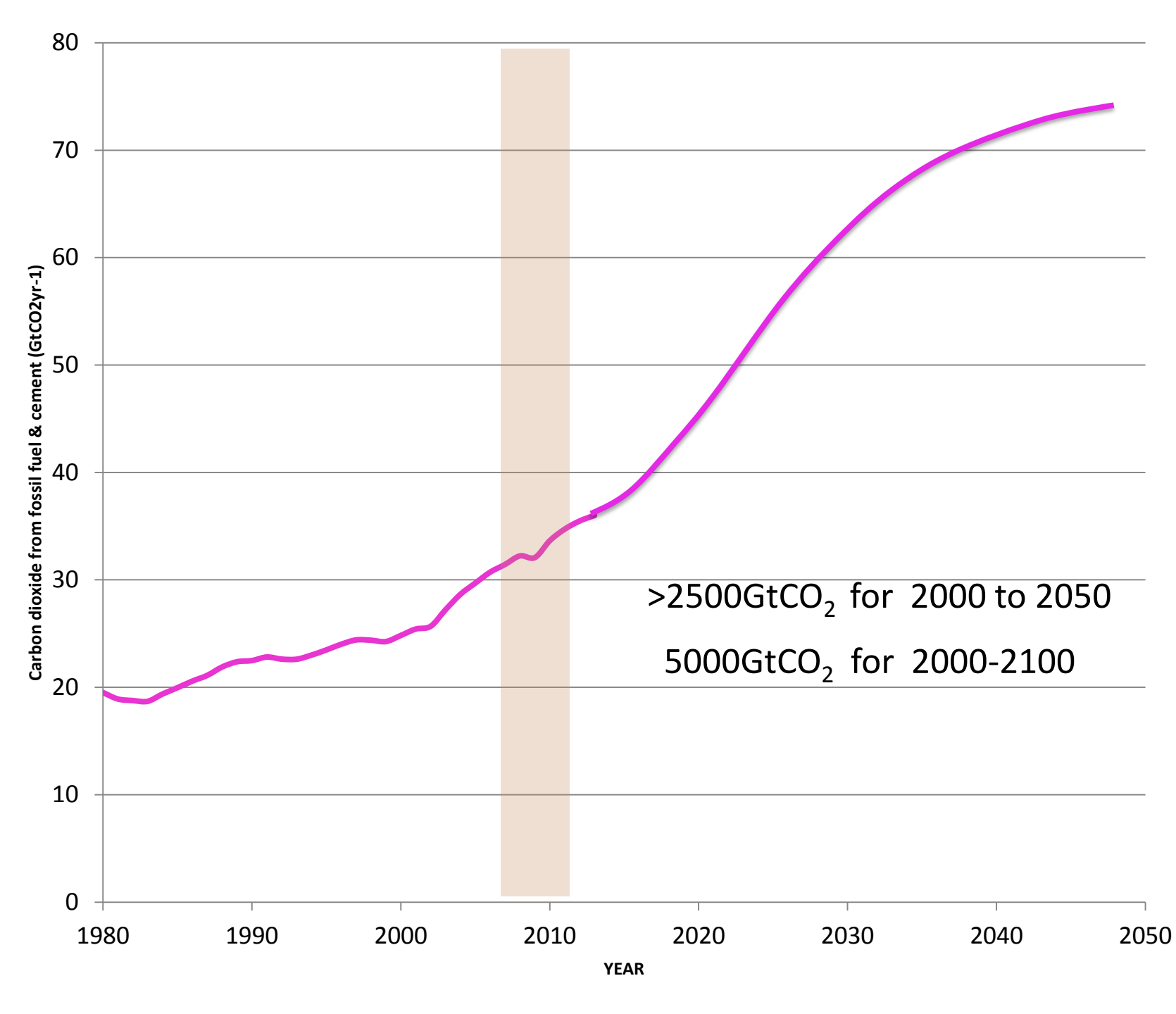
YEAR
c.f. highest IPCC's emission scenarios
RCP8.5 is 2% p.a. growth from 2020
(i.e. 1.5% below pre-recession rate)



… but are such rising emissions realistic?

consider the UK (a leading nation on CC?)

