SUPPLEMENTARY INFORMATION

# Impact of short-lived non-$CO_2$ mitigation on carbon budgets for stabilizing global warming

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Supplementary Table 1: Carbon budgets between 2011 and 2100 in line with limiting warming to specific temperature limits with a particular probability level during the 21st century (rounded to the nearest 5 PgC). Note that all cases are not equally plausible across the various temperature levels (see Discussion section in main text). These absolute emissions are underlying the relative changes in Table 2 in the main manuscript. All values are in PgC (= GtC). Corresponding values in $GtCO_2$ are obtained by multiplying the reported values by a factor of 3.66. Note that only for the 1.5°C and 2°C temperature limits the results reflect peak warming budgets. For both the 3°C and 4°C limit, $CO_2$ emissions are not at or below zero by 2100 and temperatures thus not yet stabilized. In the latter case, the budgets are affected by transient warming in 2100 rather than peak warming during the 21st century.

| **Carbon budgets between 2011-2100** | | | | |
|---|---|---|---|---|
| **Temperature (T) limit relative to preindustrial levels** | **1.5°C** | **2°C** | **3°C** | **4°C** |
| ***50% chance of staying below T limit in 2100*** | | | | |
| Reference case | 130 | 460 | 1005 | 1510 |
| No $CH_4$ mitigation | *ND* | 310 | 855 | 1450 |
| Stringent $CH_4$ mitigation | 230 | 560 | 1200 | 1920 |
| Delayed stringent $CH_4$ mitigation | 200 | 525 | 1160 | 1865 |
| BC measures | 135 | 470 | 1010 | 1515 |
| Frozen BC baseline | 145 | 445 | 940 | 1380 |
| No energy access policies | 105 | 435 | 980 | 1475 |
| $SO_2$ measures | 135 | 455 | 980 | 1470 |
| Frozen $SO_2$ and $NO_x$ baseline | *ND* | 505 | 1175 | 1915 |
| Updated HFC projections | *ND* | 265 to 370 | 840 to 930 | 1325 to 1420 |
| ***66% chance of staying below T limit in 2100*** | | | | |
| Reference case | *ND* | 340 | 870 | 1325 |
| No $CH_4$ mitigation | *ND* | 205 | 700 | 1230 |
| Stringent $CH_4$ mitigation | 135 | 435 | 1020 | 1640 |
| Delayed stringent $CH_4$ mitigation | *ND* | 405 | 980 | 1590 |
| BC measures | *ND* | 350 | 875 | 1330 |
| Frozen BC baseline | *ND* | 335 | 815 | 1220 |
| No energy access policies | *ND* | 325 | 850 | 1305 |
| $SO_2$ measures | *ND* | 340 | 845 | 1285 |
| Frozen $SO_2$ and $NO_x$ baseline | *ND* | 360 | 1010 | 1615 |
| Updated HFC projections | *ND* | 135 to 245 | 690 to 785 | 1145 to 1240 |
| ***75% chance of staying below T limit in 2100*** | | | | |
| Reference case | *ND* | 260 | 780 | 1210 |
| No $CH_4$ mitigation | *ND* | 130 | 610 | 1090 |
| Stringent $CH_4$ mitigation | *ND* | 355 | 910 | 1480 |
| Delayed stringent $CH_4$ mitigation | *ND* | 320 | 870 | 1435 |
| BC measures | *ND* | 265 | 785 | 1215 |
| Frozen BC baseline | *ND* | 260 | 735 | 1125 |
| No energy access policies | *ND* | 250 | 770 | 1200 |
| $SO_2$ measures | *ND* | 260 | 760 | 1175 |
| Frozen $SO_2$ and $NO_x$ baseline | *ND* | 250 | 900 | 1470 |
| Updated HFC projections | *ND* | *ND* to 160 | 595 to 695 | 1035 to 1130 |
| **COMPARISON** | | | | |
| **IPCC AR5 WGIII Table SPM.1** | | | | |
| **(Summary for Policymakers and Chapter 6 in IPCC, 2014)** | | | | |
| 'likely' (>66%) probability | *ND* | 170 to 320 | 170 to 665 | 170 to 1360 |
| 'more likely than not' (>50%) probability | *ND* | 260 to 390 | 700 to 910 | *ND* |
| 'about as likely as not' (33-66%) probability | *ND* | 270 to 420 | *ND* | *ND* |

*ND*: no data