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Greater gains for Australia by tackling all SDGs but the last steps will be the most challenging

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Greater gains for Australia by tackling SDGs together but final steps most challenging

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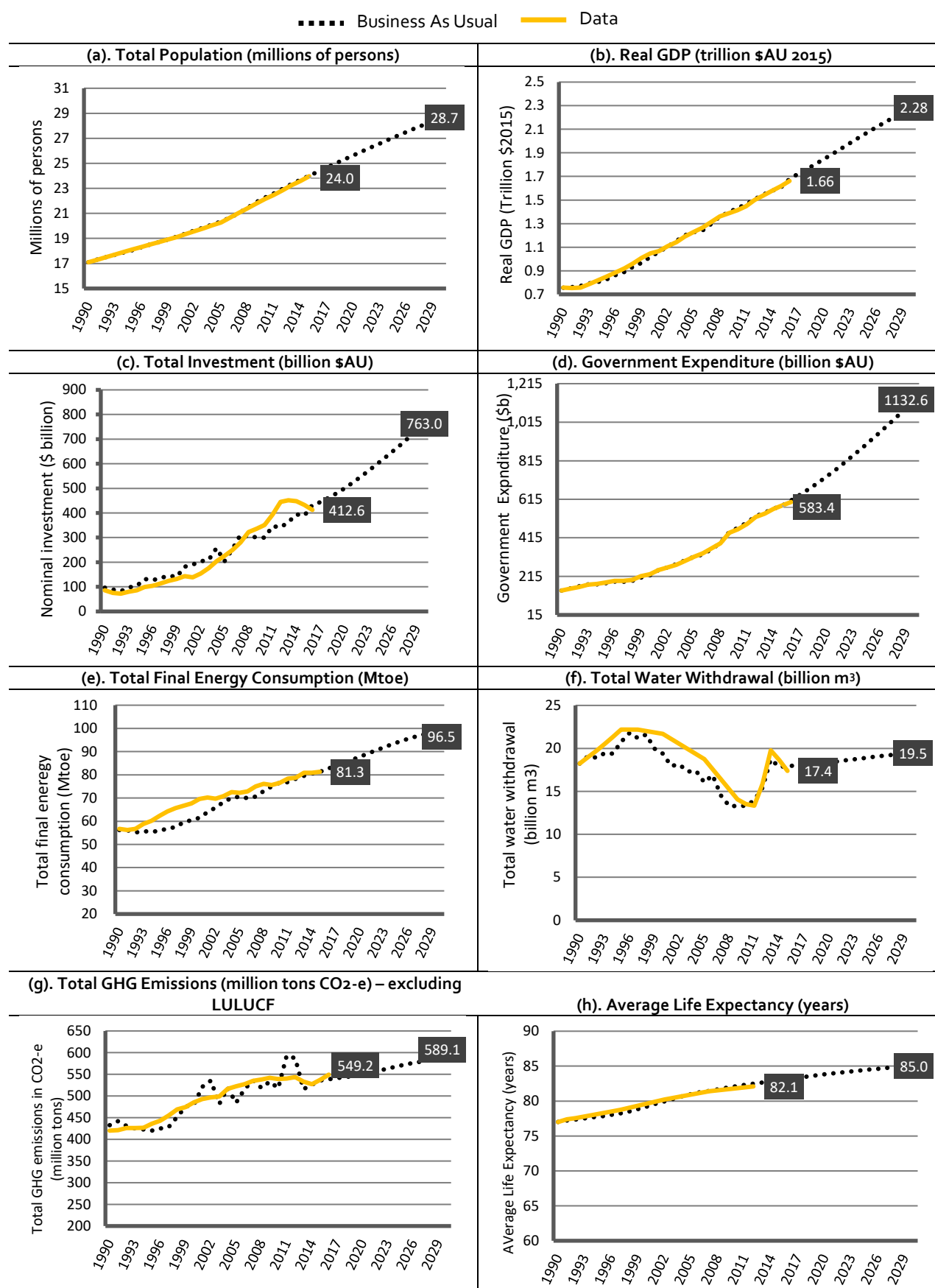
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SUPPLEMENTARY INFORMATION

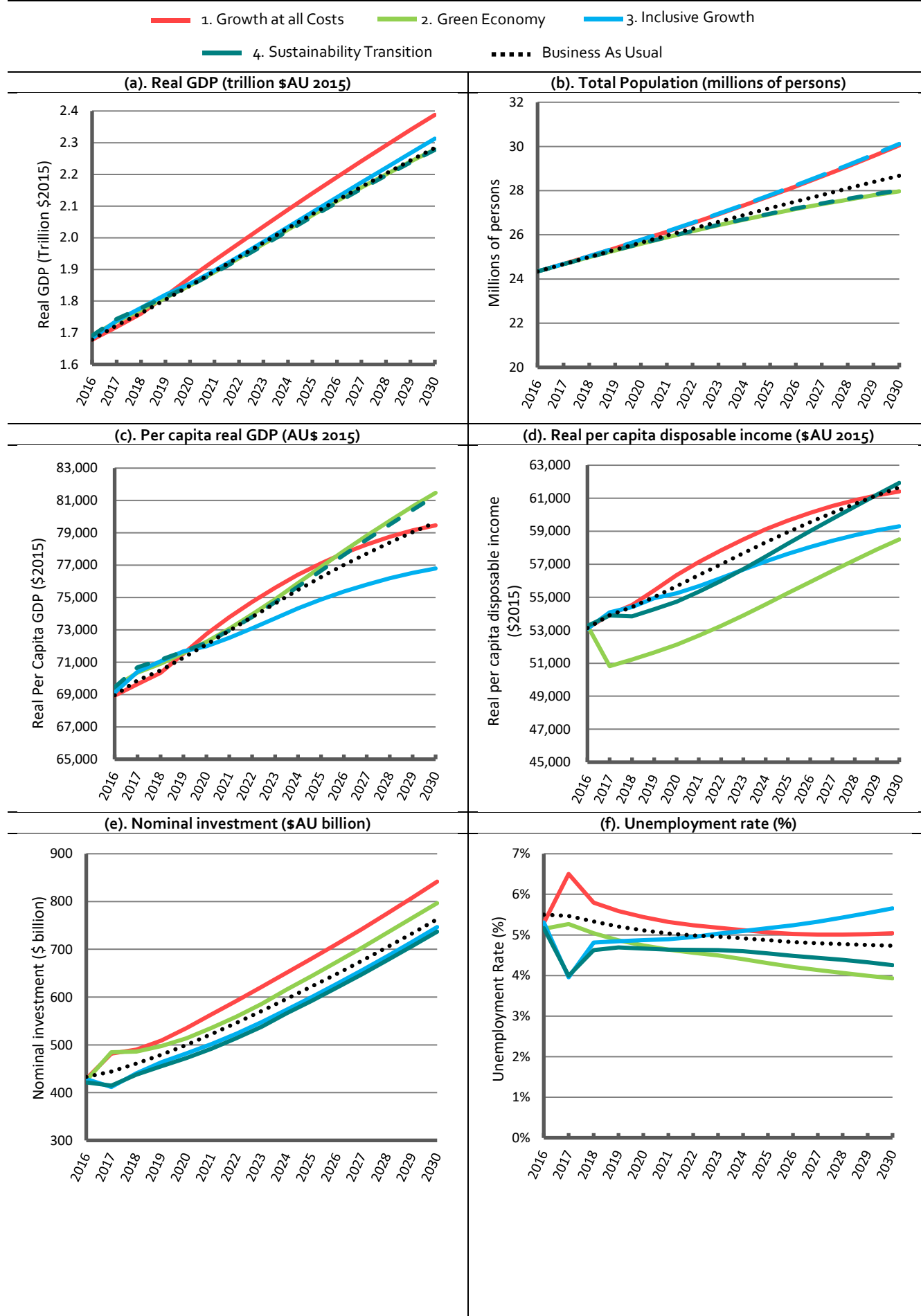
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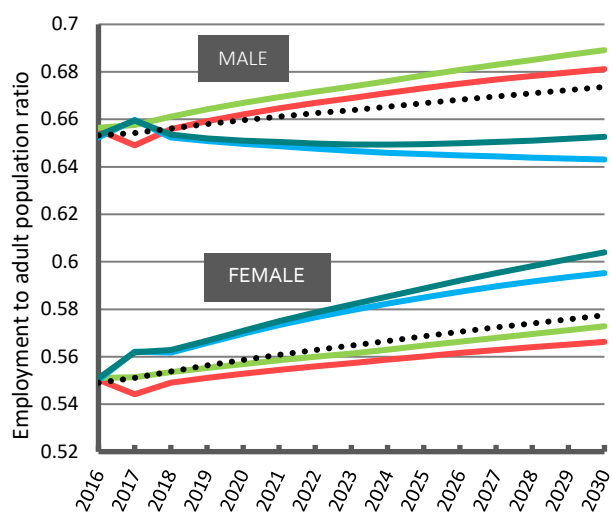
Supplementary Figure 1. Business-as-Usual projections for a selection of variables



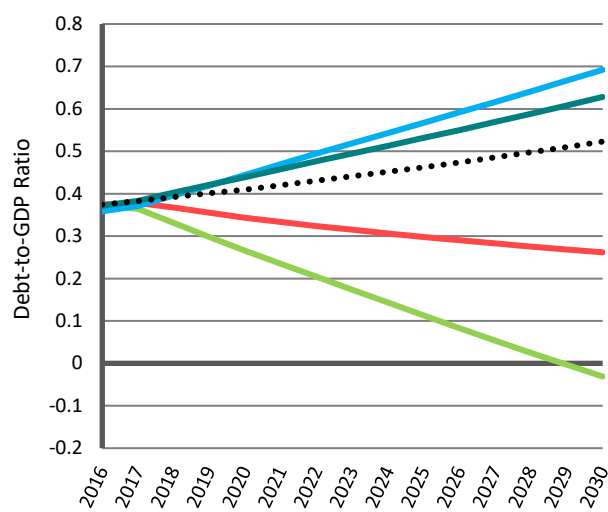
Supplementary Figure 2. Scenario projections for population and headline economic indicators



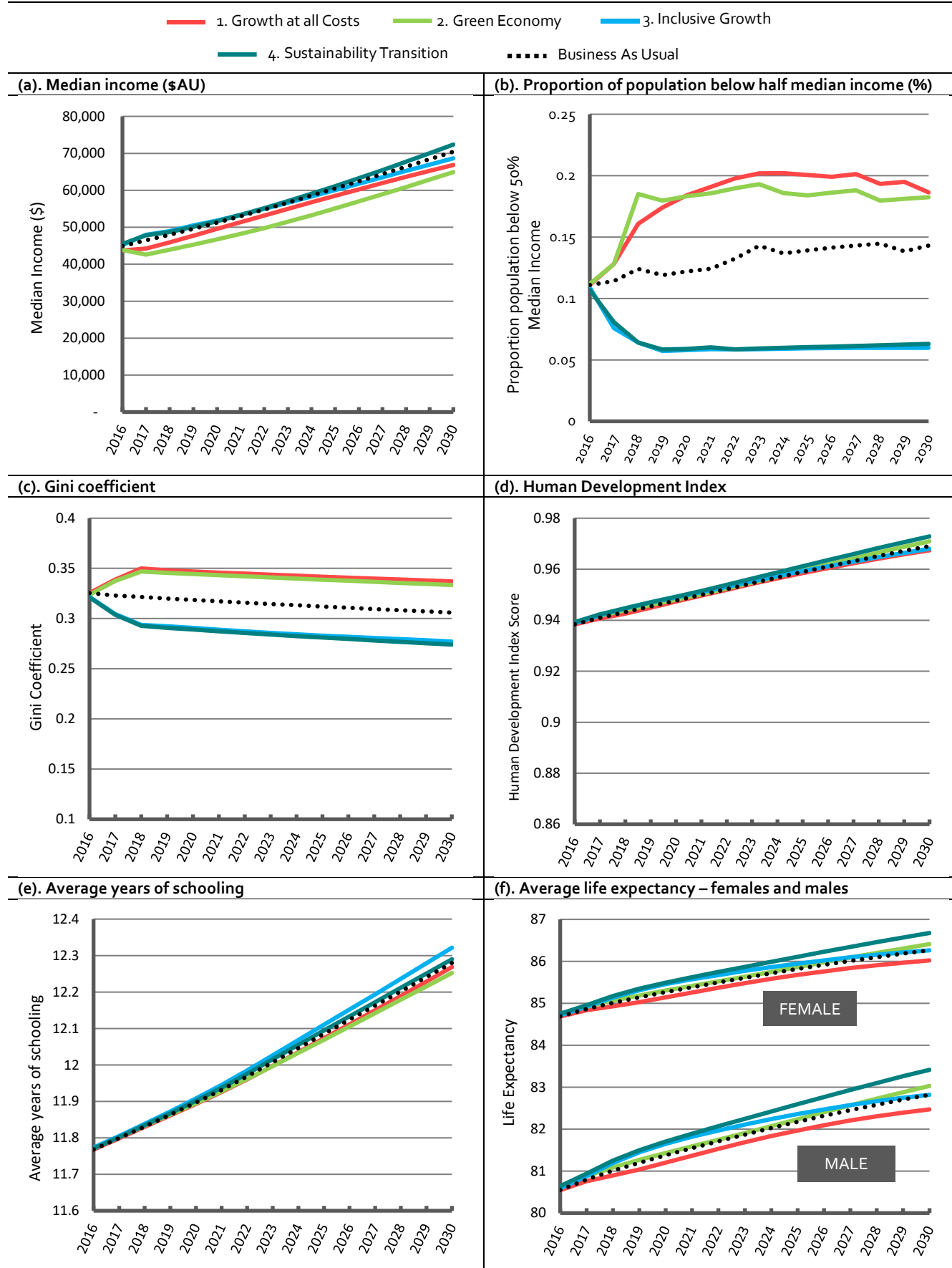
(g). Male and Female Employment-to-Population Ratio



