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Supplement of

Flexible parameter-sparse global temperature time profiles that stabilise at 1.5 and 2.0 °C

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Table S1 provides the fitting of parameters in our analytical curves to simulations presented in the IPCC scenario database (<https://tntcat.iiasa.ac.at/AR5DB/>) and for the marker scenarios in the Shared Socioeconomic Pathways (SSP) database (<https://tntcat.iiasa.ac.at/SspDb/>). Both websites accessed during May 2017. The constraint placed on selecting any particular simulation for fitting our curves against is that: (i) projected temperatures do not exceed three degrees above pre-industrial temperature levels and (ii) that there is evidence of transition to temperature stabilisation. The latter is by only considering temperature profiles where the absolute difference between warming level in year 2090 and 2100 is less than 0.1°C.

For each warming profile and in both databases, temperature projections are supplied for year 2005, 2010 and then each decade until 2090, 2100. Warming in year 2015, ΔT_0 , is calculated as the mean of temperature in 2010 and 2020. Contemporary warming gradient, β ($^{\circ}\text{C yr}^{-1}$) is then calculated based on the difference between ΔT_0 and temperature in year 2005. The fitting of three parameters for the curves to future time periods i.e. μ_0 (yr^{-1}), μ_1 (yr^{-2}) and ΔT_{lim} ($^{\circ}\text{C}$) are against nine temperature values, decadal 2020 to 2100 inclusive. With just nine values to constrain three parameters, we additionally provide bounds on parameters to avoid potentially unrealistic future projections beyond year 2100. Specifically we set $-0.02 \leq \mu_0 \leq 0.08$ (yr^{-1}), $0.0 \leq \mu_1 \leq 0.0008$ (yr^{-2}) and $0.0 \leq \Delta T_{\text{lim}} \leq 4.0$ ($^{\circ}\text{C}$). Optimisation is performed simply, by finding the three parameters with lowest RSME between associated curve and the nine data points for each scenario. Each parameter is sampled by 100 equal intervals, in three nested loops. Hence even smaller RMSE values might be found, by initialising optimisation software with starting values in Table S1 below. This would help avoid the risk of finding only local minima if using arbitrary initial conditions in optimisation packages.

By fitting three parameters to just nine data points, in some instances a range of parameters can have similar RMSE. This could lead to divergent curve shapes beyond year 2100.

Table S1: Fitted curve parameters for all scenarios in the IPCC database, and for marker scenarios in the Shared Socioeconomic Pathways (SSP) database. Presented is modelling centre group name, the scenario name, fitted initial conditions β and ΔT_0 , and the three fitted parameter for the curves μ_0 , μ_1 and ΔT_{lim} . Final column is RMSE for the parameter set μ_0 , μ_1 and ΔT_{lim} shown.

Group Name	Scenario Name	β ($^{\circ}\text{C yr}^{-1}$)	ΔT_0 ($^{\circ}\text{C}$)	μ_0 (yr^{-1})	μ_1 (yr^{-2})	ΔT_{lim} ($^{\circ}\text{C}$)	RMSE
GCAM 2.0	AME 2.6 W/m2 OS	0.0214	1.02	0.003	0.000728	1.8	0.0189
GCAM 2.0	AME 3.7 W/m2 NTE	0.0211	1.017	0.051	0	2.32	0.0212
GCAM 2.0	AME CO2 price \$10 (5% p.a.)	0.0209	1.015	0.004	0.000368	2.36	0.0158
GCAM 2.0	AME CO2 price \$30 (5% p.a.)	0.0214	1.0205	0.002	0.000752	1.76	0.0204
GCAM 2.0	AME CO2 price \$50 (5% p.a.)	0.0221	1.0275	0.001	0.000584	1.48	0.0282
GCAM 3.0	AMPERE2-450-Conv-HST	0.0183	0.9935	0.07	0.000072	2.16	0.0167
GCAM 3.0	AMPERE2-450-Conv-LST	0.0187	0.9975	0.064	0	2.2	0.014
GCAM 3.0	AMPERE2-450-Conv-OPT	0.0193	1.0035	0.059	0	2.2	0.011
