

Going beyond dangerous climate change: does Paris lock out 2°C ?

Professors Kevin Anderson & Alice Bows-Larkin

Twitter: @kevinclimate @aliceblarkin

*School of Mechanical Aerospace & Civil Engineering
University of Manchester
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Outline

- Global policy objective
- Current emissions & scale of the challenge
- Contrasting 2°C and 4°C futures
- Importance of cumulative emissions & carbon budgets
- Implications of Paris Agreement
- Issues of equity, technology and economics
- Conclusions

New global goal

The [Paris] Agreement aims to strengthen the global response to the threat of climate change...including by:

*“Holding the increase in the global average temperature to **well below** 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C...”*

“This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities...”

Missing elements

Reference to fossil fuels and decarbonisation

International aviation and shipping emissions

Urgent review of pledges (won't be reviewed until 2020)

Hidden reliance in temperature estimates of need for highly speculative negative emission technologies

- *Pledge outcome closer to 3.5°C than 2.7°C*

Influencing the future

Decisions made now impact on future climate adaptation

Higher Mitigation = Lower Adaptation

Lower Mitigation = Higher Adaptation

(There isn't a '*no climate change*' future)

2°C is dangerous

... what about a 4°C future?

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

Global impacts: 4°C

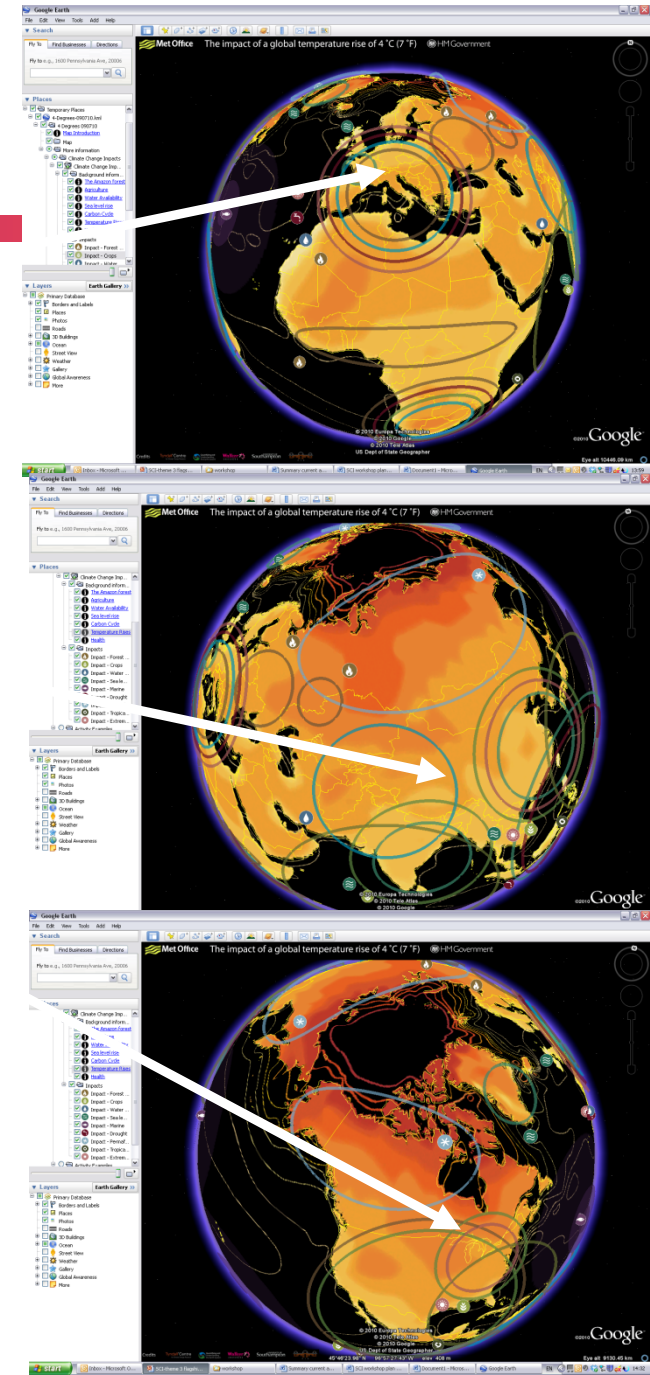
+8°C

Hottest days



+6°C

+10-12°C



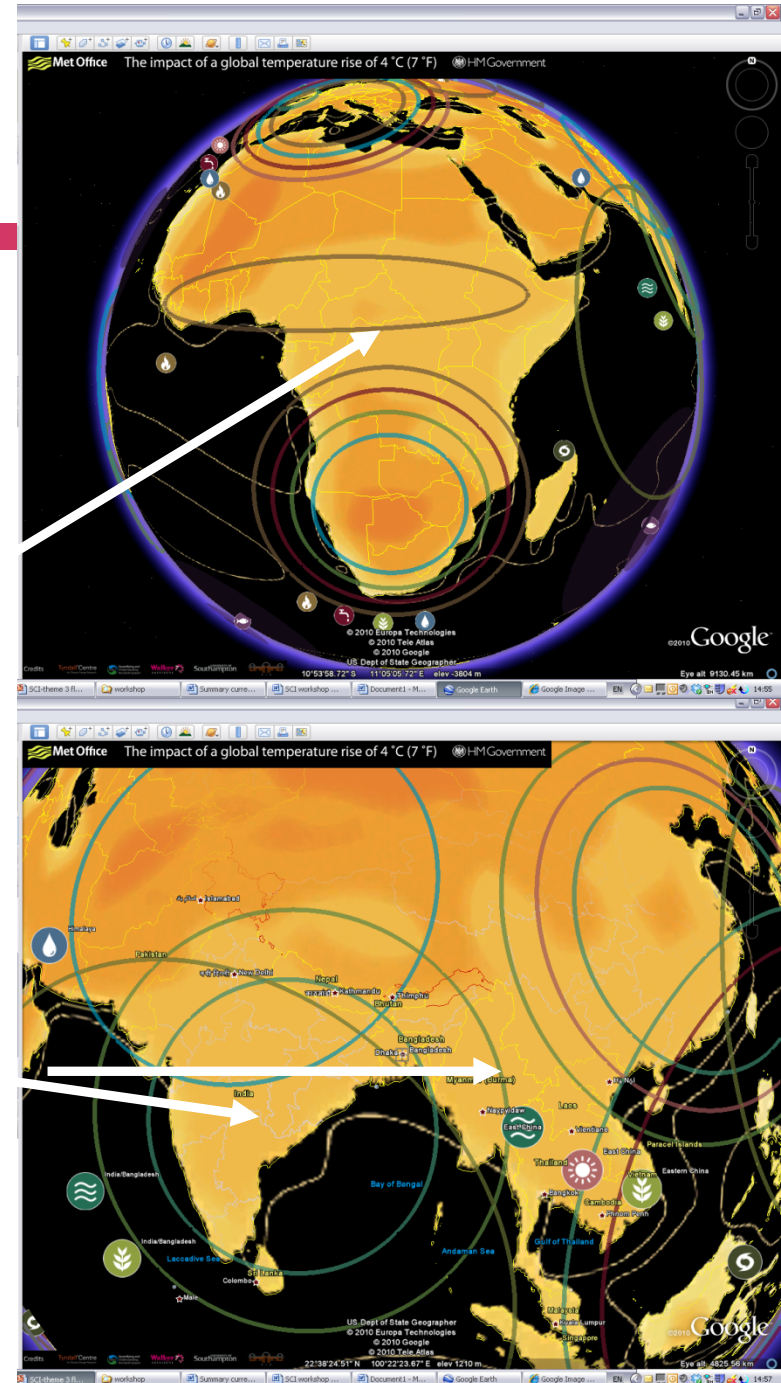
Global impacts: 4°C

Food crops



40%
reduction
in maize
& wheat
yields in
low
latitudes.