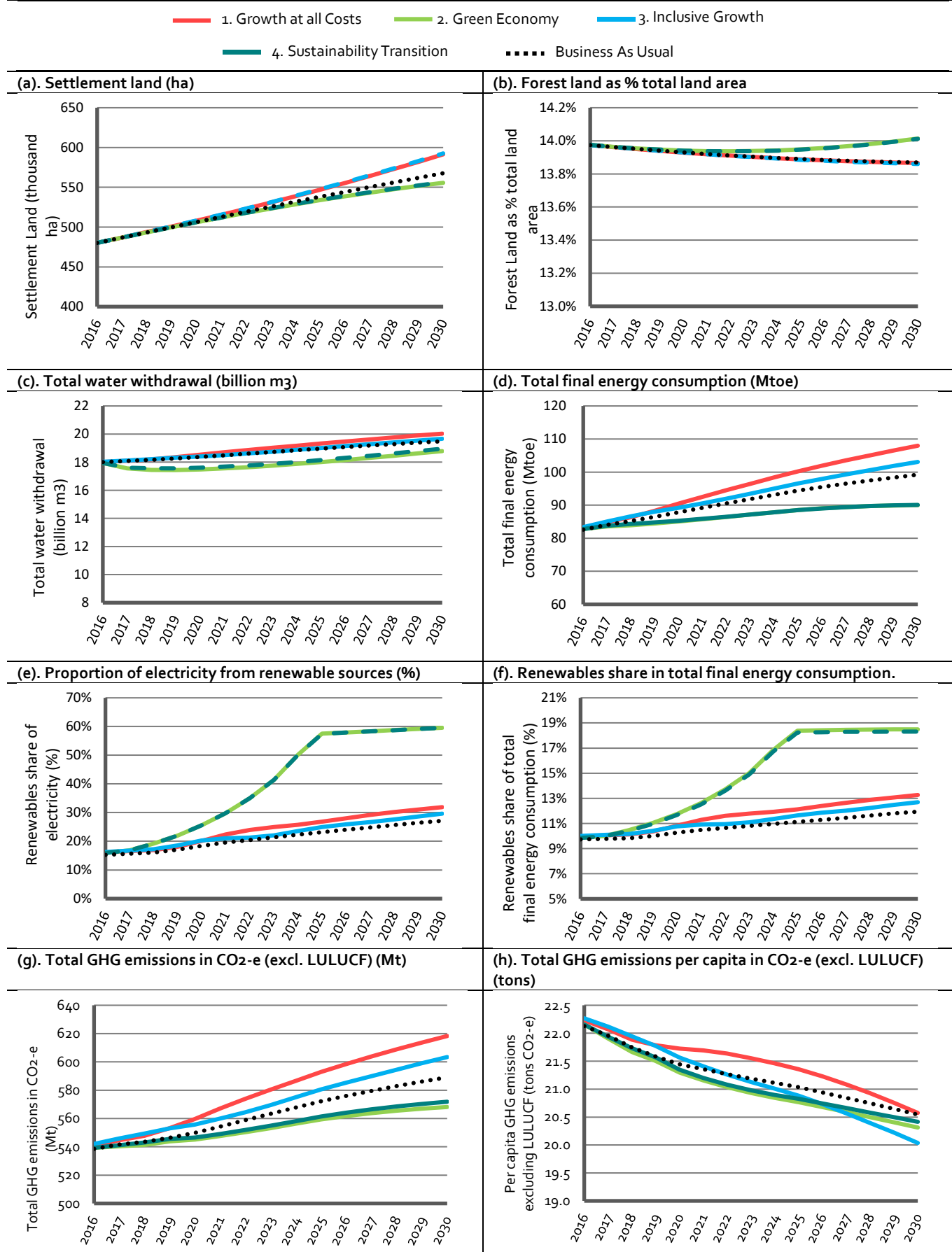
(h). Debt-to-GDP ratio



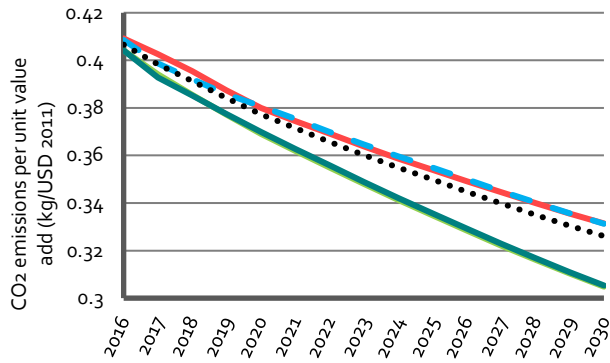
Supplementary Figure 3. Scenario projections for a selection of socio-economic indicators



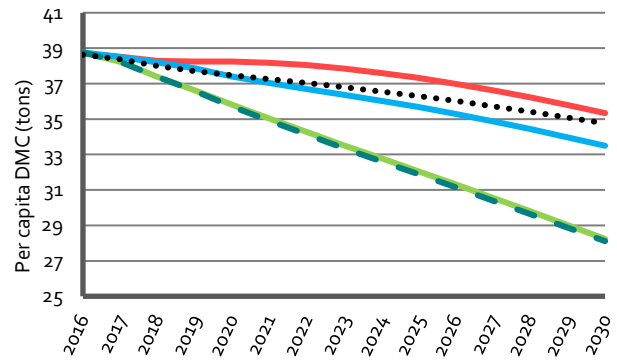
Supplementary Figure 4. Scenario projections for a selection of environmental indicators



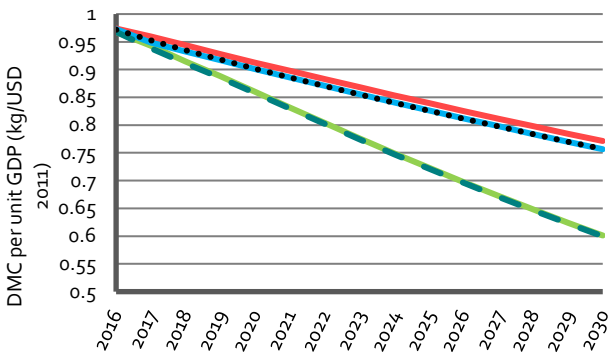
(i). CO₂ emissions per unit value add (kg/USD 2011)



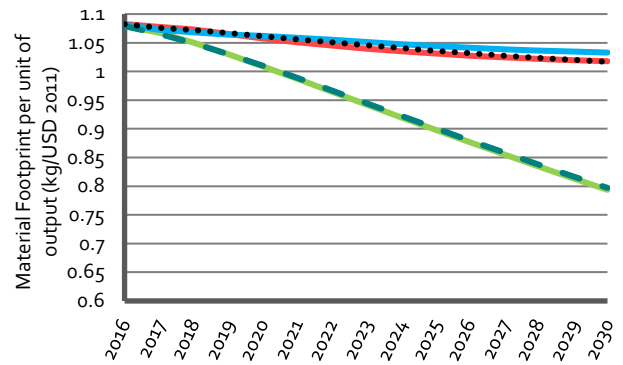
(j). Per capita Domestic Material Consumption (DMC) (tons)



(k). Domestic Material Consumption (DMC) per unit GDP (kg/USD 2011)

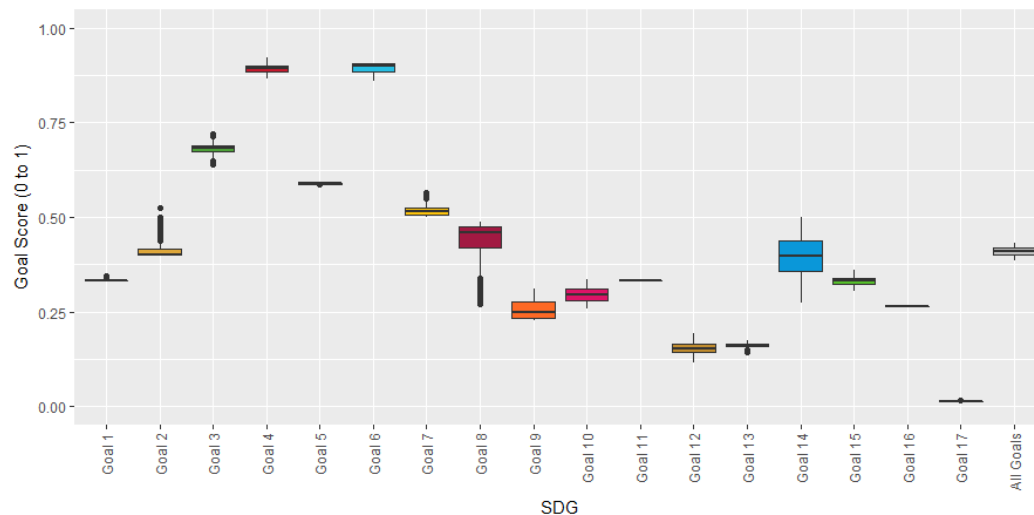


(l). Material Footprint per unit of output (kg/USD 2011)

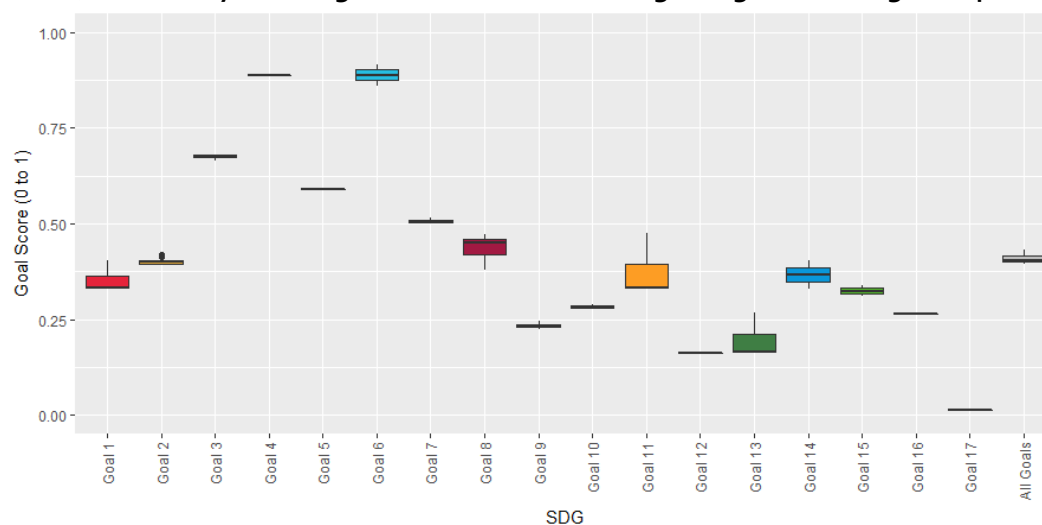


Supplementary Figure 5. Sensitivity analysis of SDG performance results: boxplot frequency distributions from Monte Carlo simulations for: (a) average mining gross value added; (b) expected average global temperature change; and (c) target net migration. Sensitivity of results for goal scores (index scale 0 to 1, where 1 = goal achieved) for each of the 17 SDGs plus the aggregate score for all 17 goals. The line in the box is the median; the edges of the box are the lower range (25th percentile; Q1) and the upper edge (the 75th percentile, Q3), and the whiskers extend to $1.5 \times (Q3 - Q1)$. Outliers represent values beyond the whiskers (i.e. beyond $1.5 \times (Q3 - Q1)$).

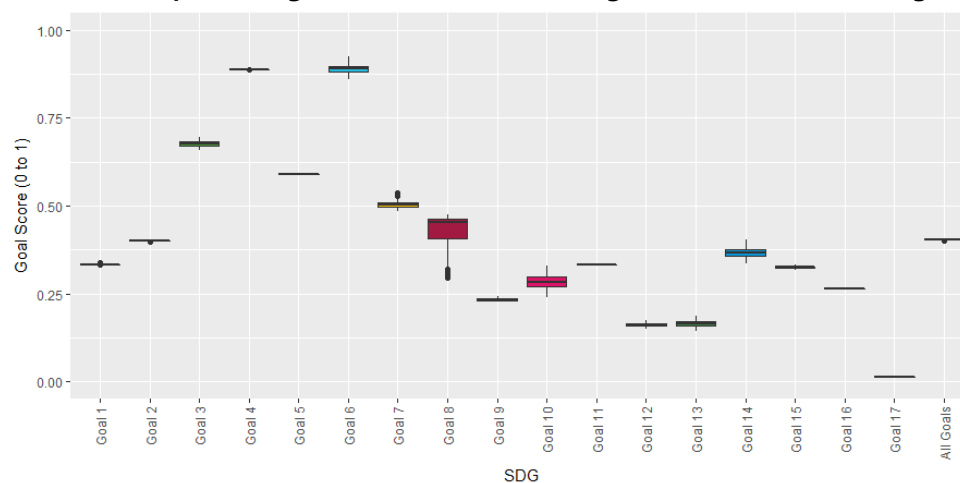
(a) Sensitivity of SDG goal score results to change in mining gross value added



(b) Sensitivity of SDG goal score results to changes in global average temperature

