# **Briefing on Climate Emergency September 2019**

# 1 Climate Emergency as a matter of fact

"Meanwhile climate change grows more and more dangerous to the whole planet, a true horseman of the Apocalypse" observes the Archbishop of Canterbury.<sup>1</sup> Similarly, the journalist David Wallace-Wells insists that the climate emergency is 'worse, much worse, than you think.'<sup>2</sup> The gravity of the situation is underlined by Sir James Bevan, the current Chief Executive of the UK Environment Agency. Speaking one month *before* the recordsetting UK heatwave of July (and record-setting temperatures *again* in late August) Sir James said,

"I'll be honest: I've been Chief Executive of the Environment Agency for over three and a half years now, and it's taken me a while realise what the Main Thing is. And the answer, which I now say to myself every day, is this: it's the climate emergency, stupid."<sup>3</sup>

The 2015 Paris Agreement's central aim was 'to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.'<sup>4</sup>

Presently, however, we are pursuing a global greenhouse gas (GHG) emissions track for a minimum of around 3 - but perhaps as much as 5 - degrees of heating by 2100.<sup>5</sup> Indeed, there is increasing evidence that the IPCC projections have been biased towards *underestimating* the potential amount of heating under the scenarios it has so far considered. (IPCC methodology is explained in appendix 1). This systematic underestimation has been attributed to both sociological<sup>6</sup> and methodological factors.<sup>7</sup> Whatever the reasons, the latest Earth-system climate sensitivity models are tending towards a new consensus of around 5

Some comparative differences between the consequences of 1.5, 2, and 3 degrees warming can be seen at, <u>https://interactive.carbonbrief.org/impacts-climate-change-one-point-five-degrees-two-degrees/?utm\_source=web&utm\_campaign=Redirect</u>

<sup>&</sup>lt;sup>1</sup> <u>https://www.archbishopofcanterbury.org/speaking-and-writing/speeches/archbishop-canterburys-presidential-address-anglican-consultative</u>

<sup>&</sup>lt;sup>2</sup> David Wallace-Wells, The Uninhabitable Earth: A Story of the Future, Penguin Random House, 2019.

<sup>&</sup>lt;sup>3</sup> Speech by Sir James Bevan, Chief Executive of the Environment Agency Aldersgate Group, London, 25 June 2019; <u>https://www.gov.uk/government/speeches/its-the-climate-emergency-stupid</u>

<sup>&</sup>lt;sup>4</sup> For an overview of the historical reasons for delineating 2 degrees as the upper limit, see <u>https://theconversation.com/why-is-climate-changes-2-degrees-celsius-of-warming-limit-so-important-82058</u> <sup>5</sup> For up to date projections, see https://climateactiontracker.org/global/temperatures/

<sup>&</sup>lt;sup>6</sup> On the sociological dimension, see <u>https://blogs.scientificamerican.com/observations/scientists-have-been-underestimating-the-pace-of-climate-change/</u>

<sup>&</sup>lt;sup>7</sup> On the potential shortcomings in earlier climate modelling and the new 5 degree consensus for a given amount of GHG, see <u>https://www.wunderground.com/cat6/New-Models-Point-More-Global-Warming-We-Expected</u>

degrees of heating by 2100 unless we significantly modify the current global emissions trajectory.

Yet it is not only the gravity of the Climate Emergency that must be recognised, but also its urgency. 2019 is likely to become the second warmest year in recorded history.<sup>8</sup> July was the warmest month on Earth in at least 100,000 years.<sup>9</sup> Yet the near record setting temperatures of 2019 are all the more remarkable since they are occurring during the minimum of one the weakest solar cycles in 100+ years,<sup>10</sup> and in the absence of a strong El Niño.<sup>11</sup> This is a testament to how much human-caused global heating is impacting the planet.<sup>12</sup> The Earth is generally agreed to have warmed, on average, by between 1.1 and 1.2 degrees above the pre-industrial mean to date. Most of that heating has been absorbed by the World's oceans (figure 3), with unavoidable consequences for sea-level rise although the rate at which that rise will occur remains highly uncertain.<sup>13</sup> Moreover, heating is not uniformly distributed across the globe but is, instead, concentrated poleward, where large carbon deposits are, for now, locked into permafrost (See fig 4). The consequences of these shifts in global mean temperature and distribution are depicted variously in figures 5-9.

As a recent Washington Post article insists, the climate emergency is not a future concern but with us here and now.<sup>14</sup> Previously exceptional events, like the record-breaking European and UK temperatures, as well as the shift in global averages, have been broadly predicted by the IPCC assessments. Indeed, as a 2014 study of European heatwaves noted,

The vulnerability of European citizens was made evident during the summer heatwave of 2003 [...] when the heat-related death toll ran into tens of thousands [...]. The first formal event attribution study [...] made the ominous forecast that severe heatwaves could become commonplace by the 2040s. [...] We find that events that would occur twice a century in the early 2000s are now expected to occur twice a decade. For the more extreme threshold observed in 2003, the return time [has reduced] from thousands of years [...] to about a hundred years in little over a decade.<sup>15</sup>

July's and then August's heatwaves in Europe are thus a first taste of *average* summers to come. They epitomise inevitable increases in climate instability as well as average global temperature (See figure 10). Events in the Arctic this summer similarly herald

<sup>13</sup> <u>https://e360.yale.edu/features/abrupt\_sea\_level\_rise\_realistic\_greenland\_antarctica</u>

<sup>&</sup>lt;sup>8</sup> The most detailed review to date of 2018's weather and climate was published by the American Meteorological Society in August 2019. See <u>https://www.ametsoc.net/sotc2018/Socin2018\_hires.pdf</u> <sup>9</sup> We are probably now on a par with the Eemian inter-glacial 130,000 years ago. See <u>https://www.nature.com/articles/nature11789</u>

<sup>&</sup>lt;sup>10</sup> On solar cycles and the potential length of the current 'Maunder minimum' separating the end of SC24 and the eventual onset of SC25, see <u>https://spaceweatherarchive.com/2019/04/10/experts-predict-the-solar-cycle/</u> <sup>11</sup> El Nino and La Nina are large-scale cyclical oceanic warming and cooling events. An explanation can be found at <u>https://www.metoffice.gov.uk/weather/learn-about/weather/oceans/el-nino</u>

