Global Calculator climate science – Climate KIC sub committee meeting 1st May 2014

Attendees

Sophie Hartfield (DECC)	Phil Williamson (NERC/UEA)
David Mackay (DECC)	Nigel Arnell (Reading University)
Jeremy Woods (Imperial College)	Lucy Hayes (DECC)
Erica Thompson (LSE)	Lenny Smith (LSE) – joined by Skype
Jason Lowe (Met Office)	

Non-CO2 emissions

Currently, only the CO2 emissions generated by the user's choice of pathway have an impact on the temperature calculation. The group discussed possible methodologies for incorporating the impact of non-CO2 emissions into the temperature calculation. The rationale for doing so is to allow the user to see a change when different levers are changed (eg non-CO2 land use emissions), not to get a "better" answer, since any method will involve approximation. Erica and Jason together identified four possible methodologies, one of which was the preferred approach.

Action: Erica to write a note setting out these four methodologies, which one they prefer, and the reasons for this. The paper should also summarise why we rejected alternative approaches. This would be for discussion at the next Climate-KIC Project Committee meeting in June.

Action: Erica to include an approximate estimate for SO2 emissions into the spreadsheet, which would enable her to implement the non-CO2 temperature calculation (by mid May).

The group concluded that it would not be possible to come up with an estimate of the cumulative CO2e associated with a 50:50 chance of 2C. This would not be robust from a climate science perspective, because of the different behaviours of short- and long-lived forcings. So the tool would continue to use the cumulative CO2-only emissions figure of 3010 GtCO2 associated with a 50:50 chance of 2C (based on IPCC analysis).

Temperature change in excess of 5C

Currently, if the user generates a pathway with emissions in excess of around 9000 GtCO2 cumulative emissions, then the thermometer shows temperature change as unknown (i.e. no estimates given). This is because the temperature calculation is based on IPCC figure SPM-10, which only goes out to 9000 GtCO2 and 5C temperature change. The group agreed that it would be better to give the user some (albeit speculative) information about temperature increases beyond 9000 GtCO2 to better communicate to users the adverse climate impacts. This could be done by simply

extrapolating the IPCC figure SPM-10 graph outwards. This calculation would be very crude, so we would need to accompany it with a warning message for the user alerting them of this.

Action: Erica to implement this extrapolation of the temperature calculation as described above. This edit would be implemented after July.

Methodology for production of temperature and precipitation maps

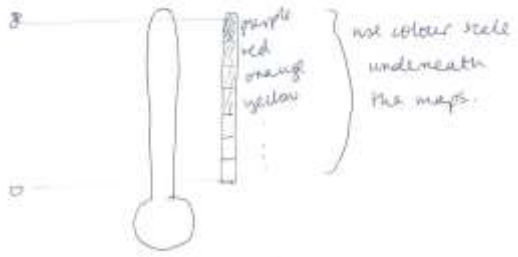
The group were happy with Erica's methodology, as set out in her paper.

Action: Climate-KIC partners to let Erica know if they have any comments on her paper.

Presentation of climate science and impacts in web tool

Precipitation maps: user should have functionality to select whether they view results in mm or % change. This edit will need to wait until after July.

Temperature maps: the group discussed including the colour code for different temperatures within or alongside the thermometer, see below:



Also to move the "whiskers" from the left hand side of the thermometer to the right.