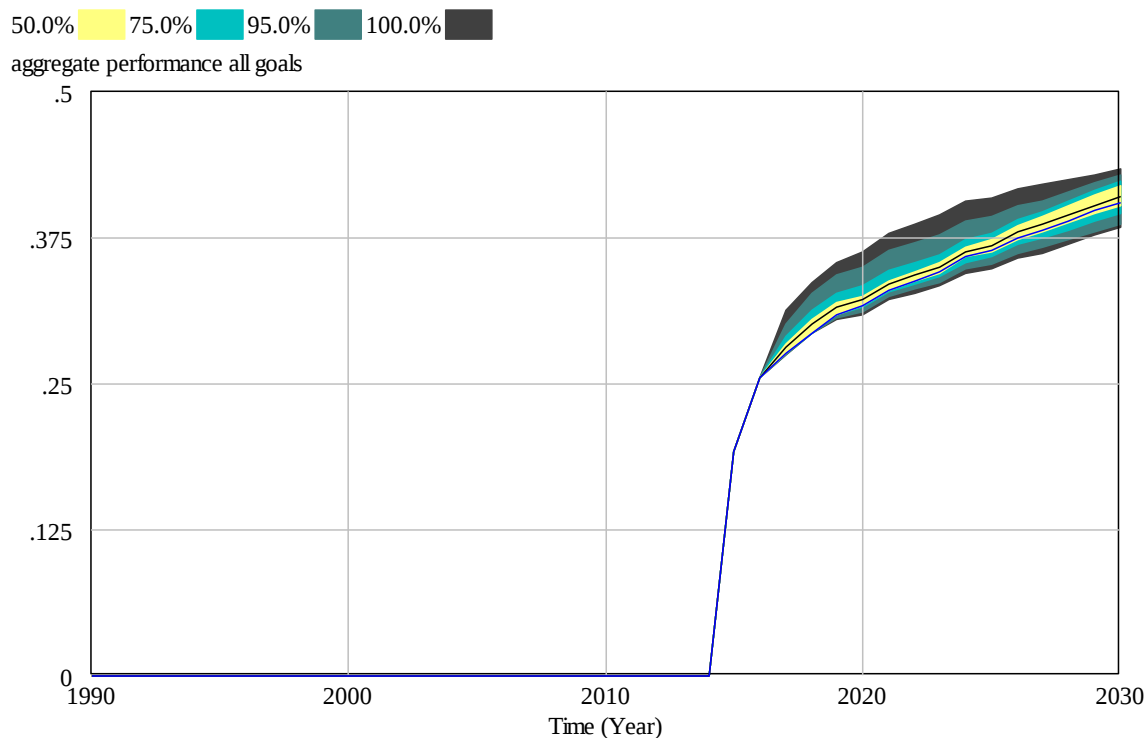


(c) Sensitivity of SDG goal score results to changes in the level of net migration

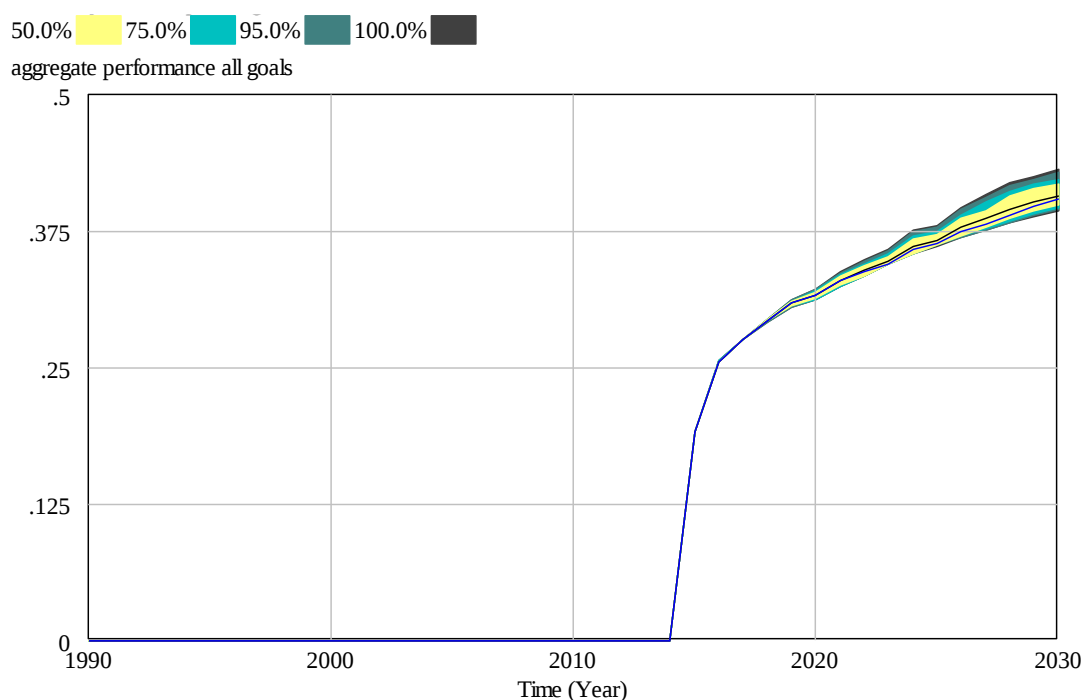


Supplementary Figure 6. Sensitivity simulation graphs for SDG aggregate performance results across all 17 goals (BAU scenario): (a) average mining gross value added; (b) expected average global temperature change; (c) target net migration; and (d) all variables (mining-temperature-migration) combined. All graphs show aggregate goal score for all 17 goals on an index scale (0-1, where 1=all goals achieved). Percentages and corresponding shaded colours represent the confidence bounds for simulation runs (50%, 75%, 95%, and 100%). For example, a confidence bound of 50% means that 50% of simulations fall within this bound, while 25% of simulations have a larger value and 25% have a lower value. Thin black lines represent plotted mean values. Red line in (d) highlights the BAU projection.

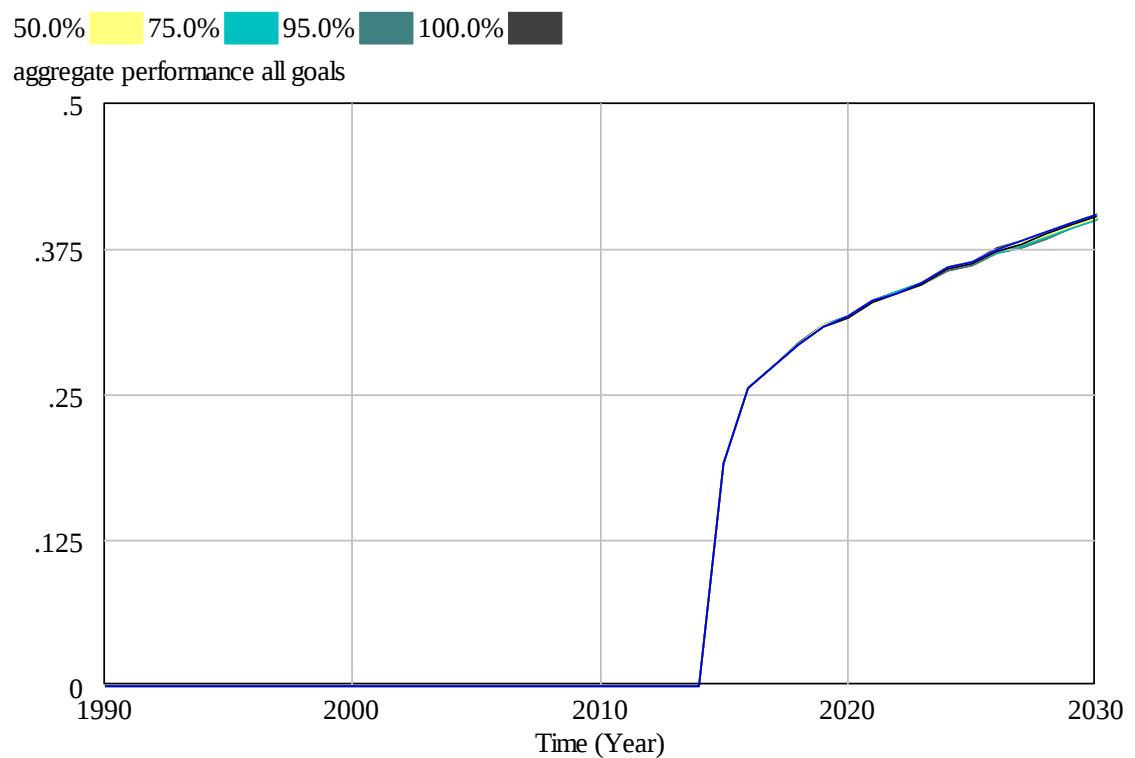
(a) Sensitivity of aggregate SDG goal score results to change in mining gross value added



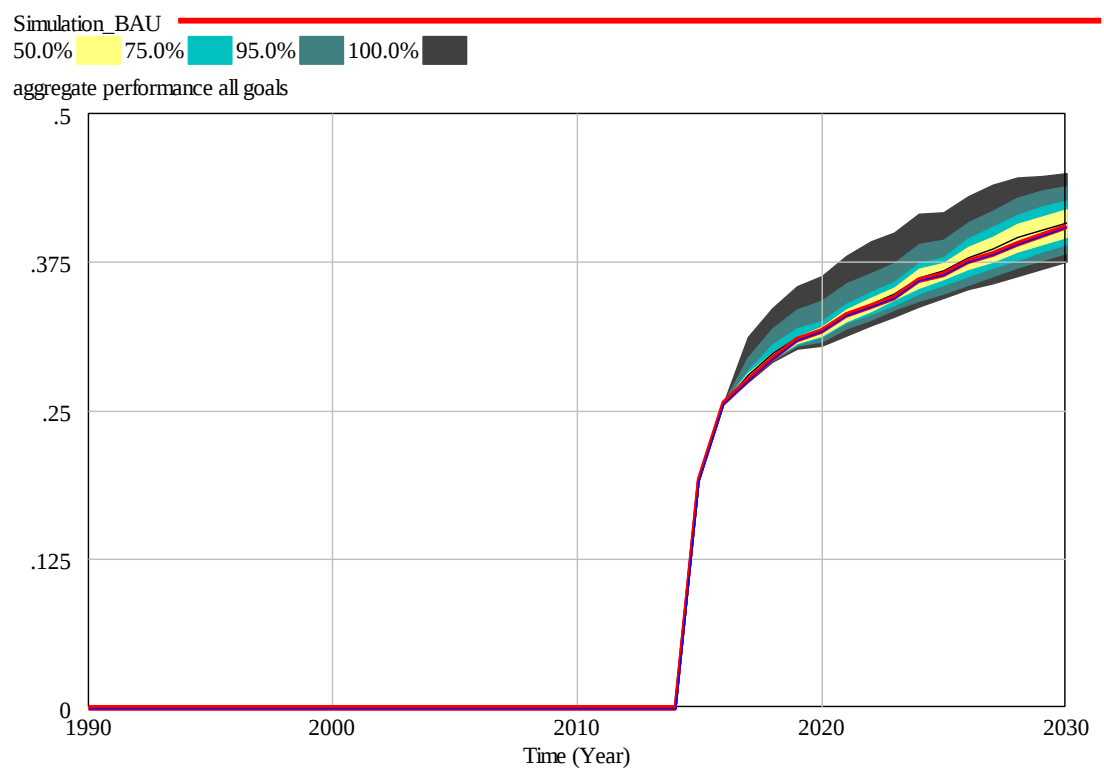
(b) Sensitivity of aggregate SDG goal score results to changes in global average temperature



(c) Sensitivity of aggregate SDG goal score results to changes in the level of net migration

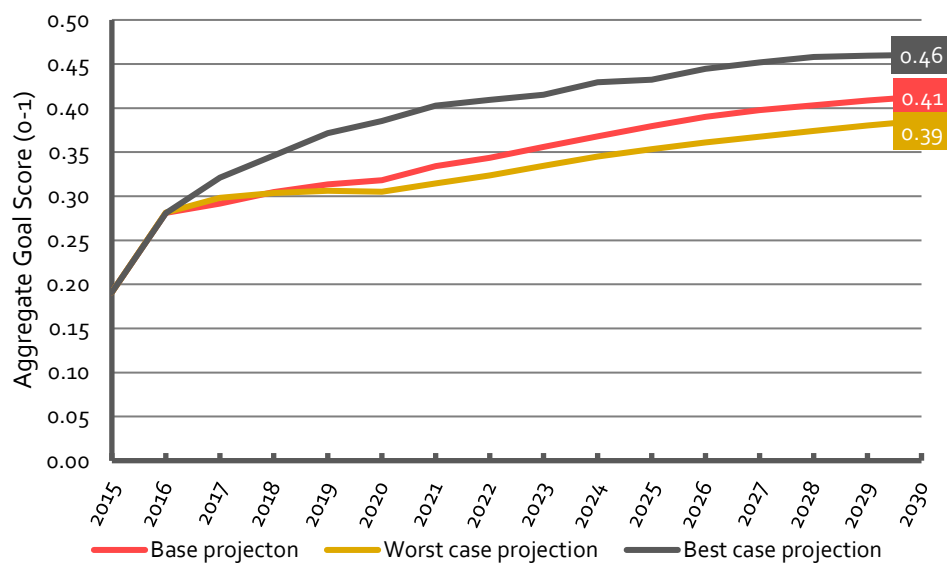


(d) Sensitivity of aggregate SDG goal score results to changes all variables (mining-temperature-migration) combined