<sup>&</sup>lt;sup>12</sup> An excellent interactive graphic quantifying the limited influence of alternative geo-physical explanations for global warming can be found at <u>https://www.bloomberg.com/graphics/2015-whats-warming-the-world/</u> On discounting the role of variable cycles, see <u>https://www.carbonbrief.org/guest-post-why-natural-cycles-only-</u>play-small-role-in-rate-of-global-warming

<sup>&</sup>lt;sup>14</sup> https://www.washingtonpost.com/science/2019/08/09/climate-change-isnt-an-intangible-future-risk-its-herenow-its-killing-us/

<sup>&</sup>lt;sup>15</sup> http://www.indiaenvironmentportal.org.in/files/file/2003%20European%20heatwave.pdf

the consequences of global heating. Besides near record melting of the Greenland ice sheet,<sup>16</sup> forest fires in the arctic region following a dry winter and early spring emitted in the month of June *alone*, more CO<sub>2</sub> than the entire nation of Sweden does in a full year.<sup>17</sup>

# 1.1 Gravity and Urgency: Why it is a 'Climate *Emergency*'?

Both IPCC sponsored and other scientific studies point towards alarming impacts, which authors like Mark Lynas (2008) and, more recently, David Wallace-Wells use to portray the future for which we are currently on course. In *The Uninhabitable Earth*, (2019) Wallace-Wells lays out a stark and alarming picture of where the World is presently heading, both climatologically and ecologically. He provides a detailed survey of current scientific investigations of the whole-Earth-system, discovering that, cumulatively, they project increasingly extreme weather events superimposed upon soon-to-be normative European summers like that of 2018 and 2019; systemic decreases in crop yield and global-wide incidents of crop failure; significant increases in the frequency and extent of both drought and flood; the potential for global forest die-back, and substantial geographical areas of currently dense population for whom average temperatures in the hemispheric summer will exceed the body's ability to thermo-regulate. More powerful storms, and, of course, unavoidable and significant sea level rise for centuries to come.<sup>18</sup>

The uncertainty of precise mechanisms of feedback, such as the release of methane and CO<sub>2</sub> through the melting of permafrost; and the link between sea temperature, ice calving, and transport processes at the glacial/ocean grounding line mean that although the possibility of tipping points was recognised in principle by AR5, specific positive-feedback mechanisms were *omitted* from the calculations because they were deemed too difficult to model.<sup>19</sup>

<sup>17</sup> Several recent articles signify the importance of this year's arctic weather events: 'Arctic wildfires emitted as much CO2 in June as Sweden does in a year' <u>https://www.theguardian.com/world/2019/jul/12/arctic-wildfires-c02-carbon-emissions-same-sweden</u>; 'July, Earth's hottest month in Recorded History'

<sup>&</sup>lt;sup>16</sup> Cumulatively, the 2019 *daily* melt season sum is tracking well behind 2012, the satellite-era record for total melt-day area. However, *total ice mass loss for 2019 is nearly equal to 2012* because of low winter snowfall, early melting of the snow accumulated over winter, and deeper melting of older snow and ice over large areas of the western side of Greenland. See <a href="http://nsidc.org/greenland-today/2019/08/europes-warm-air-spikes-greenland-melting-to-record-levels/">http://nsidc.org/greenland-today/2019/08/europes-warm-air-spikes-greenland-melting-to-record-levels/</a>

https://www.wunderground.com/cat6/July-2019-Earths-Hottest-Month-Recorded-History; 'Baked Alaska 2019' https://www.wunderground.com/cat6/Baked-Alaska-State-Endures-Warmest-Month-Record; 'Arctic wildfires spew soot and smoke cloud bigger than EU' https://www.theguardian.com/world/2019/aug/12/arctic-wildfiressmoke-cloud?CMP=Share\_AndroidApp\_Tweet; 'What do Alaska Wildfires Mean for Global Climate Change?' https://blog.ucsusa.org/carly-phillips/alaska-wildfires-climate-change

<sup>&</sup>lt;sup>18</sup> https://www.theccc.org.uk/publication/briefing-note-on-time-lags-in-the-climate-system-met-office/

<sup>&</sup>lt;sup>19</sup> The complexity of the whole-Earth system is well captured in this August 2019 FT article Climate change: 'How the jet stream is changing your weather', <u>https://on.ft.com/31jS4h5</u>

There is also the deeply worrying possibility that at some point – potentially very close to where we presently are – a positive (runaway) feedback mechanism may be triggered that exceeds *any* even as yet theoretical mitigation strategy.<sup>20</sup>

Nonetheless, the running total of GHG emissions is growing at a still accelerating rate. This is best illustrated by the dramatic shortening in the time periods taken for 400 billion tonnes of  $CO_2$  to enter the atmosphere:

First period:	217 years (1751 to 1967)
Second period:	23 years (1968 to 1990)
Third period:	16 years (1991 to 2006)
Fourth period:	11 years (2007 to 2018)
	First period: Second period: Third period: Fourth period:

These figures mean that if you are 60 years old then - in your lifetime - more than 80% of the **total** global emission of GHGs since 1751 have occurred. For a 15-year-old, it is just over 30%.<sup>21</sup> A graph of these increasing annual emissions by country is at figure 11.