30%
decrease
in rice
yields



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')

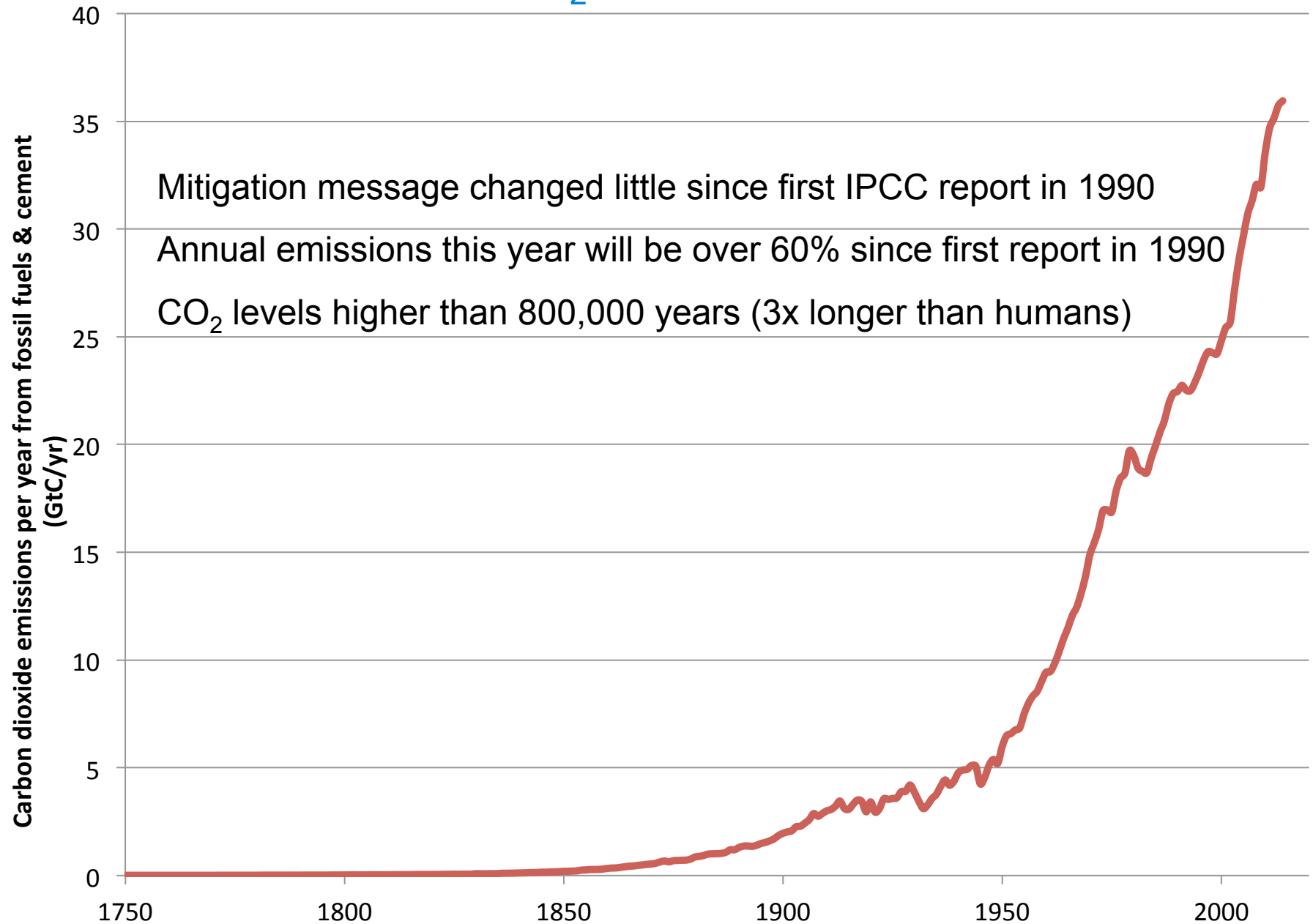
... consequently ...

4°C should be avoided at 'all' costs



**So back to avoiding 2°C – how
are we doing so far?**

Global CO₂ emission trends



Mitigation message changed little since first IPCC report in 1990

Annual emissions this year will be over 60% since first report in 1990

CO₂ levels higher than 800,000 years (3x longer than humans)

