Supplementary Information

Supplementary Notes 1 Regional classification

R5ASIA

This region includes most Asian countries with the exception of the Middle East, Japan and Former Soviet Union states.

Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China (incl. Hong Kong and Macao, excl. Taiwan), Democratic People's Republic of Korea, Fiji, French Polynesia, India, Indonesia, Lao People's Democratic Republic, Malaysia, Maldives, Micronesia (Fed. States of), Mongolia, Myanmar, Nepal, New Caledonia, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand, Timor-Leste, Vanuatu, Vietnam

R5LAM

This region includes the countries of Latin America and the Caribbean.

Argentina, Aruba, Bahamas, Barbados, Belize, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, United States Virgin Islands, Uruguay, Venezuela (Bolivarian Republic of)

R5MAF

This region includes the countries of the Middle East and Africa.

Algeria, Angola, Bahrain, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote d`Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Libyan Arab Jamahiriya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotte, Morocco, Mozambique, Namibia, Niger, Nigeria, Occupied Palestinian Territory, Oman, Qatar, Rwanda, Reunion, Saudi Arabia, Senegal, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Swaziland, Syrian Arab Republic, Togo, Tunisia, Uganda, United Arab Emirates, United Republic of Tanzania, Western Sahara, Yemen, Zambia, Zimbabwe

R5OECD90+EU

This region includes the OECD 90, European Union member states and candidates.

Albania, Australia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guam, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Puerto Rico, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, Turkey, United Kingdom, United States of America

R5REF

This region includes countries with reforming economies in Eastern Europe and the Former Soviet Union.

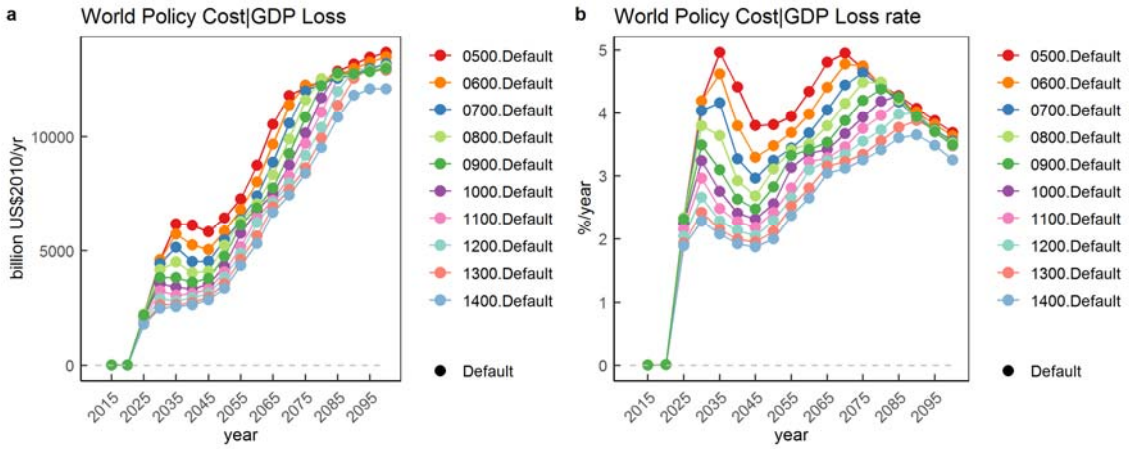
Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