# 1.2 Mitigation: Carbon Budgeting and 'Net Zero'

If we are to cap the heating that is being triggered to between 1.5 and 2 degrees Celsius, the World has, in effect, a 'carbon budget' for available emissions.<sup>22</sup> This includes the gap, or 'headroom', between the amount of heating that emissions to date must trigger and the amount that would trigger 1.5 or 2 degrees. Carbon Brief, in evaluating the November 2018 IPCC Special Report 1.5 Degrees, provide some specific calculations and attendant commentary on carbon budgeting;

In order to limit warming to 1.5C with "no or limited overshoot", net global CO<sup>2</sup> emissions need to fall by about 45% from **2010** levels by 2030 and reach "net zero" by around 2050. It is worth noting that [the IPCC's Integrated Assessment Models - IAMs] have a well-known bias towards technological solutions, such as switching the source of energy supply or adding carbon capture and storage (CCS). [...] It is worth adding that IAM pathways are only really able to explore what is technically feasible. As explained in a lengthy section of chapter one [of the IPCC report], this is distinct from what is socially, environmentally, politically or institutionally feasible. Though some aspects of these broader questions are explored in chapter four, the report does not – and cannot – say whether it will, ultimately, be possible to avoid 1.5C of warming.<sup>23</sup>

<sup>&</sup>lt;sup>20</sup> One of the most cited papers on this topic is: "Trajectories of the Earth System in the Anthropocene" (2018), <u>https://www.pnas.org/content/pnas/115/33/8252.full.pdf?fbclid=IwAR3nGFgy\_sfscBBZJ48HTWemsPQs-gY89IGSGYx7BvsZDp69SsLRjdoDoR0</u>

<sup>&</sup>lt;sup>21</sup> <u>https://www.visualcapitalist.com/all-the-worlds-carbon-emissions-in-one-chart/</u>

<sup>&</sup>lt;sup>22</sup> For a helpful list of articles exploring carbon budgeting and capping heating see <u>https://www.nature.com/collections/fgmlwncmxd</u>

<sup>&</sup>lt;sup>23</sup> https://www.carbonbrief.org/in-depth-qa-ipccs-special-report-on-climate-change-at-one-point-fivec?utm\_content=buffer7c236&utm\_medium=social&utm\_source=twitter.com&utm\_campaign=buffer

As figure 12 clearly depicts, however, this budgetary approach reveals that the lifetime carbon budget shrinks dramatically when a present-day 15-year-old compares their allowance with a present-day 60-year-old.<sup>24</sup> Some of the inter-generational aspects of climate change have been explored helpfully by the institute of actuaries.<sup>25</sup> This includes drawing attention to the problematic role of discounting in conventional economic theory when calculating the costs and benefits of climate change mitigation.

# 2. <u>The Climate Emergency as a current concern in Britain</u>

The *Climate Change Act 2008* set a target for decarbonisation of 80% of the **1990** (benchmark) national emissions via a series of 5-year carbon budgets.<sup>26</sup> 2017's *Clean Growth Strategy* (CGS) set the budgets for periods 4 and 5 (2023-2032).<sup>27</sup> Nonetheless, the CGS has been criticised for failing to match ambition with concrete policy proposals, and, having exceeded the savings specified in budgets 1 and 2, there was concern earlier this year that the present budget 3 target would be met by offsetting the extra savings accrued against a shortfall in actual reductions as the rate of national emissions reduction declines ahead of the even more ambitious budget 4/5 targets.<sup>28</sup>

As part of the 2008 Act, the Government established an independent statutory body, The Climate Change Committee (CCC), currently led by Lord Deben.<sup>29</sup> The CCC advises the UK Government and Devolved Administrations on emissions targets and reports regularly to Parliament.<sup>30</sup>

More recently and responding to the increasingly alarming scientific assessments of CC, a citizen-activist 'Climate Emergency' movement has emerged with both global and national import.<sup>31</sup> Greta Thunberg's School Strike protest has gained international attention and support.<sup>32</sup> Extinction Rebellion (abbreviated as XR) was established in the UK in May 2018 and uses civil disobedience and nonviolent resistance to protest against climate breakdown, biodiversity loss, and the risk of social and ecological collapse. XR is now an

<sup>&</sup>lt;sup>24</sup> <u>https://www.carbonbrief.org/analysis-why-children-must-emit-eight-times-less-co2-than-their-grandparents?utm\_source=TwitterVid&utm\_campaign=Intergenerational09042019</u>

<sup>&</sup>lt;sup>25</sup> Climate Change and Intergeneration Fairness: Institute of Actuaries report 2017,

https://www.actuaries.org.uk/system/files/field/document/IF%20Bulletin%20Issue%2001%20V05%20WEB.pdf<sup>26</sup> The devolved administrations have set their own targets.

<sup>&</sup>lt;sup>27</sup> <u>https://www.gov.uk/government/publications/clean-growth-strategy</u>

 <sup>&</sup>lt;sup>28</sup> <u>https://www.carbonbrief.org/uk-will-miss-climate-goals-despite-new-strategy-says-official-watchdog</u>
 <sup>29</sup> <u>https://www.theccc.org.uk/</u>

<sup>&</sup>lt;sup>30</sup> CCC annual report, <u>https://www.theccc.org.uk/publication/annual-report-and-accounts-2018-2019/</u> See also interim synthesis report 2017, <u>https://www.theccc.org.uk/tackling-climate-change/preparing-for-</u> climate-change/uk-climate-change-risk-assessment-2017/

<sup>&</sup>lt;sup>31</sup> But note also, <u>https://www.conservativehome.com/thecolumnists/2019/04/james-frayne-what-polling-does-and-doesnt-tell-us-about-voters-and-the-environment.html</u>. And;

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/817872/BEIS Public\_Attitudes\_Tracker\_Wave\_30\_key\_findings.pdf

<sup>&</sup>lt;sup>32</sup> Greta Thunberg TED talk,

https://www.ted.com/talks/greta\_thunberg\_school\_strike\_for\_climate\_save\_the\_world\_by\_changing\_the\_rules/t ranscript

international movement.<sup>33</sup> The declaration of an emergency is one of the key demands put to the government by XR and, in local politics, by July 2019, a total of **209 local councils** had passed resolutions declaring a climate emergency.<sup>34</sup>

Responding to this pressure MPs approved a motion, originally tabled by Caroline Lucas, to declare an environment and climate emergency in April 2019 without a vote. Labour leader Jeremy Corbyn, who tabled the April motion, said it was "a huge step forward". Environment Secretary Michael Gove acknowledged there was a climate "emergency" but did not back Labour's demands to declare one. Pressure continued to build, however, and in June 2019 the Government laid down a draft target amendment to the 2008 bill introducing legislation for at least a 100% reduction of GHGs against the 1990 benchmark, by 2050.<sup>35</sup> The Government has not yet matched this will with a detailed way.