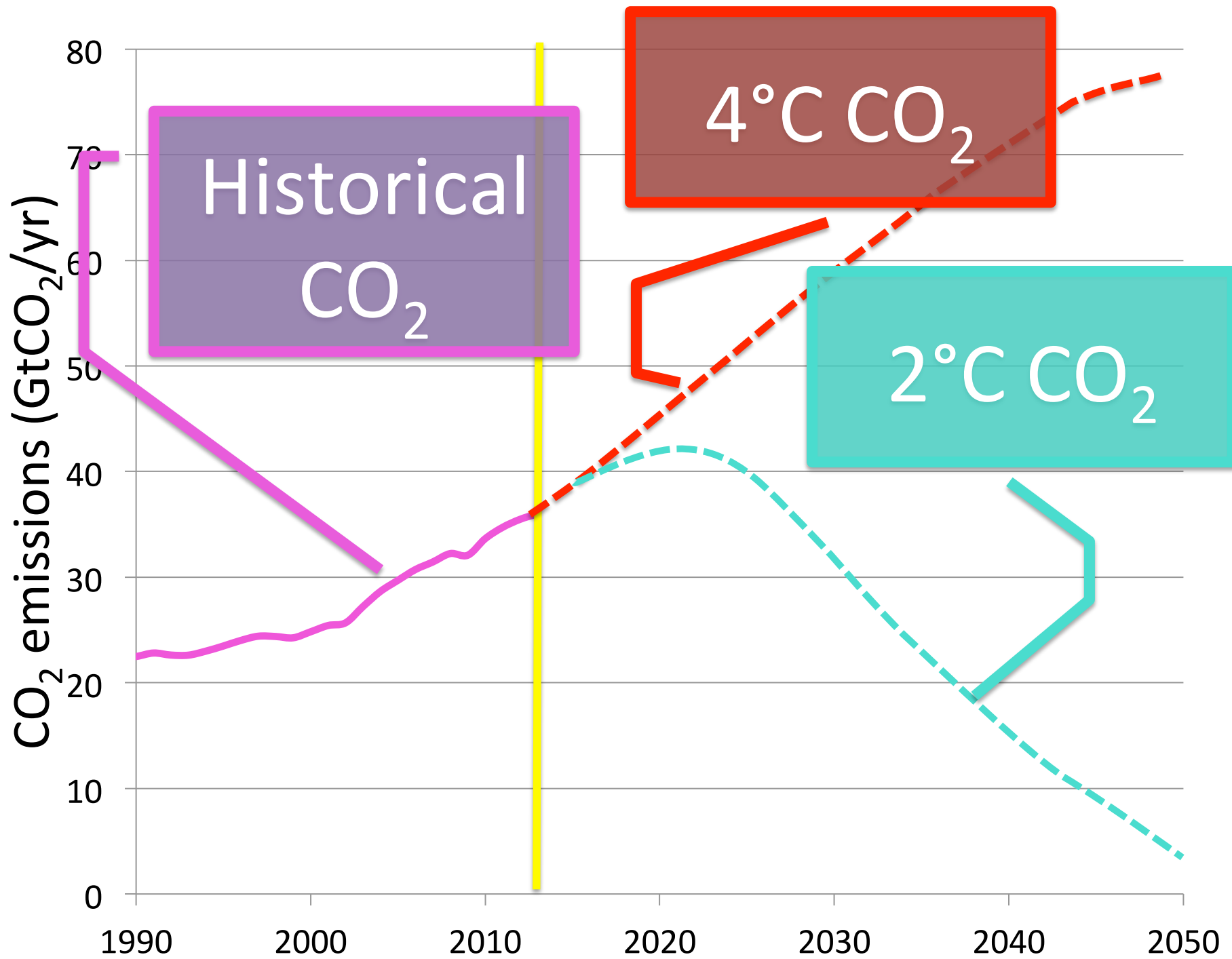
Where current policy is leading...

Global emissions continuing to grow exponentially

Lower Mitigation = **Higher** Adaptation

Pre-Paris policies in line with 4°C-6°C by 2100

(Anderson & Bows, 2011; Betts et al., 2010; Rogelj et al., 2010; Fatih Birol, IEA Chief Economist)



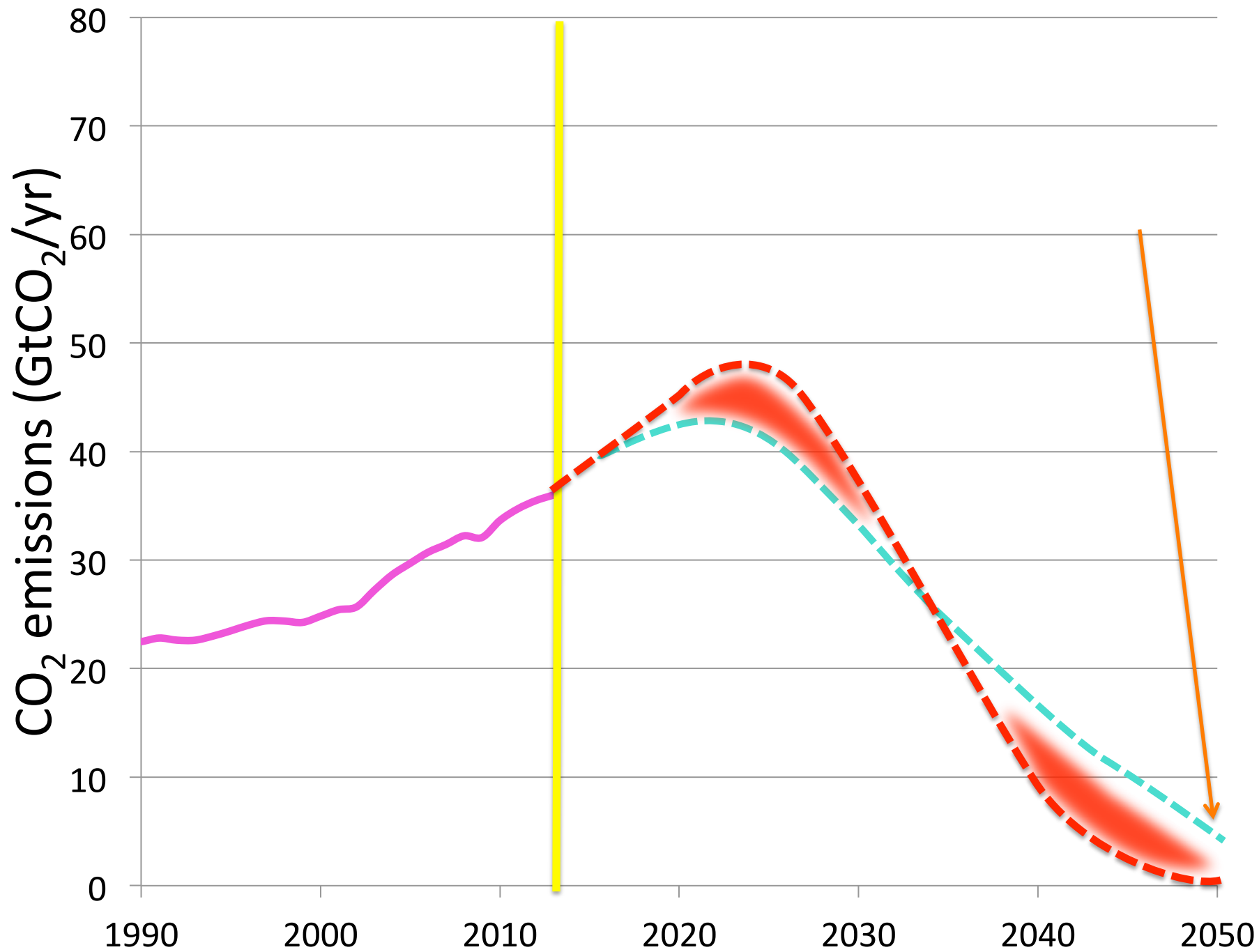
Global ambition

Translating global targets into national energy policy involves CO₂ budgets; cumulative emissions directly relate to warming.