- *Tax breaks for shale gas development*
- *Chancellor proposes 37GW of unabated CCGTS*
- *Highest investment ever in North Sea oil*
- *Reopening of Scottish coal mines*
- *Expanding aviation & more ports*
- *Emission standards for cars watered down*
- *Rejected 2030 decarbonisation target*
- *Plan to remove 'green' taxes from energy bills*
- *Supporting Arctic exploration for hydrocarbons*
- *Opened a consul office in Alberta (tar sands)*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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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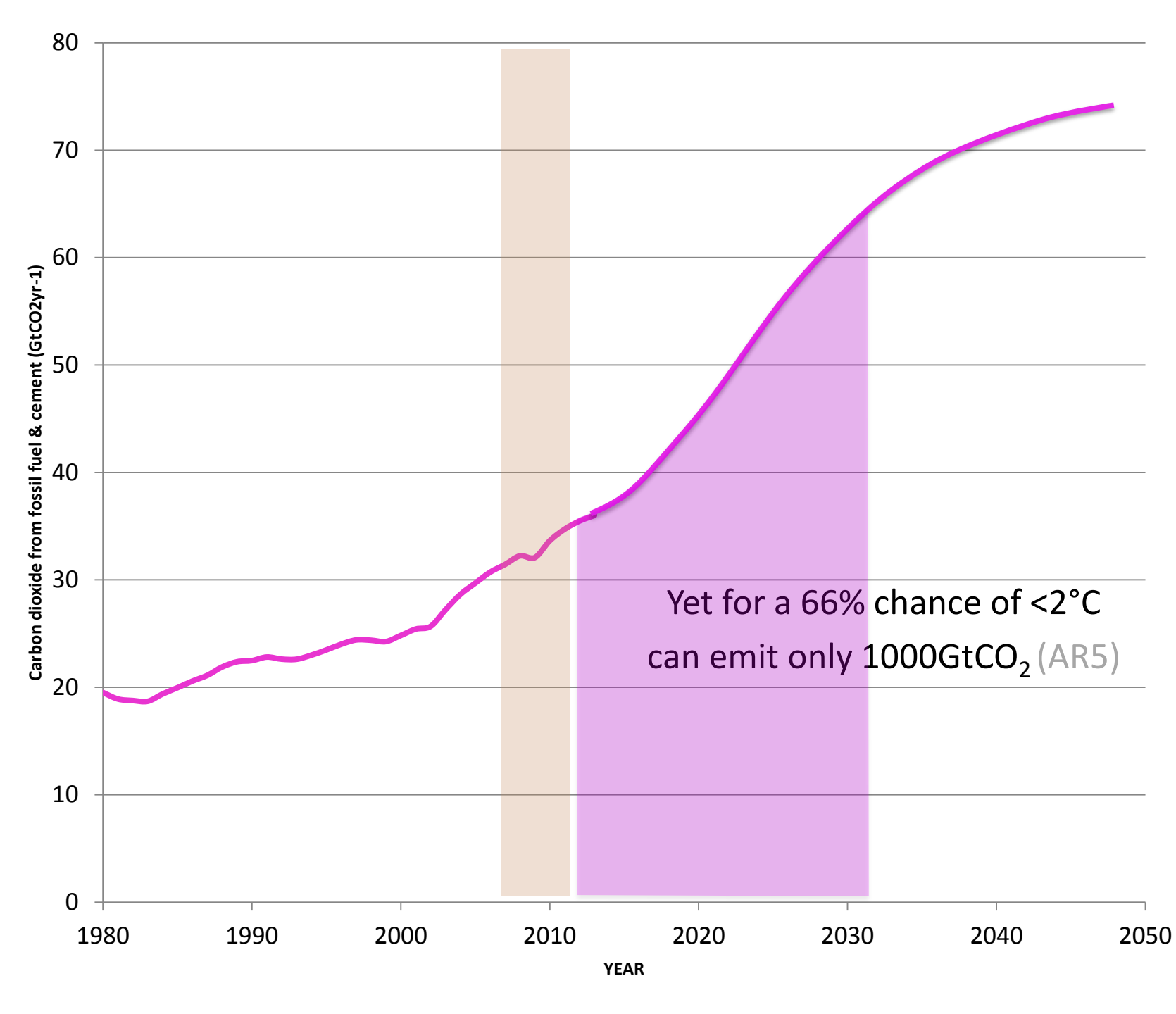
YEAR
>2500GtCO2 for 2000 to 2050