Two other issues are, perhaps, worth noting in the national context; Fracking, and Brexit. First, there is recent evidence that fracking is a bigger contributor to GHG contributions than has been realised. This may be of increasing significance in relation to the planning requests, pilot projects, and local protests against fracking in the United Kingdom.<sup>36</sup> On the other hand, UK shale-gas reserves may yet prove uneconomical.<sup>37</sup>

Secondly, despite a direct request from the Climate Change Committee, the Government has pointedly refused to rule out international carbon offsetting to meet the SI's amended net zero provision. This may prove both controversial and very significant; not least because attendant movements in Sterling after Brexit may seriously distort emissions charging in the UK after it has exited the EU.<sup>38</sup>

3. Opportunities for UK involvement in Climate Emergency debate and action over the next 12-18 months.

<sup>34</sup> <u>https://researchbriefings.files.parliament.uk/documents/LBP-2019-0026/LBP-2019-0026.pdf</u> <u>https://www.bbc.co.uk/news/newsbeat-47570654</u> <u>https://www.bbc.co.uk/news/uk-politics-48126677</u>

<sup>35</sup> Commons Research Library, Legislating for Net Zero, July 2019, <u>https://researchbriefings.files.parliament.uk/documents/CBP-8590/CBP-8590.pdf</u>

<sup>36</sup> http://news.cornell.edu/stories/2019/08/study-fracking-prompts-global-spike-atmosphericmethane#.XVQ8ygwX4yw.twitter; See also, https://www.biogeosciences.net/16/3033/2019/

<sup>&</sup>lt;sup>33</sup> For an insight into XR's goals, methods and values – with an afterward by Rowan Williams, see Extinction Rebellion *This is Not a Drill*, 2019.

For Full list of the 209 Councils to have declared a Climate Emergency by end of July 2019, see <a href="https://www.climateemergency.uk/blog/list-of-councils/">https://www.climateemergency.uk/blog/list-of-councils/</a>

 <sup>&</sup>lt;sup>37</sup> Times (paywall) <u>https://www.thetimes.co.uk/article/five-year-warning-over-shale-gas-supply-dxcb68np2</u>
 <sup>38</sup> Carbon Trading breaks down under Brexit due UK underpricing in no-deal scenario,

https://www.climatechangenews.com/2019/07/30/uk-carbon-price-plummet-no-deal-brexit/. See also; https://on.ft.com/30F9Vz4.

#### **Governmental**

Although the Climate Change Committee has been deeply critical of Government inaction, 6 select committees of the House of Commons (*Business, Energy and Industrial Strategy; Environmental Audit; Housing, Communities and Local Government; Science and Technology; Transport; and Treasury*) have announced plans to hold a **Citizens' Assembly on combatting climate change** and achieving the pathway to net zero carbon emissions beginning this Autumn.<sup>39</sup>

The **Brexit Withdrawal Bill** will include provisions on the environment, although the date(s) of debate remain obscure. An Autumn general election is highly probable and while Brexit is likely to subsume almost everything else, climate may yet prove a significant electoral issue.

Later this Autumn the Government will publish its *National Infrastructure Strategy.*<sup>40</sup> Similarly, a Governmental report on *Resilience* is due sometime in Spring 2020. Finally, *COP* 26 is now expected to take place in Glasgow in November 2020.

## Anglican Communion

Bishops attending the Lambeth Conference will bring many perspectives on the climate emergency and will be able to reflect on both the need for mitigation and the effect of climate impacts on communities around the world. Their voices - both at the conference and in the hosting programme that precedes it - will be important contributions to the conversation about climate action and climate justice.

The *Anglican Communion Environmental Network* (ACEN) will be resourcing and connecting Anglicans around the communion who "strive to safeguard the integrity of creation and sustain and renew the earth." Materials that it makes available, such as the Eco Bishops' call to climate justice, '*The World Is Our Host*', provide a framework for action.

The *Anglican Alliance*, founded as a result of Lambeth 2008, has a mandate to connect, equip and inspire across the Communion in the areas of development, relief and advocacy. Themes of the Alliance's work emerge from regions, and climate justice and food security

There is an informative parallel process occurring in the Republic of Ireland, see

https://www.businessgreen.com/bg/opinion/3080165/climate-proofing-the-uks-infrastructure-must-be-a-government-

<sup>&</sup>lt;sup>39</sup> https://www.parliament.uk/business/committees/committees-a-z/commons-select/business-energy-industrialstrategy/news-parliament-2017/climate-change-and-net-zero-chairs-comments-17-19/

https://www.citizensassembly.ie/en/How-the-State-can-make-Ireland-a-leader-in-tackling-climatechange/Recommendations/

<sup>&</sup>lt;sup>40</sup> This will be a first for the UK, but also a key test for scoring Britain's progress towards meeting the ninth Sustainable Development Goal (SDG), by investing up *1.2 per cent of GDP a year in infrastructure*. See <u>https://www.nic.org.uk/.</u> Report summary can be found at <u>https://www.nic.org.uk/wp-content/uploads/CCS001\_CCS0618917350-001\_NIC-NIA\_Accessible.pdf#page=8</u>

priority?utm content=bufferc6400&utm medium=social&utm source=twitter.com&utm campaign=buffer

are prominent among them.<sup>41</sup> The Alliance will be working alongside ACEN and others to build on the momentum that is emerging from the work of the churches, global movements, and the work of the UN.