The carbon budget available depends on:

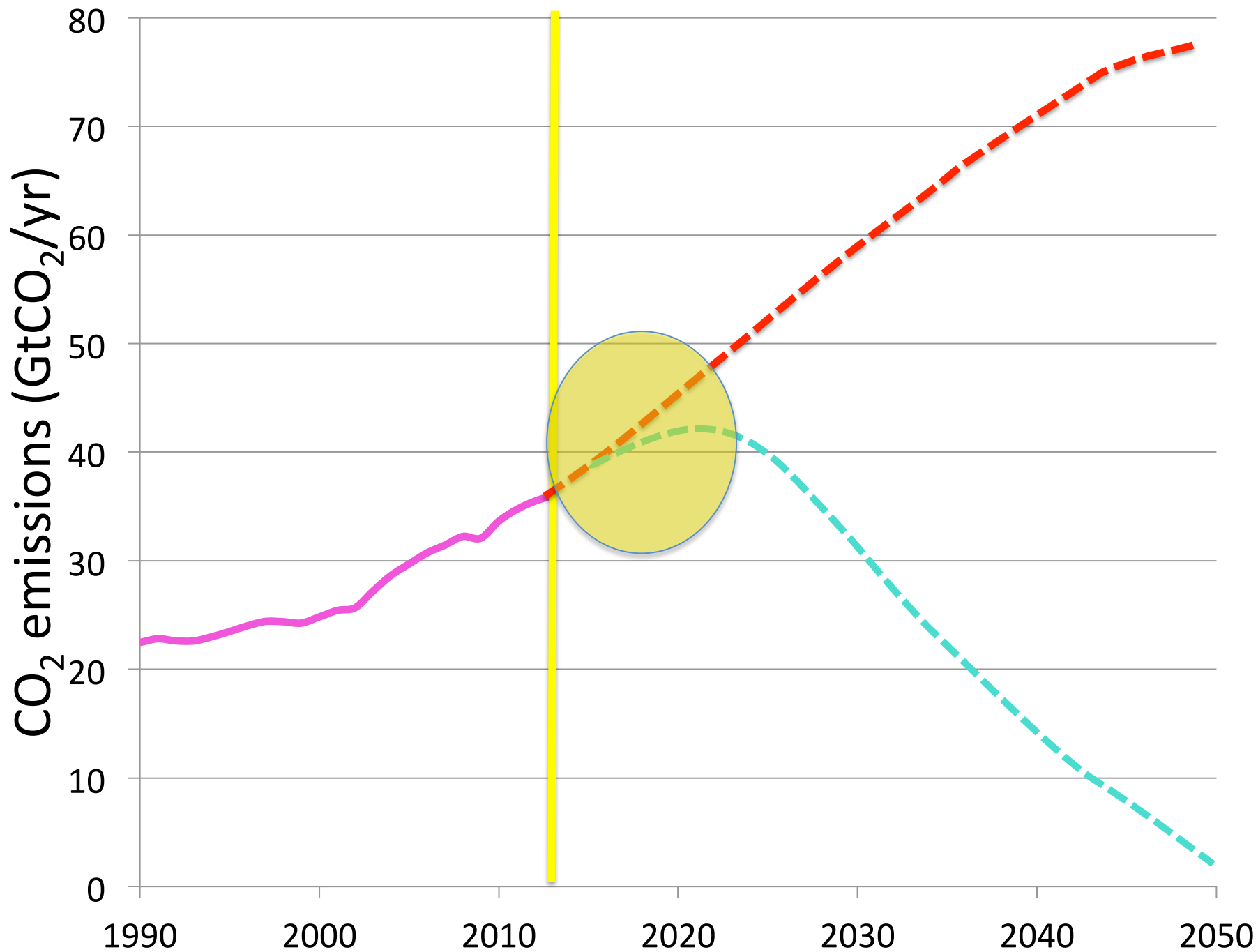
- a) our understanding of ***climate sensitivity***
- b) the ***probability*** of exceeding 2°C 'we' are prepared to accept

A lower probability of avoiding 2°C gives a higher chance of 4°C+



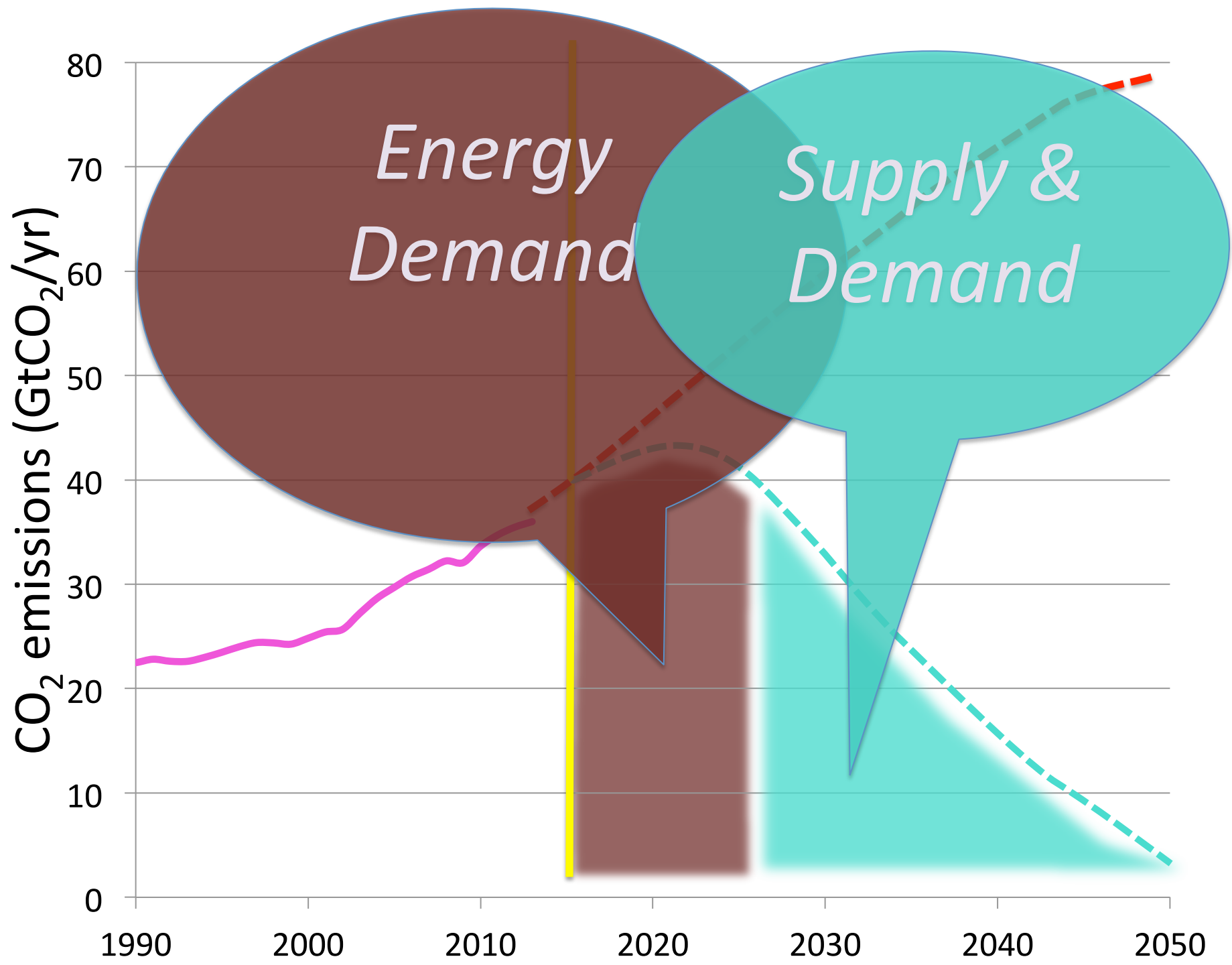


We are rapidly ‘spending’ the carbon budget that remains to avoid 2°C goal





**Mitigation policies need to be
delivering change in the short-term
because emissions accumulate**



Kevin now to take us through the more detailed implications of the Paris Agreement for wealthy regions