Supplementary Tables

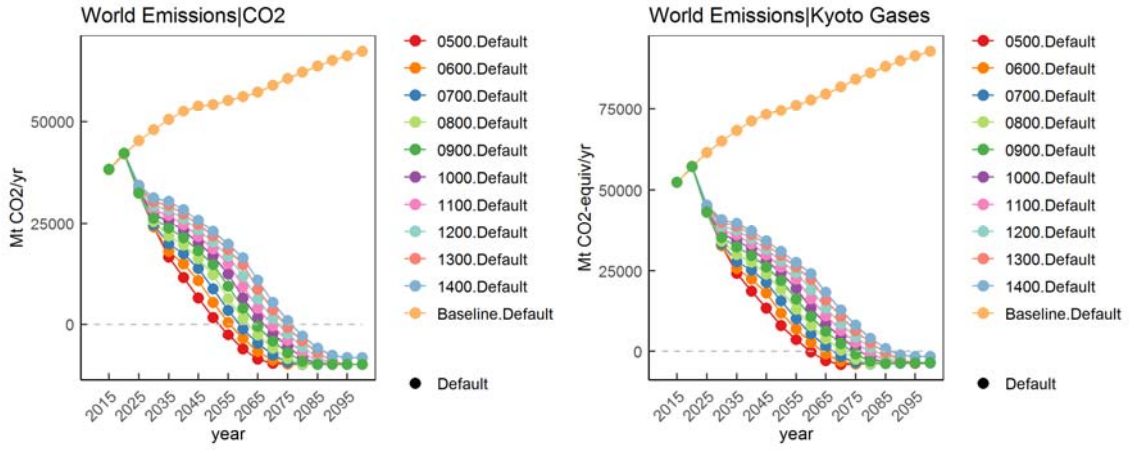
Supplementary Table 1 Climate change mitigation scenario architecture

		Climate mitigation stringency				
		500	600	700	…	1400
	Default (SSP2)					
Social transformation	Energy-Demand-Change (LDC)					
	Energy-Supply-Change (ESC)					
	Food-System-Transformation (FST)					
	Green-Investment (GI)					
	Integrated-Social-Transformation (IST)					