5000GtCO2 for 2000-2100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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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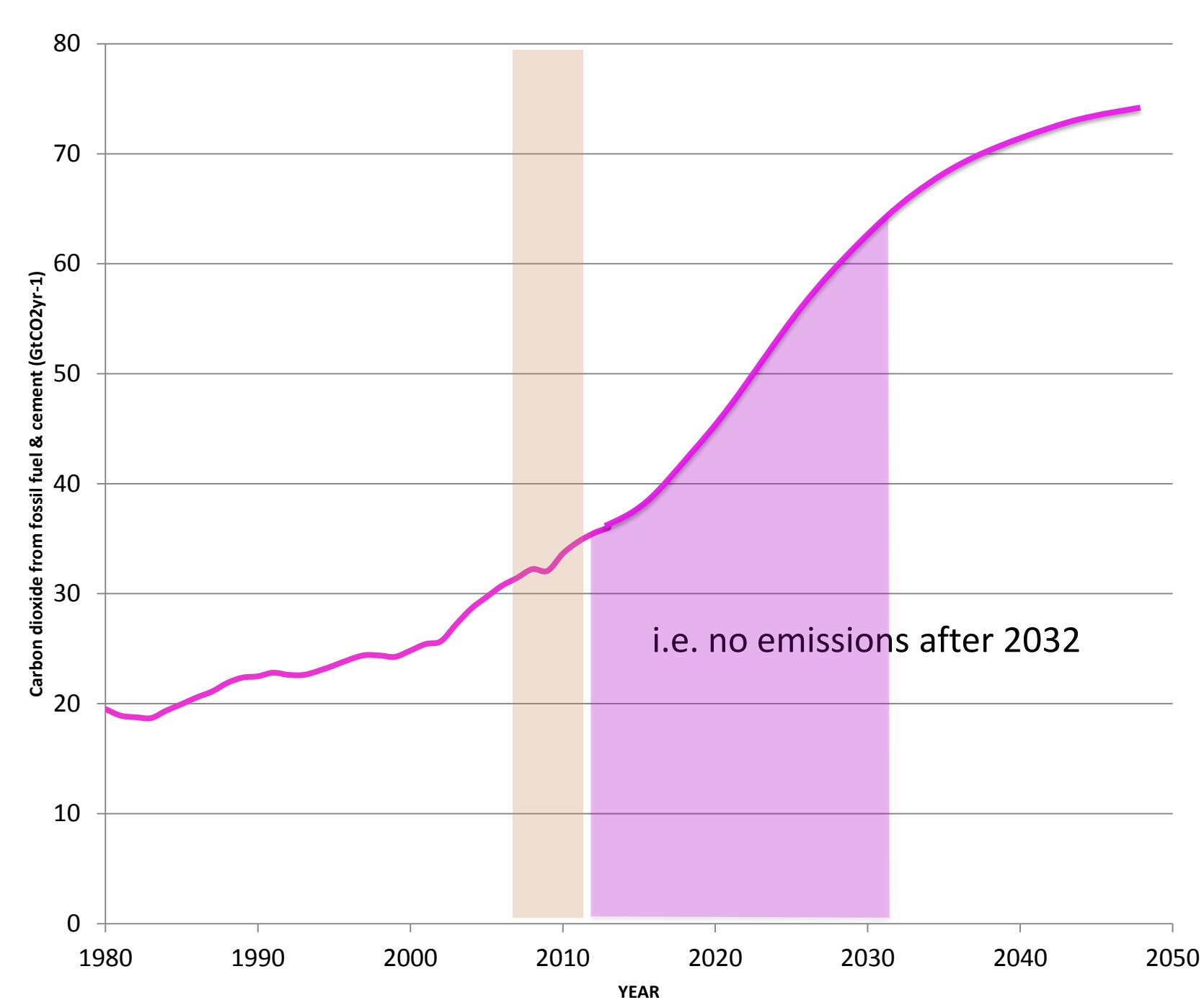
YEAR
Yet for a 66% chance of <2°C
can emit only 1000GtCO2 (AR5)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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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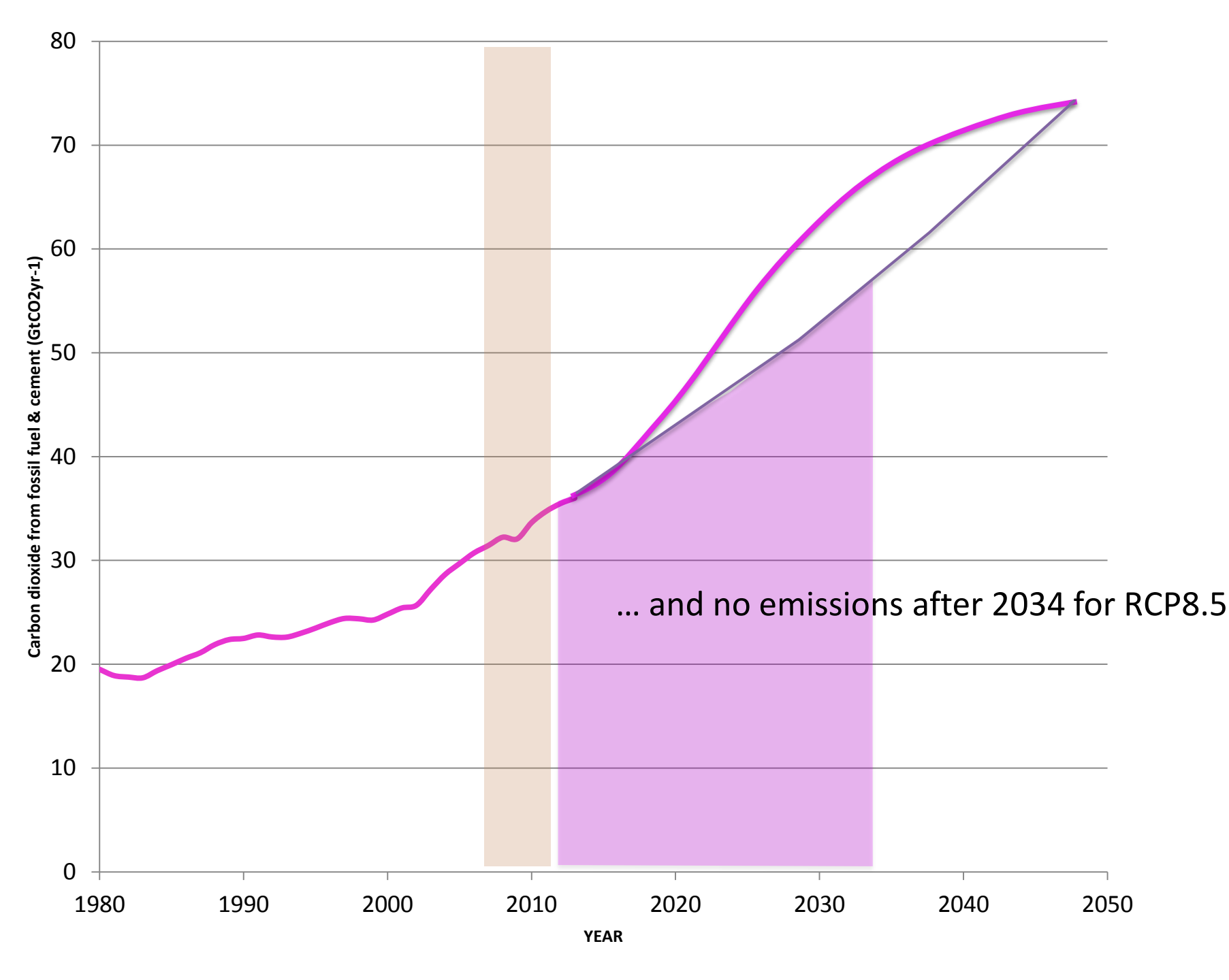
i.e. no emissions after 2032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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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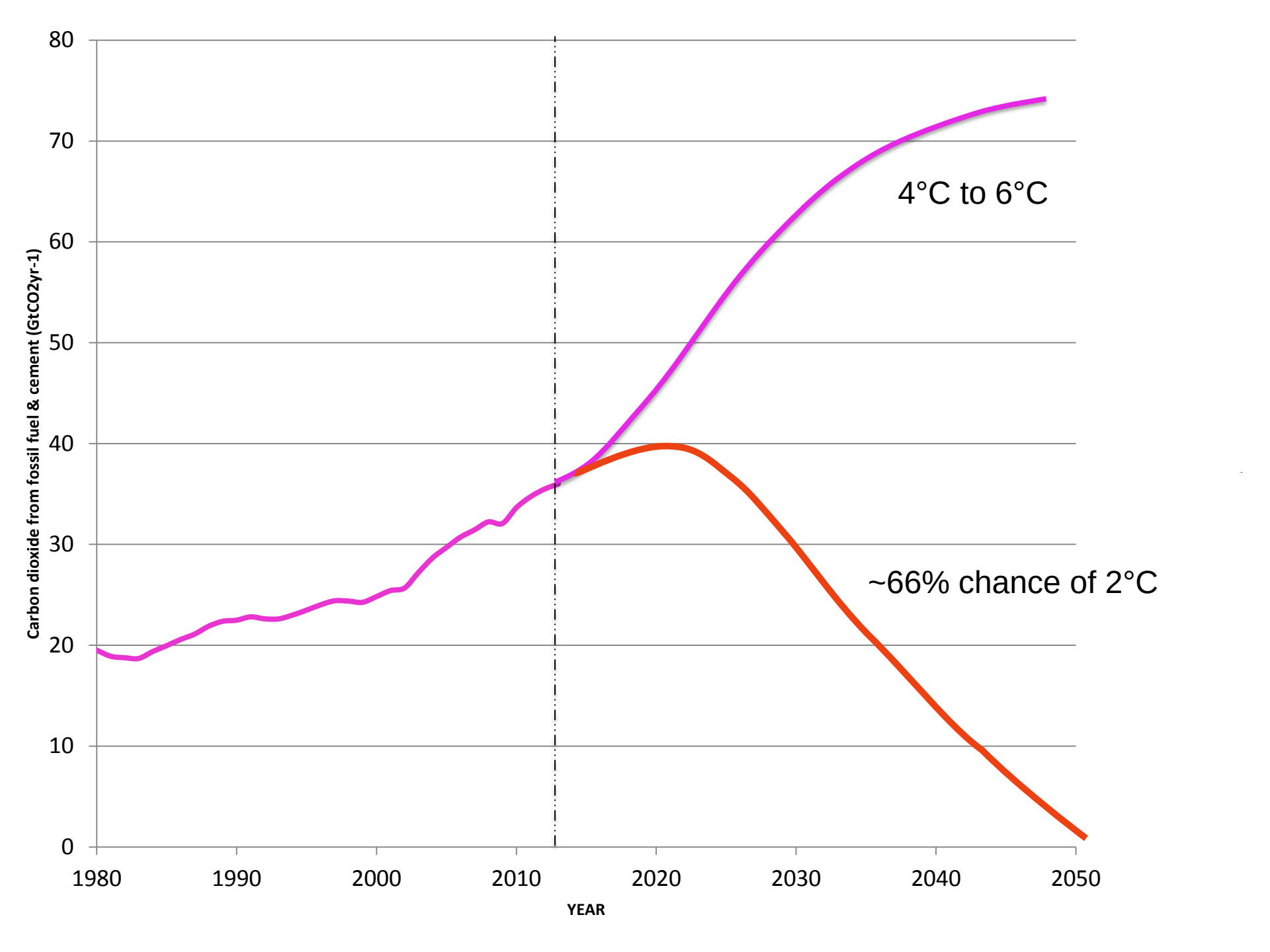
YEAR
… and no emissions after 2034 for RCP8.5