Paris & the 2°C framing of dangerous climate change



Paris Agreement – 32 page document. Dec. 2015



United Nations



Framework Convention on
Climate Change

FCCC/CP/2015/L.9/Rev.1

Distr.: Limited
12 December 2015

Original: English

Conference of the Parties

Twenty-first session

Paris, 30 November to 11 December 2015

Agenda item 4(b)

Durban Platform for Enhanced Action (decision 1/CP.17)

**Adoption of a protocol, another legal instrument, or an
agreed outcome with legal force under the Convention
applicable to all Parties**

ADOPTION OF THE PARIS AGREEMENT

Proposal by the President

Draft decision -/CP.21

The Conference of the Parties,

Recalling decision 1/CP.17 on the establishment of the Ad Hoc Working Group on the Durban Platform for Enhanced Action,

Also recalling Articles 2, 3 and 4 of the Convention,

Further recalling relevant decisions of the Conference of the Parties, including decisions 1/CP.16, 2/CP.18, 1/CP.19 and 1/CP.20,

Paris Agreement – Dec. 2015

FCCC/CP/2015/L.9/Rev.1

local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity,

Also acknowledging the specific needs and concerns of developing country Parties arising from the impact of the implementation of response measures and, in this regard, decisions 5/CP.7, 1/CP.10, 1/CP.16 and 8/CP.17,

Emphasizing with serious concern the urgent need to address the significant gap between the aggregate effect of Parties' mitigation pledges in terms of global annual emissions of greenhouse gases by 2020 and aggregate emission pathways consistent with holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels,

Also emphasizing that enhanced pre-2020 ambition can lay a solid foundation for enhanced post-2020 ambition,

Stressing the urgency of accelerating the implementation of the Convention and its Kyoto Protocol in order to enhance pre-2020 ambition,

Recognizing the urgent need to enhance the provision of finance, technology and capacity-building support by developed country Parties, in a predictable manner, to enable enhanced pre-2020 action by developing country Parties,

Emphasizing the enduring benefits of ambitious and early action, including major reductions in the cost of future mitigation and adaptation efforts,

Acknowledging the need to promote universal access to sustainable energy in developing countries, in particular in Africa, through the enhanced deployment of renewable energy,

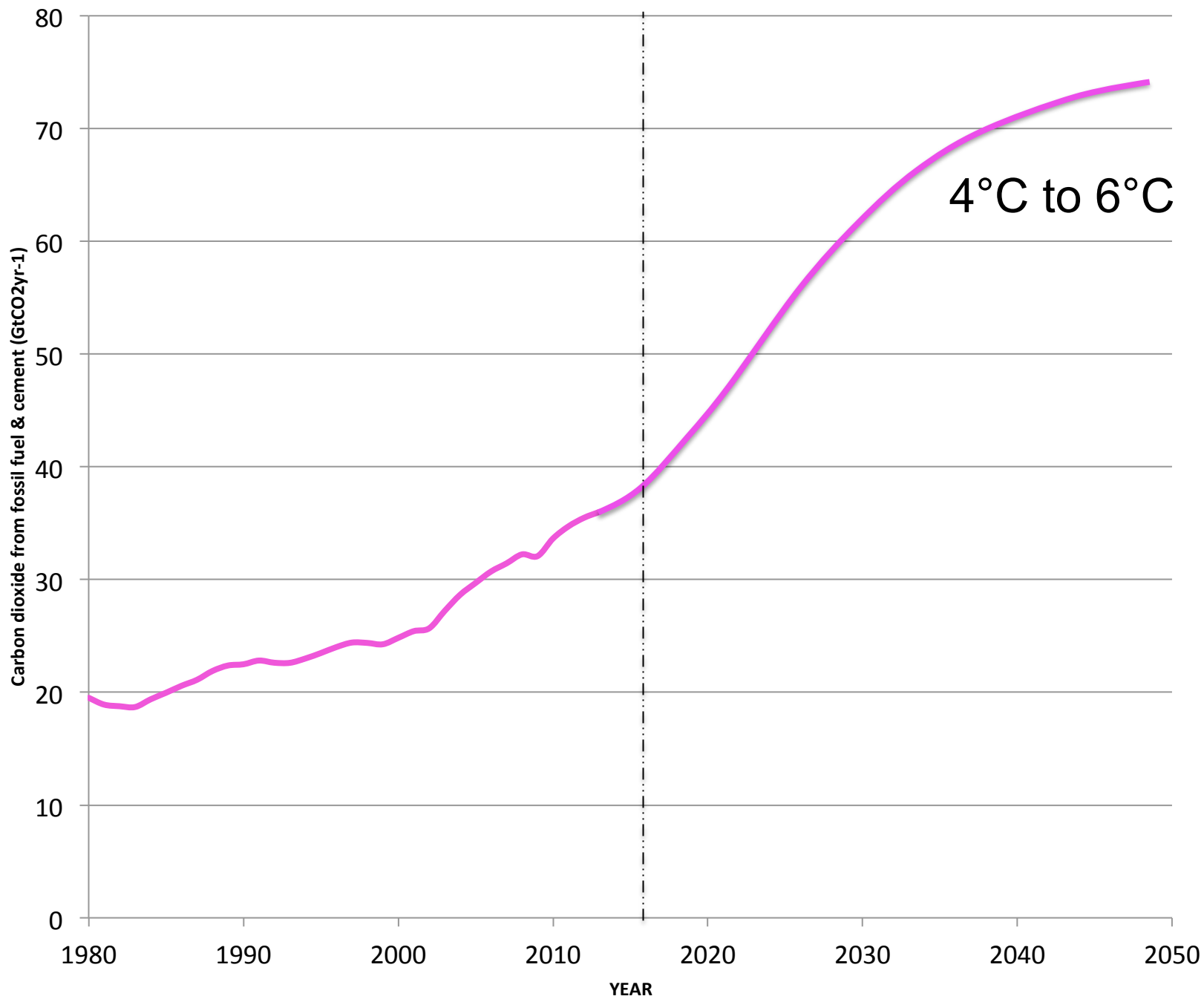
Agreeing to uphold and promote regional and international cooperation in order to mobilize stronger and more ambitious climate action by all Parties and non-Party stakeholders, including civil society, the private sector, financial institutions, cities and other subnational authorities, local communities and indigenous peoples.

