



Reframing Climate Change:

*How recent emission trends & the
latest science change the debate*

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Talk outline

- 1) Dangerous climate change - *post-Copenhagen*
- 2) Cumulative emissions - *a new chronology*
- 3) Misplaced optimism - *ignoring the bean counters*
- 4) Global GHG pathways - *impossible challenges?*
- 5) *Provisional thoughts on implications for UK transport*

What is dangerous climate change?

UK & EU define this as 2°C

But:

- ... 2°C impacts at the worst end of the range*
- ... ocean acidification devastating even at 400-450ppmv CO₂*
- ... failure to mitigate leaves 2°C stabilisation highly unlikely*

Impacts around 2°C

- Destruction of vast majority of coral reefs
- Billion plus people suffer water stress & risk coastal flooding
- 30% species at risk of extinction
- Cereal production reduces in low latitudes
- Land becomes a carbon source
- Risk triggering tipping points (e.g. albedo, permafrost, etc)

Emission-reduction targets

- UK, EU & Global - long term reduction targets
 - *UK's 80% reduction in CO₂e by 2050*
 - *EU 60%-80% reduction in CO₂e by 2050*
 - *Bali 50% global reduction in CO₂e by 2050*
- CO₂ stays in atmosphere for 100+ years,
hence long-term targets are highly misleading

Put bluntly ...

- 2050 reduction unrelated to avoiding dangerous climate change (2°C)
- **cumulative** emissions that matter (i.e. carbon budget)
- this fundamentally rewrites the chronology of climate change
 - *from long term gradual reductions*
 - *to urgent & radical reductions*

How does this 'scientifically-credible' way of thinking alter the challenge we face?

Tyndall's *emission scenarios* (2000-2100 CO₂e)

1. *Latest IPCC-based scientific understanding of CC*
2. *Latest emissions data (prior to economic crisis)*

Tyndall's *emission scenarios* (2000-2100 CO₂e)

To consider:

1. *CO₂ emissions from landuse (**deforestation**)*
2. *Non-CO₂ GHGs (principally **agriculture**)*

What emission space remains for:

3. *CO₂ emissions from **energy**?*

Tyndall's *emission scenarios* (2000-2100 CO₂e)

- Included very optimistic:
 - land-use & forestry emission scenarios (**deforestation**)
 - non-CO₂ greenhouse gas emissions (**agriculture**)
- Global CO₂e emissions peaks of 2015/20/25?

