

Steel in a circular economy: global implications of a green shift in China

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Supplementary Information

1. ENGAGE-materials - regional and sectoral model structure

Table S1 - ENGAGE-materials regional aggregation

Region	Countries
CAN	Canada
USA	United States
MEX	Mexico
BRA	Brazil
JAP	Japan
KOR	South Korea
IND	India
IDN	Indonesia
CHN	China, Hong Kong, Taiwan, Macau
LAM	Argentina, Bolivia, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Aruba
WEU	Austria, Belgium, Luxembourg, Denmark, Finland, France, Germany, Iceland, Norway, Switzerland, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom
EEU	Greece, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Montenegro, Albania, Bosnia Herzegovina, Macedonia, Serbia
RUS	Russia
FSU	Ukraine, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Uzbekistan
ASO	Mongolia, North Korea, Burma Myanmar, Cambodia, Malaysia, Philippines, Thailand, Vietnam, Brunei, Laos, Singapore, Bangladesh, Pakistan, Afghanistan, Bhutan, Nepal, Sri Lanka, Fiji, French Polynesia, Kiribati, Maldives Islands, Marshall Islands, Micronesia, Federated States of, New Caledonia, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu New Hebrides, Timor-Leste

ANZ	Australia, New Zealand
MEA	Iran, Iraq, Saudi Arabia, Turkey, Bahrain, Qatar, Israel, Jordan, Kuwait, Lebanon, Oman, Syria, United Arab Emirates, West Bank, Yemen United
AFR	Egypt, Morocco, Algeria, Libya, Tunisia, Republic of South Africa, Benin, Burkina Faso, Cape Verde Islands, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo, Angola, Botswana, Burundi, Cameroon, Central African Republic, Chad, Comoros Islands, Congo (Democratic Republic of), Congo (Republic of), Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Kenya, Lesotho, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Namibia, Rwanda, Sao Tome and Principe, Seychelles, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe, Somalia

Table S2 - ENGAGE-materials economic sectors

Sector	Description
AGR	Agriculture
I_M	Iron mining
O_M	Other mining
WOP	Food processing and other animal products
PPP	Paper products
CRP	Chemicals
ISP	Primary steel
ISS	Secondary steel
SST	Treated scrap steel
NFM	Non-ferrous metals
NMM	Non-metallic minerals
MTP	Metal products
MVT	Motor vehicles
ELE	Electric and electronic equipment
MAE	Other machinery and equipment
OMA	Other manufacturing
COA	Coal
OIL	Oil
GAS	Gas
P_C	Coking coal and refined petroleum products
ELY	Electricity
RCY	Recycling
CNS	Construction
TRA	Transport services
SER	Other services