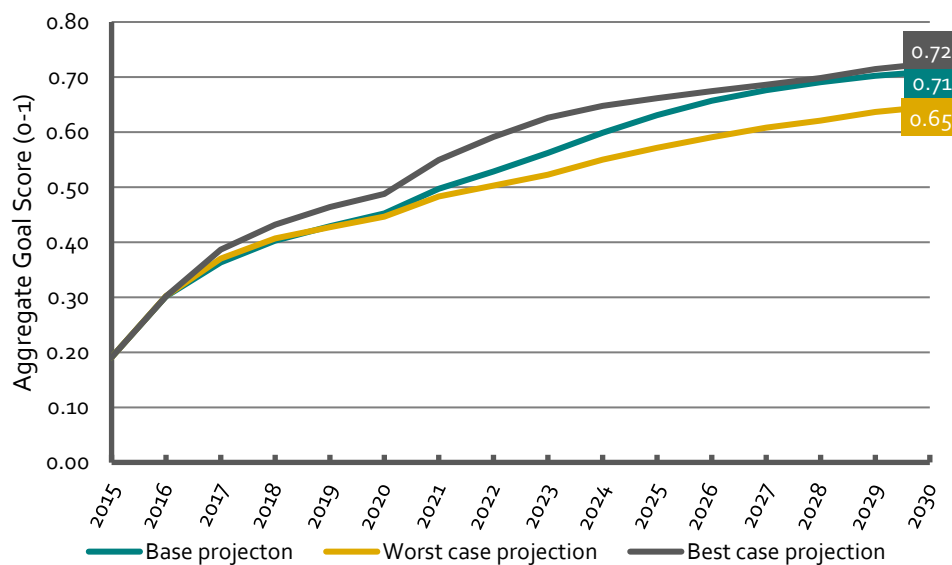


Supplementary Figure 7. Extreme conditions test of Aggregate SDG Score results from Scenarios 1 ('Growth at all costs') and Scenario 4 ('Sustainability Transition') – base case, best case, worst case

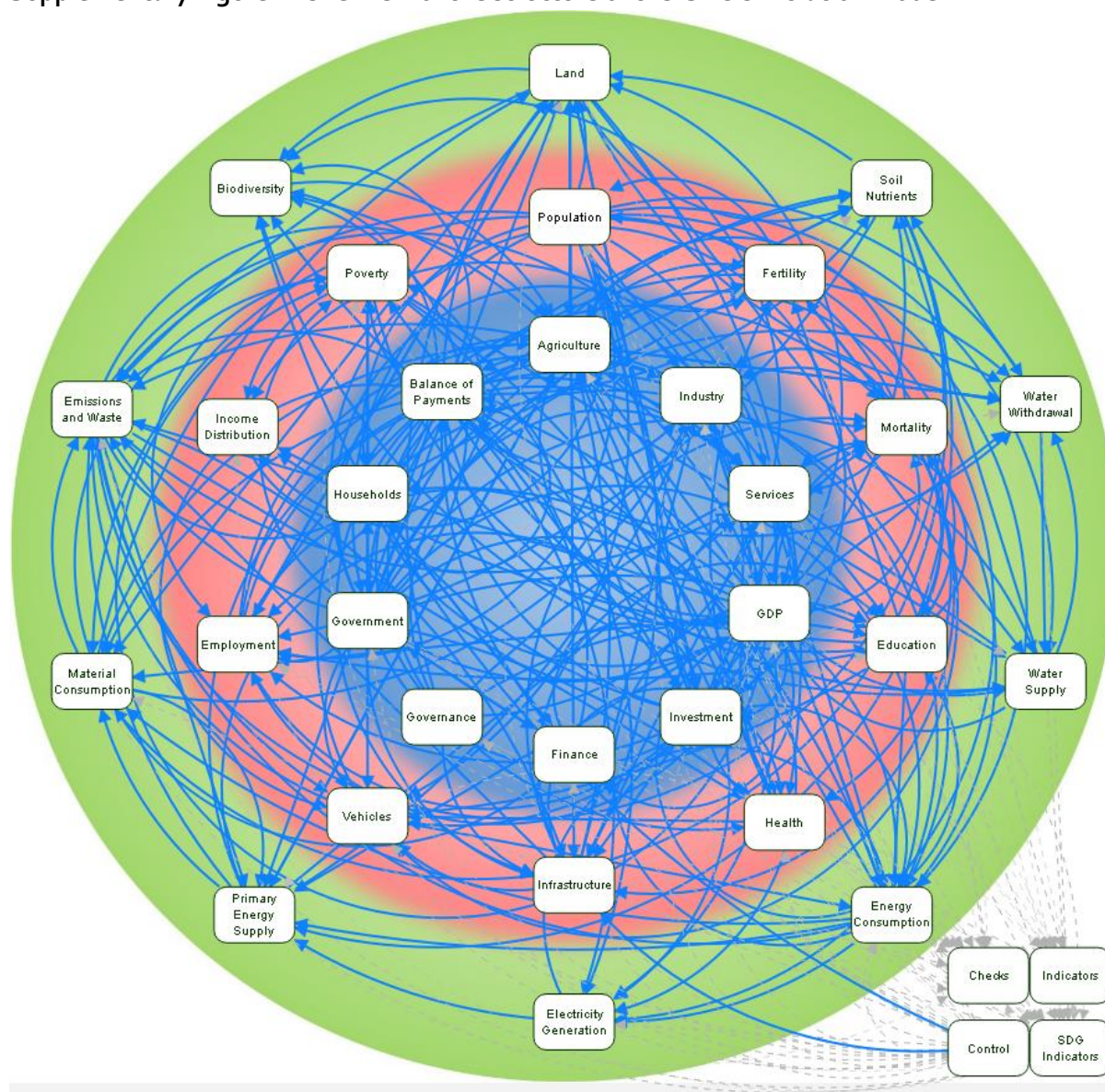
(a) 'Growth at All Costs' scenario – variation in aggregate goal score



(b) 'Sustainability Transition' scenario - variation in aggregate goal score



Supplementary Figure 8. Overview of the structure of the *iSDG* simulation model



Brief description of some key *iSDG* modules in Supplementary Figure 8.

A description of each of the sectoral modules, assumptions and source literature is available in the model documentation (Millennium Institute, 2017). In brief, economic production in the core of the model is divided into agriculture, industry and services (which are further disaggregated by sub-sector) and production is based on Cobb-Douglas production functions which are expanded to include effects of education, health, climate change, governance, infrastructure and other factors on total factor productivity. Investment is endogenously based on public investment, private savings and foreign investment and is allocated across sectors based on the rate of return on investment (Arrow, 1964). Conventional closing rules are used to assure consistency of the macroeconomic framework (Lofgren et al., 2002).

The population module includes endogenous treatment of fertility and mortality along with dynamics for the main factors that influence these variables, while migration is set exogenously. Population is disaggregated into 100 age cohorts and by gender. Births are based on the size of the reproductive age of the population and total fertility rate, while mortality rates are based on income, health, education, exposure to risks and other factors. This also enables estimation of life expectancy.

The government sector is structured according to a standard accounting framework (International Monetary Fund, 2014), with tax and non-tax revenues from the households and private sector used for public consumption, investment and transfers. At a functional level, expenditure is allocated for education, health, agriculture, infrastructure, etc. which represent key policy variables that the analyst can set as a desired

proportion of GDP or per capita level. Additional financing needs of government are met through domestic and foreign financing.

The land sector simulates land use for different purposes based on standard land cover classifications (FAO, 1998) and includes endogenous representation of the main factors that shift land between categories (e.g. capital, labour, population growth, protection/restoration); and the soil sector keeps track of macro nutrients and organic carbon density in the soil based on natural nutrients cycles and agriculture production. The water demand sector simulates medium- to long-term trends in water withdrawal by major category (industry, agriculture, domestic), which is met through water supply from renewable sources in the water supply module. The energy consumption module represents major drivers of national final energy demand from economic sectors, residential, transportation and other uses. Electricity demand is met through the electricity generation module which simulates total electricity production from fossil fuels, nuclear and renewables, with capacity expanding to meet expected future demand. The energy supply sector represents primary energy supply of gas, oil, coal, biomass and electricity based on the International Energy Agency's energy balances (International Energy Agency, 2016). Demographic and economic growth and energy consumption are then used to calculate material consumption, emissions, and waste.

Finally, SDG expenditure, financing and performance modules are used to introduce additional SDG expenditure and financing interventions, as well as calculating SDG performance at the indicator and aggregated levels.

Supplementary Table 1. Narrative descriptors for each of the five national scenarios

SCENARIO	NARRATIVE DESCRIPTOR
Scenario 1: Growth at all Costs (SSP5, SSP4)	Australia (and countries around the world) focus primarily on economic growth as the fundamental development goal. Growth is strongly coupled to resource and energy extraction and consumption due to material-intensive lifestyles and consumption patterns, including high food, energy, water and transportation demand. Population also rises more rapidly through 'Big Australia' policies (increased migration and fertility) for greater global economic influence. Australian Government policy does not adequately intervene to address climate change or inequality beyond existing measures. Emphasis is on free enterprise, and the role, size and expenditure of government is reduced somewhat over time, particularly in provision of social services and redistribution, and environmental management. Taxes on international trade, income and profits are lower, with government expenditure targeted at industrialisation and 'brown' infrastructure. Gender and equity policies are not adopted. Growing resource intensity and fossil fuel dependency along with difficulty in achieving international cooperation and slow technological change result in increased GHG emissions and global temperatures and related extreme events. Rising inequality and inaction on climate change result in greater political instability, while a decline in government budgets reduces government's role and effectiveness.
Scenario 2: Green Economy (SSP2, SSP1)	Australia remains focused on achieving sufficient economic growth to support continuous job creation, while addressing goals related to sustainable consumption and production, resource efficiency, clean energy and climate change. Economic value creation decouples from material consumption and final energy demand. This is combined with a strong modernization of energy, water and material resource use due to technological development, lifestyle changes and policies supporting renewable energy and efficiency improvements. Investment in environmental technology and changes in tax structures and incentives lead to improved resource efficiency, reducing overall energy and resource use and improving environmental conditions over the longer term. These technologies are subject to more rapid technological improvements. The rate of population growth slows due to reduced migration and increasing awareness of environmental limits and unsustainable consumption patterns. Action in Australia to mitigate GHGs is accompanied by action around the world, with technological change and declining emissions. Global demand for fossil fuels and other resource exports slows. Government investment in health and education remains moderate, but limited Government focus on income distribution, poverty, equity and inequality. Additional government and private investment directed at environmental objectives.
Scenario 3: BAU (SSP2)	Business as Usual projection based largely on existing trends. Assumes that the main drivers and variables continue in line with recent national and global trends, including energy and water efficiency, resource consumption, economic growth, government expenditure and policy. No additional attention is given to the SDGs or particular goals.
Scenario 4: Inclusive Growth (SSP5, SSP1)	Australia is focused on achieving strong economic growth along with goals relating to poverty, gender, and income inequality. Economic value creation remains coupled to energy, water and resource consumption. Larger investments are allocated to health, education, social inclusion, institutions, and enhancing human and social capital. Technological improvements in green technology, efficiency improvements and sustainable production are slower, and government policy incentives and expenditure provide little assistance in these areas. Growth in energy, water and resource consumption continues along historic trends, with slower modernization of the final energy mix. Population rises at a higher rate with more generous social policies stimulating a higher fertility rate and increased migration. Government policy and expenditure target equity and income equality, and an increased relative fiscal pressure on higher income earners and away from low income earners. Subsidies and transfers as % GDP are increased, with redistribution favouring lower income earners. A lower priority for environmental concerns and resource-related goals leads to ongoing environmental degradation, lower investment in renewables and resource efficiency, and higher GHG emissions.
Scenario 5: Sustainability Transition (SSP1)	Australia and the world shift toward a more sustainable path, emphasizing more inclusive development that respects environmental boundaries. An increased commitment to the SDGs in Australia and globally, with a focus in Australia on goals relating poverty and inequality, climate change, water, energy and resource consumption, as well as economic development and innovation. Increasingly effective and persistent cooperation and collaboration of local, national and international organisations, the private sector and civil society. The emphasis shifts from economic growth toward a broader consideration of human wellbeing, even at the expense of slower growth over the long-term. Population rises more slowly, with lower levels of migration and fertility. Investment in environmental technology and changes in tax structures lead to reduced consumption, improved resource efficiency, reducing overall energy and resource use and improving environmental conditions over the longer term. Economic value creation decouples from resource and material consumption and final energy demand. Global demand for fossil fuel and other resource exports slows. This is combined with a strong modernization of energy use due to technological development, lifestyle changes and policies supporting energy efficiency improvements. Government taxes and fiscal policy target consumption and pollution, as well as redistribution of the income tax burden from lower towards higher income households. Greater investment in public transport, energy efficiency, and renewables as well as social sectors (education, health, subsidies/transfers). A well-resourced and effective government plays a stronger role in steering the transition, and greater political stability.