GCAM 3.0	AMPERE2-450-EERE-HST	0.0185	0.9945	0.053	0.00064	2.12	0.0133
GCAM 3.0	AMPERE2-450-EERE-LST	0.0188	0.9985	0.059	0.0004	2.12	0.0089
GCAM 3.0	AMPERE2-450-EERE-OPT	0.0194	1.0045	0.058	0.000208	2.12	0.0079
GCAM 3.0	AMPERE2-450-LimBio-HST	0.0185	0.9945	0.072	0.000024	2.16	0.0149
GCAM 3.0	AMPERE2-450-LimBio-LST	0.0188	0.9985	0.068	0.000008	2.16	0.012
GCAM 3.0	AMPERE2-450-LimBio-OPT	0.0194	1.004	0.059	0	2.2	0.0118
GCAM 3.0	AMPERE2-450-NoCCS-HST	0.0185	0.9945	0.062	0.000432	2.12	0.0149
GCAM 3.0	AMPERE2-450-NoCCS-LST	0.0188	0.9985	0.065	0.000248	2.12	0.009
GCAM 3.0	AMPERE2-450-NoCCS-OPT	0.0195	1.005	0.058	0.000272	2.12	0.0068
GCAM 3.0	AMPERE2-550-Conv-OPT	0.0187	0.9975	0.043	0.00012	2.68	0.0027

GCAM 3.0	AMPERE2-550-EERE-OPT	0.0187	0.9975	-0.001	0.00036	2.56	0.0067
GCAM 3.0	AMPERE2-550-FullTech-HST	0.0185	0.9945	-0.014	0.000272	1.84	0.0129
GCAM 3.0	AMPERE2-550-FullTech-LST	0.0188	0.9985	-0.014	0.00024	1.64	0.0147
GCAM 3.0	AMPERE2-550-FullTech-OPT	0.0186	0.9955	-0.014	0.000264	1.8	0.0108
GCAM 3.0	AMPERE2-550-LimBio-OPT	0.0188	0.998	0.044	0.000104	2.68	0.004
GCAM 3.0	AMPERE2-550-LimSW-OPT	0.0184	0.9945	-0.013	0.000272	1.96	0.011
GCAM 3.0	AMPERE2-550-LowEI-OPT	0.0186	0.9955	-0.011	0.000248	2	0.0102
GCAM 3.0	AMPERE2-550-NoCCS-OPT	0.0188	0.9985	0	0.00044	2.56	0.0056
GCAM 3.0	AMPERE2-550-NucOff-OPT	0.0186	0.9955	-0.015	0.000264	1.72	0.0102
GCAM 3.0	AMPERE3-550	0.0185	1.0115	-0.014	0.000272	1.88	0.0113
GCAM 3.0	AMPERE3-CF550	0.0186	0.994	-0.013	0.000272	1.96	0.0102
GCAM 3.0	EMF27-450-Conv	0.0167	0.9775	0.009	0.000008	0.4	0.0076
GCAM 3.0	EMF27-450-EERE	0.0168	0.9785	0.005	0.000032	0.16	0.018
GCAM 3.0	EMF27-450-FullTech	0.0162	0.972	-0.008	0.000168	0.72	0.0098
GCAM 3.0	EMF27-450-LimBio	0.0166	0.9765	0.009	0.000032	0.92	0.0065
GCAM 3.0	EMF27-450-NoCCS	0.017	0.98	0.006	0.000024	0.12	0.0136
GCAM 3.0	EMF27-550-Conv	0.0161	0.9715	0.026	0.000208	1.92	0.014
GCAM 3.0	EMF27-550-EERE	0.0163	0.9735	-0.001	0.000064	0.88	0.0148
GCAM 3.0	EMF27-550-FullTech	0.0162	0.9725	0.031	0.000184	1.92	0.0122
GCAM 3.0	EMF27-550-LimBio	0.0162	0.9725	0.03	0.000192	1.92	0.0137
GCAM 3.0	EMF27-550-LimSW	0.0161	0.9715	0.028	0.0002	1.92	0.0124
GCAM 3.0	EMF27-550-LowEI	0.0164	0.974	0.007	0.000216	1.92	0.0113
GCAM 3.0	EMF27-550-NoCCS	0.0163	0.9735	0.004	0.000112	1.76	0.013
GCAM 3.0	EMF27-550-NucOff	0.0162	0.9725	0.02	0.00024	1.92	0.0125
GCAM 3.0	EMF27-G8-FullTech	0.0185	0.9945	0.056	0.000024	2.16	0.012
GCAM 3.0	ROSE 450 DEF	0.0223	1.0335	0.001	0.000688	2.04	0.0106
GCAM 3.0	ROSE 450 FS Gr	0.0227	1.038	0.048	0.000752	2.04	0.0107
GCAM 3.0	ROSE 450 HI Coal	0.0221	1.0325	0.002	0.000736	2.04	0.0092
GCAM 3.0	ROSE 450 HI Fos	0.022	1.031	0.002	0.000696	2.04	0.0095
GCAM 3.0	ROSE 450 HI Gas	0.0223	1.0335	0.002	0.000728	2.04	0.0105
GCAM 3.0	ROSE 450 HI Pop	0.0221	1.0315	0.077	0	2	0.0121
GCAM 3.0	ROSE 450 LO Fos	0.0227	1.0375	0.002	0.000664	2.04	0.0081
GCAM 3.0	ROSE 450 LO Oil	0.0221	1.0325	0.002	0.000728	2.04	0.0092
GCAM 3.0	ROSE 450 SL Gr	0.0219	1.0295	-0.001	0.000672	2.04	0.0092
GCAM 3.0	ROSE 550 DEF	0.0219	1.0295	0.058	0	2.44	0.0177
GCAM 3.0	ROSE 550 FS Gr	0.0221	1.0315	0.059	0	2.44	0.0156
GCAM 3.0	ROSE 550 HI Coal	0.0218	1.0275	0.057	0	2.44	0.0195
GCAM 3.0	ROSE 550 HI Fos	0.0216	1.026	0.057	0	2.44	0.018
GCAM 3.0	ROSE 550 HI Gas	0.0219	1.0295	0.058	0	2.44	0.0177
GCAM 3.0	ROSE 550 HI Pop	0.021	1.02	0.054	0	2.44	0.0231
GCAM 3.0	ROSE 550 LO Fos	0.0222	1.033	0.057	0	2.44	0.0183
GCAM 3.0	ROSE 550 LO Oil	0.0218	1.0275	0.057	0	2.44	0.0192
GCAM 3.0	ROSE 550 SL Gr	0.0217	1.027	0.056	0	2.44	0.0213
GCAM 3.0	ROSE WEAK-2020 DEF	0.021	1.02	0.056	0.000752	2.08	0.0135