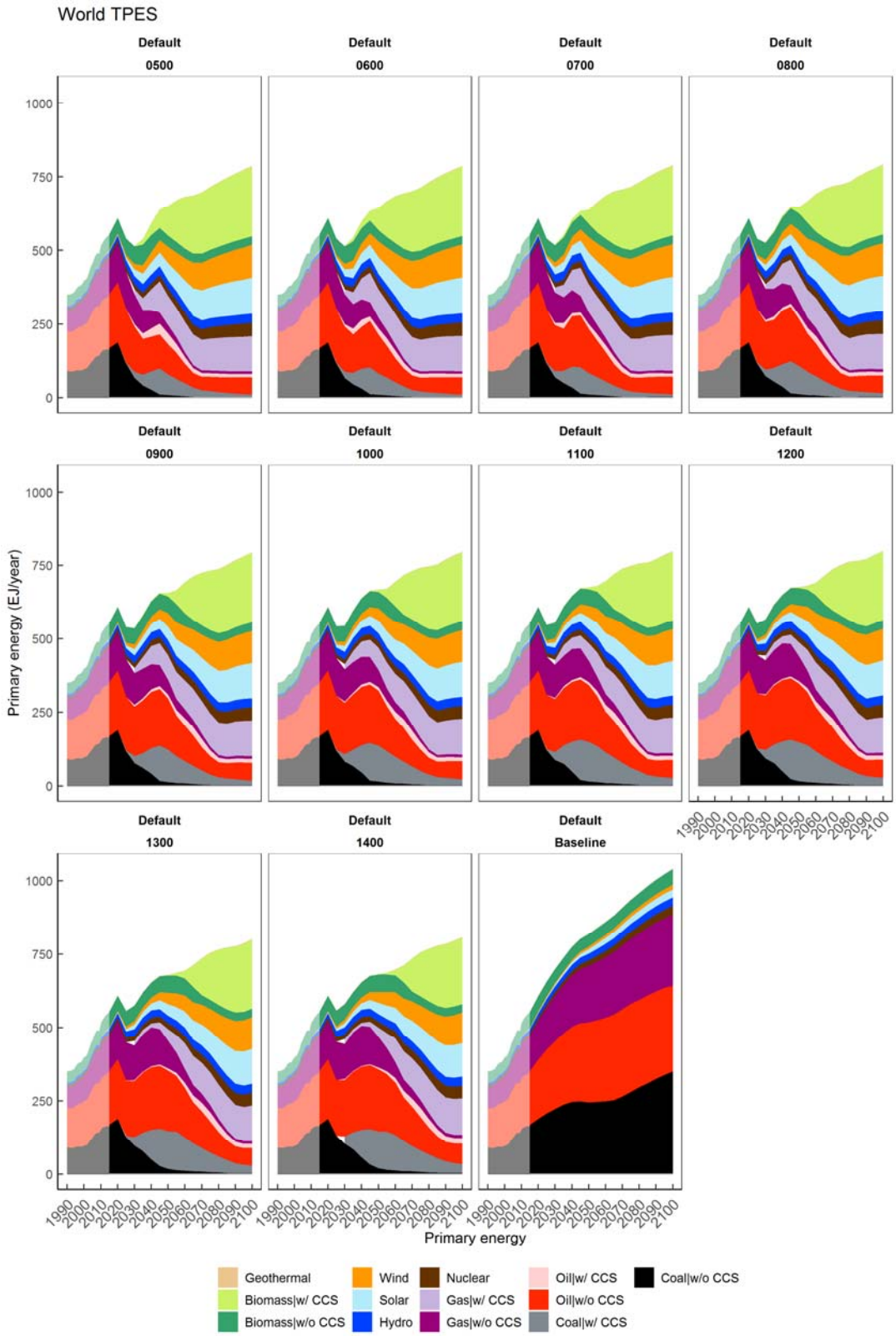
Supplementary Figures



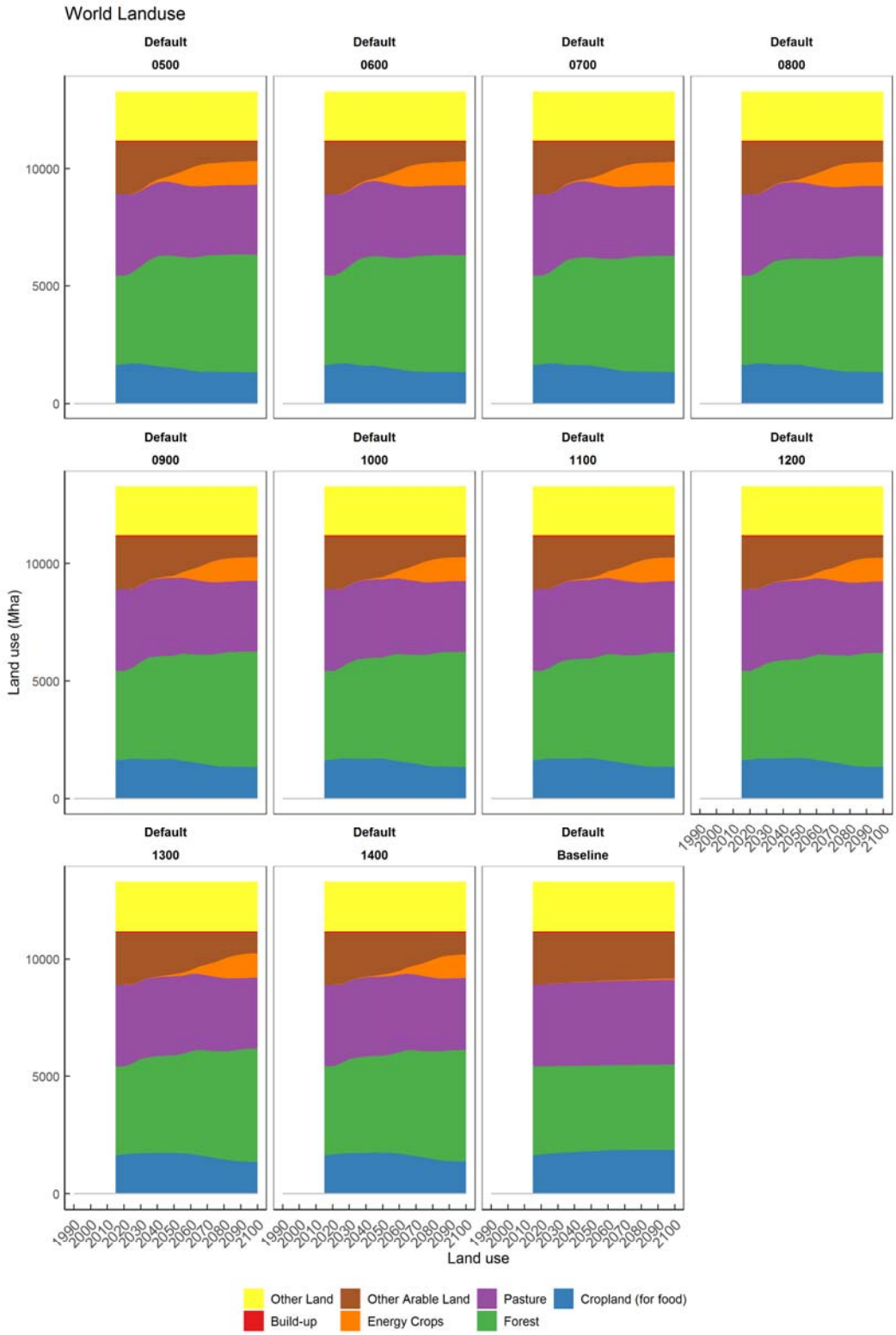
Supplementary Figure 1 Global policy cost in terms of overall GDP loss (**a**) and its rate (**b**) under the default scenario with various carbon budgets.