Supplementary Table 2. Summary of main drivers and associated qualitative and quantitative assumptions and policy settings

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
1. Demographics	Assumption	Population growth	Medium	Relatively Low	Existing trends [28.7m]	Medium	Relatively Low	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Fertility	Medium (~1.9)	Low (~1.7)	Existing trends [1.7]	Medium (~1.9)	Medium (1.7)	Australian Bureau of Statistics (ABS) fertility data for Australia 1990- 2017 (ABS, 2017b); parameterised based on low and medium historic values.
	Assumption	Mortality	Medium	Medium	Existing trends	Low	Low	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Migration	High	Medium	Existing trend	High	Medium	Qualitative. Based on scenario narratives.
	Assumption	Urbanization	High	Medium	Historical pattern	Medium	High, well-managed	Qualitative. SSP narratives (O'Neill et al., 2017)
	Policy	Annual net migration target 2030 per 1,000 people*	Increasing to 350,000/year by 2030 (11.8 per 1000 people)	100,000 per year by 2030 (3.6 per 1000 people)	7 per 1,000 [200,000 per year by 2030]	Increasing to 350,000 per year by 2030 (11.8 per 1000 people)	100,000 per year by 2030 (3.6 per 1000 people)	ABS net migration data for Australia 1990-2017 (ABS, 2018a). Parameterised based on moderate to high historic values.
2. Human development	Assumption	Education	Medium/unequal	Medium	Existing trends	High	High	Qualitative. SSP narratives (O'Neill et al., 2017)
	Assumption	Access to health	Low-medium (private focus)	Medium	Existing trends	High	High	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Gender equality/equity	Medium	Medium	Existing trend	High	High	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Social cohesion	Low-medium; stratified	Medium	Existing trend	High	High	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Societal participation	Medium	Medium	Existing trend	High	High	Qualitative. SSP narratives (O'Neill et al., 2017).
	Policy	Education expenditure (% GDP)	5% pa (-0.609%)	5.5% pa	5.609% pa	6% pa	6% pa	ABS Government Finance Statistics (ABS, 2017f) data 1990-2016 general government education expenditure; moderate to high expenditure parameterised from ABS and OECD data (OECD, 2015) for

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								general government education expenditure.
	Policy	Health expenditure (% GDP)	7% pa (-0.88%)	7.5% pa	7.88% pa	8.2% pa	8.2% pa	ABS Government Finance Statistics (ABS, 2017f) data 1990-2016 general government health expenditure; moderate to high expenditure parameterised from ABS and OECD data (OECD, 2015) for general government health expenditure.
	Assumption	Gender - Target effect of Social & Market framework	Medium (0.1)	Medium (0.1)	0.08	High (0.03)	High (0.03)	SSPs narratives. Parameterised based on iSDG model settings (Millennium Institute, 2017); adjusted for higher/lower gender equality.
	Assumption	Political stability	Low 0.9	Moderate 1.3	0.9639	Moderate 1.3	High 1.8	World Bank Worldwide Governance indicator data (Kaufman and Kraay, 2016) for Australia (1990-2016); parameterised based on low-high global benchmark values for Political Stability indicator. Scores -2.5 to +2.5; Global Max (2015) = 1.94
	Assumption	Voice and accountability	Moderate 1.2	Moderate 1.2	1.301	High 1.5	High 1.5	World Bank Worldwide Governance indicator data (Kaufman and Kraay, 2016) for Australia (1990-2016); parameterised based on low-high values for Voice and Accountability indicator. Scores -2.5 to +2.5; Global Max (2015) = 1.69
	Policy	Redistribution of fiscal pressure (Relative fiscal pressure by percentile)*	Reduction for middle-high income (0.6, 1, 1.4, 1.5, 1)	Reduction for middle-high income (0.6, 1, 1.4, 1.5, 1)	Existing trend (0.5, 1, 1.45, 1.55, 1.2)	Increase for high income earners/decreased for low income earners (0.2, 1, 1.45, 1.55, 1.3)	Increased for high/decreased for low income earners (0.2, 1, 1.45, 1.55, 1.3)	Parameters based on iSDG model settings (Millennium Institute, 2017) calibrated on income distribution and poverty data from ABS

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								household income and wealth data (ABS, 2017i) and HILDA survey data (Melbourne Institute, 2018). Adjusted for additional fiscal pressure on high/low income quintiles.
	Policy	Subsidies & transfers (% GDP)*	Low (0.10)	Low (0.10)	Existing trend 13.2% (0.132)	High (0.15)	High (0.15)	ABS Government Finance Statistics (ABS, 2017f) data 1990-2016 general government expenditure on subsidies/transfers. Parameterised based ABS data low-high estimates and OECD social expenditure data (OECD, 2018a).
	Policy	Redistribution of subsidies (subsidies & transfers distribution curve)*	Reduction overall (1,1; 100,1) No change	Reduction overall (1,1; 100,1)	Existing trend (1,1; 100,1)	Higher for low-income (1,1; 100,0.9)	Higher for low-income (1,1; 100,0.9)	Parameterised based on iSDG model settings (Millennium Institute, 2017) with adjustments to increase share to low-income earners.
3. Economy and lifestyle	Assumption	Growth (real GDP per capita)	High	Medium	Existing trend [\$79,600 (\$ 2015)]	Medium	Medium	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Inequality (Gini coefficient)	Medium-High	Medium-High	Existing trend (Gini 0.304)	Low	Low	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	International trade & globalization	High	Moderate	Moderate	Moderate	Moderate	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Consumption and diet	Material-intensive	Low growth in material consumption	Existing trend [PC-DMC: 34.8]	Material-intensive	Low growth in material consumption	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Demand for resources – exports and consumption	Increase on BAU: +13% coal +5% gas +7%: metal ores (+7.5% mining GVA: \$160bn)	Decrease on BAU: -13% coal -5% gas -7%: ores (-7.5% mining GVA: \$137bn)	Existing trend ABARES BAU Coal production: 780.4 M st/year Oil: 74.55 Mbl/year Gas: 3,904.1 Bcf/year Ores: 1.5 bn tons/year Mining GVA = real \$148.1bn	Increase on BAU: +13% coal +5% gas +7%: ores (+7.5% mining GVA: \$160bn)	Decrease on BAU: -13% coal -5% gas -7%: ores (-7.5% mining GVA: \$137bn)	Production data from CSIRO material flows data (West and Lieber, 2018) for Australia 1990-2017; IEA energy balance for Australia (International Energy Agency, 2016) 1990-2016; and ABS mining and economic data 1990-2016 (ABS, 2017j, ABS, 2017d).

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								Parameterised based on government projections (Syed et al., 2010, Resources 2030 Taskforce, 2018) and global SSP projections from IMAGE (Riahi et al., 2017). GLOBAL: SSP global energy 2030 projections (IMAGE): Coal: 13% increase or decrease Fossil energy: 7% increase or decrease. Gas: 5% difference Oil: 3.5% difference Iron ore (Resources 2030 Taskforce, 2018): 13% increase in global demand by 2030; Other ores: 16-52% ABARES: Syed et al. (2010) – projections assumes real price stability (=avg for 2000-15)
	Assumption	Demand for agriculture – exports & consumption: crops (prices AU\$ 2015 per ton)	Price decline in real terms on BAU (-10%) Cereals: \$208.98 Rest: \$360.72	Real prices stable	Existing trend Cereals: \$232.2 Rest: \$400.8 Real prices stable.	Price decline in real terms on BAU (-10%) Cereals: \$208.98 Rest: \$360.72	Real prices stable	Agricultural commodity data from for Australia from FAOSTAT database (FAO, 2017). Parameterised based on OECD and FAO (2017) Agricultural Outlook. Real prices to be constrained by supply growth, stocks, weakening demand. Global cereal production and consumption to expand by 13% to 2027. Prices for major cereals to remain stable or decline slightly in real terms.

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								Cereals compound annual growth rate (CAGR) (1990-2015): 0.73% pa; total 19%. Rest CAGR: 2.61% pa; total 85.6%
		Demand for agriculture exports & consumption – meat: (prices AU\$ 2015 per ton)	Price decline in real terms on BAU (-10%) Livestock: \$366.48 Fish: \$10,125.9	Real prices stable	Existing trend Livestock: \$407.2 Fish: \$11,251 Real prices stable.	Price decline in real terms on BAU (-10%) Livestock: \$366.48 Fish: \$10,125.9	Real prices stable	Agricultural commodity data from for Australia from FAOSTAT database (FAO, 2017). Parameterised on OECD and FAO (2017) Agricultural Outlook. Meat production to increase by 15% by 2027; fish by 13%. Prices for meat to remain stable or decline slightly in real terms. Fish prices stable in real terms. Livestock CAGR: -1.45% pa; total -30.6% Fish CAGR: 1.24% pa; total 36%.
	Assumption	Forestry production (Au\$ 2015; total value)	Increased log availability BAU +15% \$4.02 bn	Decreased log availability BAU \$3.353	Existing trend (\$3.353 bn +5%) \$3.521 bn	Increased log availability BAU +15% \$4.02 bn	Decreased log availability BAU \$3.353	Forestry production data from ABS National Accounts GVA by industry (ABS, 2017d). Parameterised based on ABARES (2015) Forestry Outlook. BAU scenario – no change in growth rate (5% to 2030). Productivity scenario with increased log availability (+15% to 2030); Constrained scenario with decreased log availability (no increase). Forestry production CAGR (1990-2015): 0.28%; Total 7.1%
	Assumption	Interest rates on debt (domestic/foreign)*	Maintain	Maintain	Existing trend 3.8%	Maintain	Maintain	General government interest payments based on IMF government finance data for

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								Australia (IMF, 2017) Stabilised across all scenarios.
	Policy	Tax rate on international trade (Taxes on int'l trade as share of imports; Additional taxes on international trade as share of GDP)*	Low (% Imports: 0.03; no additional tax)	Low-Medium (% Imports 0.04; no additional tax)	Existing trend Share imports: 4.03% Share GDP: 0.82%	Medium- (% imports 0.05; share GDP+0.2%)	Medium (% imports 0.05; share GDP+0.2%))	International trade tax rates based on IMF data for Australia 1990-2016 (IMF, 2017). Low-medium parameters estimated based on BAU and timeseries data.
	Policy	Infrastructure expenditure (% GDP – transport; SDG expenditure paved road; SDG expenditure rail as % GDP)	High for roads (0.02; +road expenditure 0.4% GDP)	High for public transport (0.02; + rail 0.4% GDP)	Existing trend 1.583% GDP (0.01583)	High (0.02; + road 0.2%, +rail 0.2% GDP)	High for public transport (0.02; + rail 0.4% GDP)	ABS Government Finance Statistics (ABS, 2017f) and road/rail expenditure statistics (BITRE, 2016) 1990-2016 general government expenditure on transportation infrastructure. Parameterised based on historic data and high estimates for road or rail above BAU.
	Policy	Tax rate on income and profits (% GDP; additional taxes on income and profits as % GDP)*	Low (0.15; no additional)	Moderate (0.17; no additional)	Existing trend 17.13% GDP 0.1713	High (+2% = 0.1913)	Medium (+1% = 0.1813)	Tax rate on income and profits based on IMF data for Australia 1990-2016 (IMF, 2017). Low-medium parameters estimated based on BAU and timeseries data.
	Policy	Tax rate on consumption (GST) (% GDP; additional taxes on consumption as % GDP)*	Low 4.5% GDP (-1.321%)	High 7.5% GDP (+1.68%)	Existing trend 5.82% GDP 0.05821	Medium (no change)	High 7.5% GDP (+1.68%)	Tax rate on consumption based on IMF data for Australia 1990-2016 (IMF, 2017). Low to high parameters based on BAU and timeseries data.
4. Environment & natural resources	Assumption	Fossil constraints	None	Shift away from fossil fuels	Existing trend	None	Shift away from fossil fuels	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Environment	Serious degradation	Improving conditions over time	Existing trend Forest cover: 13.8% SoC: 0.00313 Biodiversity: 0.8	Continued degradation	Improving conditions over time	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Land use	Limited regulation; continued deforestation; rapid conversion of land	Strong regulations to manage environmental trade-offs;	Existing trend	Limited regulation; continued deforestation; rapid	Strong regulations to manage environmental trade-	Qualitative. SSP narratives (O'Neill et al., 2017).

SCENARIOS								
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	Source/Notes for Quantitative Settings
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
			for agriculture/settlements	reforestation increases forest area		conversion of land for agriculture/settlements	offsets; reforestation increases forest area	
	Assumption	Agriculture	Increase in large-scale farming; highly managed, resource-intensive; productivity limited by climate	Increased spread of sustainable farming practices, water efficiency and productivity	Existing trend	Increase in large-scale farming; highly managed, resource- intensive; productivity limited by climate	Increased spread of sustainable farming practices, water efficiency and productivity	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Electricity capacity costs	No change	No change	Existing trend (CSIRO cost projections; EIA) 2030 estimates (USD10/kw): Oil: 982.5 Gas: 982.5 Coal: 2,000 Wind: 1,182 Solar: 657 Nuclear: 6,100 Bio: 2,465	No change	No change	Electricity capacity costs based on CSIRO data and cost projections for Australia (Hayward and Graham, 2017) and global cost projections (International Renewable Energy Agency, 2012).
	Policy	SDG Expenditure on small-scale solar (% GDP)	None	Additional \$2 bn/pa 0.124% GDP/pa (90% private; 10% public) [0.124 to 2025; 0.08 to 2030]	None	None	Additional \$2 bn/pa 0.124% GDP/pa (90% private; 10% public) [0.124 to 2025; 0.08 to 2030]	Additional expenditure parameterised based on recent solar investment data from Clean Energy Council (2018): 172,000 PV installations 1.1GW in 2017 Approx. \$2.5 bn in 2017 (Total = 6.6GW capacity in 2017) Clean Energy Finance Corporation (CEFC): \$10bn
	Policy	SDG Expenditure for large-scale solar (% GDP)	None	Additional \$2 bn/pa 0.124% GDP/pa (90% private; 10% public) [0.125 until 2023]	None	None	Additional \$2 bn/pa 0.124% GDP/pa (90% private; 10% public) [0.125 until 2023]	Additional expenditure parameterised based on recent solar investment data from Clean Energy Council (2018). \$1.3bn investment in 2017
	Policy	SDG Expenditure for vehicle efficiency	None	~\$1bn/pa additional 0.0621% GDP/pa	None	None	~\$1bn/pa additional 0.0621% GDP/pa	Additional expenditure parameterised based on Commonwealth of Australia