GCAM 3.0	ROSE WEAK-2030 DEF	0.0209	1.0195	-0.004	0.0008	2.04	0.0207
GCAM 3.1	LIMITS-450	0.0182	0.9925	-0.005	0.000112	0.16	0.0118
GCAM 3.1	LIMITS-500	0.018	0.99	-0.015	0.000152	0.16	0.0117
GCAM 3.1	LIMITS-RefPol-450	0.0177	0.9865	-0.005	0.000448	1.52	0.0282
GCAM 3.1	LIMITS-RefPol-450-EE	0.0177	0.9865	-0.005	0.000448	1.52	0.0282

GCAM 3.1	LIMITS-RefPol-450-PC	0.0177	0.9865	-0.005	0.000448	1.52	0.0282
GCAM 3.1	LIMITS-RefPol-500	0.0177	0.9865	-0.003	0.00044	1.72	0.0247
GCAM 3.1	LIMITS-RefPol2030-500	0.0177	0.986	-0.007	0.000632	1.8	0.0236
GCAM 3.1	LIMITS-StrPol-450	0.0177	0.9875	-0.003	0.000368	1.48	0.0222
GCAM 3.1	LIMITS-StrPol-500	0.0177	0.9875	-0.003	0.000312	1.6	0.0189
IMAGE 2.4	AME 2.6 W/m2 OS	0.0142	0.9515	-0.007	0.00056	1.48	0.013
IMAGE 2.4	AME 3.7 W/m2 NTE	0.0139	0.948	0.035	0.000208	2.16	0.0101
IMAGE 2.4	AME CO2 price \$10 (5% p.a.)	0.0141	0.9505	0.032	0.000232	2.24	0.0099
IMAGE 2.4	AME CO2 price \$30 (5% p.a.)	0.0146	0.9555	0.064	0.000056	1.84	0.006
IMAGE 2.4	AME CO2 price \$50 (5% p.a.)	0.0148	0.957	0.059	0.000368	1.72	0.0046
IMAGE 2.4	AMPERE2-450-FullTech-OPT	0.0161	0.97	-0.003	0.000656	1.72	0.0173
IMAGE 2.4	AMPERE2-450-LimSW-OPT	0.0161	0.97	-0.004	0.000632	1.72	0.0179
IMAGE 2.4	AMPERE2-450-LowEI-HST	0.0159	0.968	-0.01	0.00064	1.72	0.0177
IMAGE 2.4	AMPERE2-450-LowEI-LST	0.0159	0.968	-0.009	0.00064	1.72	0.0154
IMAGE 2.4	AMPERE2-450-LowEI-OPT	0.0162	0.9715	-0.006	0.00056	1.72	0.0147
IMAGE 2.4	AMPERE2-450-NucOff-OPT	0.016	0.9695	0	0.0008	1.72	0.0139
IMAGE 2.4	AMPERE2-550-FullTech-HST	0.0154	0.963	0	0.000552	2.24	0.0131
IMAGE 2.4	AMPERE2-550-FullTech-LST	0.0158	0.9675	0.047	0.00012	2.28	0.0086
IMAGE 2.4	AMPERE2-550-FullTech-OPT	0.0155	0.964	0.043	0.000248	2.28	0.0088
IMAGE 2.4	AMPERE3-450	0.0162	1.0315	-0.002	0.000744	1.8	0.0167
IMAGE 2.4	AMPERE3-450P-CE	0.016	0.9485	-0.004	0.000616	1.96	0.0152
IMAGE 2.4	AMPERE3-450P-EU	0.0158	0.96	-0.006	0.000568	2.08	0.0153
IMAGE 2.4	AMPERE3-550	0.016	0.923	0.044	0.0002	2.24	0.0135
IMAGE 2.4	AMPERE3-CF450	0.0161	0.953	-0.001	0.000752	1.72	0.0179
IMAGE 2.4	AMPERE3-CF550	0.0156	1.004	0.044	0.000232	2.32	0.009
IMAGE 2.4	EMF27-450-FullTech	0.0166	0.9755	-0.005	0.000608	1.64	0.0172
IMAGE 2.4	EMF27-450-LimSW	0.0166	0.9755	-0.004	0.000664	1.68	0.0169
IMAGE 2.4	EMF27-450-LowEI	0.0168	0.977	-0.004	0.000624	1.72	0.018
IMAGE 2.4	EMF27-450-NucOff	0.0166	0.9755	-0.003	0.000712	1.64	0.0167
IMAGE 2.4	EMF27-550-Conv	0.0162	0.971	0.054	0	2.2	0.0106
IMAGE 2.4	EMF27-550-EERE	0.0167	0.976	0.054	0	2.2	0.0129
IMAGE 2.4	EMF27-550-FullTech	0.0163	0.972	0.058	0	2.2	0.0077
IMAGE 2.4	EMF27-550-LimBio	0.0162	0.9715	0.053	0	2.2	0.0123
IMAGE 2.4	EMF27-550-LimSW	0.0162	0.971	0.057	0.000008	2.2	0.0078
IMAGE 2.4	EMF27-550-LowEI	0.0167	0.976	0.057	0	2.16	0.0117
IMAGE 2.4	EMF27-550-NoCCS	0.0166	0.9755	0.053	0	2.16	0.0164
IMAGE 2.4	EMF27-550-NucOff	0.0162	0.971	0.059	0	2.16	0.0112
IMAGE 2.4	EMF27-G8-FullTech	0.0164	0.9735	0.079	0	1.8	0.0094
IMAGE 2.4	LIMITS-450	0.0161	0.9705	-0.003	0.00064	1.72	0.0188
IMAGE 2.4	LIMITS-500	0.0158	0.9675	-0.006	0.00044	1.96	0.0153
IMAGE 2.4	LIMITS-RefPol-450	0.0162	0.9715	-0.004	0.0008	1.76	0.0218
IMAGE 2.4	LIMITS-RefPol-450-EE	0.0162	0.9715	-0.005	0.000784	1.76	0.0216
IMAGE 2.4	LIMITS-RefPol-450-PC	0.0162	0.9715	-0.004	0.0008	1.76	0.0218
IMAGE 2.4	LIMITS-RefPol-500	0.0162	0.9715	0.039	0.000608	2.04	0.0154
IMAGE 2.4	LIMITS-RefPol2030-500	0.0162	0.971	-0.007	0.000504	1.96	0.0103
IMAGE 2.4	LIMITS-StrPol-450	0.0162	0.971	-0.004	0.000632	1.76	0.0183
IMAGE 2.4	LIMITS-StrPol-500	0.0162	0.9715	0.035	0.000552	2.04	0.0164
MERGE-ETL_2011	AMPERE2-450-Conv-OPT	0.0149	0.9965	-0.019	0.000128	0.16	0.01

MERGE-ETL_2011	AMPERE2-450-EERE-OPT	0.0151	0.946	-0.003	0.000096	0.56	0.0076