The Anglican Communion Office at the UN will be resourcing engagement with the key UN processes in 2019 and 2020, including the UN Climate Summit this September and the COP 26 in 2020.<sup>42</sup>

# Planned Public Protest Sep/Oct 2019

Action is being coordinated to coincide with publication of the *IPCC Special Report on Oceans and the Cryosphere*. Consequently, there will be a Global Climate Strike, including Greta Thunberg *et al*, in the week **Sep 20-27**<sup>th</sup>.<sup>43</sup> As part of that protest, the TUC are also coordinating what they hope will be major strike action in the UK on, or around, **Sep 20**<sup>th</sup>.<sup>44</sup> Extinction Rebellion are planning to disrupt London Fashion Week (**Sep 13-17**<sup>th</sup>) and to blockade the Port of Dover on **Sep 24**<sup>th</sup> As part of an XR International 'Global Extinction Uprising' period between Oct 6<sup>th</sup> and 19<sup>th</sup>, the UK XR movement will try to '<u>peacefully</u> <u>shutdown Westminster'</u> for 2 weeks from **October 7-19**<sup>th</sup>.<sup>45</sup>

# 4. The role of faith communities in the next round of climate change action: a non-exhaustive sample.

## Internationally

Faith leadership on climate action already has a strong pedigree. The 2015 Paris climate talks were influenced by initiatives such as the publication of Pope Francis's encyclical *Laudato Si'*; statements from faith leaders; climate pilgrimages; and prayers. Indeed, after the talks, former UNFCCC Executive Secretary Christiana Figueres began her 'Open Letter of Gratitude' 'To those who walked, [and] to those who prayed...".<sup>46</sup>

Currently, the Vatican continues to provide major initiatives relating to climate, including the forthcoming synod 'The Amazon: new paths for the Church and for

<sup>&</sup>lt;sup>41</sup> <u>https://anglicanalliance.org/advocacy/climate-justice/</u>

<sup>&</sup>lt;sup>42</sup> <u>https://www.anglicancommunion.org/mission/at-the-un.aspx</u>

<sup>&</sup>lt;sup>43</sup> This is timed to coincide with *IPCC 51st Session* and Consideration of the SR on the Ocean and Cryosphere in a Changing Climate, due to take place 20 Sep-23 Sep in Monaco. <u>https://globalclimatestrike.net/</u>

 <sup>&</sup>lt;sup>44</sup> The TUC are coordinating a work/student 30-minute 'solidarity stoppage' on September 20<sup>th</sup> https://www.cacctu.org.uk/climate\_strike\_20\_september

<sup>&</sup>lt;sup>45</sup> https://rebellion.earth/event/international-rebellion-uk-action-continues-7-october-2019/

<sup>&</sup>lt;sup>46</sup> <u>https://unfccc.int/news/an-open-letter-of-gratitude</u>

integral ecology.'<sup>47</sup> There is also the *Global Catholic Climate Movement* (GCCM),<sup>48</sup> of which several UK congregations, groups and agencies, including CAFOD, are members.<sup>49</sup>

- **The Patriarch**. Ecumenical Patriarch Bartholomew has spoken frequently about care for creation and has also worked with Pope Francis and the Archbishop of Canterbury on statements for key occasions.
- The Lausanne/World Evangelical Alliance creation care network provides theological and practical resources for churches and is participating in global climate initiatives.<sup>50</sup>
- The ACT Alliance, is the world's "largest coalition of Protestant and Orthodox churches and church-related organisations engaged in humanitarian, development and advocacy work". It seeks to respond to climate disaster by providing resources for adaptation and offers a powerful platform for global climate advocacy.<sup>51</sup>
- **Greenfaith** "Is an interfaith coalition for the environment that works with houses of worship, religious schools, and people of all faiths to help them become better environmental stewards". It has a strong focus on climate advocacy and action.<sup>52</sup>

## Within the UK,

- Churches Together in Britain and Ireland (CTBI) has the environment as a major focus and resources churches for prayer and advocacy. It helps to ensure coordinated work through its *Environmental Issues Network* (EIN), which brings together churches that are members of CTBI and Christian environmental organisations.<sup>53</sup>
- The Faith for the Climate Network brings together people from a range of faiths, seeking "to encourage, inspire and equip faith communities in their work on climate change".<sup>54</sup>
- The Roman Catholic Church, the Baptist Union of Great Britain, Church of Scotland, the Methodist Church, and the United Reformed Church and the Quakers in Britain are all active.<sup>55</sup>
- Christian environmental organisations such as **A Rocha UK**, **Climate Stewards**, **Green Christian**, the **John Ray Initiative**, and **Operation Noah** help churches to engage in prayer, practical action and advocacy. Each has a particular focus:

<sup>49</sup> <u>https://cafod.org.uk/</u> Edward de Quay is the representative for the Environmental Advisory Group of the Catholic Bishops' Conference of England & Wales. Relations with MPA are actively strengthening at present.

<sup>&</sup>lt;sup>47</sup> <u>http://www.sinodoamazonico.va/content/sinodoamazonico/en.html</u>

<sup>&</sup>lt;sup>48</sup> <u>https://catholicclimatemovement.global/</u>

<sup>&</sup>lt;sup>50</sup> <u>https://www.lausanne.org/networks/issues/creation-care</u>

<sup>&</sup>lt;sup>51</sup> <u>https://actalliance.org/</u>

<sup>&</sup>lt;sup>52</sup> <u>http://www.arcworld.org/</u> Cf., <u>https://greenfaith.org/#</u>

<sup>53</sup> https://ctbi.org.uk/environment

<sup>&</sup>lt;sup>54</sup> <u>https://faithfortheclimate.org.uk/</u>.

<sup>&</sup>lt;sup>55</sup> <u>http://www.jointpublicissues.org.uk/</u>. For examples of their output see,

https://www.baptist.org.uk/Articles/366527/Resource\_Library/Free\_Resources\_and/Being\_a\_Baptist/Engaging\_with\_Society/Faith\_and\_Society.aspx; and,

https://urc.org.uk/images/mission/church\_and\_society/Resources/201905\_URC\_Environmental\_Policy.pdf;

**A Rocha** on conservation and the Eco Church programme; **Green Christians** on building a community of Christians concerned about the environment; **JRI** on linking environmental science and faith; and **Operation Noah** on engaging churches on climate issues and divestment.

 Christian development agencies, such as CAFOD, Christian Aid, and Tearfund, and Anglican mission agencies such as CMS and USPG help to bring an international perspective to climate advocacy and to campaign for climate justice.

