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### ***What climate science tells us (briefly):***

1. Between 1880 and 2012, **global mean surface temperature warmed 0.85°C**.<sup>1</sup>
2. **Our greenhouse gas (GHG) emissions rate is currently above<sup>2</sup> RCP 8.5**, the highest scenario of the 5<sup>th</sup> Assessment Report, placing us on track for **global mean surface temperature rise of up to 4.8°C** by 2100 compared to pre-industrial levels.<sup>3</sup>
3. **This rate of global temperature rise would be, to the best of scientific knowledge, unprecedented in our human history.** Warming between the last ice age and the current warm period, about 20,000 to 10,000 years ago, was approximately 0.5°C to 1°C rise in global mean surface temperature per 1,000 years.<sup>4</sup>
4. **The levels of carbon dioxide, methane, and nitrous oxide concentrations in Earth's atmosphere are unprecedented in (at least) the last 800,000 years.** CO<sub>2</sub> concentrations have increased by 40% since pre-industrial times.<sup>5</sup>
5. **Since 1951, human activities have been responsible for the majority of warming<sup>6</sup>.** These activities include fossil fuel energy production, forestry and land use, intensive and animal agriculture, industry, transport, and buildings.<sup>7</sup> These human activities, reflecting our lifestyles and behaviours, are the 'root causes' of anthropogenic climate change.
6. **Population growth and, more significantly, economic growth, are the most important drivers of increases in CO<sub>2</sub> emissions<sup>8</sup>.** Since 1970, emissions of CO<sub>2</sub> from fossil fuel combustion and industrial processes contributed to about 78% of the total GHG emission increase.<sup>9</sup>
7. **At current GHG emission levels, we have less than ten years to limit warming to under 1.5°C (with a 66% probability).**<sup>10</sup> A 1.5°C rather than 2°C temperature rise target could significantly influence the survival chances of the most vulnerable communities.<sup>11</sup>

<sup>1</sup> Intergovernmental Panel on Climate Change (IPCC) 5<sup>th</sup> Assessment Report, Working Group I, 'The Physical Science Basis', Summary for Policy Makers, page 3, [https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5\\_SPM\\_FINAL.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf)

<sup>2</sup> Glen P. Peters, Robbie M. Andrew, Tom Boden, Josep G. Canadell, Philippe Ciais, Corinne Le Quéré, Gregg Marland, Michael R. Raupach and Charlie Wilson (collaboration of the Global Carbon Project) in Nature Climate Change, online publication, 2 December 2012, p.2

<sup>3</sup> Intergovernmental Panel on Climate Change (IPCC) 5<sup>th</sup> Assessment Report, Working Group III Summary for Policy Makers, p.8 [http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc\\_wg3\\_ar5\\_summary-for-policymakers.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf)

<sup>4</sup> Jeremy Shakun, et al, *Global Warming Preceded by Increasing Carbon Dioxide Concentrations During the Last Deglaciation*, Nature, 5 April 2012, Volume 484, p. 49-55, and Shaun Marcott et al, *A Reconstruction of Regional and Global Temperature for the Past 11,300 Years*, Science Mag, 8 March 2013, Volume 339, p. 1198-1201.

<sup>5</sup> Intergovernmental Panel on Climate Change (IPCC) 5<sup>th</sup> Assessment Report, Working Group I, 'The Physical Science Basis', Summary for Policy Makers, page 11, [https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5\\_SPM\\_FINAL.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf)

<sup>6</sup> Climate Change 2014, The Synthesis Report, p.5 [http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full\\_wcover.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf)

<sup>7</sup> Ibid, p.88.

<sup>8</sup> Ibid, p.5

<sup>9</sup> Ibid, p.5

<sup>10</sup> Ibid, p.64

<sup>11</sup> <http://unfccc.int/resource/docs/2015/sb/eng/inf01.pdf>

8. **About half of the anthropogenic CO<sub>2</sub> emissions between 1750 and 2011 have occurred in the last 40 years.**<sup>12</sup>
9. The **oceans have absorbed more than 90% of the energy** accumulated between 1971 and 2010, and about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification which **compromises marine eco-systems.**<sup>13</sup>
10. **The Arctic is experiencing the fastest rate of warming.** This results not only in the melting of ice sheets, which raise sea levels, but also in the melting of permafrost, which releases both CO<sub>2</sub> and methane, leading to greater levels of warming.
11. Human activities resulting in climate change also contribute to the three other planetary boundaries which have been crossed: biodiversity (number of living species), biogeochemical flows (nitrogen in particular), and land use change.<sup>14</sup> **We are experiencing the highest species extinction rate in human history. The damage is inter-linked; action to reverse damage in one boundary can positively help others.**
12. **Current GHG emission levels, unless substantially reduced, will undermine our water resources and our ability to grow food and work outdoors,**<sup>15</sup> **threatening the collapse of eco-systems and thus the long term survival of our current human civilization.**
13. **We have a choice.** We still have time to ensure warming below 2°C in this century, if we commit up to 70% GHG emissions by 2050 (compared to 2010) and near zero or below by 2100.<sup>16</sup>
14. **Near zero anthropogenic GHG emission by 2050 is possible while being socially just and economically prosperous,** and includes replacing fossil fuels with renewable energies, reducing energy demand, adapting transport systems and changing land use to produce more plant based diets, and naturally carbon-sequestering landscapes.<sup>17</sup>
15. **Effective climate change responses can be a way to build a richer, more resilient, fundamentally more vibrant world.** Access to low-carbon energy can improve health and livelihoods, while also protecting the climate.<sup>18</sup>

*We call on our leaders to make the courageous decisions needed to create a fair, sufficient and effective international climate change agreement. The goal is achievable but priorities will need to change: currently, the majority of States commit more resources to warfare than to tackling climate change.*

*The choices we make now, personal and collective, can ensure that the poorest and most vulnerable peoples now, and all our future generations, do not suffer profoundly as a consequence of our actions. Our faith in common humanity gives us hope: love, rather than fear, can lead us through this crisis.*<sup>19</sup>

***This is a call to conscience.***

<sup>12</sup> Climate Change 2014, The Synthesis Report, p.4 [http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full\\_wcover.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf)

<sup>13</sup> Ibid. p.4.

<sup>14</sup> *The Nine Planetary Boundaries:* <http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries.html>

<sup>15</sup> Climate Change 2014, The Synthesis Report, p.15 [http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full\\_wcover.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf)

<sup>16</sup> Ibid. p 20

<sup>17</sup>For example, as outlined in *Whose Getting Ready for Zero?*, Centre for Alternative Technology and Track 0, <http://zerocarbonbritain.org/images/pdfs/wgrz-full-report.pdf>

<sup>18</sup> Katharine Mach, Director of Science, IPCC Working II Technical Support Unit.

<sup>19</sup> Britain Yearly Meeting, June 2009, <http://old.quaker.org.uk/quaker-response-crisis-climate-change> and the [Quaker Statement on Climate Change](#), 2014 <http://quno.org/resource/2015/11/quaker-statement-climate-change>