MERGE-ETL_2011	AMPERE2-450-FullTech-HST	0.0167	0.9195	-0.008	0.000552	1.56	0.0115
MERGE-ETL_2011	AMPERE2-450-FullTech-LST	0.0162	0.934	-0.007	0.000368	1.48	0.0071
MERGE-ETL_2011	AMPERE2-450-FullTech-OPT	0.0159	0.9785	-0.008	0.000248	1.24	0.0051
MERGE-ETL_2011	AMPERE2-450-LimBio-OPT	0.0154	0.926	-0.006	0.000192	1.08	0.0069
MERGE-ETL_2011	AMPERE2-450-LimSW-HST	0.0167	0.952	-0.008	0.000552	1.6	0.0118
MERGE-ETL_2011	AMPERE2-450-LimSW-LST	0.0161	0.9735	-0.005	0.000376	1.56	0.0077
MERGE-ETL_2011	AMPERE2-450-LimSW-OPT	0.0151	0.9115	-0.017	0.000144	0.16	0.0079
MERGE-ETL_2011	AMPERE2-450-LowEI-HST	0.0168	0.9755	-0.009	0.000528	1.6	0.0101
MERGE-ETL_2011	AMPERE2-450-LowEI-LST	0.0163	0.9275	-0.008	0.000368	1.44	0.0051
MERGE-ETL_2011	AMPERE2-450-LowEI-OPT	0.0158	0.981	-0.008	0.000216	1.12	0.0065
MERGE-ETL_2011	AMPERE2-450-NoCCS-OPT	0.015	0.947	-0.003	0.000104	0.68	0.0078
MERGE-ETL_2011	AMPERE2-450-NucOff-LST	0.0161	0.955	-0.007	0.000384	1.52	0.006
MERGE-ETL_2011	AMPERE2-450-NucOff-OPT	0.0159	0.995	-0.008	0.000256	1.28	0.0062
MERGE-ETL_2011	AMPERE2-550-Conv-OPT	0.0161	1.042	0	0.000272	2.12	0.0061
MERGE-ETL_2011	AMPERE2-550-EERE-OPT	0.0163	0.991	-0.006	0.000224	1.76	0.0067
MERGE-ETL_2011	AMPERE2-550-FullTech-HST	0.0168	0.964	-0.008	0.000328	1.92	0.0039
MERGE-ETL_2011	AMPERE2-550-FullTech-LST	0.0162	0.9545	-0.011	0.000232	1.48	0.0098
MERGE-ETL_2011	AMPERE2-550-FullTech-OPT	0.0168	1.055	-0.011	0.00028	1.72	0.0071
MERGE-ETL_2011	AMPERE2-550-LimBio-OPT	0.0166	1.001	-0.007	0.000296	1.92	0.0067
MERGE-ETL_2011	AMPERE2-550-LimSW-OPT	0.0164	1.0295	-0.004	0.000264	2	0.0065
MERGE-ETL_2011	AMPERE2-550-LowEI-OPT	0.0166	0.925	-0.01	0.000248	1.56	0.0062
MERGE-ETL_2011	AMPERE2-550-NoCCS-OPT	0.0161	0.9295	-0.006	0.000216	1.68	0.0069
MERGE-ETL_2011	AMPERE2-550-NucOff-OPT	0.0169	0.9905	-0.009	0.000352	1.92	0.0055
MERGE-ETL_2011	AMPERE3-450	0.0157	0.9575	-0.008	0.000232	1.16	0.0074
MERGE-ETL_2011	AMPERE3-450P-CE	0.0166	1.0245	-0.009	0.000432	1.8	0.0071
MERGE-ETL_2011	AMPERE3-450P-EU	0.017	1.02	-0.01	0.00048	1.88	0.0079
MERGE-ETL_2011	AMPERE3-550	0.0166	1.001	-0.011	0.000272	1.64	0.0071
MERGE-ETL_2011	AMPERE3-550P-EU	0.017	0.988	-0.009	0.000376	2.04	0.0048
MERGE-ETL_2011	AMPERE3-CF450	0.0157	0.9925	-0.008	0.000256	1.28	0.0062
MERGE-ETL_2011	AMPERE3-CF450P-EU	0.0181	0.9275	-0.011	0.000576	2	0.0103
MERGE-ETL_2011	AMPERE3-CF550	0.0168	0.954	-0.01	0.000296	1.72	0.0084
MERGE_AME	AME 3.7 W/m2 NTE	0.0172	0.9825	0.021	0.000024	2.88	0.0176

MERGE_AME	AME CO2 price \$30 (5% p.a.)	0.0169	0.9795	-0.004	0.000032	0	0.0212
MERGE_AME	AME CO2 price \$50 (5% p.a.)	0.0169	0.979	-0.006	0.000056	0.2	0.0185
MERGE_EMF27	EMF27-450-Conv	0.02	1.01	0.08	0.000304	1.68	0.0117
MERGE_EMF27	EMF27-450-FullTech	0.0198	1.0085	-0.004	0.00048	1.68	0.008
MERGE_EMF27	EMF27-450-LimBio	0.02	1.0095	0.007	0.000784	1.64	0.0121
MERGE_EMF27	EMF27-450-LimSW	0.0198	1.0085	-0.003	0.000456	1.68	0.0081
MERGE_EMF27	EMF27-450-LowEI	0.0197	1.007	-0.002	0.000456	1.68	0.0084
MERGE_EMF27	EMF27-450-NucOff	0.0198	1.0085	-0.003	0.000448	1.68	0.0086
MERGE_EMF27	EMF27-550-Conv	0.0196	1.006	0.053	0	2.08	0.0177
MERGE_EMF27	EMF27-550-EERE	0.0195	1.005	0.048	0	2.12	0.013
MERGE_EMF27	EMF27-550-FullTech	0.0198	1.0085	0.053	0	2.08	0.0193
MERGE_EMF27	EMF27-550-LimBio	0.0198	1.0085	0.053	0	2.08	0.0183
MERGE_EMF27	EMF27-550-LimSW	0.0196	1.006	0.053	0	2.08	0.0184
MERGE_EMF27	EMF27-550-LimTech	0.0198	1.0085	0.054	0.000008	2.08	0.0178
MERGE_EMF27	EMF27-550-LowEI	0.0197	1.007	0.052	0	2.08	0.0189
MERGE_EMF27	EMF27-550-NoCCS	0.0196	1.006	0.049	0	2.12	0.0154
MERGE_EMF27	EMF27-550-NucOff	0.0196	1.006	0.053	0	2.08	0.019