So recent history supports the IEA view

… that the CO_2 trend *"is perfectly in line with a temperature increase of **6 degrees Celsius**, which would have devastating consequences for the planet."*

Fatih Birol - IEA chief economist


… but what about 2°C?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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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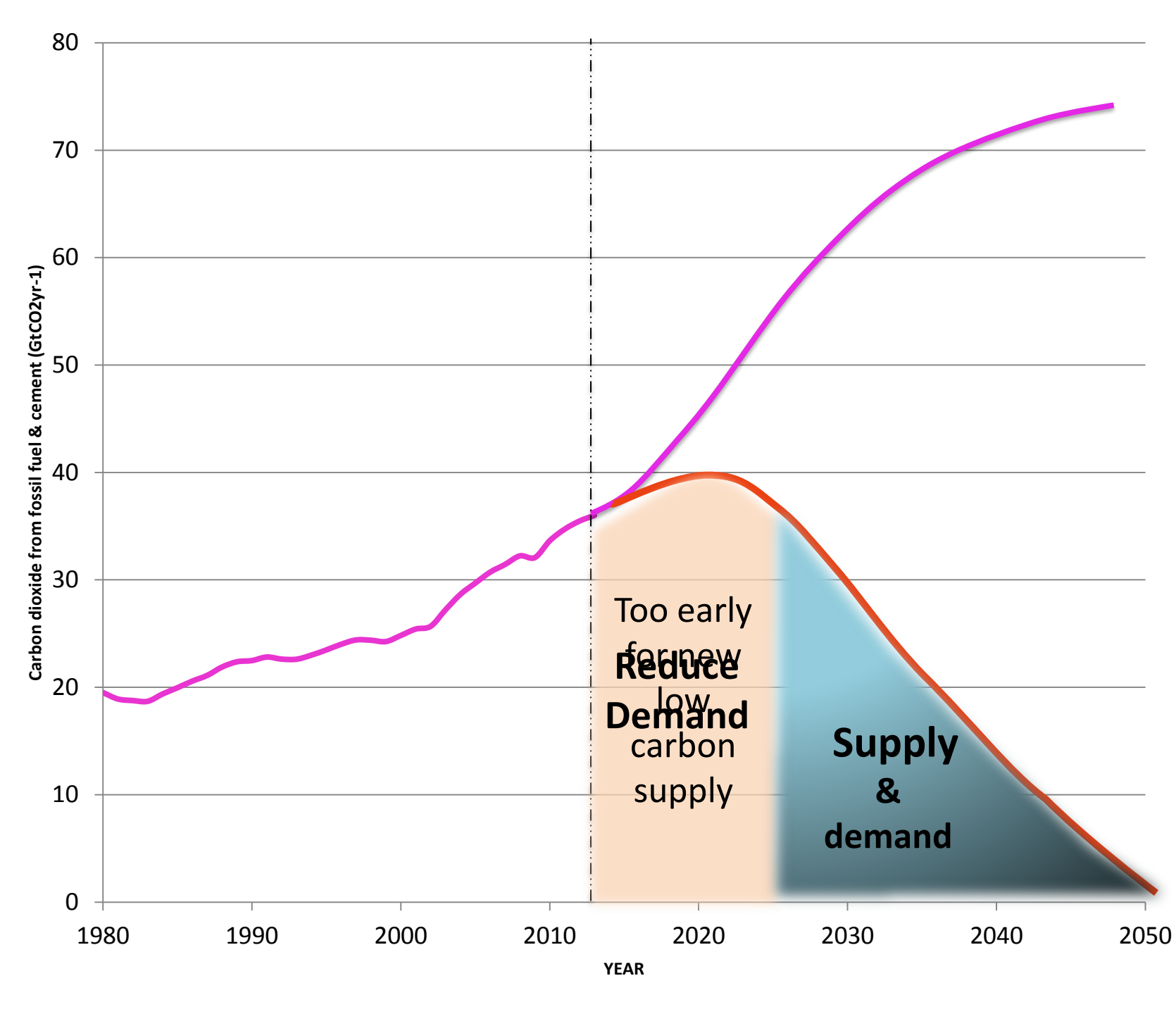
YEAR
4°C to 6°C
~66% chance of 2°C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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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YEAR
Too early
for new
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carbon
