The case for urgent and radical carbon emission reductions

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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
Global ambition

The UK has signed up to make a fair contribution 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

…2°C taken as a threshold between ‘acceptable’ and ‘dangerous’ climate change
Global impacts: 2°C

E.g.
Widespread mortality of corals
Increased risks of extreme weather events
Increased water stress & wildfire frequency
Hundreds of millions of people suffering coastal flooding
Avoiding 2°C – how are we doing so far?
Carbon dioxide from fossil fuel & cement (GtCO2yr⁻¹)

UN Climate change panel established

GCP new data
Carbon dioxide from fossil fuel & cement (GtCO₂yr⁻¹)

YEAR


GCP new data

UN Climate change panel established

RIO Earth Summit
Carbon dioxide from fossil fuel & cement (GtCO2yr⁻¹)

- UN Climate change panel established
- RIO Earth Summit
- Royal Commission (60% by 2050)

YEAR

GCP new data
Carbon dioxide from fossil fuel & cement (GtCO₂yr⁻¹)

YEAR


UN Climate panel established
RIO Earth Summit
Royal Commission (60% by 2050)
Copenhagen Accord

GCP new data
... despite economic downturn, emissions continue to rise...5% 2010; 2-3% since. Pre-recession – closer to 3.5% p.a.
Carbon dioxide from fossil fuel & cement (GtCO2 yr\(^{-1}\))

UN Climate change panel established
RIO Earth Summit
Royal Commission (60% by 2050)
Copenhagen Accord
Rio + 20

... so what of future emissions?
Energy system design lives (lock-in)
- Supply technologies 25-50 years
- Large scale infrastructures
- Built environment
- Aircraft and ships ~30 years
Carbon dioxide from fossil fuel & cement (GtCO2yr⁻¹)

- UN Climate change panel established
- Rio Earth Summit
- Royal Commission (60% by 2050)
- Copenhagen Accord
- Rio + 20

Even most ‘extreme’ RCP pathway slows to 2% growth from 2020

Alternative?
Carbon dioxide from fossil fuel & cement (GtCO2yr⁻¹)

- UN Climate change panel established
- RIO Earth Summit
- Royal Commission (60% by 2050)
- Copenhagen Accord
- Rio + 20

>2,500GtCO₂ for 2000 to 2050
(5,000GtCO₂ for 2000-2100)

Note: 1,000GtCO₂ left for 66% chance of <2° C
Where current policy is leading…

Global emissions continuing to grow

Lower Mitigation = Higher Adaptation

Currently policies in line with 4°C-6°C C by 2100

(Anderson & Bows, 2010; Betts et al., 2010; Rogelj et al., 2010)
Because of a severe delay to set in train measures to avoid 2°C – how can we now meet this target?
Carbon dioxide from fossil fuel & cement (GtCO2yr⁻¹)

YEAR


Urgently require very different policy responses

... 66% chance of avoiding 2°C

GCP new data

Too early for supply

Reduce Demand

Supply & demand
How feasible is change?
“To keep ... global average temperature rise close 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.”

Committee on Climate Change first report p.xiii & 7 (2009/11)
2°C – an alternative take …
If we consider it appropriate for poorer nations to have enough emission budget to develop and improve their welfare, then **for the wealthier nations**...

“...dangerous climate change can only be avoided if economic growth is exchanged, *at least temporarily*[^1], for a period of planned austerity within Annex 1 nations...”.

Anderson & Bows 2011

[^1]: *until low carbon energy supply is widespread*
How can such radically different interpretations arise from the same science?
Consequently, very different results for 2° C

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Anderson &amp; Bows</th>
<th>Typical 2° C scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability of exceeding 2° C</td>
<td>37%</td>
<td>50 to 80%</td>
</tr>
<tr>
<td>Global emissions peak year</td>
<td>2020</td>
<td>In the past! to 2016</td>
</tr>
<tr>
<td>Non-Annex 1 nations peak</td>
<td>2025</td>
<td>2017/18</td>
</tr>
<tr>
<td>Deforestation considered</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Annex 1 mitigation rate</td>
<td>8-10% p.a.</td>
<td>3-4% p.a.</td>
</tr>
</tbody>
</table>
If avoiding $2^\circ C$ is too difficult

... what about a $4^\circ C$ future?

(i.e. a larger carbon budget and lower rates of mitigation)
Global impacts: 4°C

4°C Google Earth Tool from the Hadley Centre & Foreign and Commonwealth Office.
Global impacts: 4°C

Hottest days

+8°C

+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
i.e. the future’s impossible!

- We can’t mitigate for $2^\circ$ C to $3^\circ$ C
- And we can’t live with $4^\circ$ C ... or more

*at least within our blinkered mindset*
... and then ask ...

...have we the *agency* to deliver the unprecedented reduction rates necessary to ‘stay below 2°C’?
Agency

- **Equity** – a message of hope; perhaps?
- **Technology** – how far, how fast & how soon?
- **Growth** – useful proxy or obstructive dogma?
Equity

... who are the emitters?
Little chance of polices working for all 7 billion

... but how many people really need to reduce emissions?

40% to 60% emissions from 1% to 5% population

Who are they?
Climate scientists, OECD (& other) academics, anyone who gets on a plane once a year – middle classes...
Technology

... refocus on demand
The electricity system

Demand opportunities dwarf those from supply in short-term
Growth

... a misguided proxy?
Growth is a proxy for many social goods

Including:

- Welfare (health, life expectancy)
- Employment/income
- Equity
- Literacy rates
- Crime & safety, etc.
- Time with family & friends

*Economic growth itself has no meaningful value*
£350b QE or £300b retrofit of ⅔ of UK’s housing stock

- Reduce fuel poverty (over 5 million homes)
- Reduce energy bills
- Reduce vulnerability to volatile energy prices
- Provide mass skilled & semi-skilled employment

as well as:

- Reduce emissions
- Increase resilience to a changing climate
To summarise
For 2°C mitigation, we need a paradigm shift in UK:

- Be candid about the timeframe for 2°C budgets (2013-2025/30)
- Recognise that UK reduction rates need to be ~10% p.a.
- Escape the dogma of price/finance as the principal mechanism for delivering 2°C
- Acknowledge we’re not short of capital, just the initiative & courage to reallocate wealth towards low-carbon infrastructure
Don’t shoot the messenger: *implications for policy* (Annex 1)

- Should avoid 4°C at all costs
- The UK and rest of Annex 1 need ~70% decarbonisation over next decade
- Only small % of global population need radical mitigation
- Low carbon energy supply cannot deliver early reductions in the UK
- Principal response is to reduce energy demand now
Ultimately

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

- This will demand leadership, courage, innovative thinking, engaged teams and difficult choices.
Thank you

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