MERGE_EMF27	EMF27-G8-EERE	0.0194	1.0045	0.043	0	2	0.0202
MERGE_EMF27	EMF27-G8-FullTech	0.0194	1.0045	0.043	0	2.12	0.0237
MESSAGE V.2	RCP 8.5_MIT_2.6W	0.0205	1.016	0.001	0.000168	1.48	0.0092
MESSAGE V.2	RCP 8.5_MIT_4.5W	0.0216	1.0255	0.021	0.000232	3	0.0091
MESSAGE V.3	AME 2.6 W/m2 OS	0.0218	1.028	0.001	0.000416	1.84	0.0137
MESSAGE V.3	AME 3.7 W/m2 NTE	0.0216	1.026	0.056	0.000016	2.4	0.0037
MESSAGE V.3	AME CO2 price \$10 (5% p.a.)	0.0216	1.026	0.004	0.000432	2.44	0.0097
MESSAGE V.3	AME CO2 price \$30 (5% p.a.)	0.0218	1.028	0.001	0.000432	1.88	0.0133
MESSAGE V.3	AME CO2 price \$50 (5% p.a.)	0.022	1.03	0.002	0.000376	1.68	0.0159
MESSAGE V.3	GEA Efficiency_450_Illustrative	0.0217	1.0275	0	0.000376	1.76	0.0161
MESSAGE V.3	GEA Efficiency_450_adv.transp_full	0.0217	1.027	0	0.000432	1.8	0.0152
MESSAGE V.3	GEA Efficiency_450_adv.transp_limbe	0.0217	1.0275	0.003	0.000536	1.8	0.015
MESSAGE V.3	GEA Efficiency_450_adv.transp_limbe_limir	0.0219	1.029	0.077	0.000176	1.8	0.0154
MESSAGE V.3	GEA Efficiency_450_adv.transp_limir	0.0217	1.0275	0.003	0.00044	1.8	0.0173
MESSAGE V.3	GEA Efficiency_450_adv.transp_nbecs	0.0218	1.028	0.006	0.000664	1.8	0.013
MESSAGE V.3	GEA Efficiency_450_adv.transp_nbecs_nsink_limbe	0.0221	1.0315	0.08	0.000008	1.76	0.0116
MESSAGE V.3	GEA Efficiency_450_adv.transp_noccs	0.0219	1.029	0.065	0.000576	1.8	0.0121
MESSAGE V.3	GEA Efficiency_450_adv.transp_noccs_nonuc	0.022	1.03	0.08	0.000096	1.8	0.0121
MESSAGE V.3	GEA Efficiency_450_adv.transp_nsink	0.0218	1.028	0.006	0.000592	1.8	0.0147
MESSAGE V.3	GEA Efficiency_450_conv.transp_full	0.0217	1.0275	0.001	0.000456	1.8	0.0157
MESSAGE V.3	GEA Efficiency_450_conv.transp_limbe	0.0218	1.028	0.065	0.000496	1.84	0.0142
MESSAGE V.3	GEA Efficiency_450_conv.transp_limbe_limir	0.0221	1.0315	0.08	0.000016	1.76	0.0105
MESSAGE V.3	GEA Efficiency_450_conv.transp_limir	0.0218	1.028	0.005	0.000504	1.8	0.0174
MESSAGE V.3	GEA Efficiency_450_conv.transp_nbecs	0.0218	1.028	0.078	0.000312	1.8	0.01
MESSAGE V.3	GEA Efficiency_450_conv.transp_nbecs_nsink_limbe	0.0224	1.0335	0.08	0.000064	1.72	0.0178
MESSAGE V.3	GEA Efficiency_450_conv.transp_noccs	0.022	1.03	0.08	0.000088	1.8	0.0132
MESSAGE V.3	GEA Efficiency_450_conv.transp_noccs_nonuc	0.0221	1.0315	0.08	0.00012	1.76	0.011
MESSAGE V.3	GEA Efficiency_450_conv.transp_nonuc	0.0218	1.028	0.002	0.000448	1.8	0.0164
MESSAGE V.3	GEA Efficiency_450_conv.transp_nsink	0.0218	1.028	0.076	0.000208	1.84	0.0107
MESSAGE V.3	GEA Mix_450_Illustrative	0.0218	1.0285	0.003	0.000496	1.8	0.0171
MESSAGE V.3	GEA Mix_450_adv.transp_full	0.0218	1.028	-0.001	0.000456	1.8	0.0157

MESSAGE V.3	GEA Mix_450_adv.transp_limbe	0.0218	1.028	0.001	0.00048	1.76	0.016
MESSAGE V.3	GEA Mix_450_adv.transp_limir	0.022	1.0295	0.007	0.000464	1.8	0.0182
MESSAGE V.3	GEA Mix_450_adv.transp_nbecs	0.0218	1.0285	0.009	0.0008	1.8	0.0141
MESSAGE V.3	GEA Mix_450_adv.transp_noccs	0.0221	1.0315	0.08	0.00012	1.8	0.0149
MESSAGE V.3	GEA Mix_450_adv.transp_nonuc	0.0218	1.028	0.001	0.00044	1.8	0.0177
MESSAGE V.3	GEA Mix_450_adv.transp_nsink	0.0219	1.029	0.005	0.000536	1.8	0.0167
MESSAGE V.3	GEA Mix_450_conv.transp_limbe	0.022	1.03	0.075	0.000304	1.8	0.0134
MESSAGE V.3	GEA Mix_450_conv.transp_limir	0.0221	1.0315	0.062	0.000376	1.8	0.0164
MESSAGE V.3	GEA Mix_450_conv.transp_nbecs	0.022	1.0305	0.08	0.000184	1.76	0.0109
MESSAGE V.3	GEA Mix_450_conv.transp_nonuc	0.022	1.0295	0.069	0.000344	1.84	0.0185
MESSAGE V.3	GEA Mix_450_conv.transp_nsink	0.022	1.0305	0.077	0	1.84	0.0138
MESSAGE V.3	GEA Supply_450_Illustrative	0.022	1.0295	0.001	0.000376	1.76	0.0201
MESSAGE V.3	GEA Supply_450_adv.transp_limbe	0.022	1.03	0.003	0.000392	1.76	0.0195