supply
Reduce
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Supply
&
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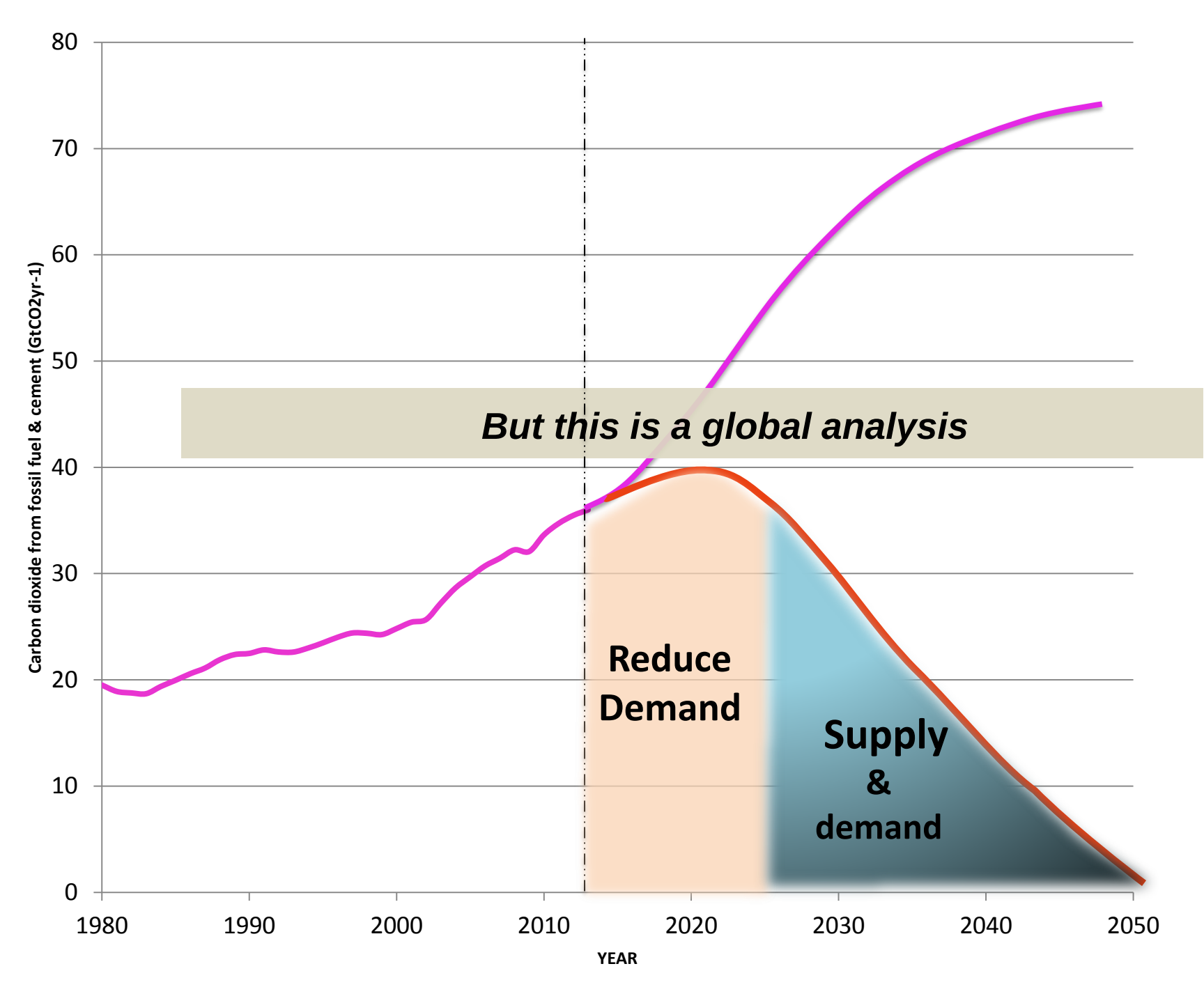
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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
1980
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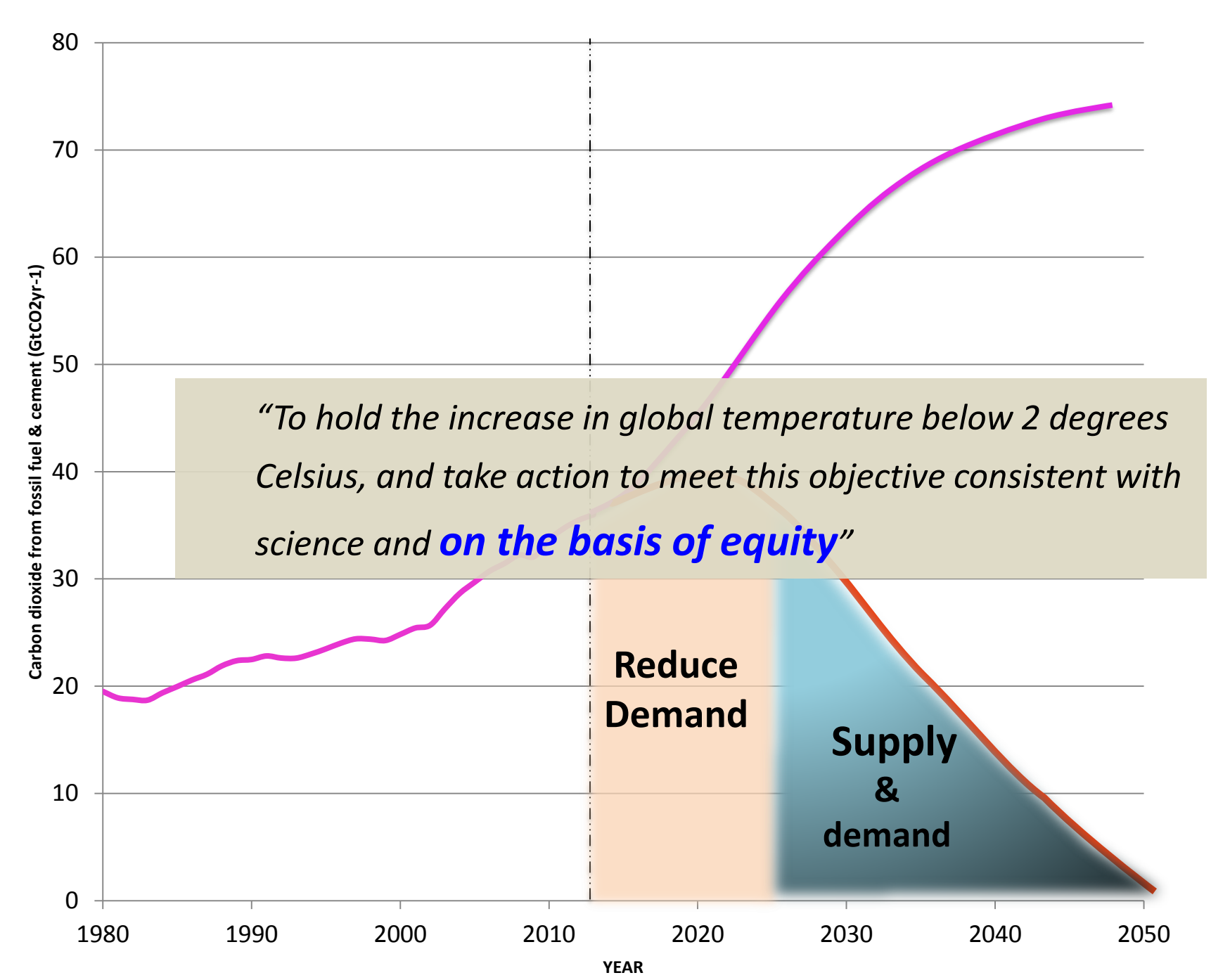
YEAR
But this is a global analysis
Reduce Demand
Supply & demand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Carbon dioxide from fossil fuel & cement (GtCO2yr-1)
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YEAR
"To hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity"
Reduce Demand
Supply & demand