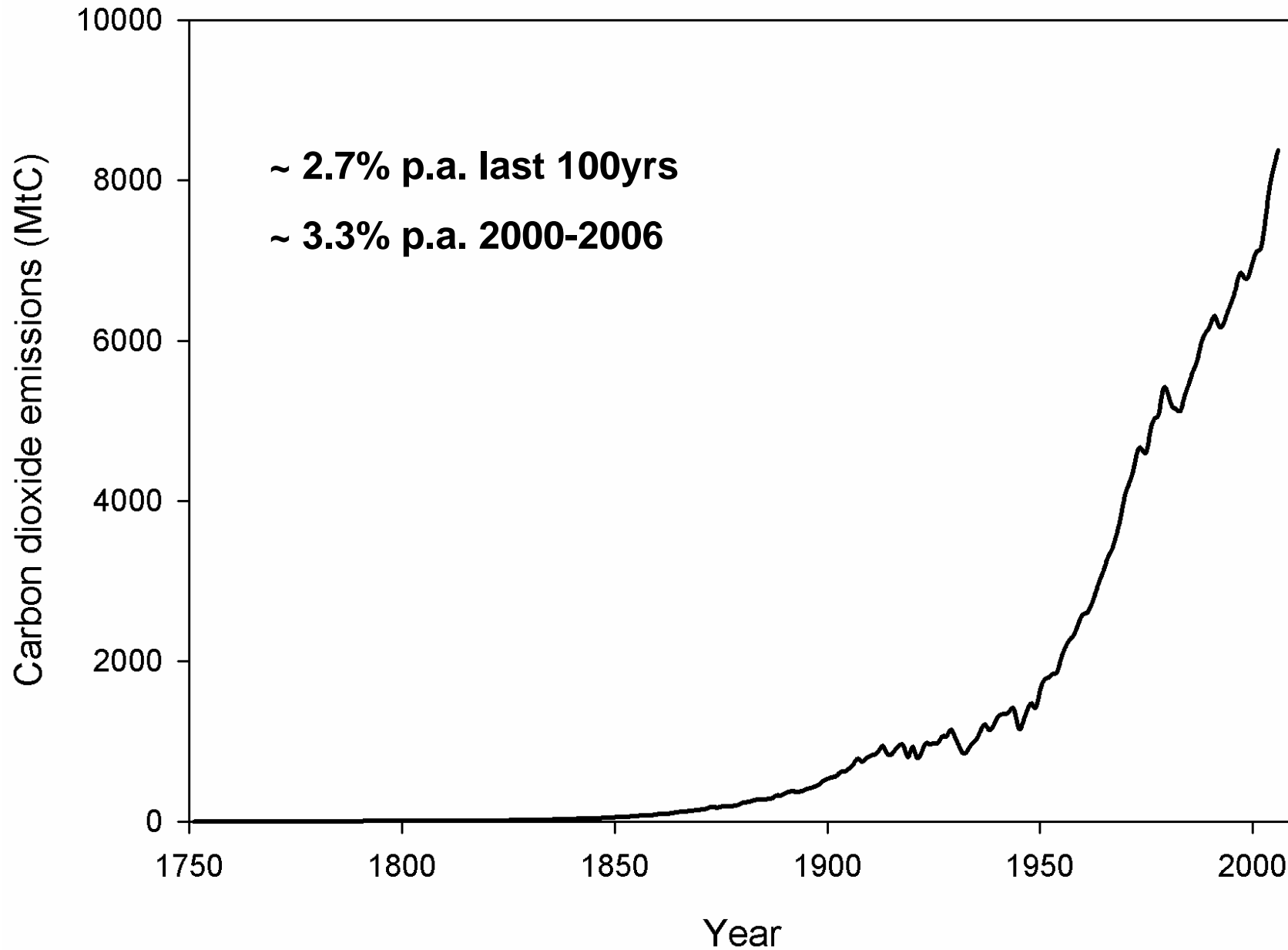
factoring in...

the latest emissions data

what is the scale