MESSAGE V.3	GEA Supply_450_adv.transp_limir	0.0222	1.032	0.005	0.000256	1.72	0.0194
MESSAGE V.3	GEA Supply_450_adv.transp_nbecs	0.0221	1.0315	0.078	0.000216	1.8	0.017
MESSAGE V.3	GEA Supply_450_adv.transp_nonuc	0.022	1.03	0.003	0.000288	1.72	0.0215
MESSAGE V.3	GEA Supply_450_adv.transp_nsink	0.0221	1.0315	0.006	0.000384	1.8	0.0198
MESSAGE V.3	GEA Supply_450_conv.transp_full	0.022	1.03	0.006	0.00048	1.8	0.02
MESSAGE V.3	GEA Supply_450_conv.transp_nonuc	0.0221	1.0315	0.075	0.00004	1.84	0.0197
MESSAGE V.4	AMPERE2-450-Conv-OPT	0.0209	0.9815	0.009	0.000576	1.92	0.0074
MESSAGE V.4	AMPERE2-450-EERE-OPT	0.0206	1.009	0.006	0.000536	1.88	0.0065
MESSAGE V.4	AMPERE2-450-FullTech-HST	0.0196	0.9655	-0.009	0.000528	1.84	0.0108
MESSAGE V.4	AMPERE2-450-FullTech-LST	0.0202	1.0285	-0.004	0.000504	1.96	0.0087
MESSAGE V.4	AMPERE2-450-FullTech-OPT	0.0204	1.059	-0.003	0.000496	2	0.0078
MESSAGE V.4	AMPERE2-450-LimBio-LST	0.0201	0.9655	-0.001	0.000736	1.88	0.0083
MESSAGE V.4	AMPERE2-450-LimBio-OPT	0.0207	0.991	0.005	0.000568	1.92	0.0073
MESSAGE V.4	AMPERE2-450-LimSW-HST	0.0194	0.986	-0.008	0.000568	1.92	0.0112
MESSAGE V.4	AMPERE2-450-LimSW-LST	0.0201	0.9255	-0.004	0.000536	1.88	0.0069
MESSAGE V.4	AMPERE2-450-LimSW-OPT	0.0205	0.991	-0.002	0.000488	1.96	0.0066
MESSAGE V.4	AMPERE2-450-LowEI-HST	0.0201	1.0135	-0.009	0.000416	1.8	0.0099
MESSAGE V.4	AMPERE2-450-LowEI-LST	0.02	0.998	-0.006	0.000408	1.8	0.0053
MESSAGE V.4	AMPERE2-450-LowEI-OPT	0.0201	1.0245	-0.005	0.000392	1.84	0.0049
MESSAGE V.4	AMPERE2-450-NoCCS-OPT	0.0211	1.0115	0.07	0.000072	1.92	0.0087
MESSAGE V.4	AMPERE2-450-NucOff-HST	0.0196	0.9325	-0.008	0.000544	1.84	0.011
MESSAGE V.4	AMPERE2-450-NucOff-LST	0.0202	0.989	-0.004	0.000496	1.92	0.0078
MESSAGE V.4	AMPERE2-450-NucOff-OPT	0.0204	1.049	-0.003	0.000512	2	0.007
MESSAGE V.4	AMPERE2-550-Conv-OPT	0.02	1.0095	0.043	0.000128	2.56	0.0053
MESSAGE V.4	AMPERE2-550-EERE-OPT	0.0201	0.9815	0.038	0.000232	2.36	0.0047
MESSAGE V.4	AMPERE2-550-FullTech-HST	0.0196	1.0445	0	0.000416	2.52	0.0053
MESSAGE V.4	AMPERE2-550-FullTech-LST	0.0202	1.0075	0.007	0.0004	2.52	0.0055
MESSAGE V.4	AMPERE2-550-FullTech-OPT	0.0197	0.9285	0	0.000408	2.4	0.0056
MESSAGE V.4	AMPERE2-550-LimBio-OPT	0.0197	0.9815	0.041	0.000216	2.48	0.0062
MESSAGE V.4	AMPERE2-550-LimSW-OPT	0.0196	1.0505	0	0.000384	2.56	0.0063
MESSAGE V.4	AMPERE2-550-LowEI-OPT	0.0201	1.0665	-0.004	0.000224	2.2	0.0088
MESSAGE V.4	AMPERE2-550-NoCCS-OPT	0.02	1.028	0.042	0.000256	2.4	0.009
MESSAGE V.4	AMPERE2-550-NucOff-OPT	0.0196	1.005	0	0.0004	2.48	0.0061
MESSAGE V.4	AMPERE3-450	0.0204	1.007	-0.002	0.000504	1.96	0.0064
MESSAGE V.4	AMPERE3-450P-EU	0.0199	1.059	-0.003	0.000472	2.36	0.0126
MESSAGE V.4	AMPERE3-550	0.0198	0.9695	-0.001	0.000344	2.4	0.0062

MESSAGE V.4	AMPERE3-CF450	0.0204	0.9935	-0.004	0.000488	1.92	0.0075
MESSAGE V.4	AMPERE3-CF550	0.0196	1.066	0.002	0.00044	2.56	0.0055
MESSAGE V.4	EMF27-450-EERE	0.021	1.02	0.003	0.000432	1.72	0.0087
MESSAGE V.4	EMF27-450-FullTech	0.0205	1.015	-0.005	0.000424	1.72	0.009
MESSAGE V.4	EMF27-450-LimBio	0.0212	1.022	0.003	0.000464	1.72	0.0116
MESSAGE V.4	EMF27-450-LimSW	0.0205	1.0155	-0.003	0.000408	1.72	0.0091
MESSAGE V.4	EMF27-450-LowEI	0.0201	1.011	-0.007	0.000336	1.6	0.0065
MESSAGE V.4	EMF27-450-NucOff	0.0205	1.015	-0.004	0.000392	1.72	0.0096
MESSAGE V.4	EMF27-550-Conv	0.0204	1.0145	0.055	0	2.2	0.013
MESSAGE V.4	EMF27-550-EERE	0.0202	1.0115	0.055	0	2.16	0.0156
MESSAGE V.4	EMF27-550-FullTech	0.0206	1.016	0.051	0	2.2	0.0194
MESSAGE V.4	EMF27-550-LimBio	0.0206	1.016	0.056	0.000016	2.16	0.016
MESSAGE V.4	EMF27-550-LimSW	0.0205	1.0155	0.053	0	2.2	0.0174
MESSAGE V.4	EMF27-550-LowEI	0.0203	1.013	0.055	0	2.16	0.0172