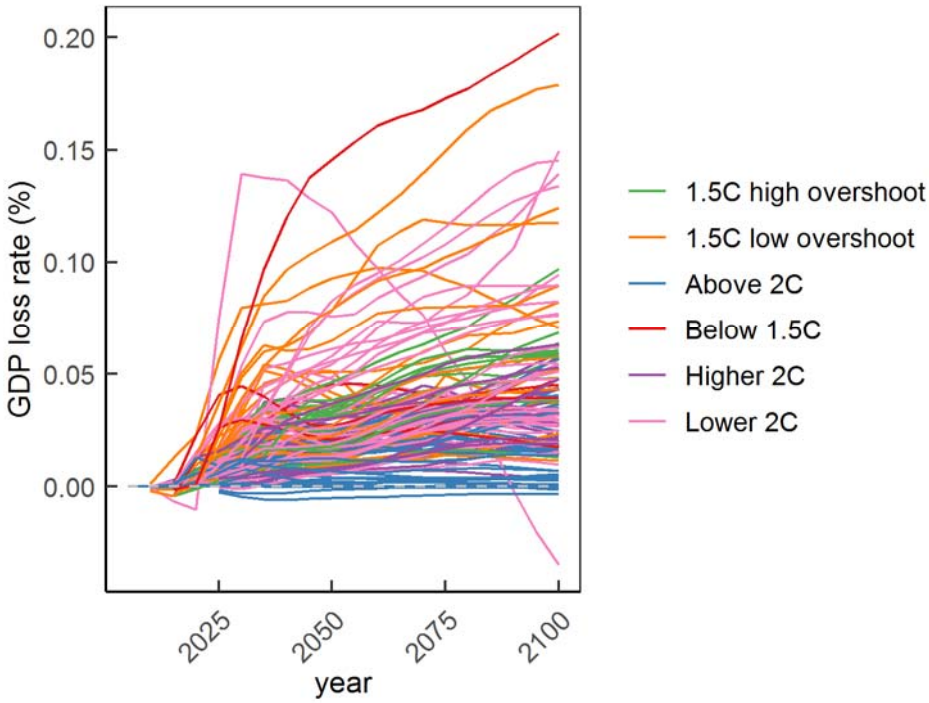
Supplementary Figure 2 Global CO_2 and Kyoto gas emissions under the default scenario with various carbon budgets.