2. Scenario definition

Table S3 – Scenario operational capacity (million tons) – BASELINE, INT

Region	Steel type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
AFR	Primary steel	13.3	13.1	13.7	11.9	13.5	13.2	13.0	13.3	13.7	14.0	14.4	14.8	15.2	15.6	16.0	16.5	16.9	17.4	17.8	18.3
AFR	Secondary steel	27.7	27.0	28.0	27.0	22.3	21.0	26.4	27.0	27.6	28.3	29.0	29.6	30.4	31.1	31.8	32.6	33.4	34.1	35.0	35.8
AUS	Primary steel	7.2	5.5	5.3	5.2	5.5	5.7	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
AUS	Secondary steel	1.9	1.8	1.7	1.6	1.7	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
CAN	Primary steel	11.9	12.4	10.9	12.3	10.7	11.2	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
CAN	Secondary steel	8.6	9.1	8.9	8.0	9.2	9.0	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
CHI	Primary steel	790.5	835.4	958.6	963.9	949.3	950.5	947.1	898.2	898.2	898.2	898.2	898.2	898.2	898.2	898.2	898.2	898.2	898.2	898.2	898.2
CHI	Secondary steel	99.7	91.7	71.8	78.8	68.5	72.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4	106.4
CSA	Primary steel	7.2	6.3	6.2	6.3	6.4	5.7	5.5	5.8	6.1	6.4	6.6	6.9	7.2	7.5	7.8	8.2	8.5	8.8	9.1	9.5
CSA	Secondary steel	15.2	14.3	14.3	13.3	12.4	10.1	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
EEU	Primary steel	39.3	35.7	35.4	38.7	41.5	41.3	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2
EEU	Secondary steel	25.0	22.4	18.4	19.0	18.2	17.4	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
FSU	Primary steel	54.1	49.0	48.9	41.9	36.5	38.7	35.1	34.8	34.5	34.2	33.8	33.6	33.3	33.0	32.7	32.4	32.1	31.8	31.5	31.2
FSU	Secondary steel	5.1	5.3	4.7	4.1	3.6	3.8	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
IND	Primary steel	28.7	29.6	41.8	44.4	45.8	48.9	52.4	56.1	60.0	64.2	68.7	73.5	78.6	84.1	90.0	96.3	103.0	110.2	117.9	126.1
IND	Secondary steel	59.3	62.7	55.6	60.1	60.9	65.6	66.2	70.8	75.6	80.9	86.5	92.4	98.8	105.6	112.9	120.8	129.1	138.0	147.6	157.8
JPN	Primary steel	101.8	101.3	105.4	104.6	99.8	100.3	97.6	96.6	95.6	94.6	93.6	92.6	91.6	90.6	89.6	88.7	87.7	86.8	85.8	84.9
JPN	Secondary steel	30.6	30.2	30.7	31.6	29.6	28.6	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2
MEA	Primary steel	16.8	17.3	18.0	19.6	20.3	20.4	20.8	22.0	23.3	24.7	26.1	27.6	29.1	30.8	32.6	34.4	36.4	38.4	40.6	42.9
MEA	Secondary steel	66.6	71.3	71.6	72.5	67.8	73.4	80.9	86.6	92.6	99.1	106.1	113.6	121.6	130.1	139.2	149.0	159.5	170.7	182.7	195.6
MEX	Primary steel	6.0	5.9	6.4	6.7	5.9	5.8	5.6	5.6	5.5	5.4	5.4	5.3	5.2	5.2	5.1	5.0	4.9	4.8	4.7	4.6
MEX	Secondary steel	15.5	15.5	15.3	15.7	15.7	16.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.6	22.1	22.7	23.3	23.9	24.5	25.2

ODA	Primary steel	0.7	0.4	1.3	2.0	3.1	4.6	5.9	7.7	9.1	9.8	10.5	11.2	12.0	12.9	13.8	14.8	15.8	16.9	18.1	19.4
ODA	Secondary steel	36.4	35.1	32.6	33.6	30.1	32.8	39.6	42.0	44.6	47.3	50.2	53.3	56.6	60.1	63.8	67.7	71.9	76.3	81.0	85.9
SKO	Primary steel	50.4	51.5	48.2	56.6	58.0	56.8	57.0	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9
SKO	Secondary steel	31.5	31.0	30.8	28.9	25.3	25.2	27.9	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
USA	Primary steel	46.2	48.9	46.2	44.5	39.6	34.9	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8
USA	Secondary steel	70.3	70.7	71.0	74.4	66.7	70.9	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3
WEU	Primary steel	106.2	102.2	105.7	107.9	104.6	101.0	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8	104.8
WEU	Secondary steel	82.3	77.8	74.8	74.3	73.4	71.8	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2
RUS	Primary steel	63.1	61.9	61.2	62.1	61.0	61.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
RUS	Secondary steel	23.2	26.1	25.1	27.4	27.1	27.3	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
IDN	Primary steel	0.0	0.0	0.0	1.9	2.7	2.9	2.9	3.3	3.7	4.1	4.6	5.1	5.6	6.2	6.8	7.4	8.1	8.9	9.7	10.6
IDN	Secondary steel	6.7	4.2	4.9	4.7	3.9	3.4	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
BRA	Primary steel	36.2	35.6	34.3	34.9	35.6	33.1	36.5	37.7	39.0	40.2	41.6	42.9	44.4	45.8	47.3	48.9	50.5	52.2	53.9	55.7
BRA	Secondary steel	11.3	11.1	11.7	10.8	9.2	9.0	9.9	10.2	10.5	10.9	11.2	11.6	12.0	12.4	12.8	13.2	13.7	14.1	14.6	15.1