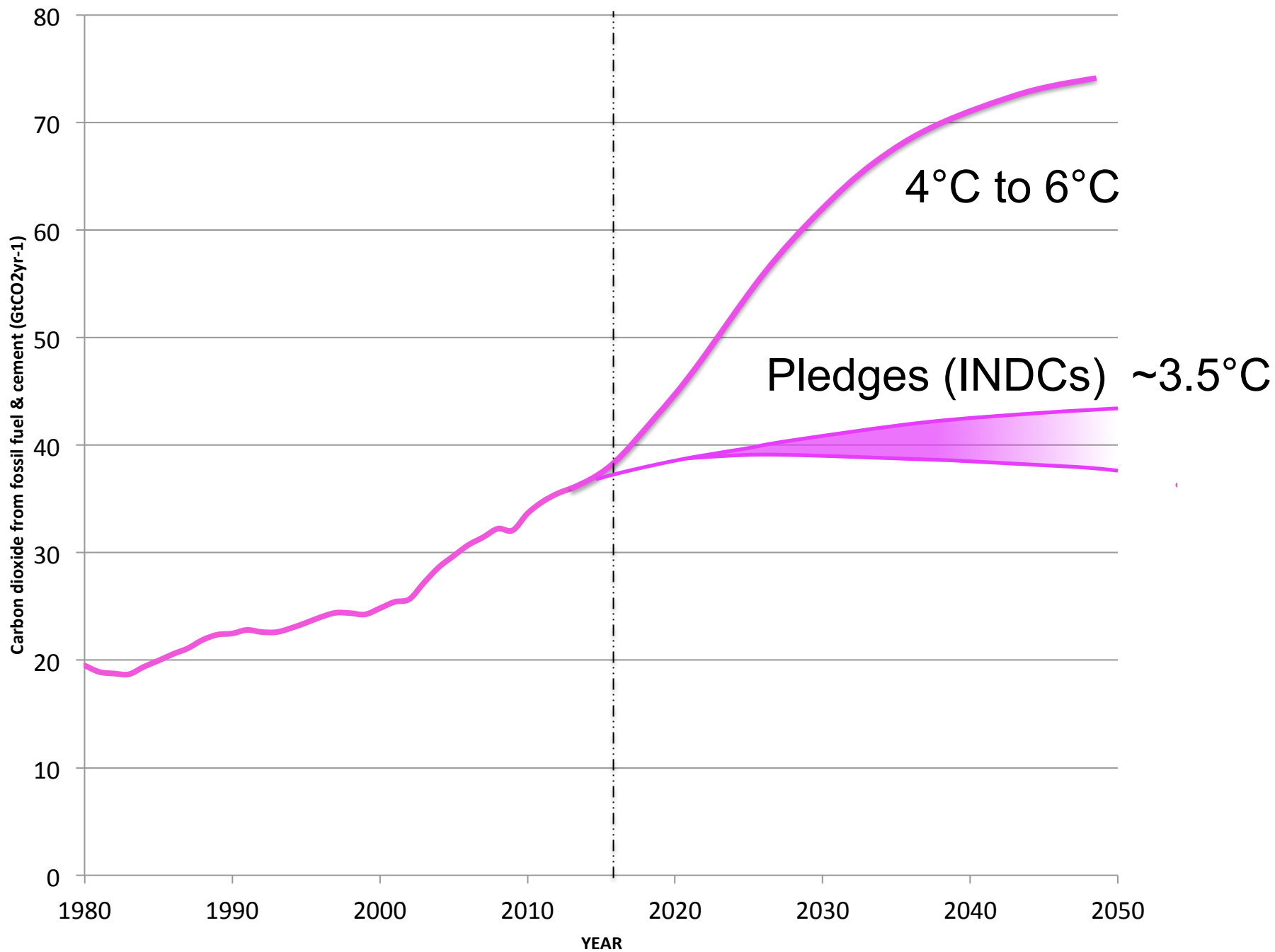
Paris Agreement – *An important diplomatic triumph*

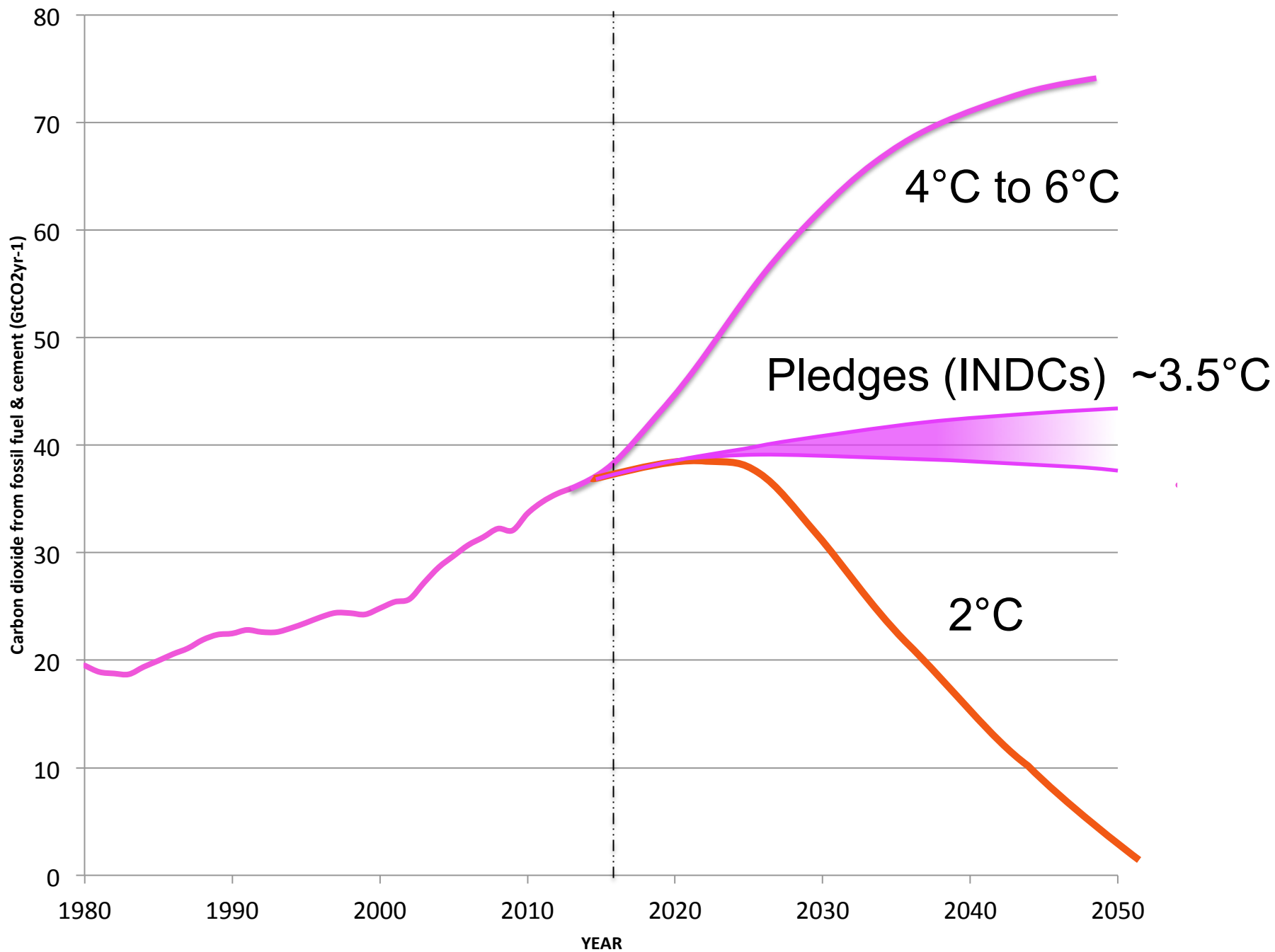
... hold the increase in global average temperature to **well below 2°C** above pre-industrial levels and pursue **efforts** to limit the temperature increase to **1.5°C**