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
				[0.0621 to 2025; 0.04 to 2030]			[0.0621 to 2025; 0.04 to 2030]	(2016) data on fuel efficiency. Three schemes, total costs of \$6bn to \$16.2 bn. Abatement of 25Mt to 65Mt CO ₂ by 2030.
	Policy	SDG Expenditure for energy efficiency of industry	None	~\$500m/pa additional 0.031% GDP/pa [0.031 to 2025; 0.02 to 2030]	None	None	~\$500m/pa additional 0.031% GDP/pa [0.031 to 2025; 0.02 to 2030]	Additional expenditure parameterised based on The Climate Institute (2008): Expanded National Energy Efficiency Program costs \$2.1bn/pa (\$2015); split 50/50 across industry & households
	Policy	SDG Expenditure for energy efficiency households	None	~\$500m/pa additional 0.031% GDP/pa [0.031 to 2025; 0.02 to 2030]	None	None	~\$500m/pa additional 0.031% GDP/pa [0.031 to 2025; 0.02 to 2030]	As above. (The Climate Institute, 2008): split 50/50 industry and households
	Assumption	Environment (Forest cover % land area; SoC density; Benefits index for biodiversity)	Serious degradation	Improving conditions over time	Existing trend	Continued degradation	Improving conditions over time	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Land use	Limited regulation; continued deforestation; rapid conversion of land for agriculture/settlements	Strong regulations to manage environmental trade-offs; reforestation increases forest area	Existing trend Forest cover: 13.8% (0.138)	Limited regulation; continued deforestation; rapid conversion of land for agriculture/settlements	Strong regulations to manage environmental trade-offs; reforestation increases forest area	Qualitative. SSP narratives (O'Neill et al., 2017). Data on forest cover for Australia 1990-2012 from (ABARES, 2015; ABARES, 2013).
	Assumption	Agriculture	Increase in large-scale farming; highly managed, resource-intensive; productivity limited by climate	Increased spread of sustainable farming practices, water efficiency and productivity	Existing trend		Increased spread of sustainable farming practices, water efficiency and productivity	Qualitative. SSP narratives (O'Neill et al., 2017).
	Policy	Expenditure on reforestation as % GDP	Maintain 0.0001	Increase by 50% + 0.005% GDP/pa by 2030 [gradual increase to +0.015% in 2030]	Existing trend 0.01% GDP/pa (0.0001)	Maintain 0.0001	Increase by 50% + 0.005% GDP/pa by 2030 [gradual increase to +0.015% in 2030]	Reforestation expenditure estimated based on Summers et al. (2015) and Landcare expenditure data (Australian Government, 2018).
	Policy	Additional SDG expenditure on sustainable agriculture training (\$)	None	\$25 million/pa 0.00155% GDP [0.00155 to 2025; 0.0008 to 2030]	None	None	\$25m/pa 0.00155% GDP [0.00155 to 2025; 0.0008 to 2030]	Agriculture training expenditure estimated based on ABS Labour Force data for Australia 1990-2016 (ABS,

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								2017g) on agricultural employment and estimate of AUD7,500 per farmer (\$5,000 USD 2010); 240,000 employed in ag in 2015; reach ~20% = \$375m
	Policy	SDG Investment in water efficiency in agriculture (\$)	None	Increasing gradually to 0.03% GDP by 2030 [increasing from 0 in 2016 to 0.02% in 2025 and to 0.03% in 2030]	None	None	Increasing gradually to 0.03% GDP by 2030 [increasing from 0 in 2016 to 0.02% in 2025 and to 0.03% in 2030]	Water efficiency expenditure estimated based on Hickey et al. (2006), Government of Victoria (2015) and FAOSTAT database (FAO, 2017). Australian Government Water Fund allocation of \$2.6 billion over 6 years (AUD2015); 4.3ML/ha average water usage all crops (Hickey et al., 2006) Cost of enhanced irrigation = \$2,100/ha/pa average (Government of Victoria, 2015) Total irrigated area = 23m ha (FAO, 2017) 20% = \$9.66bn
	Policy	Expenditure for terrestrial protected areas (% GDP)	Reduce 0.05%	Increase 0.08%	Existing trend 0.066% GDP [0.00066]	Reduce 0.05%	Increase 0.08% GDP	Expenditure for terrestrial protected areas estimated based on Adams et al. (2011), James et al. (1999) and ABS government expenditure data on environmental heritage (ABS, 2014)
	Policy	Expenditure for marine protected areas (% GDP)	Reduce 0.025%	Increase 0.04%	Existing trend 0.033% GDP 0.00033	Reduce 0.025%	Increase 0.04%	Expenditure for marine protected areas estimated based on Balmford et al. (2004), Ban et al. (2011).
5. Technology	Assumption	Development & Change	Slow from fossil fuels	Rapid in green sectors; renewables	Existing trends	Slow from fossil fuels	Rapid in green sectors; renewables	Qualitative. SSP narratives (O'Neill et al., 2017)..

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
	Assumption	Carbon intensity	High	Low	Existing Trend	High	Low	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Energy intensity	High	Low	Existing Trend	High	Low	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Climate change – temperature (above pre-industrial)*	1.555C (2030) and 2.217 (2050)	1.486C (2030) and 1.769 (2050)	Existing trend (SSP2_4.5) 1.486 (2030) and 1.965 (2050)	1.555C (2030) and 2.217 (2050)	1.486C (2030) and 1.769 (2050)	Average temperature estimated based on SSP database (Riahi et al., 2017) CSIRO data (CSIRO, 2018). SSP1_2.6: 1.486C (2030) and 1.769 (2050) SSP2_4.5: 1.486 (2030) and 1.965 (2050) SSP5_6.0: 1.555C (2030) and 2.217 (2050)
	Assumption	Expected global energy intensity change per annum	-1% (0.01 in Final Energy Consumption module)	-3% (-0.03)	Existing trend (IEA) -1.5%	-1% (0.01 – NB commences in 2012)	-3% (-0.03)	Expected energy intensity changes estimated based on Enerdata (2018) and International Energy Agency (2017). 1.2%pa improvement in 2017; historical trend is 1.5%pa. Aust = 1.8% CAGR
	Assumption	Global average yearly change in material consumption per unit output	BAU -0.775% (-0.0075 Materials module)	BAU -0.775% (-0.015)	Existing trend (model setting) -0.775% (-0.00775/year)	BAU -0.775% (-0.0075)	BAU -0.775% (-0.015)	Material efficiency changes estimated based on International Resource Panel (2017) and Sustainable Europe Research Institute (2009). MP of G7 countries improved by 1.9% pa since 1970. Global improvement 0.4%pa IRP projection – improve by 36-54% by 2050.
	Assumption	Relative average global water efficiency	Moderate 1.95	Rapid 3	Existing trend (OECD) 1.95 index value	Moderate 1.95	Rapid 3	Global water efficiency change estimated based on Organisation for Economic Cooperation and Development (2012) and ABS water consumption data (ABS, 2018c) and economic data (ABS, 2017d) 1990-2016.

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								Aust: water consumption/unit GDP: -2.8% CAGR 1990-2015
	Policy	Target material consumption efficiency improvement	No additional target; existing trend	30% by 2030 (-2%pa) [0.3]	None	No additional target; existing trend	30% by 2030 (-2%pa) [0.3]	Material efficiency target estimated based on CSIRO material flows data for Australia 1990-2017 (West and Lieber, 2018). Australia DMC/US\$ GDP: 1.27% pa improvement over 27 years (34.2% total)
	Policy	SDG Climate change – adaptation expenditure	None	~100% of modelled capital requirement 2020: 0.015; 2025: 0.05; 2030: 0.05	None	None	~100% of modelled capital requirement 2020: 0.015; 2025: 0.05; 2030: 0.05	SDG adaptation expenditure based on iSDG model projections of adaptation costs.
6. Governance, policy and institutions	Assumption	Institutions	Effective for elite, not for rest	Modest effectiveness	Existing trend	Increasingly effective	Effective	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	International cooperation	Relatively weak	Effective	Existing trend [ODA = 0.22% GDP]	Moderate	Effective	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Environmental policy	Little concern with environment and global goals/problems	Improved management of local and global issues	Existing trend	Low priority for environmental issues	Improved management of local and global issues.	Qualitative. SSP narratives (O'Neill et al., 2017).
	Assumption	Policy orientation	Oriented towards economic development, free markets, small government, highly engineered infrastructure	Oriented towards greening of economic development, role for government in correcting markets	Existing trend	Oriented towards inclusive growth and addressing inequality, free markets, role for government in redistribution; rapid human development, reduced inequality	Oriented towards sustainable development, role for government in correcting markets and redistribution	Qualitative. SSP narratives.
	Policy	Administrative expenditure as % GDP	Low (-20%) 0.06897	Moderate 0.086	\$122.5bn; 8.621% GDP (0.08621)	High (+10%) 0.0948	High (+10%) 0.0948	ABS general government expenditure data 1990-2016 (ABS, 2017f).
	Policy	Government exp salaries & wages (as % of consumption)	Low (-15%) 0.327	Moderate 0.3629	36.29% (0.3629)	High (+15%) 0.4	High (+15%) 0.4	General government salaries and wages expenditure based on ABS data on earnings (ABS, 2017h) and employment (ABS, 2017g) and Government Finance

			SCENARIOS					Source/Notes for Quantitative Settings
Drivers	Assumption/ Policy	Attributes	SSP5, SSP4	SSP2 + SSP1 (ENV)	BAU (SSP2)	SSP5 + SSP1(EQUALITY)	SSP1	
			1. Growth at all Cost	2. Green Economy	3. BAU projected values for 2030	4. Inclusive Growth	5. Sustainability Transition	
								statistics (ABS, 2017f) 1990-2016. High-low parameterised from time series data.
	Assumption	Public share of SDG expenditure	None	30% public; 70% private	None	70% public; 30% private	50% public; 50% private	Parameterised based on scenario narratives.
	Assumption	Government effectiveness [WGI score]*	Low 1.2	Moderate 1.58	Existing trend [1.585]	High 2.1	High 2.1	World Bank Worldwide Governance indicator data (Kaufman and Kraay, 2016) for Australia (1990-2016). Parameterised based on low-high values for Government Effectiveness indicator Scores -2.5 to +2.5; Global Max (2015) = 2.24
	Assumption	6.3 Control of corruption	Low-Moderate 1.5	Moderate 1.77	Existing trend 1.771	High 2.1	High 2.1	World Bank Worldwide Governance indicator data (Kaufman and Kraay, 2016) Parameterised based on low-high values for Control of Corruption indicator Global Max (2015) = 2.28
	Assumption	6.4 Rule of law	Moderate-High 1.75	Moderate-High 1.75	Existing trend 1.752	High 1.9	High 1.9	World Bank Worldwide Governance indicator data (Kaufman and Kraay, 2016) for Australia (1990-2016). Parameterised based on low-high values for Rule of Law; Global Max (2015) = 2.06
	Assumption	6.6 Regulatory quality	Low-Moderate 1.5	Moderate-High 1.8	Existing trend 1.897	High 2	High 2	World Bank Worldwide Governance indicator data (Kaufman and Kraay, 2016) for Australia (1990-2016). Parameterised based on low-high values for Regulatory quality; Global Max (2015) = 2.26

Supplementary Table 3. Error analysis of BAU simulations for a selection of variables

Variable	R ²	ME	RSME	MAE	MPE	MAPE	Theil (UII)
Total population (persons)	0.9997734	32715.92	58255.77	45385	0.1456079	0.2148866	0.0051315
Real GDP (\$ 2015)	0.9968465	-5.77E+09	1.743E+10	1.384E+10	-0.641898	1.352131	0.0300276
Total investment (\$)	0.9442571	-8.77E+08	4.189E+10	3.485E+10	5.246559	15.95191	0.1873271
Government Expenditure (\$)	0.9994119	-85423077	3.889E+09	3.371E+09	-0.295034	1.237973	0.0999124
Total final energy consumption (Ktoe/yr)	0.9165864	-3310.808	4296.59	3316.962	-5.368624	5.376574	0.0063752
Total water withdrawal (m ³)	0.8615849	-1.18E+09	1.558E+09	1.278E+09	-6.721893	7.349121	0.0113659
GHG in CO ₂ -e (excl LULUCF) (tons)	0.8167225	-671730.5	21774277	16595632	-0.332655	3.313846	0.0043023
Average life expectancy (years)	0.9908189	-0.125784	0.3107565	0.266893	-0.164393	0.3364065	0.0002031

Supplementary Table 4. SDG Targets and Indicators - performance evaluation framework for the scenarios in the *iSDG-Australia* model

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
1	1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	Ec	1.2.1	Proportion of population below national poverty line (% population)	0.12	0.06	SDG Target 1.2 is to halve baseline value (United Nations General Assembly, 2015).
	1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services...	S	1.4.1	Average access to basic health care (% population)	0.99	1	SDG Target 1.4 already achieved for Australia. Maintain performance.
	1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	S	1.5.1a	Mortality due to disasters five-year average (% population)	0.0000021 2.1e-6	1.05e-6	Sendai Framework DRR targets for 2030 are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	1.5	S	1.5.1b	Proportion of population affected by natural disasters five-year average (%)	0.0361	0.018	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	1.5	Ec	1.5.2	Economic damage due to natural disasters as share of GDP five-year average (% GDP)	0.0023	0.0013	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
2	2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round	S	2.1.1	Prevalence of undernourishment	0.025	0.0125	SDG Target 2.1 is to 'end hunger' (United Nations General Assembly, 2015); target set as 50% improvement on baseline.
	2.1	S	2.1.2.ALT	Prevalence of food insecurity: Proportion of population below the food poverty line	0.025	0.0125	SDG Target 2.1 is to end hunger (United Nations General Assembly, 2015); target set as 50% improvement on baseline.
	2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age...	S	2.2.1	Prevalence of stunting	0	0	SDG Target 2.2 already achieved for Australia. Maintain performance.
	2.2	S	2.2.2	Prevalence of malnutrition	0	0	SDG Target 2.2 already achieved for Australia. Maintain performance.
	2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers...	Ec	2.3.1	Total agriculture production in tons per labor unit (t/person)	329.5	659	SDG Target 2.3 is to double productivity compared to baseline value (United Nations General Assembly, 2015).
	2.3	Ec	2.3.1Alt	Cereal yield (t/ha)	2.1	4.2	SDG Target 2.3 is to double productivity compared to baseline value (United Nations General Assembly, 2015)