# 5. What do we do about the Climate Emergency, then?

Member churches of the Anglican Communion have been challenged to action through Anglican Consultative Communion, Resolution A17:05,<sup>56</sup> which states that the ACC;

- 1. recognises that there is a global climate emergency
- 2. encourages Member Churches to make the **Fifth Mark of Mission**, 'To strive to safeguard the integrity of creation, and sustain and renew the life of the earth', a living testament to our faith, and calls upon Member Churches to:
  - a. promote a day during the Season of Creation as a day of public repentance
  - b. develop an **action plan and resources for sustainable living** at individual, parish, diocesan and provincial level; including policies and procedures to minimise waste, increase use of renewable energies, and incorporate creation care into liturgical practice
  - c. prepare a Lenten Fast for Creation
  - d. hold strategic planning conferences on the Sustainable Development Goals and Climate Change, ensuring the involvement of Indigenous, youth, and women's voices, and to report back to ACC18
  - e. identify environmental and climate-related threats in their context and to **develop or adapt existing tools on** disaster preparedness and **mitigation**.

How, then, might we begin to respond? A framework for achieving concrete progress was adopted by the IPCC and utilised during COP22-24, based on the Fijian tradition of inclusive, participatory and transparent dialogue known as *Talanoa*.<sup>57</sup> Such dialogue is structured around three general topics:

- 1. Where are we?
- 2. Where do we want to go?
- 3. How do we get there?

In answering these questions dialogue must be constructive, facilitative, and solutionsoriented. The dialogue must not lead to confrontation or the singling out of any individual

<sup>&</sup>lt;sup>56</sup> Anglican Consultative Communion Resolutions, <u>http://bit.ly/2zpyXpP</u>

<sup>&</sup>lt;sup>57</sup> Talanoa explained, <u>http://unfccc.int/files/bodies/cop/application/pdf/approach\_to\_the\_talanoa\_dialogue.pdf</u>

or group. The purpose of Talanoa is, rather, to share stories, build empathy and trust; advance knowledge through common understanding and; create a platform of dialogue which results in better decision-making for the collective good.

A Talanoan approach would draw on the current structures and relationships, including Dioceses, MPA, DEOs, CWPs, Lambeth, York and the wider Communion while also drawing in, and upon, the energy, imagination and expertise of newly engaged volunteers. Much has been written about the psychology of the climate emergency.<sup>58</sup> and it is important to frame the challenge(s) carefully.<sup>59</sup>All of this can then applied to the live questions; both the broader questions of morality, inter-generational fairness, the moral responsibilities of the established Church for defending the common good, the meaning of Mission and so on; as well as the more narrow question of defining net zero and of agreeing a timetable.

# **Further References**

- UK Gov 'Mission Possible' initiative/report. <u>http://www.energy-transitions.org/mission-possible</u>
- A plain English guide to the role of agriculture in forming/solving the CE <u>https://globalecoguy.org/farming-our-way-out-of-the-climate-crisis-c235e1aaff8d</u> NB. it is estimated that about 30 percent of the world's food is lost after harvest, whether in transport, warehouses, markets, homes, schools, businesses, or restaurants.
- Debate about excess warming in data models which Carbon Brief and lead author debunk <u>https://www.carbonbrief.org/factcheck-climate-models-have-not-exaggerated-global-</u> warming (end of 2017)
- On the scale of sea-level rise and the challenges the World faces see Tyler Prize (For environmental achievement) Lecture May 2019 Warren Washington and Michael Mann <a href="https://www.youtube.com/watch?v=MU1E\_OD0JZU">https://www.youtube.com/watch?v=MU1E\_OD0JZU</a> (Incidentally, at 55:30ff point emerges that (despite) Trump's vow to withdraw from Paris; cannot be legally enacted until day *after* next election).
- WMO 12-page guide to 1.5 degrees <a href="https://library.wmo.int/doc\_num.php?explnum\_id=5188">https://library.wmo.int/doc\_num.php?explnum\_id=5188</a>
- Bloomberg's New Energy Outlook Report 2019 <u>https://about.bnef.com/new-energy-outlook/</u>
- What is Happening with Coal? <u>https://www.carbonbrief.org/guest-post-how-plans-for-new-coal-are-changing-around-the-world</u>
- What are the core issues and options? What might it mean to be a carbon free household? <u>https://es.catapult.org.uk/wp-content/uploads/2019/06/ESC-Living-Carbon-Free-report-for-CCC.pdf</u>

<sup>58</sup> For a short and accessible introduction see; Geoffrey Beattie, Laura McGuire, *The Psychology of Climate Change*, 1st Ed., Routledge, 2018. For a podcast on the challenges of communicating the CE see; <a href="https://energypolicy.columbia.edu/challenge-communicating-climate-change">https://energypolicy.columbia.edu/challenge-communicating-climate-change</a>

<sup>&</sup>lt;sup>59</sup> For a positive example see "Imagining a climate-change future, without the dystopia" <u>https://www.pnas.org/content/pnas/115/51/12832.full.pdf</u>

# Selective Parliamentary Research Briefings/Debates

- Opposition Day Debate (ODD) E&CC debate, Hansard 2017-19 Session 01 May 2019: <u>https://hansard.parliament.uk/Commons/2019-05-01/debates/3C133E25-D670-4F2B-B245-33968D0228D2/EnvironmentAndClimateChange</u>
- Environment and Climate Emergency debate Lords 1<sup>st</sup> July 19 (after SI): <u>https://hansard.parliament.uk/Lords/2019-07-01/debates/A561CEE9-FA34-4F60-BADD-7BC392951841/EnvironmentAndClimateEmergency</u>
- Commons Research Library: Brexit, Energy and Climate Change;
  <u>https://researchbriefings.files.parliament.uk/documents/CBP-8394/CBP-8394.pdf</u>
- Commons Research Library: Legislating for Net Zero;
  <u>https://researchbriefings.files.parliament.uk/documents/CBP-8590/CBP-8590.pdf</u>
- Threats Presented by Climate Change, Lord's Debate 24<sup>th</sup> January 2019: <u>https://researchbriefings.files.parliament.uk/documents/LLN-2019-0005/LLN-2019-0005.pdf</u>
- Protecting and Representing Future Generations in Policymaking, June 20th 2019; <u>https://researchbriefings.files.parliament.uk/documents/LLN-2019-0076/LLN-2019-0076.pdf</u>
- Climate Change and Agriculture: POST note;
  <u>https://researchbriefings.files.parliament.uk/documents/POST-PN-0600/POST-PN-0600.pdf</u>
- General debate in Commons on 10<sup>th</sup> July on tackling climate change, protecting the environment and securing global development. Includes **links** to a range of further briefing materials; <u>https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CDP-2019-0183</u>