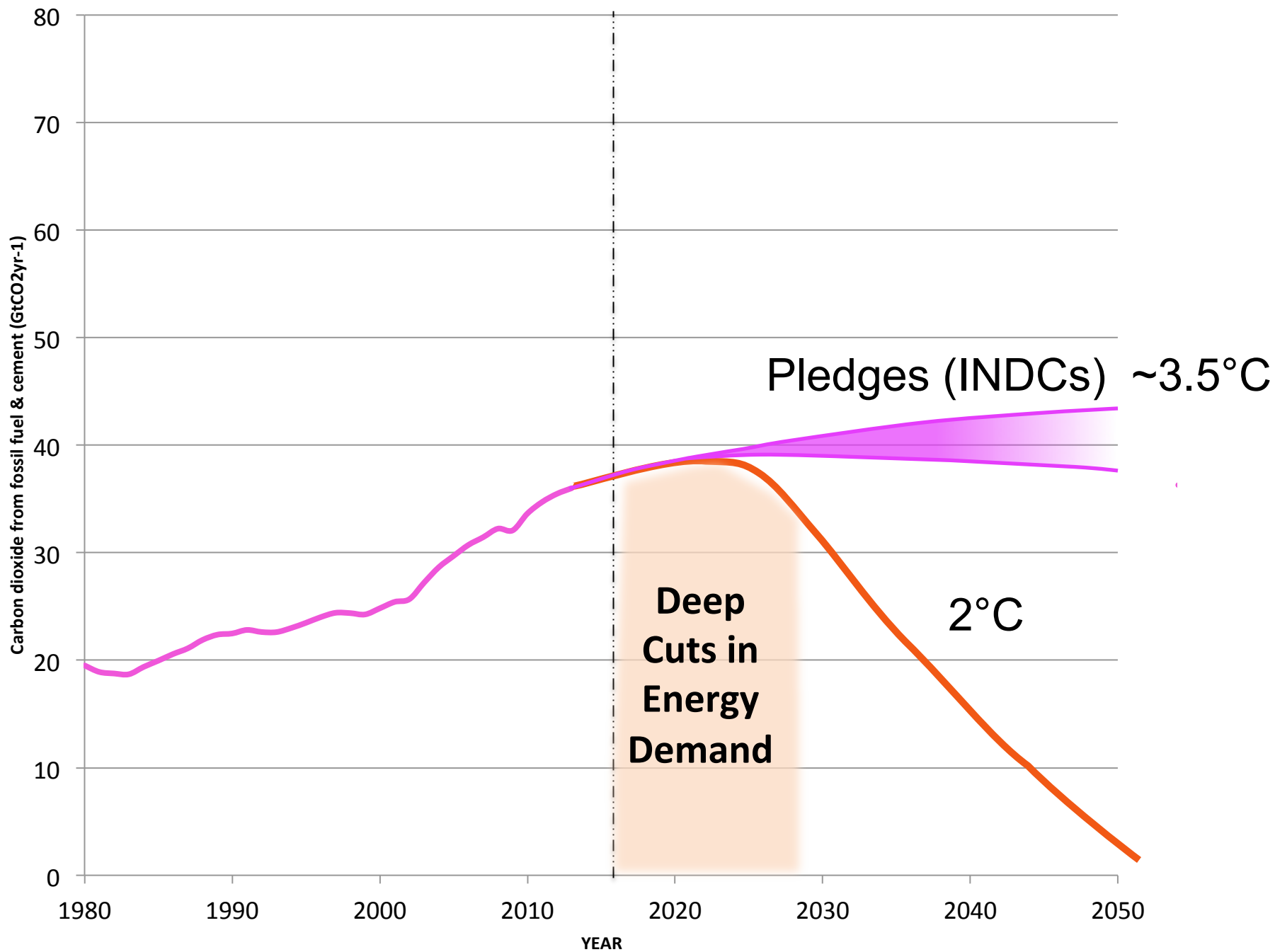
...to undertake rapid reductions in accordance with **best science**

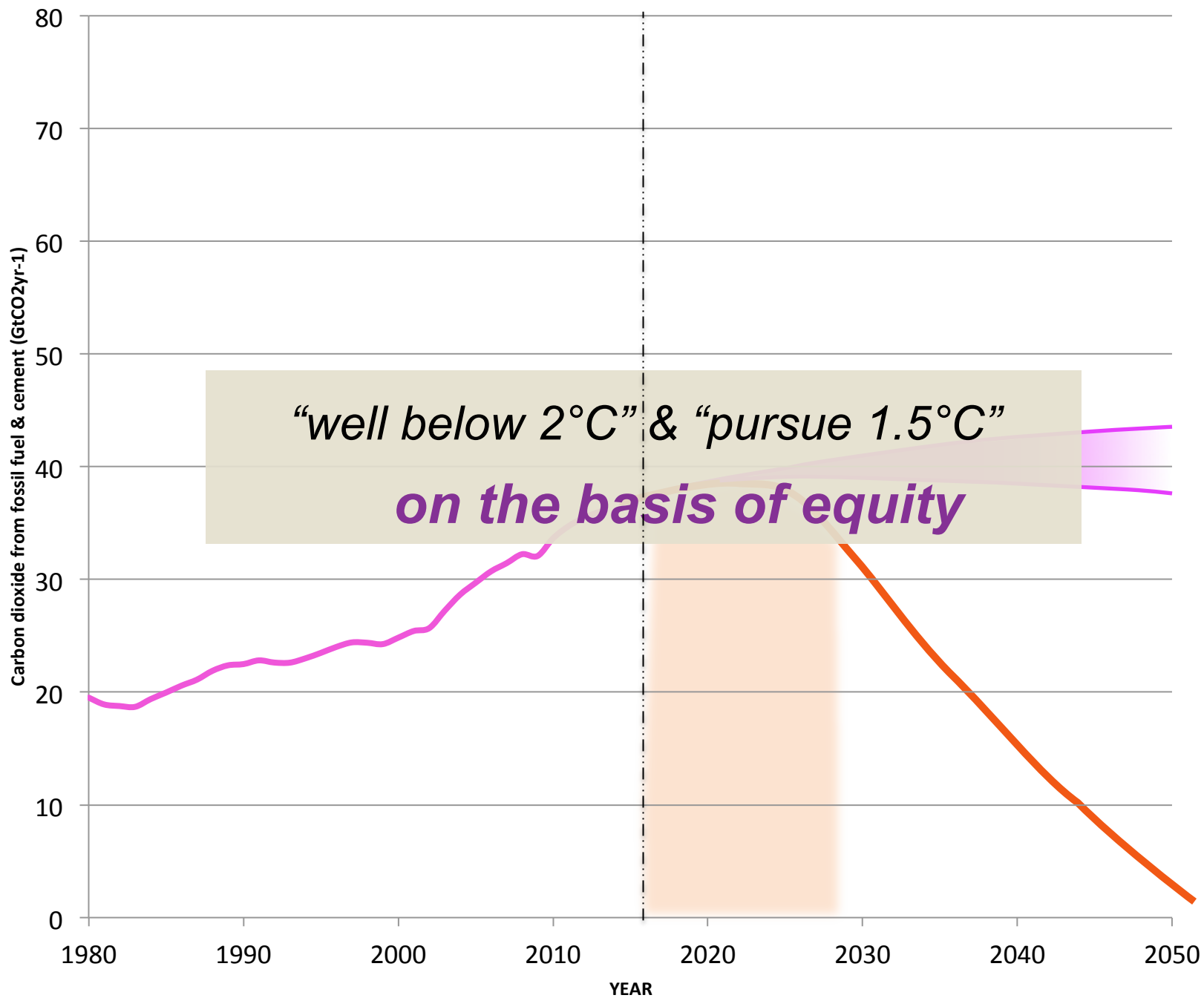
...on the **basis of equity**, and efforts to **eradicate poverty**.