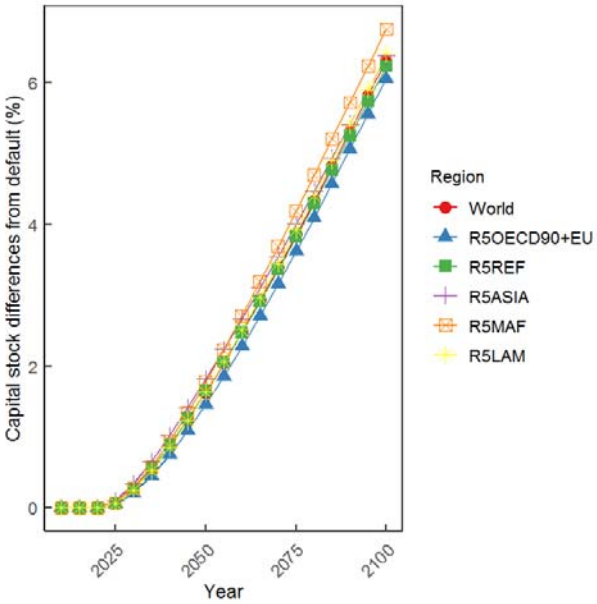
Supplementary Figure 3 Global primary energy supply under the default scenario with various carbon budgets.



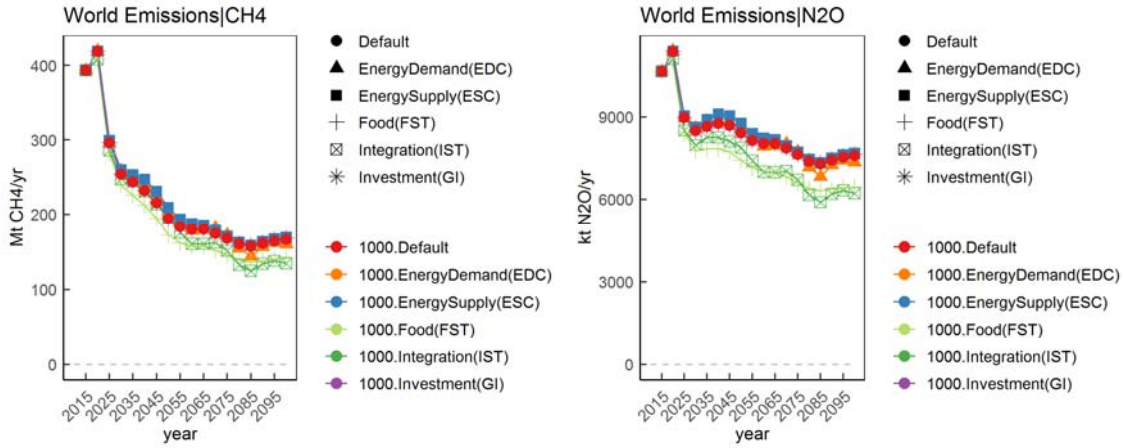
Supplementary Figure 4 Global land use under the default scenario with various carbon budgets.



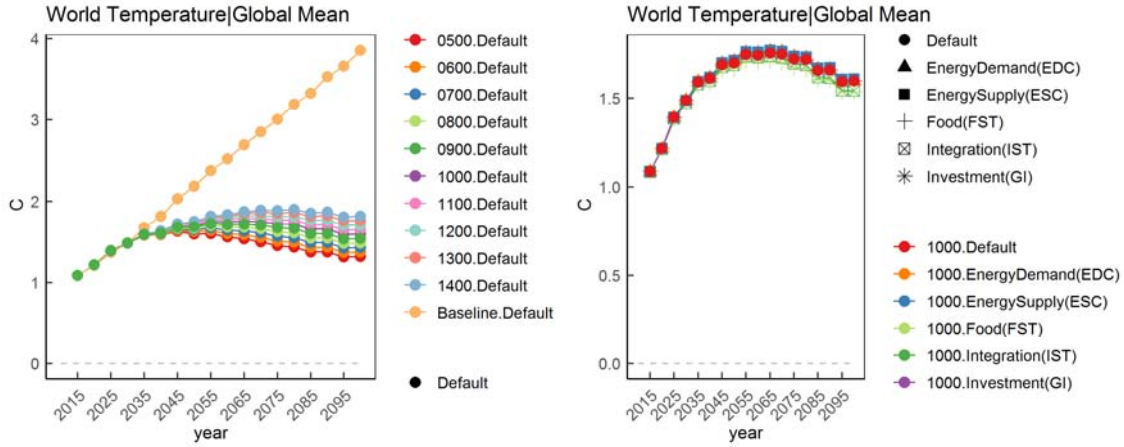
Supplementary Figure 5 GDP loss rates from IPCC SR1.5