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production...	En	2.4.1	Proportion of harvested area sustainably managed (%)	0.2087	0.5	SDG Target is vague. Target set as 50% of harvested area, calibrated off historic data from FAO (increase of 1% to 25% in 10 years; historic peak of 27%) (FAO, 2017).
	2.4	En	2.4.1.ALT	Soil Organic Carbon density (dmnl)	0.00337	0.00337	Target set as maintain or improve based on SDG Target 15.3 which requires 'no net loss' (United Nations General Assembly, 2015) and guidelines from the UN Convention to Combat Desertification on SoC (Cowie et al., 2018, Orr et al., 2017).
3	3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	S	3.1.1	Maternal mortality ratio (per 100,000 live births)	6	6	Target already achieved for Australia. Maintain performance.
	3.1	S	3.1.2	Average access to basic health care (%)	0.99	1	Target already achieved for Australia. Maintain performance.
	3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	S	3.2.1	Under five mortality rate (per 1,000 live births)	5	5	SDG Target 3.2 already achieved for Australia. Maintain performance.
	3.2	S	3.2.2	Neonatal mortality rate (per 1,000 live births)	2.3	2.3	SDG Target 3.2 already achieved for Australia. Maintain performance.
	3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being	S	3.4.1	Cardiovascular neoplasm diabetes and respiratory mortality (per 1,000 population)	All: 0.00417	0.00278	SDG Target 3.4 is to reduce by 1/3 on baseline value (United Nations General Assembly, 2015)
	3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents	S	3.6.1	Total road fatalities	1538	770	SDG Target 3.6 is to halve baseline value (United Nations General Assembly, 2015)
	3.7 By 2030, ensure universal access to sexual and reproductive health-care services...	S	3.7.1	Contraceptive prevalence rate (%)	0.72	0.72	Target set as 'maintain'. Baseline value is comparably high compared with other developed countries (OECD average = 70.5) (The World Bank, 2018).
	3.7	S	3.7.2	Adolescent birth rate (per 1,000)	15	11.25	Target set as 25% improvement on baseline value; calibrated from historic data and BAU projection (Australian Institute of Health & Welfare, 2018, The World Bank, 2018)
	3.8 Achieve universal health coverage	S	3.8.1	Average access to basic health care	0.99	0.99	SDG Target 3.8 already achieved for Australia. Maintain performance.

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
4	4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes	S	4.1.1	Proportion of population age 20 to 24 that has completed secondary school (%)	0.86	0.9	SDG Target 4.1 is 'universal completion' (United Nations General Assembly, 2015). Target level of 0.9 set based on historic data and BAU projection (The World Bank, 2018, OECD, 2017a).
	4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	S	4.3.1	Proportion of population age 20 to 29 that has enrolled in tertiary education (%)	0.5 (2015); 0.73 (2030)	0.75	Target set as 50% improvement on baseline value; calibrated off historic data and BAU projection (The World Bank, 2018, OECD, 2017a).
	4.3	S	4.3.1.ALT	Gender parity ratio in tertiary education (women proportion of total tertiary graduates)	0.53	~0.5	SDG Target 4.3 is for 'equal access' or gender parity (United Nations General Assembly, 2015). Target set as maintain at ~50% (+/-0.03%).
	4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations	S	4.5.1	Adult literacy gender gap ratio	0.01	0.01	SDG Target 4.5 is to 'eliminate gender disparity' (United Nations General Assembly, 2015). Target set as maintain at ~0% (+/-0.03%).
	4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	S	4.6.1	Average adult literacy rate (%)	0.97	0.97	SDG Target 4.6 is a 'substantial proportion' of adults ' (United Nations General Assembly, 2015). Target already achieved for Australia. Maintain performance.
	4.6	S	4.6.1alt	Total average years of schooling	11.73 (2015); 12.27 (2030)	12.3	Target calibrated from historic data and BAU projection (Barro and Lee, 2013).
5	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	S	5.5.1	Proportion of female legislators senior officials and managers (%)	0.37	0.5	SDG Target 5.5 is for 'equal opportunity' (United Nations General Assembly, 2015). Target set as gender parity ~0.5.
	5.5	S	5.5.1.ALT	Employment to population ratio (female/male parity)	0.839	0.95-1.05	SDG Target 5.5 is for 'equal opportunity' (United Nations General Assembly, 2015). Target set as gender parity = ~1.
	5.6 Ensure universal access to sexual and reproductive health and reproductive rights...	S	5.6.1	Contraceptive prevalence rate (%)	0.72	0.72	Target set as 'maintain'. Baseline value is comparably high compared with other developed countries (OECD average = 70.5) (The World Bank, 2018).
6	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all	S	6.1.1	Average access to improved water source (%)	1	1	SDG Target 6.1 already achieved for Australia. Maintain performance.
	6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all	S	6.2.1	Average access to improved sanitation facility (%)	1	1	SDG Target 6.2 already achieved for Australia. Maintain performance.

Goal	Target (52)	D [#]	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater...	En	6.4.1	Total water withdrawal per unit of GDP (m3/\$real GDP)	0.01164 (2015); 0.00895 (2030)	0.008148	SDG Target 6.4 is for a 'substantial increase' (United Nations General Assembly, 2015). Target set as 30% improvement on baseline value; calibrated from historic trend data, BAU projection and global trend and outlook (ABS, 2017c, FAO, 2018, Organisation for Economic Cooperation and Development, 2012).(ABS, 2017d)
	6.4	En	6.4.1.ALT1	Water consumption per capita (m3/capita)	775.9	581.925	SDG Target 6.4 is for a 'substantial increase' (United Nations General Assembly, 2015). Target set as 25% improvement on baseline; calibrated off historic trend and timeseries data (ABS, 2017c, ABS, 2017a).
	6.4	En	6.4.1.ALT2	Agricultural consumption of water and gross value added by irrigated agricultural production (L/\$ real GVIAP)	0.4715	0.3772	SDG Target 6.4 is for a 'substantial increase' (United Nations General Assembly, 2015). Target set as 20% improvement on baseline; calibrated off historic trend and timeseries data (ABS, 2017c, ABS, 2017a, FAO, 2018).
	6.4	En	6.4.2	Water resources vulnerability index (%)	0.037	0.04	SDG Target 6.4 is for 'sustainable withdrawal and supply'. Index score is low for Australia. A country is considered water scarce if annual withdrawals are between 20 and 40% of annual supply, and severely water scarce if withdrawals exceed 40% (Raskin et al., 1997). Target set as maintain at 0.04 or below; calibrated based on historic timeseries data and BAU projection (FAO, 2018, ABS, 2017c).
7	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	S	7.1.1	Percentage of population with access to electricity (%)	100	100	SDG Target 7.1 already achieved for Australia. Maintain performance.
	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	En	7.2.1	Renewable share in total final energy consumption (%)	0.094	0.24	Target set based on National Sustainable Development Council (NSDC) target (Allen et al., 2019).

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	7.2	En	7.2.1.ALT	Renewable share in electricity (%)	0.13	0.55	Target set based on National Sustainable Development Council (NSDC) target (Allen et al., 2019).
	7.3 By 2030, double the global rate of improvement in energy efficiency	En	7.3.1	Energy intensity level of primary energy (MJ/USD11)	7.857	3.9285(-50%)	SDG Target 7.3 is to double the rate of improvement; calibrated from historic timeseries data (equates to target of 3.7%pa; or ~50% total) (Australian Department of the Environment and Energy, 2018, ABS, 2018b). COAG NEPP target is 40% increase in energy productivity 2015 to 2030 (~2.67%pa) (Council of Australian Governments, 2015).
	7.3	En	7.3.1.ALT	Per capita electricity consumption (Kwh/person/year)	8849	7079.2	Target set as 20% improvement on baseline value; calibrated from historic data and BAU projection (Australian Department of the Environment and Energy, 2018, ABS, 2018b, ABS, 2017a)
8	8.1 Sustain per capita economic growth in accordance with national circumstances...	Ec	8.1.1	Real pc GDP growth rate 5-year average (% pa)	0.007	0.01	SDG Target 8.1 is to 'sustain' growth. Target set at 1% pa; calibrated from timeseries data and BAU projection (ABS, 2017d).
	8.1	Ec	8.1.1.ALT1	Real GDP per capita 5-year average (real \$/person/year)	67,020	80,424	Target set as 20% improvement on baseline value; calibrated from timeseries data and BAU projection (ABS, 2017d, ABS, 2017a).
	8.1	Ec	8.1.1.ALT2	Per capita real disposable income (real \$/person/year)	53,950	64,740	Target set as 20% improvement on baseline value; calibrated from timeseries data and BAU projection (ABS, 2017e).
	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	Ec	8.2.1	GDP per employed person growth rate (%)	0.01	0.015	SDG Target 8.2 is higher productivity. Target set as 1.5% pa; calibrated from timeseries data and BAU projections (ABS, 2017d, ABS, 2017g).
	8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation	En	8.4.1b	PC material footprint (t/person/year)	42	29.4	Target set at 30% total improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018); developed country average ~21).

Goal	Target (52)	D [#]	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	8.4	En	8.4.1c	Material footprint per unit of output (kg/USD11)	1.01	0.707	Target set at 30% total improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018).
	8.4	En	8.4.2b	PC domestic material consumption (t/person/year)	38.4	26.88	Target set at 30% total improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018).
	8.4	En	8.4.2c	Domestic material consumption per unit of output (kg/USD11)	1.008	0.6048	Target set at 40% improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018), and IRP target 36-54% by 2050 (International Resource Panel, 2017).
	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Ec	8.5.2	Unemployment rate (%)	0.074	0.05	SDG Target 8.5 is 'full employment'. Target set at ≥95% employment (i.e. approximately 'natural rate' of unemployment – long-term average 5.3%) (ABS, 2017g).
	8.5	Ec	8.5.2.ALT	Average employment to adult population ratio	Average: 59.82 (2015); 0.6221 (2030)	65.802	Target set at 10% improvement on BAU projection; calibrated from timeseries data (ABS, 2017g).
9	9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	Ec	9.1.1.ALT	Public infrastructure investment (transportation expenditure as % GDP)	0.01583	0.019	20% increase (calibrated from historic data; max 0.22 in 1990s) (BITRE, 2017a, BITRE, 2016, Gargett, 2017, BITRE, 2017b).
	9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	Ec	9.2.1a	Industry production as share of GDP at factor cost (%)	0.2476 (2015); 0.2247 (2030)	0.27236	SDG Target 9.2 is to increase share. Target set at 10% increase on baseline value; calibrated from timeseries data (max 0.29) (ABS, 2017d, ABS, 2018d).
	9.2	Ec	9.2.1b	PC industry production (real \$/person/year)	15,470 (2015); 16,040 (2030)	17,017	SDG Target 9.2 is to increase share. Target set at 10% improvement on baseline; calibrated of timeseries data and BAU (ABS, 2017d, ABS, 2017a, ABS, 2018d).
	9.2	Ec	9.2.1c	Manufacturing value added as % GDP fc (%)	0.064	0.07	SDG Target 9.2 is to increase share. SDG target set at 10% improvement on

Goal	Target (52)	D [#]	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
							baseline; calibrated from timeseries data (max 0.14) (ABS, 2017d, ABS, 2018d).
	9.2	Ec	9.2.1d	PC manufacturing value added (real \$/person/year)	4,071	4478	SDG Target 9.2 is to increase share. Target set as 10% improvement on baseline; calibrated from timeseries data (max 5,700) (ABS, 2018d, ABS, 2017d, ABS, 2017a).
	9.2	Ec	9.2.2a	Industry employment as share of total employment	0.1878	0.207	SDG Target 9.2 is to increase share. Target set as 10% improvement on baseline; calibrated from timeseries data (max 0.24) (ABS, 2018d, ABS, 2017g).
	9.2	Ec	9.2.2b	Manufacturing employment as share of total employment	0.0774 (2015)	0.085	SDG Target 9.2 is to increase share. Target set as 10% improvement on baseline; calibrated from timeseries data (max 0.14) (ABS, 2018d, ABS, 2017g).
	9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	En	9.4.1	CO ₂ emissions per unit of value added (kg CO ₂ -e/USD 2011)	0.422	0.21	SDG Target 9.4 is to increase efficiency. Target set as 50% improvement on baseline value; calibrated from timeseries data and global data (OECD average = 0.21) (ABS, 2017d, Australian Department of the Environment and Energy, 2017, OECD, 2017c).
10	10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average	Ec	10.1.1	Bottom 40 percent income growth to average income growth gap	0.00221	0.001	SDG Target 10.1 is to achieve and sustain growth. Target set as equal to or greater than 0.1% growth pa; calibrated from timeseries data (ABS, 2017i).
	10.1	Ec	10.1.1.ALT1	Gini coefficient income	0.323	0.29	Target set based on SDG Index green threshold (Schmidt-Traub et al., 2017, Sachs et al., 2017) and calibrated from timeseries data (Melbourne Institute, 2018, ABS, 2017i).
	10.1	Ec	10.1.1.ALT2	Palma ratio income (top 10%/bottom 40%)	1.25	0.99	Target set based on SDG Index green threshold (Schmidt-Traub et al., 2017, Sachs et al., 2017) and calibrated from timeseries data (Melbourne Institute, 2018, ABS, 2017i).
	10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex,	Ec	10.2.1	Proportion of population below half median income	0.11	0.055	SDG Target 10.2 is to halve the baseline value (United Nations General Assembly, 2015).