# The UK Climate Change Committee's Infographic on the UK and CC



Source: <u>https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/</u>



#### Figure 1.

A timeline of notable dates in preparing the IPCC Special Report on Global Warming of 1.5°C (blue) embedded within processes and milestones of the United Nations Framework Convention on Climate Change (UNFCCC; grey), including discussion of temperature limits. Source: <u>https://report.ipcc.ch/sr15/pdf/sr15\_faq.pdf</u>







#### Figure 3

More than 90% of global heating goes into heating the oceans, while less than 3% goes into heating the atmosphere. This means ice-melt at the poles is now certain to unfold for centuries to come.



#### Figure 4.

Large quantities of carbon are locked into permafrost and at risk of release through positivefeedback mechanisms as the Arctic warms.



#### Figure 5.

Land temperatures are increasing much faster than sea temperatures because of thermodynamics.

Annual (thin lines) and five-year LOWESS smooth (thick lines) for the temperature anomalies averaged over the Earth's land area and sea surface temperature anomalies. Credit: NASA



#### Figure 6.

Without quick and radical changes to global CO2 emissions the world is locked into substantial warming.

CUMULATIVE GLOBAL FOSSIL FUEL CONSUMPTION, 1751 - 2018. Percent of cumulative total as of 2018. SOURCE: CDIAC through 2014 and BP World Energy report if changes since 2014. https://cdiac.ess-dive.ibl.gov/fip/ndp030/global.1751\_2014.ems. CHART by Berry Saxitrage at VisualCarbon org and NationalObserver.com. July 2019.



#### Figure 7

Shifting the mean in a warming direction explains the preponderance of heat records and absence of record cold temperatures set in recent decades.



#### Figure 8.

IPCC projected outcomes for climate impact at 1.5 and 2 degrees Celsius warming, respectively. Note, however, that these projections are on Earth System models that ranged around a consensus warming of 3 degrees by 2100 and that the latest generation of (more complex and integrated) climate models are projecting a business-as-usual consensus of closer to **5** degrees Celsius of heating by 2100.



#### Figure 9

Arctic Sea Ice by volume from 1979 to July 2019, showing that September is the lowest individual month by volume annually. The previous cumulative annual sea ice low was 2012 but 2019 is already on track to be at least the second lowest in recorded history.



#### Figure 10

Shifts in the distribution of temperature, rainfall, drought or other weather events aren't necessarily symmetrical, uniform, or identical across the globe.

But we do know that the climatic future will not be like either the recent past or present.



#### Figure 11

NB. The vertical axis shows *annual* emissions beginning in 1751, not total (cumulative) emissions since 1751. This chart illustrates the compounding effects of the world's current dependence on fossil fuel for its energy needs.



If warming is limited to well below 2C the global average lifetime carbon budget for someone born in 2017 is 122 tonnes of CO2, only about a third as large as the budget for someone born in 1950. If warming is to be limited to 1.5C, the remaining budget is only 43 tonnes of CO2 and the difference is eight times as large. Current per-capita global emissions are around 4.9 tonnes per person per year. This means that the lifetime carbon budget of someone born today is equal to 25 years of current emissions if warming is limited to well below 2C - and <u>only 9 years of current emissions</u> if warming is limited to 1.5C.

 $\label{eq:source_carbon} Source Carbon Brief \\ \underline{https://www.carbonbrief.org/analysis-why-children-must-emit-eight-times-less-co2-than-their-grandparents?utm_source=TwitterVid&utm_campaign=Intergenerational09042019$ 

# Appendix 1: Background to IPCC Process and Methodology

Although the scientific realisation that CO<sub>2</sub> is a 'greenhouse' gas can be traced back some two hundred years,<sup>60</sup> co-ordinated political response to the implications of human-induced climate change began in 1988 with the founding of the Intergovernmental Panel on Climate Change (IPCC).<sup>61</sup> Subsequent milestones are shown at fig 1. The main Assessment Reports (AR) are published every 7 years. AR5, the latest, was published in 2013/14,<sup>62</sup> with AR6 due in 2021/22.<sup>63</sup> The IPCC also publishes interim reports such as 2018's Special Report on 1.5 degrees<sup>64</sup> and 2019's special report on Climate Change and Land.<sup>65</sup> Another special report, on Oceans and the Cryosphere, will be published this month (*Sep*).<sup>66</sup>

The combined IPCC assessment depends upon predicting future emissions as well as identifying the physical/climate interactions that may result. To achieve this, IPCC projections combine the analysis of three working groups (WGs). WG I examines the physical science underpinning past, present, and future climate change by constructing and evaluating ensembles of climate (Earth System) models.<sup>67</sup> WG II assesses impacts, adaptation and vulnerabilities related to climate change, and WG III assesses mitigations for the rate of climate change (CC). Representation Concentration Pathways (RCPs) were developed to predict the climate effects of total greenhouse gases (GHGs) resulting from a range of defined economic pathways during AR5.68 Future global scenarios need, however, to include both quantitative and qualitative assessments of potential challenges to mitigation and adaptation and the flexibly to accommodate regional and local studies of adaptation and vulnerability. These more complex scenarios are designated Shared Socioeconomic reference Pathways (SSPs).69 The latest IPCC methodology combines RCP and SSP data with Earth System models to provide Integrated Assessment Models (IAMs). A simplified diagram illustrating the IPCC-IAM methodology is shown at Appendix 2 together with the range of outputs generated by this approach.