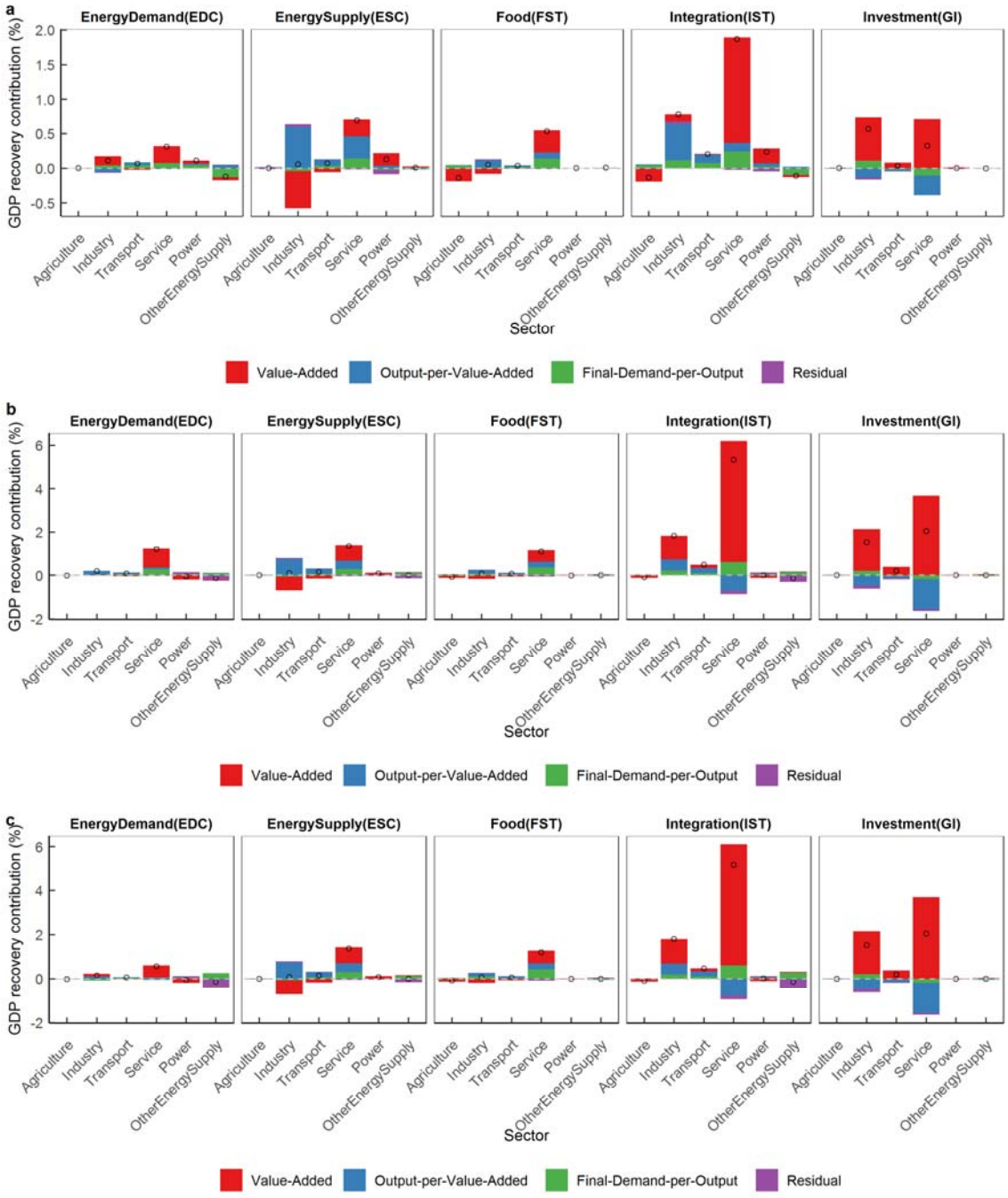
Supplementary Figure 6 Global capital stock change ratios from the default scenario to Green-Investment by region.