of the global
'problem' we now face?

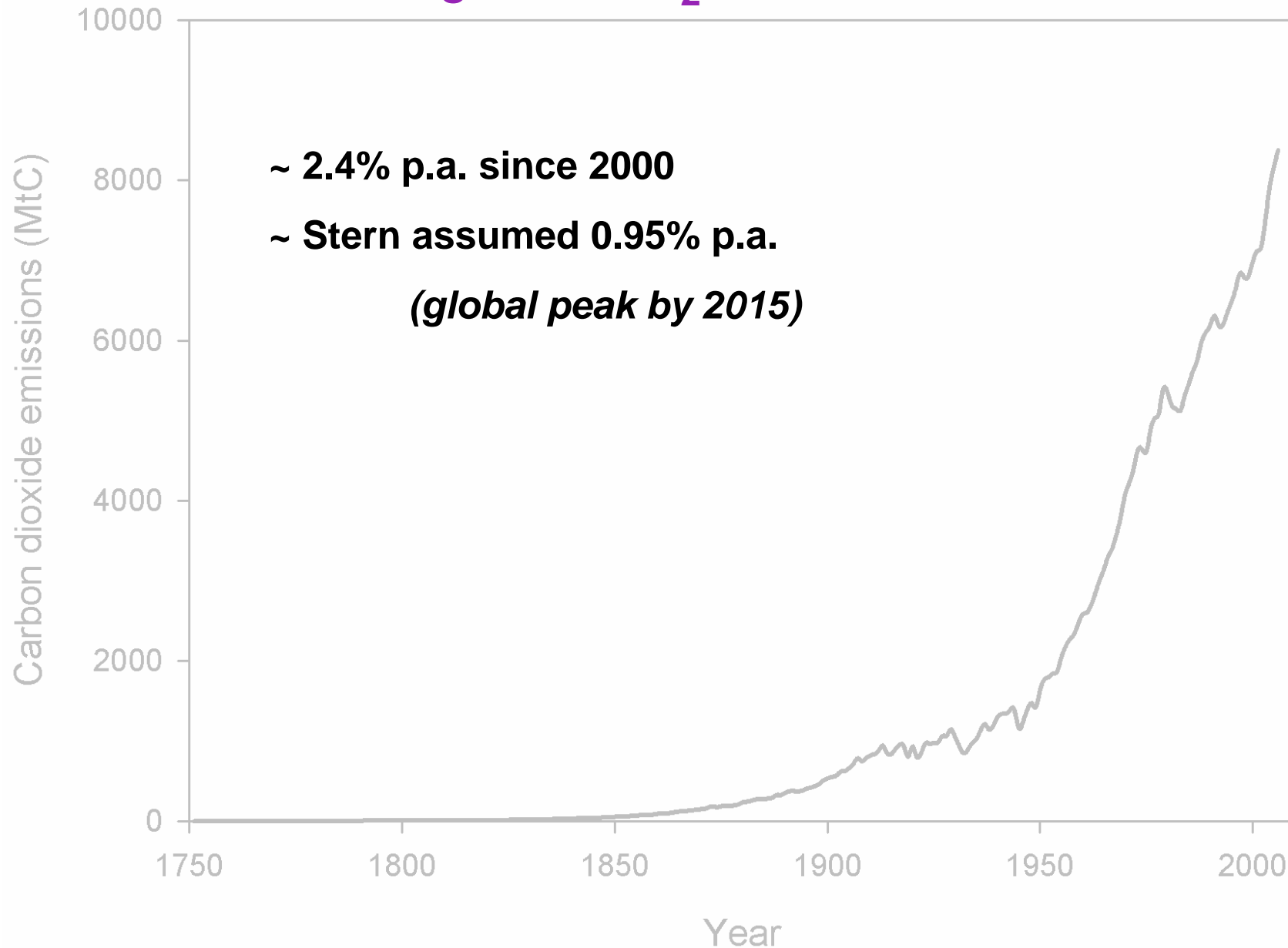
It's getting worse!