Table S4 – Scenario operational capacity changes (million tons)– EXT*, PLUS*

Region	Steel type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CHI	Primary steel	790.5	835.4	958.6	963.9	949.3	950.5	947.1	898.2	880.3	862.7	845.4	828.5	811.9	795.7	779.8	764.2	748.9	733.9	719.2	704.9
CHI	Secondary steel	99.7	91.7	71.8	78.8	68.5	72.4	106.4	106.4	124.3	141.9	159.2	176.1	192.7	208.9	224.8	240.4	255.7	270.7	285.4	299.7

* no capacity changes in the other regions

Table S5 – Obsolete scrap availability (million tons) – BASELINE, INT, EXT, PLUS

Region	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
AFR	3.3	3.5	3.8	4.0	4.2	4.5	4.8	5.0	5.3	5.7	6.0	6.4	6.8	7.2	7.6	8.1	8.5	9.1	9.6	10.2
AUS	2.8	2.9	3.0	3.1	3.2	3.2	3.3	3.4	3.5	3.6	3.7	3.9	4.0	4.1	4.2	4.3	4.4	4.6	4.7	4.8
CAN	7.6	7.6	7.7	7.7	7.8	7.8	7.9	7.9	8.0	8.1	8.1	8.2	8.2	8.3	8.4	8.4	8.5	8.5	8.6	8.7
CHI	26.6	29.0	33.3	36.3	40.4	44.8	49.3	53.3	58.8	64.8	69.9	75.4	81.4	87.8	94.7	102.2	110.2	118.9	128.3	138.4
CSA	3.2	3.4	3.6	3.9	4.1	4.4	4.7	5.0	5.3	5.7	6.0	6.4	6.9	7.3	7.8	8.3	8.8	9.4	10.0	10.7
EEU	18.7	18.9	19.2	19.4	19.6	19.8	20.1	20.3	20.5	20.8	21.0	21.3	21.5	21.8	22.0	22.3	22.6	22.8	23.1	23.4
FSU	3.3	3.3	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.5	3.5	3.5	3.5	3.5
IND	15.4	16.7	18.1	19.6	21.3	23.1	25.1	27.2	29.5	32.0	34.7	37.6	40.8	44.2	47.9	52.0	56.4	61.1	66.3	71.9
JPN	26.4	26.9	27.5	28.1	28.7	29.3	30.0	30.6	31.3	32.0	32.6	33.4	34.1	34.8	35.6	36.3	37.1	37.9	38.7	39.6
MEA	15.0	15.8	16.7	17.7	18.7	19.8	21.0	22.2	23.4	24.8	26.2	27.7	29.3	31.0	32.8	34.7	36.7	38.8	41.1	43.4
MEX	9.9	10.6	11.3	12.0	12.8	13.6	14.5	15.5	16.5	17.6	18.8	20.0	21.3	22.7	24.2	25.8	27.5	29.3	31.3	33.3
ODA	4.9	5.1	5.4	5.6	5.9	6.1	6.4	6.7	7.0	7.4	7.7	8.1	8.4	8.8	9.2	9.7	10.1	10.6	11.1	11.6
SKO	15.3	15.8	16.3	16.8	17.4	18.0	18.6	19.2	19.9	20.5	21.2	21.9	22.7	23.4	24.2	25.0	25.9	26.7	27.6	28.6
USA	72.7	73.2	73.7	74.3	74.8	75.4	75.9	76.5	77.0	77.6	78.1	78.7	79.3	79.8	80.4	81.0	81.6	82.2	82.8	83.4
WEU	99.4	100.5	101.7	102.9	104.1	105.4	106.6	107.9	109.1	110.4	111.7	113.1	114.4	115.7	117.1	118.5	119.9	121.3	122.8	124.2
RUS	18.8	18.9	19.0	19.0	19.1	19.1	19.2	19.3	19.3	19.4	19.4	19.5	19.6	19.6	19.7	19.7	19.8	19.9	19.9	20.0
IDN	1.6	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.1	3.2	3.4	3.5	3.7
BRA	6.3	6.7	7.2	7.7	8.2	8.7	9.3	9.9	10.5	11.2	12.0	12.8	13.6	14.5	15.4	16.5	17.5	18.7	19.9	21.2