MESSAGE V.4	EMF27-550-NoCCS	0.0206	1.0165	0.056	0	2.16	0.0162
MESSAGE V.4	EMF27-550-NucOff	0.0206	1.016	0.052	0	2.2	0.0188
MESSAGE V.4	LIMITS-450	0.0206	1.0165	-0.004	0.0004	1.64	0.0103
MESSAGE V.4	LIMITS-500	0.0204	1.0135	-0.004	0.000408	1.88	0.0069
MESSAGE V.4	LIMITS-RefPol-450	0.0202	1.012	-0.006	0.00056	1.72	0.016
MESSAGE V.4	LIMITS-RefPol-450-EE	0.0202	1.012	-0.006	0.00056	1.72	0.0159
MESSAGE V.4	LIMITS-RefPol-450-PC	0.0202	1.012	-0.006	0.00056	1.72	0.0163
MESSAGE V.4	LIMITS-RefPol-500	0.0202	1.012	-0.005	0.000448	1.88	0.0087
MESSAGE V.4	LIMITS-RefPol2030-500	0.0202	1.0115	-0.008	0.000488	1.88	0.0113
MESSAGE V.4	LIMITS-StrPol-450	0.0203	1.013	-0.005	0.000472	1.68	0.013
MESSAGE V.4	LIMITS-StrPol-500	0.0203	1.013	-0.004	0.000424	1.88	0.0071
REMIND 1.4	ROSE 450 DEF	0.0203	1.012	-0.003	0.0008	1.8	0.0235
REMIND 1.4	ROSE 450 FS Gr	0.0203	1.012	-0.003	0.0008	1.8	0.0233
REMIND 1.4	ROSE 450 FS Gr SL Con	0.0202	1.0115	-0.003	0.0008	1.8	0.0233
REMIND 1.4	ROSE 450 HI Coal	0.0201	1.0095	-0.003	0.0008	1.8	0.0242
REMIND 1.4	ROSE 450 HI Fos	0.0209	1.018	-0.003	0.0008	1.8	0.0244
REMIND 1.4	ROSE 450 HI Pop	0.0203	1.0125	0.079	0.000792	1.8	0.0203
REMIND 1.4	ROSE 450 LO Fos	0.0215	1.0245	-0.001	0.000624	1.76	0.0204
REMIND 1.4	ROSE 450 LO Oil	0.0205	1.014	-0.003	0.0008	1.8	0.0231
REMIND 1.4	ROSE 450 SL Gr	0.0203	1.012	-0.003	0.0008	1.8	0.0239
REMIND 1.4	ROSE 550 DEF	0.0193	1.0025	0.073	0	2.24	0.0138
REMIND 1.4	ROSE 550 FS Gr	0.0193	1.0025	0.074	0	2.24	0.0141
REMIND 1.4	ROSE 550 FS Gr SL Con	0.0193	1.0025	0.073	0	2.24	0.0132
REMIND 1.4	ROSE 550 HI Coal	0.0186	0.9955	0.071	0.000008	2.24	0.0123
REMIND 1.4	ROSE 550 HI Fos	0.0205	1.0145	0.075	0	2.24	0.0172
REMIND 1.4	ROSE 550 HI Gas	0.0198	1.0075	0.074	0	2.24	0.0157
REMIND 1.4	ROSE 550 HI Pop	0.0195	1.004	0.07	0	2.28	0.009
REMIND 1.4	ROSE 550 LO Fos	0.0208	1.017	0.067	0	2.28	0.0103
REMIND 1.4	ROSE 550 LO Oil	0.0195	1.0045	0.075	0.000072	2.2	0.0166
REMIND 1.4	ROSE 550 SL Gr	0.0193	1.002	0.073	0	2.24	0.0126
REMIND 1.4	ROSE WEAK-2020 DEF	0.0177	0.9865	-0.01	0.0008	1.8	0.0269
REMIND 1.4	ROSE WEAK-2030 DEF	0.0177	0.986	-0.014	0.0008	1.8	0.0154
REMIND 1.5	AMPERE2-450-Conv-HST	0.0174	0.9885	-0.009	0.0008	1.8	0.0222
REMIND 1.5	AMPERE2-450-Conv-LST	0.0182	1.002	0.08	0.0008	1.84	0.0082
REMIND 1.5	AMPERE2-450-Conv-OPT	0.0195	0.9935	0.074	0	1.8	0.0296

REMIND 1.5	AMPERE2-450-EERE-OPT	0.0195	0.952	0.078	0	1.76	0.0256
REMIND 1.5	AMPERE2-450-FullTech-HST	0.0174	0.9705	-0.011	0.0008	1.84	0.0141
REMIND 1.5	AMPERE2-450-FullTech-LST	0.0182	0.9875	-0.008	0.0008	1.84	0.0203
REMIND 1.5	AMPERE2-450-FullTech-OPT	0.019	0.9905	0.08	0.00044	1.88	0.016
REMIND 1.5	AMPERE2-450-LimBio-HST	0.0174	0.9685	0.08	0.0008	1.84	0.0216
REMIND 1.5	AMPERE2-450-LimBio-LST	0.0184	0.995	0.08	0.0008	1.84	0.0133
REMIND 1.5	AMPERE2-450-LimBio-OPT	0.0196	1.0825	0.08	0.000008	1.88	0.0223
REMIND 1.5	AMPERE2-450-LimSW-HST	0.0173	0.9445	-0.01	0.0008	1.8	0.0164
REMIND 1.5	AMPERE2-450-LimSW-LST	0.0182	0.991	0.074	0.0008	1.88	0.0156
REMIND 1.5	AMPERE2-450-LimSW-OPT	0.0193	0.9815	0.08	0.000216	1.84	0.0149
REMIND 1.5	AMPERE2-450-LowEI-HST	0.0175	0.949	-0.012	0.0008	1.84	0.0155
REMIND 1.5	AMPERE2-450-LowEI-LST	0.0181	1.0285	-0.008	0.0008	1.92	0.0199
REMIND 1.5	AMPERE2-450-LowEI-OPT	0.0186	0.975	0.068	0.0008	1.88	0.0215
REMIND 1.5	AMPERE2-450-NoCCS-OPT	0.0193	0.9975	0.076	0	1.8	0.026
REMIND 1.5	AMPERE2-450-NucOff-HST	0.0174	0.9405	-0.011	0.000784	1.8	0.0143
REMIND 1.5	AMPERE2-450-NucOff-LST	0.0183	0.936	-0.008	0.0008	1.8	0.0201
REMIND 1.5	AMPERE2-450-NucOff-OPT	0.0191	1.0085	0.07	0.000792	1.88	0.0171
REMIND 1.5	AMPERE2-550-Conv-OPT	0.0187	1.0415	0.057	0	2.28	0.0363