Global CO₂ emission trends?



... appears we're denying its happening

latest global CO₂e emission trends?



What does:

- this failure to reduce emissions
- &
- the latest science on cumulative emissions

Say about a 2°C future?

450ppmv CO₂e

greenhouse gas emission pathways

50% chance of 2°C

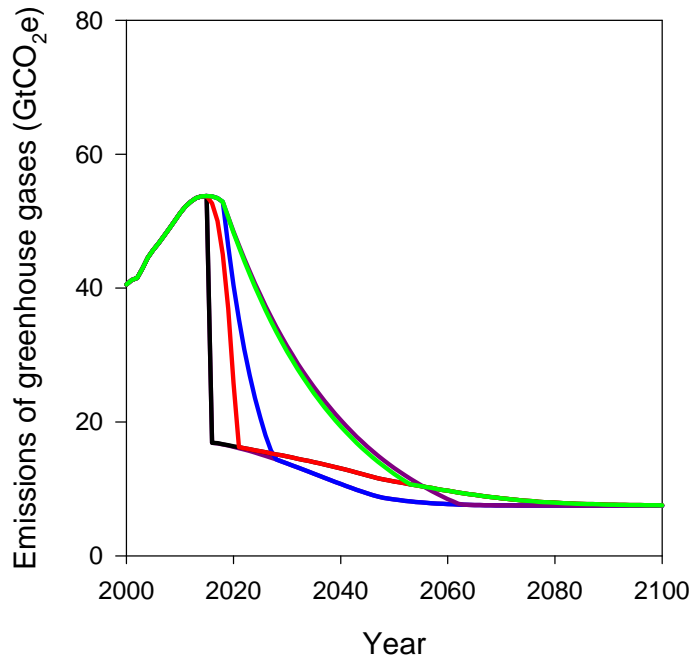