Table S6 – Substitutability of primary and secondary steel in downstream sectors - σ_s values adopted in ENGAGE-materials

Region	BASELINE, INT, EXT	PLUS
China		
MVT, MAE, MTP	2	3.5
CNS	10	10
Rest of regions		
MVT, MAE, MTP	2	2
CNS	10	10

3. Results

3.1. Regional GDP impacts across scenarios

Table S7 – Regional GDP gains and losses in 2030 – deviations from the GDP baseline values in 2030

	INT	EXT	PLUS
AFR	-0.005%	0.093%	0.092%
AUS	-0.059%	-0.481%	-0.453%
CAN	-0.003%	0.054%	0.053%
CHI	0.022%	0.322%	0.553%
CSA	-0.002%	0.136%	0.147%
EEU	-0.001%	0.140%	0.111%
FSU	-0.003%	0.163%	0.176%
IND	-0.003%	-0.112%	-0.112%
JPN	0.000%	-0.029%	-0.062%
MEA	-0.004%	-0.125%	-0.100%
MEX	-0.003%	0.091%	0.081%
ODA	0.001%	-0.251%	-0.374%
SKO	0.004%	0.061%	0.032%
USA	0.000%	0.022%	0.032%
WEU	-0.001%	-0.023%	-0.047%
RUS	-0.009%	0.094%	0.114%
IDN	-0.002%	0.079%	0.063%
BRA	-0.017%	-0.144%	-0.115%

Table S8 – Regional GDP gains and losses in USD bn – INT scenario

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
AFR	-0.02	-0.04	-0.06	-0.08	-0.10	-0.13	-0.15	-0.17	-0.20	-0.22	-0.24	-0.27	-1.67
AUS	-0.12	-0.26	-0.40	-0.53	-0.65	-0.78	-0.90	-1.02	-1.14	-1.24	-1.34	-1.45	-9.84
CAN	-0.01	-0.01	-0.02	-0.02	-0.03	-0.04	-0.04	-0.05	-0.06	-0.06	-0.07	-0.07	-0.46
CHI	0.30	0.68	1.10	1.56	2.01	2.46	2.92	3.38	3.84	4.28	4.66	5.12	32.30
CSA	-0.01	-0.01	-0.02	-0.03	-0.04	-0.04	-0.05	-0.06	-0.07	-0.08	-0.09	-0.10	-0.60
EEU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.05
FSU	-0.01	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.30
IND	-0.01	-0.02	-0.03	-0.04	-0.06	-0.07	-0.09	-0.11	-0.13	-0.16	-0.18	-0.20	-1.09
JPN	0.02	0.04	0.05	0.07	0.07	0.06	0.05	0.03	0.02	0.00	-0.01	-0.02	0.39
MEA	-0.03	-0.05	-0.08	-0.10	-0.13	-0.16	-0.19	-0.21	-0.23	-0.24	-0.25	-0.27	-1.93
MEX	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.03	-0.04	-0.05	-0.06	-0.26
ODA	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.06	0.33
SKO	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.08	0.08	0.57
USA	0.02	0.04	0.06	0.08	0.08	0.09	0.09	0.10	0.10	0.10	0.11	0.09	0.96
WEU	0.00	0.00	0.00	0.00	-0.02	-0.04	-0.07	-0.09	-0.12	-0.14	-0.15	-0.16	-0.79
RUS	-0.02	-0.04	-0.07	-0.09	-0.11	-0.15	-0.18	-0.20	-0.23	-0.25	-0.27	-0.29	-1.91
IDN	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.04	-0.05	-0.05	-0.06	-0.33