Returning to IPCC's Carbon budgets

*5 to 8 years of current global emissions
will consume all the remaining energy-carbon budget for 1.5°C*

so...

it is now too late for 1.5°C

... and for 2°C ?

- ~~61%~~ chance of 2°C is lost
- ~~51%~~ chance demands a *war-like* footing on mitigation - now
- **33%** chance demands mitigation far beyond anything discussed in Paris

What's this mean for poorer & richer nations?

Method

[1] We have a global CO₂ budget for 33% chance of <2°C
(from the IPCC)

[2] Estimate mitigation by poorer/industrialising nations
(i.e. their CO₂ budget)

subtract [2] from [1] = CO₂ budget left for industrial nations

Assuming **poorer** (non-Annex 1) nations:

1. Collectively peak their emissions by 2025
2. Then rapidly increase mitigation to ~10% p.a. by 2035
3. Fully decarbonise their energy systems by 2050

... then, for 2°C, **wealthy** (e.g. *IoM*) nations require:



At least **10% reduction** in emissions year on year from **now**,

... equivalent to:

40% reduction by ~2018 (c.f. 1990)

70% ~2024

90% ~2030

Decarbonise **all** energy by 2035

c.f. EU's submission to Paris 40% by 2030

How can this be reconciled with ‘official’ accounts?

*“To keep ... to 2°C ... the UK [must] cut emissions by at least 80% ...
the good news is that reductions of that size are possible without
sacrificing the benefits of economic growth and rising prosperity.”*

UK Committee on Climate Change

... two rabbits from the hat:

1. Negative emissions technologies (BECCS):

Grow trees/plants

they absorb CO₂ through photosynthesis

burn trees in powerstations

capture the CO₂ from the chimney

~liquefy the CO₂ & pump it underground

store for many 1000s of years

2. Peak global emissions in the past

UK governments carbon budgets



Based on The UNEP Gap Report

- 163 scenarios for 50% or better chance of 2°C; of these:
 - 140 peak global CO₂ in ~2010
 - 23 peak in ~2020, all of which assume negative emissions
- **¾ of the scenarios assume both time travel & negative emissions**

So Paris, some Academics & Politicians ...

- **rather than focus on urgent & deep mitigation now**
... with challenging political & economic repercussions
- **rely on non-existent negative emission technologies**
... to suck CO₂ out of the air after 2050 in huge quantities

e.g. planting 1 to 3x area of India, year after year

Returning to 2°C ... is it still a viable goal?



Hypothesis: yes ... *just*

Equity/behaviour - a small group to make radical & early reductions

Technology - demand side can deliver early & large reductions

[Growth - *there are alternative measures of a good life]*

EQUITY

50% of global CO₂ comes from **10%** of the population

Top 1% of US emitters (~3.4 million people)

... have CO₂ footprints

2500x higher than bottom 1% globally (~70 million)

who are the high-emitters?

- Climate scientists
- Tynwald members?
- Anyone who annually takes a long-haul flight or two ...

2°C mitigation is principally a short-term challenge;

i.e. really now to 2025 - so is mostly about the few not the many

... it is a consumption and not a population issue!

The **brutal logic** of carbon **budgets**

The example of aviation:

Every tonne CO₂ from our flying *(added to our already hi emissions)*

Is a tonne of CO₂ poorer communities cannot emit

... and in the short-term,

we know access to fossil fuel energy links to their improved welfare

The **brutal logic** of carbon **budgets**

*i.e. ... it's **our** difficult choice between:*

***a)** **flying** to another conference, political meeting or holiday*

or

b)** **their** access to **energy** for **basic needs

TECHNOLOGY

- Efficient petrol/diesel cars
- A++ refrigerators

Private road transport (Cars)

- EU & US ~12-15% of emissions
- ~270 petrol/diesel models <100gCO₂/km
... at no price premium
- 2/3 of car travel is by vehicles 8yrs old or younger

Max CO₂ Standard & existing petrol/diesel cars

- With no additional capital cost
- Reduced operating cost
- Identical infrastructure
- Same employment & companies

50% to 70% reduction in ~10yrs

Refrigeration

- A++ refrigerator uses 80% less energy than an A rated
- Phased replacement of all A-rated (& below) with A++
- CO₂ saving of **~50%+ in 10 years**

A Radical Plan for 2°C – two phases

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

*... by the **high emitters***

2. **Marshall-style** build programme of **zero carbon energy** supply

*... with **100%** penetration by **2050***

and a message of hope to finish ...

*“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.”*

Robert Unger

Thoughts on IoM & 2°C – Energy DEMAND

- Retrofit 25000 homes

~£0.5b over 15yrs or £33m/yr

excellent for training & employment

eliminate fuel poverty

isolate heating costs from fuel price volatility

- Max CO₂ standard for all new cars

100gCO₂/kWh starting 2017 & tightened at 5% p.a.

- Stringent efficiency standards on electrical equipment

40% to 70% reduction in energy demand in 15 years

Thoughts on IoM & 2°C – Energy **SUPPLY**

- Major electrification programme (htg, transport, etc)
- Role out smart grid/intelligent metering
- 20-40 wind turbines = current IoM electricity consumption
- Solar panels on all SW roofs (~1/3 current IoM elec')
- Indigenous biomass/biogas for intermittency/base load
- Hybrid ferry – consider wind-assist and/or biofuel

Thoughts on IoM & 2°C – Energy POLICY

- Progressive metering tariffs
- Stringent energy efficiency & emission standards
- Moratorium on airport expansion
- *Personal carbon allowance ?*

Thank you



University of Manchester
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