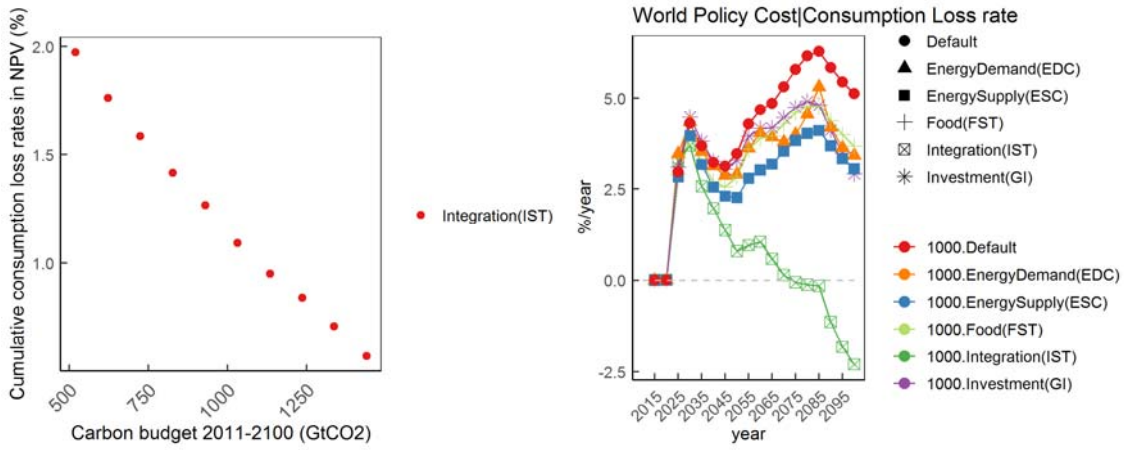
Supplementary Figure 7 Global CH_4 and N_2O emissions under a carbon budget of 1000 Gt CO_2 and various social transformations.



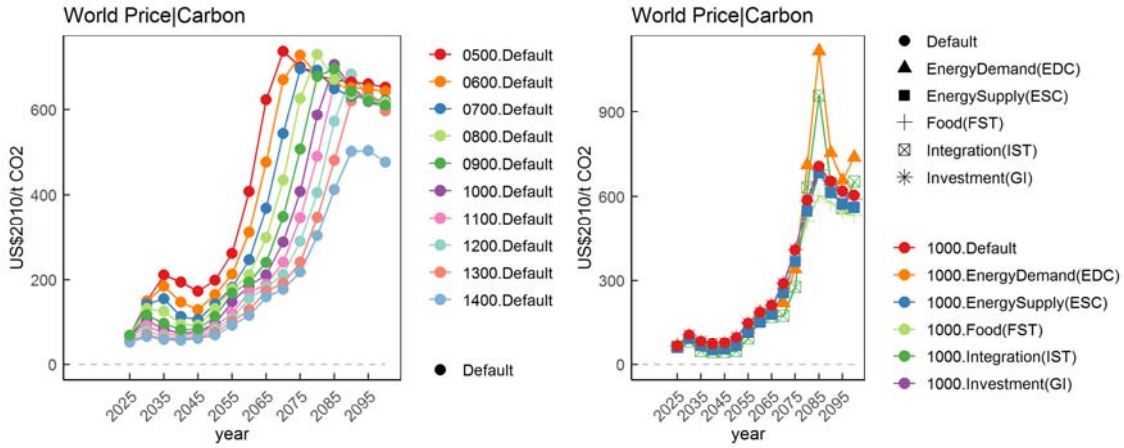
Supplementary Figure 8 Global mean temperature changes under default socioeconomic conditions with various carbon budgets (**a**) and under a carbon budget of 1000 Gt CO_2 with various social transformations (**b**).