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	disability, race, ethnicity, origin, religion or economic or other status						
	10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality	Ec	10.4.1	Average labor share of GDP, comprising wages and social protection transfers	0.57	0.68	Target set as 20% improvement on baseline value; calibrated from timeseries data and BAU projection (ABS, 2017e).
11	11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	S	11.5.1a	Mortality due to disasters five-year average (% population)	0.0000021 2.1e-6	1.05e-6	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	11.5	S	11.5.1b	Proportion of population affected by natural disasters five-year average (%)	0.0361	0.018	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	11.5	Ec	11.5.2	Economic damage due to natural disasters as share of GDP five-year average (% GDP)	0.0023	0.0013	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	En	11.6.1	Proportion of urban waste collected and disposed (%)	1	1	SDG Target 11.6 already achieved for Australia. Maintain performance.
	11.6	En	11.6.2	PM 25 mean annual exposure (µg/m³)	5.898	6	Baseline is below the recommended guideline of 10 µg/m³ (WHO, 2005). SDG Target 3.2 already achieved for Australia. Maintain performance.
12	12.2 By 2030, achieve the sustainable management and efficient use of natural resources	En	12.2.1b	PC material footprint (t/person/year)	42	29.4	Target set at 30% total improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018); developed country average ~21).
	12.2	En	12.2.1c	Material footprint per unit of output (kg/USD ₁₁)	1.01	0.707	Target set at 30% total improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018).
	12.2	En	12.2.2b	PC domestic material consumption (t/person/year)	38.4	26.88	Target set at 30% total improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018).

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	12.2	En	12.2.2c	Domestic material consumption per unit of output (kg/USD11)	1.008	0.6048	Target set at 40% improvement on baseline by 2030; calibrated from global data and BAU projection (West and Lieber, 2018), and IRP target 36-54% by 2050 (International Resource Panel, 2017).
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	En	12.5.1ALT	Average per capita waste generation (kg/person/day)	7.4	5.92	SDG Target 12.5 is to substantially reduce. Target set as 20% improvement on baseline value; calibrated from timeseries data and BAU projection (OECD, 2017b, Australian Department of the Environment and Energy, 2016).
13	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	S	13.1.2a	Mortality due to disasters five-year average (% population)	0.0000021 2.1e-6	1.05e-6	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	13.1	S	13.1.2b	Proportion of population affected by natural disasters five-year average (%)	0.0361	0.018	Sendai Framework DRR targets are to 'substantially reduce' (United Nations, 2015); target set as 50% improvement on baseline value.
	13.2 Integrate climate change measures into national policies, strategies and planning	En	13.2.NEW1	Total greenhouse gas emissions (including LULUCF) (tons CO ₂ -e)	525.3m	420.24	Target set as 40% improvement on baseline from National Sustainable Development Council (Allen et al., 2019); calibrated from baseline data (Australian Department of the Environment and Energy, 2017)
	13.2	En	13.2.NEW2	Greenhouse gas emissions per capita (tons CO ₂ -e /person/year) (excluding LULUCF)	22.33	13.398	Target set as 40% improvement on baseline from National Sustainable Development Council (Allen et al., 2019); calibrated from baseline data (Australian Department of the Environment and Energy, 2017).
	13.2	En	13.2.NEW3	CO ₂ emissions per unit value added (kg/USD 2011)	0.422	0.21	SDG Target 9.4 is to increase efficiency. Target set as 50% improvement on baseline value; calibrated from timeseries data and global data (OECD average = 0.21) (ABS, 2017d, Australian Department of the Environment and Energy, 2017, OECD, 2017c).

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
14	14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	En	14.4.1	Proportion of fish stocks sustainably exploited (%)	0.286	0.429	Target set as 50% improvement on baseline value; calibrated from timeseries data (max= 0.85) (Kleisner et al., 2015, Pauly and Zeller, 2015)
	14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	En	14.5.1	Proportion of territorial waters protected (%)	0.4	0.5	SDG Target of 10% achieved for Australia (United Nations General Assembly, 2015). National target set at 50% ; calibrated from timeseries data and BAU projection (United Nations, 2018, IUCN and UNEP-WCMC, 2017)
15	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	En	15.1.1	Forest cover (as proportion of total land area) (%)	0.14	0.154	SDG Target 15.1 is ensure conservation, while SDG Target 15.3 is for 'land degradation neutrality' or LDN (United Nations Development Group, 2015). UN Global Forest Goals include to 'reverse the loss of forest cover' (United Nations, 2017). UNCCD guidelines set as no net loss (Orr et al., 2017). Target set as 10% increase on baseline value; calibrated from timeseries data and BAU projection (ABARES, 2013).
	15.1	En	15.1.2	Proportion of terrestrial area protected (%)	0.13 (2015); 0.18 (2030)	0.2	Aichi target of 17% terrestrial areas protected by 2020 (United Nations Convention on Biological Diversity, 2010). Target set at 20% by 2030; calibrated from timeseries data and BAU projection (IUCN and UNEP-WCMC, 2017).
	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	En	15.3.1.ALT	Soil Organic Carbon density (dmnl)	0.00337	0.00337	Target set as maintain or improve based on SDG Target 15.3 which requires 'no net loss' (United Nations General Assembly, 2015) and guidelines from the UN Convention to Combat Desertification on SoC (Cowie et al., 2018, Orr et al., 2017).
	15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity	En	15.5.1	GEF benefits index for biodiversity (score 0-1)	0.84	0.84	Target 15.5 is to 'halt loss'. Target set as maintain baseline value; calibrated from timeseries data (Global Environment

Goal	Target (52)	D#	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
	and, by 2020, protect and prevent the extinction of threatened species						Facility, 2005, The World Bank, 2018, Pandey et al., 2006).
16	16.1 Significantly reduce all forms of violence and related death rates everywhere	S	16.1.1	Total mortality rate - violence	0.000022	0.00002	SDG Target 16.1 is to 'significantly reduce'. Baseline is low for Australia. Target set as maintain or decrease; calibrated from timeseries data (WHO, 2018, United Nations, 2018).
	16.5 Substantially reduce corruption and bribery in all their forms	S	16.5.2	Bribery incidence (score 0-1)	0.21	0.19	SDG Target 16.5 is to substantially reduce. Baseline is low for Australia. Target set at 10% improvement (Transparency International, 2016)
	16.6 Develop effective, accountable and transparent institutions at all levels	S	16.6.2.ALT1	Government effectiveness (score -2.5 to +2.5)	1.6	2.1	Target set at 2.1 on index scale; calibrated from timeseries data and top performing countries (max (2015) = 2.24) (Kaufman and Kraay, 2016).
	16.6	S	16.6.2.ALT2	Political stability (score -2.5 to +2.5)	0.9	1.8	Target set at 1.8 on index scale; calibrated from timeseries data; data on top performing countries and BAU projection (max (2015) = 1.94) (Kaufman and Kraay, 2016).
	16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels	S	16.6.2	Normalized average governance index (proxy score 0-1)	0.81	0.89	Target set at 0.89 on normalized scale (10% improvement); calibrated from BAU projection and World Bank governance data (Kaufman and Kraay, 2016).
	17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection	Ec	17.1.1a	Domestic revenue as share of GDP (%)	0.344	0.378	SDG Target 17.1 is to strengthen. Target set at 10% increase on baseline; calibrated from timeseries data (max = 0.37) (ABS, 2017f, The World Bank, 2018, OECD, 2018b).
	17.1	Ec	17.1.1b	Direct taxes as share of GDP (%)	0.16	0.176	Target set at 10% increase on baseline; calibrated from timeseries data (max = 0.177) (ABS, 2017f, The World Bank, 2018, ABS, 2017d, OECD, 2018b).
	17.1	Ec	17.1.1c	Indirect taxes as share of GDP	0.0608	0.073	Target set at 20% increase on baseline; calibrated from timeseries data (max = 0.0746) (ABS, 2017f, The World Bank, 2018, ABS, 2017d, OECD, 2018b).
	17.1	Ec	17.1.2	Tax burden	0.6416	0.706	Target set at 10% increase on baseline; calibrated off historic data and BAU

Goal	Target (52)	D [#]	Indicators	Indicator in <i>iSDG-Australia</i> (97)	Baseline Value (~2015)	Target value 2030	Target source
							projection (max = 0.68) (ABS, 2017f, The World Bank, 2018, ABS, 2017d, OECD, 2018b).
	17.1	Ec	17.1.2ALT	Government surplus or deficit as proportion GDP	-0.024	-0.005	Target set at less than or equal to 0.5% GDP; calibrated from timeseries data and BAU projection (max = 0.040; min = 0.015) (ABS, 2017f, The World Bank, 2018).
	17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress	Ec	17.4.1	Interest on public debt as share of export	0.071	0.057	Target set at 20% improvement on baseline value; calibrated from timeseries data (IMF, 2017, The World Bank, 2018).

[#]Dimension for indicator. Ec = economic; En = environmental; S = social

Supplementary Table 5. Sensitivity Analysis (SA): determining input ranges for key assumptions

Assumption	Sensitivity analysis input settings
Average mining gross value added (GVA)	For mining commodity prices there are several existing Australian and global studies that project changes in total production of key mining commodities, which generally project increased production in commodities through until 2030 (Syed et al., 2010, Riahi et al., 2017, Resources 2030 Taskforce, 2018). However, these longer-term studies do not explore commodity prices. Short-term projections of prices through until 2021 indicate a softening of prices due to trade disruptions (Australian Department of Industry, 2019). For the SA, a plausible range was determined based on timeseries data (ABS, 2017j, ABS, 2017d), with the range for SA set at +/-30% of historic min/max values for average mining gross value added (GVA). This resulted in minimum and maximum values of AUD28 and AUD104, respectively. This more than adequately covered the range of assumptions used in the alternative scenarios (+/-7.5% change in average mining GVA).
Average global temperature	The SA input range for global average temperatures was based on climate change projections included in the SSPs (Riahi et al., 2017) as well as CSIRO projections for Australia (CSIRO, 2018). Climate results in the SSPs are based on MAGICC 6.8 and values range from 1.552 to 2.527°C above pre-industrial levels in 2050, while CSIRO present projections across different RCPs within the range of 0.5 to 3°C by 2050. For the purposes of the SA, min/max levels were set at 1-3°C by 2050. This range adequately captured the assumptions used in the alternative scenarios (i.e. 1.769 to 2.217°C across different scenarios).
Net migration	The input range for net migration was based on official timeseries data (ABS, 2018a) and population studies available in the literature (Sobels et al., 2010, McDonald and Temple, 2010, Australian Productivity Commission, 2016). Net migration is the largest contributor to population growth in Australia. Historic rates of net immigration since 1990 have ranged from approximately 45,000 to 315,000 persons per annum, while modelling studies have used a range from 0 to 1% of total population per annum resulting in a maximum population of 31 million people by 2030. For the purposes of the SA, min/max levels were set to decline or increase to 0 and 450,000 persons per annum by 2030. This range adequately encompasses the assumptions used in the alternative scenarios (100,000 – 350,000).
Discussion of results from sensitivity analysis and extreme conditions tests The sensitivity analysis evaluated the sensitivity of model results for each of the 17 SDGs and aggregate goal performance to a selection of key economic (mining gross value added), social (net migration) and environmental (temperature change) assumptions that represent parameters of high uncertainty and that were anticipated to have an influential impact on results. Supplementary Figure 5 presents the sensitivity results for each variable individually (mining, climate, migration), while Figure 5 (Manuscript) presents results from the sensitivity analysis for all three variables combined simultaneously. The results reveal low to moderate sensitivity of the model results for each of the SDGs, which is higher for Goal 8 (economy and jobs), Goal 11 (sustainable cities), and Goal 14 (life below water), and to a lesser degree Goal 13 (climate change) and Goal 6 (water). This sensitivity is broadly intuitive - economic performance is affected by assumptions across all three variables – low mining commodity prices reduce growth as well as government revenue and expenditure; increased impacts from climate change reduces economic productivity and increases damage to infrastructure and cities; while a higher population would increase aggregate GDP along with consumption of resources. Of interest is the sensitivity of Goal 14 (life below water), and further investigation reveals that this is partly an artefact of the limited indicator coverage for this goal (i.e. only 2 indicators/targets). An increase or decrease in government expenditure on marine park protection and management strongly influences model results for this goal. As government expenditure and revenue is proportional to GDP, reduced economic performance in turn reduces expenditure in this sector.	

Supplementary Figure 6 shows that, at least over the period to 2030, SDG performance is appears to be more sensitive to mining commodity prices. However, the sensitivity of SDG results to temperature changes increases over time, suggesting that these effects will become more influential over the longer-term period to 2050 and beyond.

Supplementary Figure 7 presents results from extreme conditions tests for the 'Growth at all Costs' and 'Sustainability Transition' scenarios (see Methods section in the Manuscript). Using the same three model assumptions (mining prices, temperature, migration), best-case and worst-case values were parameterised simultaneously in separate simulation runs for each scenario maintaining all other scenario settings. The best-case value for mining prices was the maximum GVA and for average global temperature was the minimum value. For migration, setting a best- or worse-case scenario was not as clear. Based on the results from the sensitivity analysis, a mid-range migration scenario (~7.5 persons per 1,000) corresponded with a marginally higher aggregate SDG score compared with lower or higher values. For the purposes of the extreme conditions tests, we selected the maximum migration value for the best-case and the minimum value for the worst-case. The low sensitivity of the BAU model to migration levels would suggest that sensitivity of alternative scenarios to extreme migration levels will also be low.

Overall, the results for the extreme conditions tests are comparable to the sensitivity analysis of the BAU scenario. Of interest is that very little improvement (increase from 0.71 to 0.72) is projected in the aggregate SDG score for the 'Sustainability Transition' scenario, despite significantly more favourable global assumptions relating to higher mining commodity prices and reduced climate change impacts. The worst-case conditions have a more significant impact on overall results, with a reduction in the aggregate goal score for 'Sustainability Transition' of around 10% by 2030.

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