Global carbon budget for 2000-2100

... for 450ppmv CO₂e

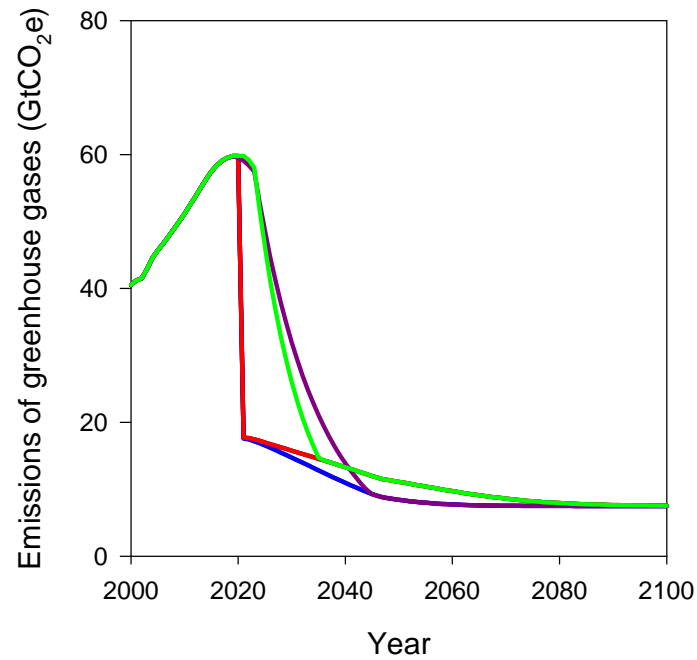
~ 1400 to 2200 GtCO₂e

Total greenhouse gas emission pathways

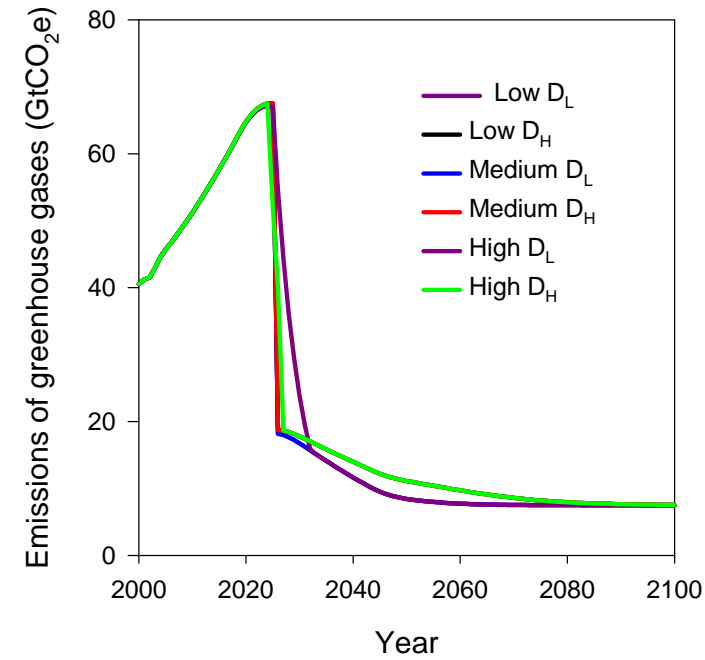
2015 peak



2020 peak

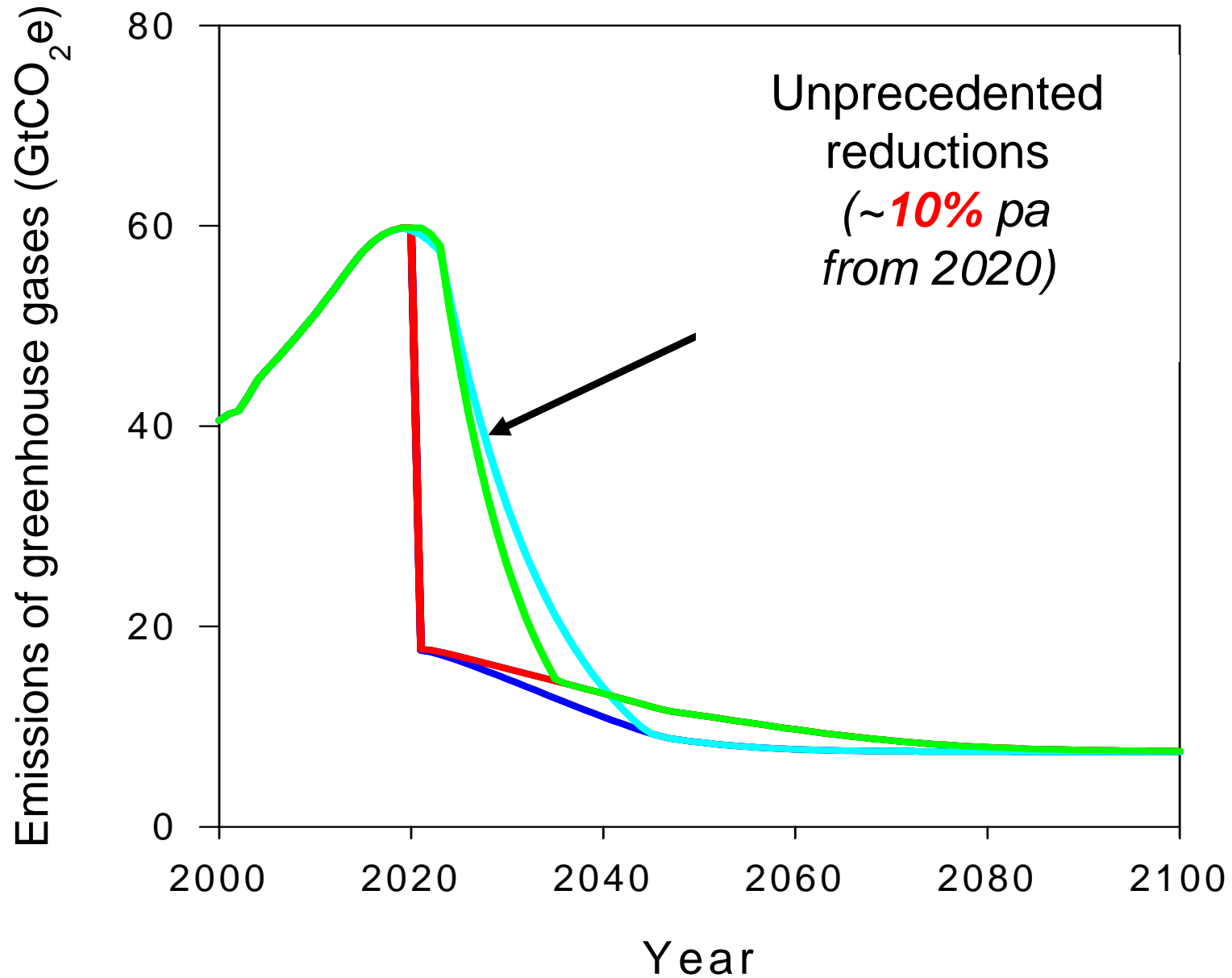


2025 peak



(Anderson & Bows. 2008 Philosophical Transactions A of the Royal Society. 366. pp.3863-3882)