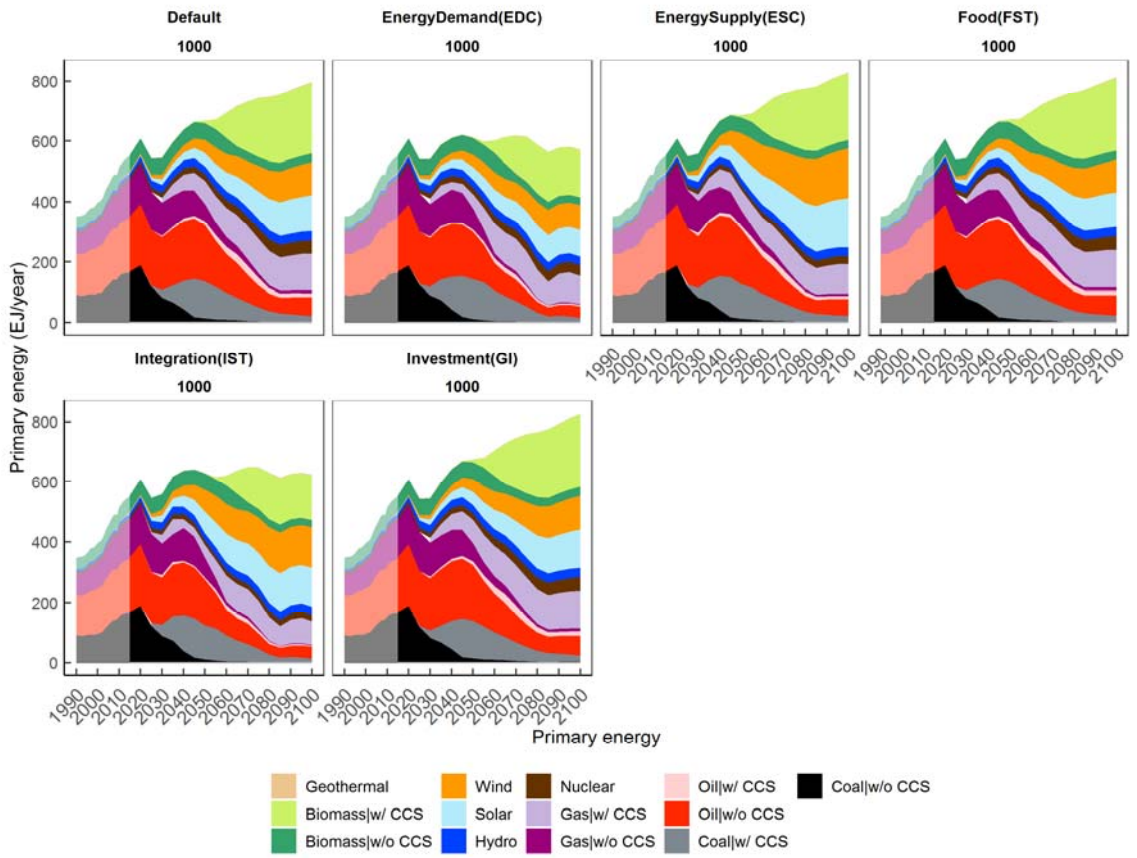
Supplementary Figure 9 Decomposition analysis of GDP recovery by sector in 2050 and 2100 under the 1000-Gt CO_2 budget scenario and in 2100 under the 500-Gt CO_2 budget scenario (panels a, b and c, respectively). Black circles indicate total net impacts on GDP recovery by sector.



Supplementary Figure 10 Global cumulative consumption loss rates expressed as NPV under the default and integrated social transformation scenarios (a) and periodic global consumption losses for various social transformation scenarios under a 1000-Gt CO_2 budget (b).



Supplementary Figure 11 Global carbon prices under default conditions with multiple budget targets and social transformation scenarios under a 1000-Gt CO_2 budget.



Supplementary Figure 12 Global primary energy supply under various social transformation scenarios.