Assuming poorer (non-Annex 1) nations:

1. Collectively peak their emissions by 2025

2. Reduce thereafter at 6-8% p.a.

… then, for 2°C, wealthy (Annex 1) nations require:

At least 10% reduction in emissions year on year, i.e.

40% reduction by	~2018 (c.f. 1990)
70%	~2024
90%	~2030

i.e. ***RADICAL EMISSION REDUCTIONS***

Is this viable?

… or is 4°C, 6°C or more a better option?

(i.e. a larger carbon budget and lower rates of mitigation)

What are potential 4°C impacts?

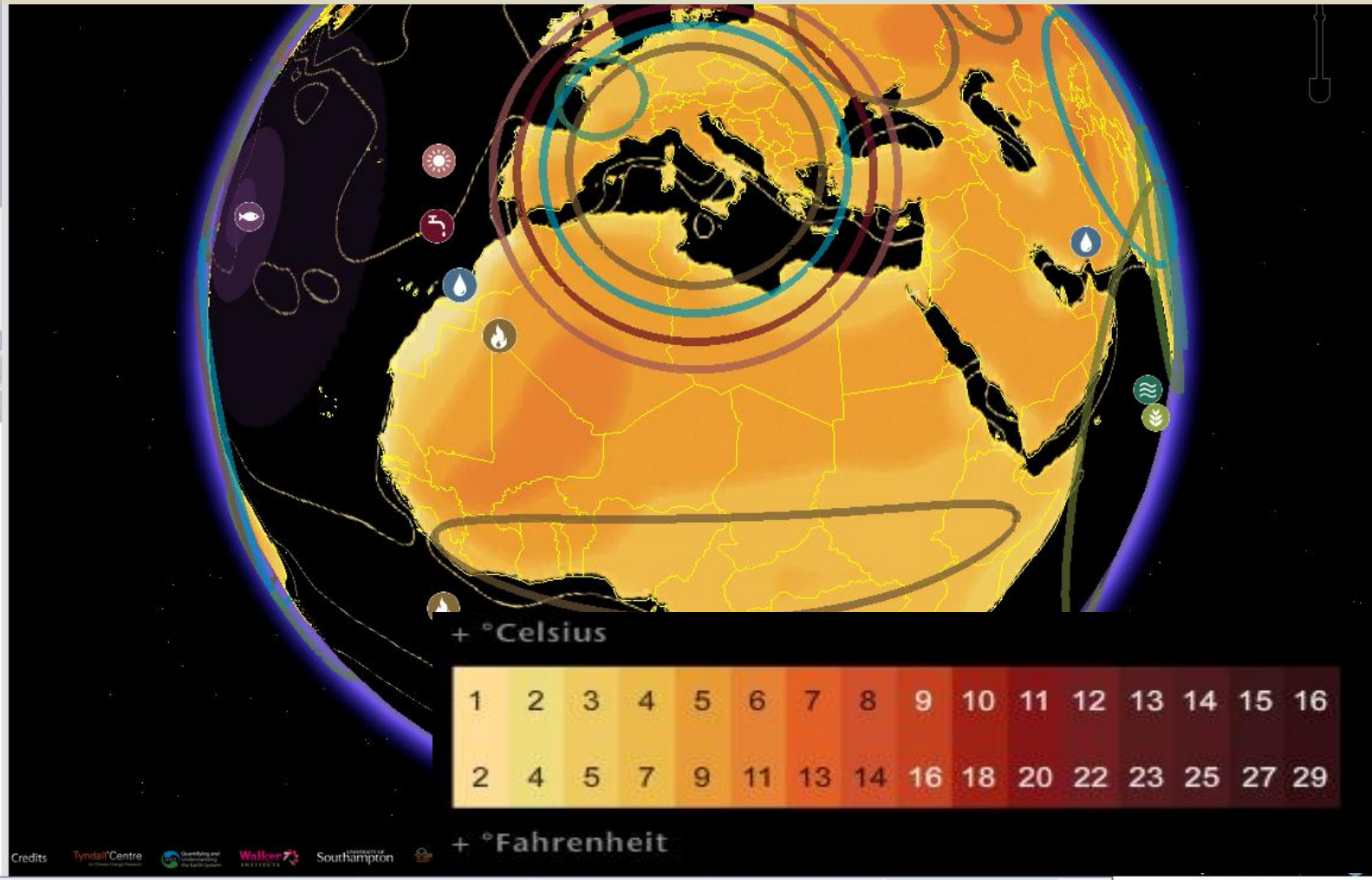
Hadley Centre & FCO

4°C Google Earth Tool

Global impacts: 4°C

Hadley Centre & FCO

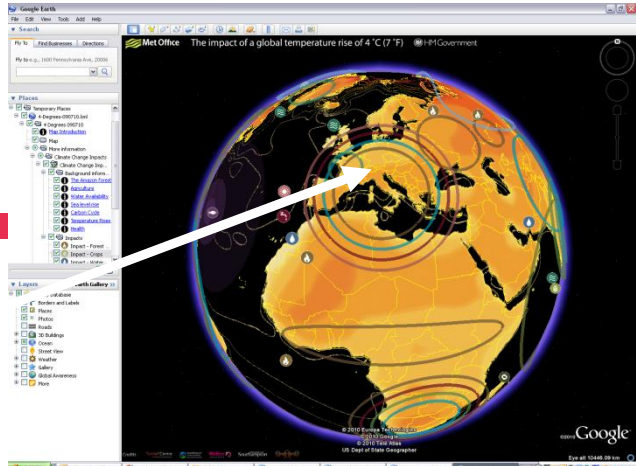
4°C Google Earth Tool



Global impacts: 4°C

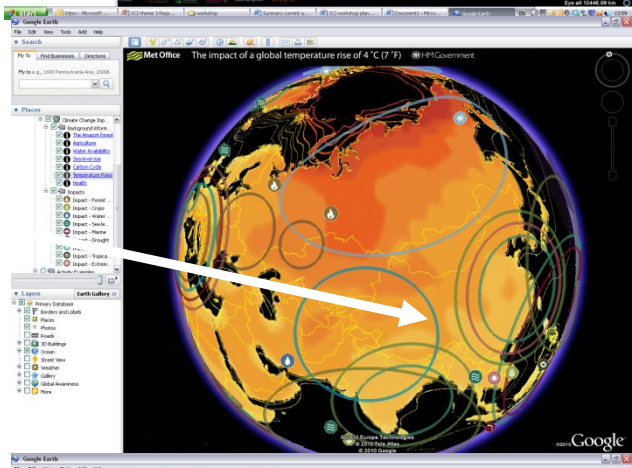
Hottest days

… add to heat-wave temps’



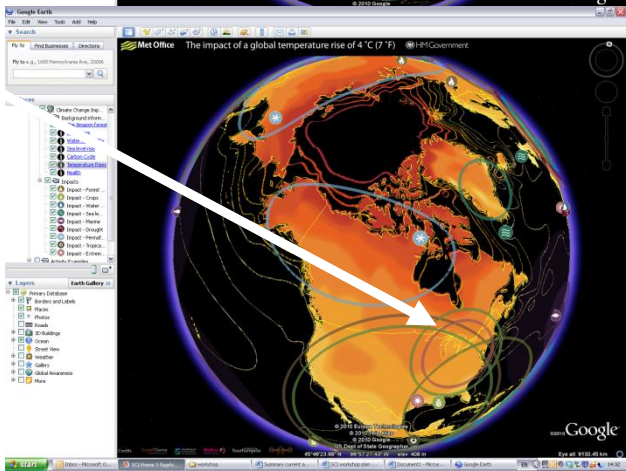
+8°C

Europe



+6°C

China



+10-12°C

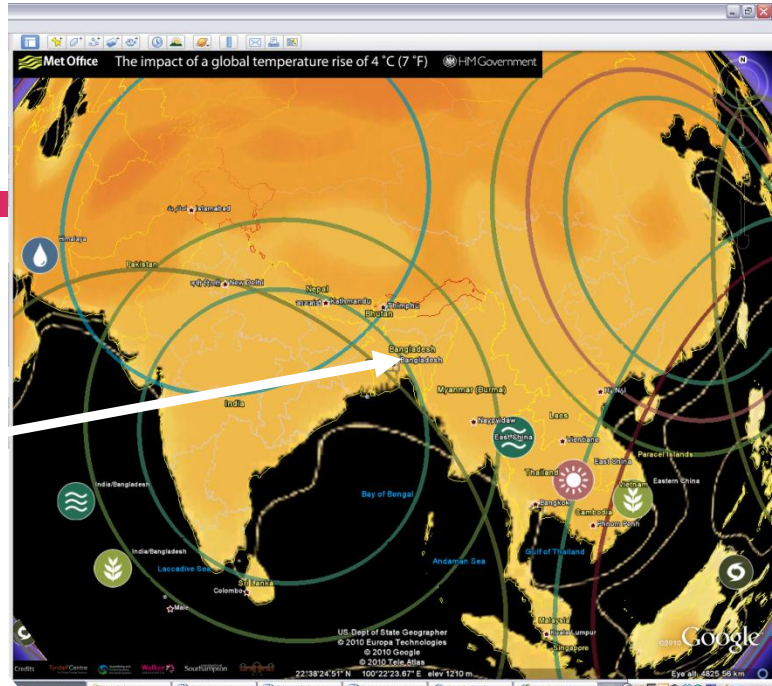
N. America

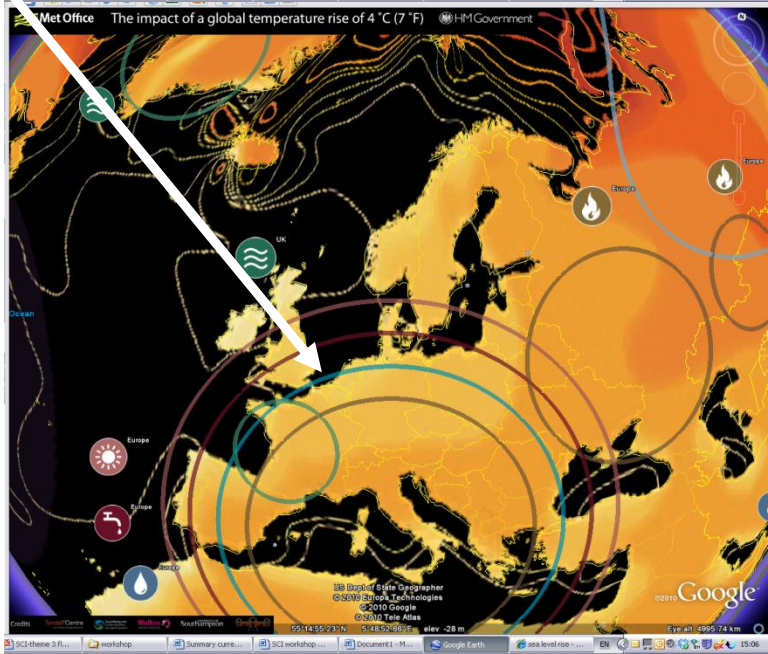
MANCHESTER 1824
The University of Manchester