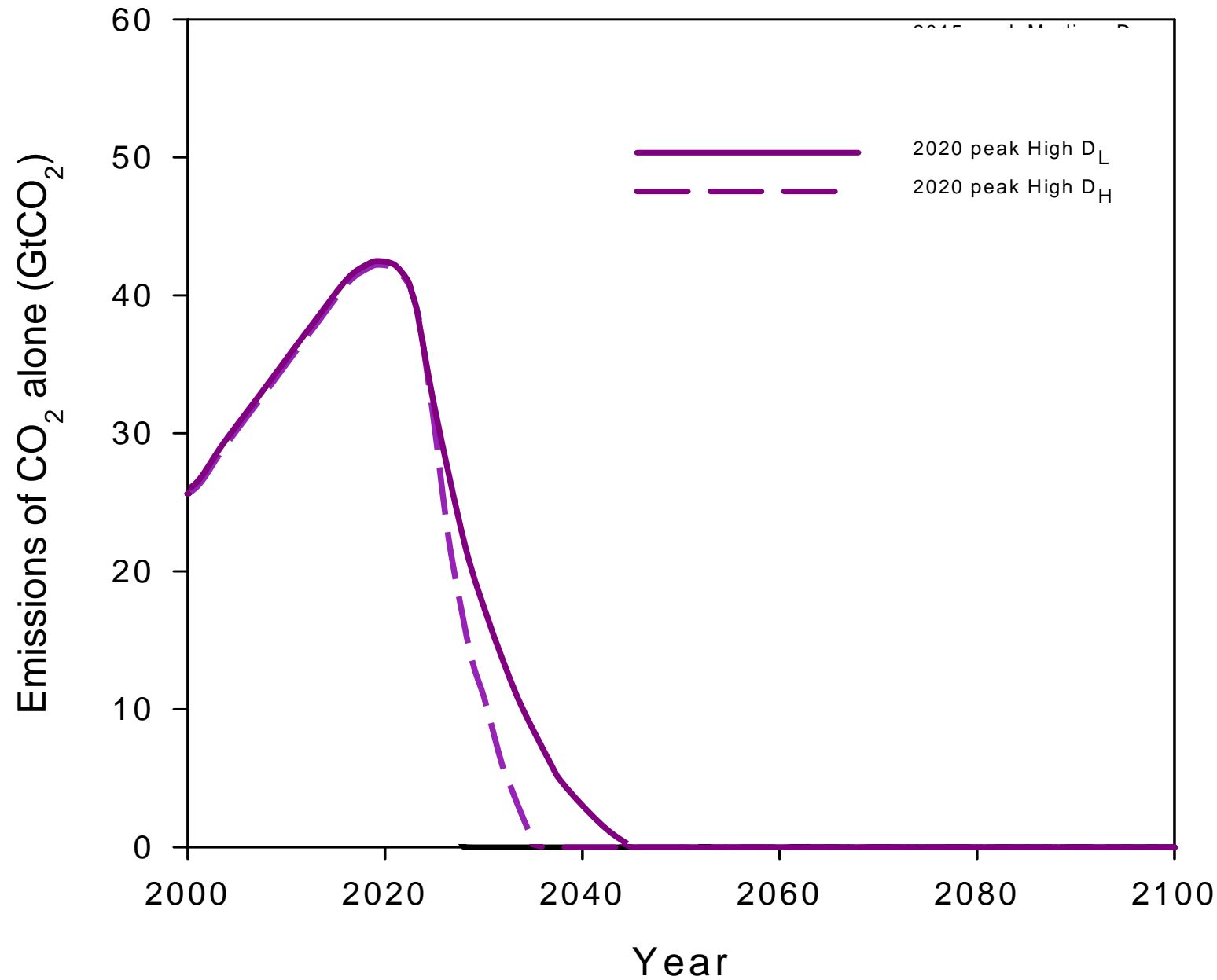
... for 450ppmvCO₂e
& 2020 peak



... and for energy emissions? *(with 2020 peak)*

13 of 18 scenarios
'impossible'

Even then total
decarbonisation by
~2035-45 necessary



550 & 650 ppmv

greenhouse gas emission pathways

50% chance of 3 & 4°C respectively

For **3°C** & emissions peaking by 2020:

... 9% annual reductions in CO₂ from energy

For **4°C** & emissions peaking by 2020:

... 3.5% annual reductions in CO₂ from energy

What are the precedents for such reductions?

Annual reductions of greater than 1% p.a. have only

“been associated with economic recession or upheaval”

Stern 2006

- *UK gas & French 40x nuclear ~1% p.a. reductions*
(ex. aviation & shipping)
- *Collapse Soviet Union economy ~5% p.a. reductions*

Urgent need for reality check

*If economic growth not possible with 6% p.a carbon reduction
... then
need planned economic 'contraction' to stabilise even at ~4°C*

Urgent need for reality check

- *Focus on win-win opportunities is misplaced*
- *Significant ‘pain’ & many losers*
- *4°C is not ‘business as usual’*
 - *but all orthodox reduction in place & successful*
- *Adaptation agenda needs completely rewriting*

Urgent need for reality check

Both mitigation & adaptation rates are:

- *beyond what we have been prepared to countenance*
- *without historical precedent*

We've entered new and uncharted territory

Provisional thoughts on implications of Tyndall analysis for UK transport

Aviation and Shipping

approximately same emissions as private cars

- Moratorium on airport & sea port expansion
(Heathrow and lock-in)
- Aviation/Shipping growth matched by efficiency gains
*(i.e. stabilised emissions in short-medium term,
reductions from 2025 onwards)*

Car

- **Mandatory efficiency standard**
(all new cars max. 130g/km by 2010, 6% tightening p.a)
70g/km by 2020
35g/km by 2030
- **Automatic enforcement of speed limits**
(onboard regulators)
- *High occupancy lanes,
car-free city's,
CO₂ savvy land-use planning (transport, housing, work)*

Freight

- Reject 'just-in-time' – its flow-rates that matter not 'speed'
(canals can manage same flow rate as trucks)
- Mandatory efficiency standard
- Strict enforcement of speed limits
- *(Penalties for low load factors?)*

*... ultimately for transport within the UK and other OECD nations to play its 'fair' part in avoiding even a 4°C future, its absolute emissions need to be reducing by at least **6% p.a** - beginning in the next few years!*



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