<sup>&</sup>lt;sup>60</sup> BBC scientific/political Timeline History of Climate Change up to 2013. <u>https://www.bbc.co.uk/news/science-environment-15874560</u>

<sup>&</sup>lt;sup>61</sup> United Nations Framework on Climate Control (UNFCC) <u>https://unfccc.int/process-and-meetings/the-</u> convention/what-is-the-united-nations-framework-convention-on-climate-change

<sup>62</sup> https://www.ipcc.ch/report/ar5/syr/

<sup>63</sup> IPCC AR6 process and timeline https://www.ipcc.ch/report/sixth-assessment-report-cycle/

<sup>&</sup>lt;sup>64</sup> 2018 IPCC Special Report (SR) on 1.5 Degrees <u>https://www.ipcc.ch/sr15/;</u> A shorter distillation can be found at <u>https://www.carbonbrief.org/in-depth-qa-ipccs-special-report-on-climate-change-at-one-point-five</u> <u>c?utm\_content=buffer7c236&utm\_medium=social&utm\_source=twitter.com&utm\_campaign=buffer</u>

<sup>&</sup>lt;sup>65</sup> 2019 IPCC SR on Climate Change and Land <u>https://www.ipcc.ch/report/srccl/</u>

<sup>&</sup>lt;sup>66</sup> 2019 IPCC SR on Climate Change and Ocean: Report due Autumn 2019.

<sup>&</sup>lt;sup>67</sup> For fuller explanation of IPCC modelling see <u>https://wg1.ipcc.ch/publications/wg1-ar4/ar4-wg1-chapter8.pdf</u> Summary explanations of key terms are provided at <u>https://www.ipcc-data.org/guidelines/pages/glossary/</u>

<sup>&</sup>lt;sup>68</sup> For a good introduction to RCPs see <u>https://skepticalscience.com/rcp.php</u>. For a fuller overview see <u>https://link.springer.com/content/pdf/10.1007%2Fs10584-011-0148-z.pdf</u>. RCPs only predict CC until the year 2100. Extended Concentration Pathways (ECPs) project beyond 2100.

<sup>&</sup>lt;sup>69</sup> Carbon Brief provide a good explanation of SSPs at <u>https://www.carbonbrief.org/explainer-how-shared-socioeconomic-pathways-explore-future-climate-change</u>.

For a short video animating differing GHG/temperature trajectories based on alternate SSPs see, <a href="https://www.instagram.com/p/Bhv-">https://www.instagram.com/p/Bhv-</a>

iJtBX9\_/?utm\_source=ig\_embed&utm\_campaign=embed\_video\_watch\_again









A plausible representation of the future development of emissions of substances that are potentially radiatively active (e.g., greenhouse gases, aerosols), based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socioeconomic development, technological change, energy and land use) and their key relationships. Concentration scenarios, derived from emission scenarios, are used as input to a climate model to compute climate projections. Source IPCC.

## **Representative Concentration Pathways used in AR5**

**RCP2.6** One pathway where radiative forcing peaks at approximately 3 W m<sup>-2</sup> before 2100 and then declines (the corresponding ECP assuming constant emissions after 2100);

**RCP4.5** and **RCP6.0** Two intermediate stabilisation pathways in which radiative forcing is stabilised at approximately 4.5 W m<sup>-2</sup> and 6.0 W m<sup>-2</sup> after 2100 (the corresponding ECPs assuming constant concentrations after 2150);

**RCP8.5** One high pathway for which radiative forcing reaches greater than 8.5 W m<sup>-2</sup> by 2100 and continues to rise for some amount of time (the corresponding ECP assuming constant emissions after 2100 and constant concentrations after 2250).

RCP 8.5 was developed using the MESSAGE model and the IIASA Integrated Assessment Framework by the International Institute for Applied Systems Analysis (IIASA), Austria. This RCP is characterized by increasing greenhouse gas emissions over time, representative of scenarios in the literature that lead to high greenhouse gas concentration levels (Riahi et al. 2007).

**RCP6** was developed by the AIM modelling team at the National Institute for Environmental Studies (NIES) in Japan. It is a stabilization scenario in which total radiative forcing is stabilized shortly after 2100, without overshoot, by the application of a range of technologies and strategies for reducing greenhouse gas emissions (Fujino et al. 2006; Hijioka et al. 2008).

**RCP 4.5** was developed by the GCAM modelling team at the Pacific Northwest National Laboratory's Joint Global Change Research Institute (JGCRI) in the United States. It is a stabilization scenario in which total radiative forcing is stabilized shortly after 2100, without overshooting the long-run radiative forcing target level (Clarke et al. 2007; Smith and Wigley 2006; Wise et al. 2009).

**RCP2.6** was developed by the IMAGE modelling team of the PBL Netherlands Environmental Assessment Agency. The emission pathway is representative of scenarios in the literature that lead to very low greenhouse gas concentration levels. It is a "peak-and-decline" scenario; its radiative forcing level first reaches a value of around 3.1 W/m2 by mid-century and returns to 2.6 W/m2 by 2100. In order to reach such radiative forcing levels, greenhouse gas emissions (and indirectly emissions of air pollutants) are reduced substantially, over time (Van Vuuren et al. 2007a). (Characteristics quoted from van Vuuren et.al. 2011)

# Addendum: The Carbon Cycle(s)



# Why Tree and Vegetative CCS cannot *simply* substitute for Oil and Gas emissions

Because of the potentially rapid fluxes in biological carbon, relying on biological carbon emission reductions to offset fossil carbon carries real risks of reversibility, so that biological carbon stocks rapidly get released to the atmosphere. A recent study found that for every degree Celsius of warming, the Amazon and other tropical forests will release 53 ±17 billion tonnes of carbon. Intended Nationally-

Determined Contributions (NDCs) pledged into the UNFCCC so far, if implemented, would imply warming of a concerning 2.7°C. Further, another recent study has found that many forests won't be able to absorb as much CO2 as previously projected, as they'll have a shortage of another vital nutrient: nitrogen. The IPCC6 also noted "Carbon stored in terrestrial ecosystems is vulnerable to loss back to the atmosphere, resulting from increased fire frequency due to climate change and the sensitivity of ecosystem respiration to rising temperatures" Not burning fossil fuels is a permanent means of not increasing atmospheric loading of CO2.

Source <u>https://carbonmarketwatch.org/wp-content/uploads/2015/11/Fossil-and-biological-carbon-a-tonne-is-not-a-tonne\_final.pdf</u>