Global impacts: 4°C

Sea level rise

80cm rise, higher in low latitudes

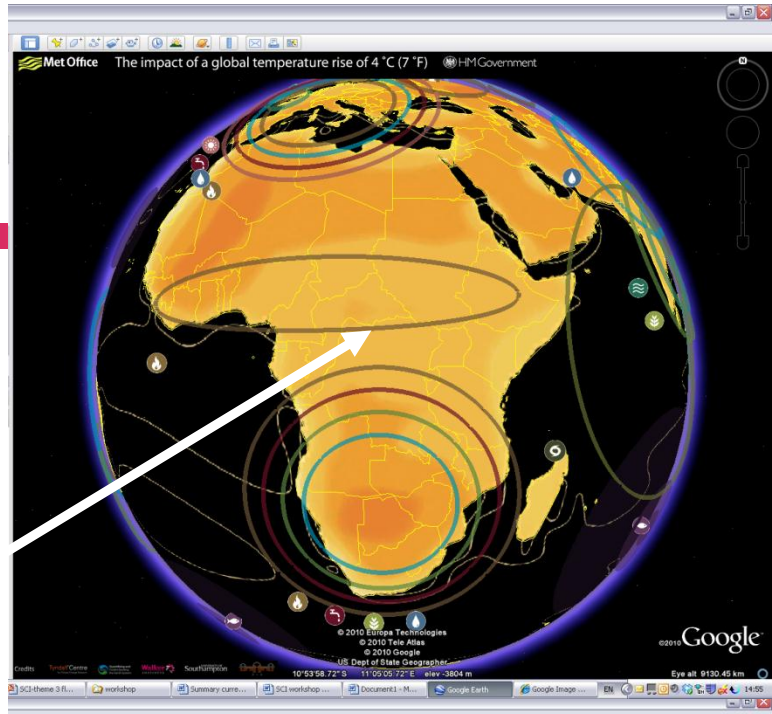


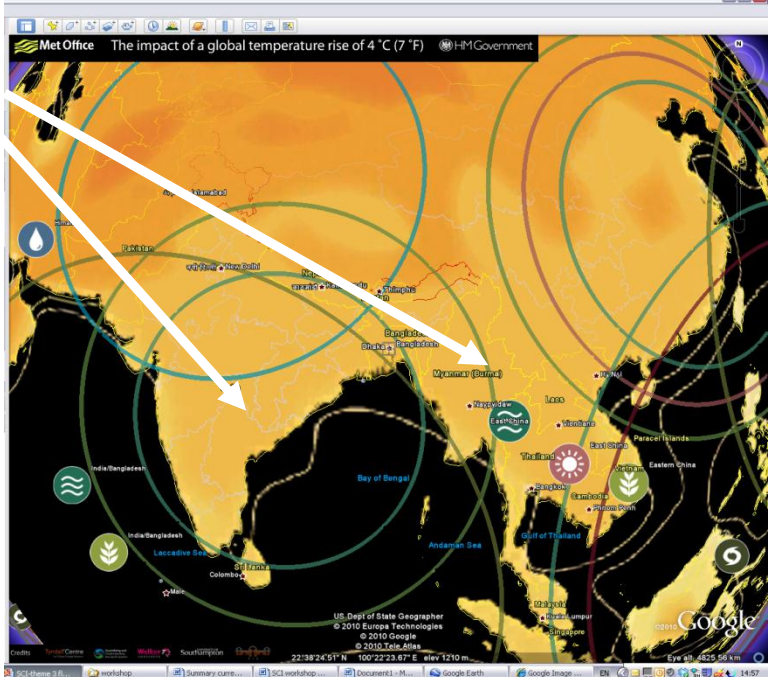


Global impacts: 4°C

Food crops

… up to 40% reduction in maize, wheat & rice yields in low latitudes.





MANCHESTER 1824
The University of Manchester

There is a widespread view that 4°C is…

- Incompatible with an organised global community
- Beyond ‘adaptation’
- Devastating to eco-systems
- Highly unlikely to be stable (‘tipping points)

… consequently …

4° C should be avoided at ‘all’ costs

So is going beyond 2°C viable?


To conclude

In my judgement …

avoiding “dangerous climate change” (stabilisation at 2°C)

remains a feasible goal of the international community

Three pillars underpin this view

Equity: a small group have to make radical & early reductions

~40-60% of emissions from ~1-5% of the population

Technology: demand side can deliver early & large reductions

an A++ rated fridge uses ~85% less energy than an 'A' model

Growth: there are alternative measures of a good life

above a threshold GDP is a poor proxy for welfare

A Radical Plan

… low carbon energy supply can't be built in time for 2°C, but…

- Radical reductions in energy demand over one decade are possible
- Carefully planned this could deliver radical & early emission reductions
- Extending the window for transitioning to low carbon energy supply

A Radical Plan for 2°C: two phases

1. *Radical reductions in energy demand from **now** to ~2030*

2. *Marshall plan to build 100% low-carbon supply **by** 2030-40*

Ultimately…

- We must escape the shackles of a twentieth century mind-set if we are ever to resolve twenty-first century challenges

- Delivering on our 2°C commitment will demand leadership, courage, innovative thinking, engaged teams & difficult choices

As Robert Unger noted …

"at every level the greatest obstacle to transforming the world is that we lack the clarity and imagination to conceive that it could be different."

Thank you

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twitter: @KevinClimate

Kevin Anderson
University of Manchester
Jan. 2014

Tyndall Centre®
for Climate Change Research