REMIND 1.5	AMPERE2-550-EERE-OPT	0.0186	0.9615	0.06	0	2.28	0.0163
REMIND 1.5	AMPERE2-550-FullTech-HST	0.0175	1.0015	0.049	0.000392	2.32	0.0073
REMIND 1.5	AMPERE2-550-FullTech-LST	0.0182	1.0385	0.062	0.000064	2.36	0.0071
REMIND 1.5	AMPERE2-550-FullTech-OPT	0.0181	0.989	0.06	0.000104	2.32	0.0063
REMIND 1.5	AMPERE2-550-LimBio-OPT	0.0187	1.0175	0.061	0	2.28	0.0254
REMIND 1.5	AMPERE2-550-LimSW-OPT	0.0182	0.9505	0.063	0	2.24	0.0139
REMIND 1.5	AMPERE2-550-LowEI-OPT	0.0178	1.0525	0.049	0.000288	2.4	0.0122
REMIND 1.5	AMPERE2-550-NoCCS-OPT	0.0187	0.953	0.058	0	2.24	0.0261
REMIND 1.5	AMPERE2-550-NucOff-OPT	0.018	1.001	0.057	0.000184	2.32	0.0066
REMIND 1.5	AMPERE3-450	0.0191	1.048	0.073	0.000648	1.92	0.0157
REMIND 1.5	AMPERE3-450P-CE	0.0182	0.935	-0.007	0.00072	1.92	0.0143
REMIND 1.5	AMPERE3-450P-EU	0.0174	0.997	-0.007	0.0008	2.08	0.0133
REMIND 1.5	AMPERE3-550	0.0182	0.9575	0.06	0.00008	2.28	0.0071
REMIND 1.5	AMPERE3-550P-EU	0.0175	1.0335	0.002	0.000656	2.48	0.0086
REMIND 1.5	AMPERE3-CF450	0.0191	1.027	0.08	0.000416	1.92	0.0194
REMIND 1.5	AMPERE3-CF450P-EU	0.0173	0.9515	-0.01	0.000784	2.04	0.015
REMIND 1.5	AMPERE3-CF550	0.018	1.003	0.061	0.000112	2.32	0.0067
REMIND 1.5	EMF27-450-Conv	0.0197	1.0055	0.003	0.0008	1.56	0.0187
REMIND 1.5	EMF27-450-EERE	0.0195	1.0045	0.008	0.0008	1.52	0.0264
REMIND 1.5	EMF27-450-FullTech	0.02	1.009	-0.007	0.000632	1.6	0.0217
REMIND 1.5	EMF27-450-LimBio	0.0197	1.0055	-0.001	0.0008	1.56	0.0211
REMIND 1.5	EMF27-450-LimSW	0.0199	1.008	-0.006	0.00076	1.6	0.0204
REMIND 1.5	EMF27-450-LowEI	0.0199	1.0085	-0.006	0.000552	1.6	0.0234
REMIND 1.5	EMF27-450-NoCCS	0.0197	1.0055	0.08	0.0008	1.52	0.0261
REMIND 1.5	EMF27-450-NucOff	0.02	1.009	-0.007	0.000616	1.6	0.021
REMIND 1.5	EMF27-550-Conv	0.0208	1.017	0.077	0	2	0.0139
REMIND 1.5	EMF27-550-EERE	0.0207	1.016	0.075	0	2.04	0.0175
REMIND 1.5	EMF27-550-FullTech	0.0205	1.0135	0.074	0	2.04	0.019
REMIND 1.5	EMF27-550-LimBio	0.0207	1.016	0.08	0	2	0.013
REMIND 1.5	EMF27-550-LimSW	0.0205	1.0135	0.074	0	2.04	0.0185
REMIND 1.5	EMF27-550-LimTech	0.0206	1.0155	0.069	0	2.04	0.0138

REMIND 1.5	EMF27-550-LowEI	0.0202	1.0115	0.076	0	2.04	0.0177
REMIND 1.5	EMF27-550-NoCCS	0.0209	1.0175	0.073	0	2.04	0.0173
REMIND 1.5	EMF27-550-NucOff	0.0205	1.0135	0.074	0	2.04	0.0185
REMIND 1.5	EMF27-G8-FullTech	0.0186	0.995	0.064	0	2.32	0.0284
REMIND 1.5	LIMITS-450	0.0196	1.005	-0.006	0.00072	1.6	0.0268
REMIND 1.5	LIMITS-500	0.0191	1	0.08	0.000432	1.88	0.019
REMIND 1.5	LIMITS-RefPol-450	0.0174	0.983	-0.013	0.0008	1.6	0.0315
REMIND 1.5	LIMITS-RefPol-450-EE	0.0174	0.983	-0.013	0.0008	1.6	0.0315
REMIND 1.5	LIMITS-RefPol-450-PC	0.0174	0.983	-0.013	0.0008	1.6	0.0313
REMIND 1.5	LIMITS-RefPol-500	0.0174	0.983	0.075	0.0008	1.88	0.0204
REMIND 1.5	LIMITS-RefPol2030-500	0.0173	0.9825	-0.011	0.0008	1.88	0.0175
REMIND 1.5	LIMITS-StrPol-450	0.0175	0.9835	-0.012	0.0008	1.6	0.0287
REMIND 1.5	LIMITS-StrPol-500	0.0175	0.9835	0.069	0.0008	1.88	0.0191
AIM/CGE	SSP3-34	0.0196	1.1085	0.061	0.000352	2.2	0.0147
AIM/CGE	SSP3-45	0.0196	1.109	0.051	0	2.68	0.0149
GCAM4	SSP4-26	0.0198	1.1115	-0.001	0.000472	1.8	0.0313
GCAM4	SSP4-34	0.0198	1.111	0.055	0.000088	2.24	0.011
GCAM4	SSP4-45	0.0198	1.111	0.043	0.000008	2.64	0.0073
IMAGE	SSP1-26	0.0198	1.111	0	0.000552	1.76	0.0196
IMAGE	SSP1-34	0.02	1.1125	0.04	0.000376	2.24	0.0215
IMAGE	SSP1-45	0.02	1.1125	0.035	0.000016	2.92	0.0182
MESSAGE-GLOBIOM	SSP2-26	0.0202	1.1155	-0.003	0.000608	1.76	0.0158
MESSAGE-GLOBIOM	SSP2-34	0.0203	1.116	0.046	0.000288	2.24	0.0097
MESSAGE-GLOBIOM	SSP2-45	0.0203	1.116	0.037	0	2.88	0.0088
REMIND-MAGPIE	SSP5-34	0.0212	1.1245	-0.004	0.000424	2.2	0.0195
REMIND-MAGPIE	SSP5-45	0.0211	1.124	0.048	0	2.8	0.0071