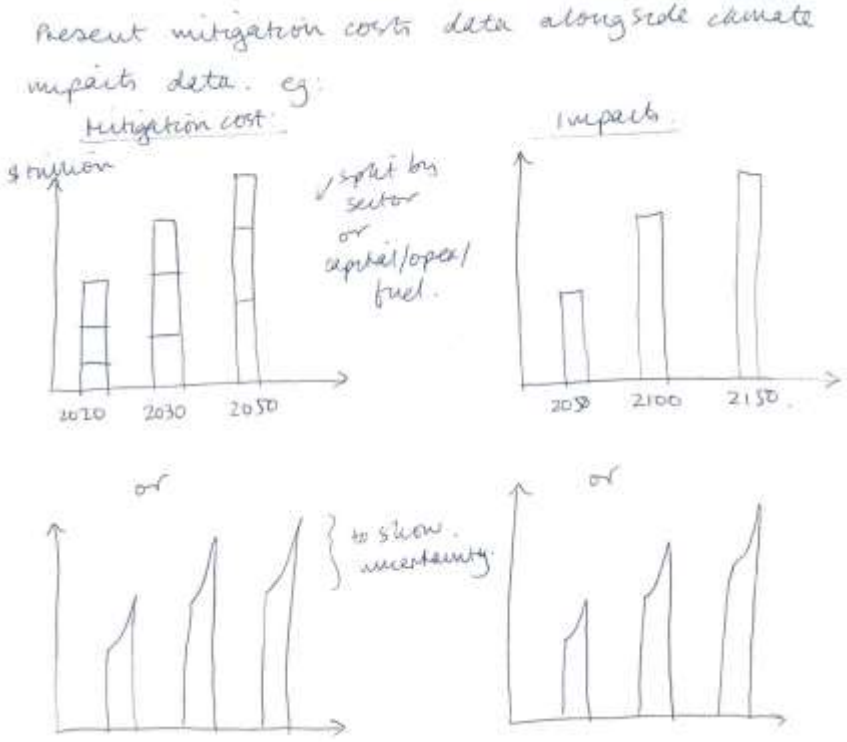
Ocean acidification

The group was concerned with our ability to confidently calculate ocean pH using cumulative emissions data only. **Action**: Jason, Erica, Phil and Lucy to meet and discuss in more detail.

The science provides more certainty on ocean acidification than temperature changes, so the group agreed that we should try to express these impacts in as tangible a way as possible. This would make the analysis more impactful for users. For example, a "burning embers" style of diagram for ocean acidification impacts, showing the impact on corals, shell fish, etc. Crucially, when the user adjusts levers, they should see a change in the ocean acidification graphic. **Action**: Phil to reflect further on this.

Prioritising next steps

David Mackay set out his desire to see the climate mitigation costs presented alongside some climate impacts graphs, in the December re-release of the tool. For example, see below sketch.



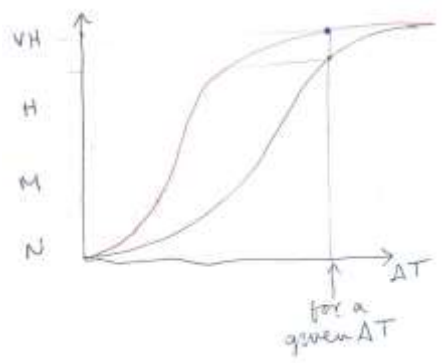
The objectives of this would be to:

- Make the science as impactful and persuasive as possible by illustrating to users some of the potential impacts of climate change on things they might care about (e.g. crop yields, droughts, etc)
- Allow the user to see the difference between, say, a 1.7 and 2.2C world. This would help the user understand that the debate is not just between 2C and 6C. Also it should help them understand the impact that their lever choices could have at the margin.
- Contextualise mitigation costs relative to climate impacts. Users sometimes dwell on mitigation costs in isolation of climate impact costs. We should find a way of helping them perceive both sets of information.

The group discussed different ways we could show climate impacts, for example:

- Nigel Arnell's work
- Burning embers diagram in IPCC
- Results from the PAGE model expressed in terms of $'s (as quoted in Stern Review).

The group had mixed views on "burning embers" types of diagram. These are calculated from graphics such as shown below. The advantage of them is that users may find them quite easy to understand; the disadvantage is that they are quite generalised and there is a subjective judgement in what should be called neutral, moderate, high or very high impact.



Action: Erica and Nigel to work on an options paper, setting out different ideas for how we could present impacts information in the December version of the Calculator.

Next meeting

The Climate-KIC Project Committee should meet again in June to:

- to discuss and agree any final small changes to presentation of results in the web tool
- agree the key messages we should highlight
- discuss our strategy for ensuring we get some good feedback during the Call for Evidence.

Action: Sophie to set up this meeting.