BRA	-0.09	-0.17	-0.25	-0.33	-0.41	-0.47	-0.53	-0.59	-0.64	-0.69	-0.72	-0.76	-5.68
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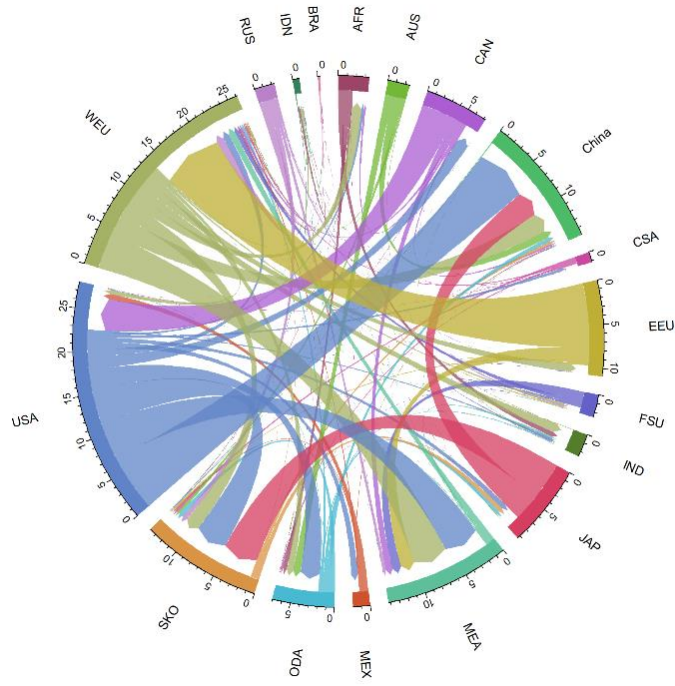
Table S9 – Regional GDP gains and losses in USD bn – EXT scenario

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
AFR	0.28	0.60	0.98	1.34	1.35	1.51	1.90	2.61	3.25	3.61	4.17	4.71	26.31
AUS	-0.99	-2.06	-3.13	-4.22	-5.25	-6.40	-7.37	-8.20	-9.05	-9.96	-10.77	-11.81	-79.20
CAN	0.08	0.18	0.31	0.45	0.51	0.53	0.65	0.83	0.99	1.13	1.25	1.45	8.36
CHI	8.35	16.79	25.34	33.72	41.22	48.76	56.36	63.65	69.45	73.29	75.75	76.31	588.97
CSA	0.43	0.88	1.38	1.86	2.16	2.42	2.93	3.64	4.27	4.81	5.30	5.79	35.88
EEU	0.13	0.28	0.49	0.72	0.90	1.05	1.34	1.71	2.07	2.42	2.78	3.17	17.06
FSU	0.09	0.22	0.38	0.54	0.60	0.70	0.88	1.19	1.49	1.70	1.92	2.18	11.88
IND	-0.10	-0.24	-0.44	-0.66	-0.96	-1.47	-2.08	-2.88	-3.77	-4.75	-5.89	-6.69	-29.91
JPN	-0.30	-0.52	-0.60	-0.50	-0.74	-1.29	-1.61	-2.20	-2.58	-2.71	-2.72	-2.21	-17.99
MEA	0.37	0.75	1.04	1.02	0.42	-0.16	-0.83	-1.50	-2.70	-4.38	-6.84	-8.75	-21.55
MEX	0.05	0.11	0.18	0.27	0.34	0.35	0.47	0.65	0.87	1.15	1.52	1.97	7.95
ODA	0.42	0.72	0.78	0.48	-0.48	-2.08	-3.49	-4.64	-6.18	-8.02	-10.28	-12.12	-44.90
SKO	0.13	0.24	0.29	0.31	0.28	0.41	0.42	0.45	0.52	0.67	0.81	1.35	5.87
USA	0.57	1.16	1.89	2.61	2.71	2.85	3.01	3.19	3.40	3.62	3.86	5.29	34.17
WEU	0.09	0.23	0.41	0.61	0.25	-0.62	-1.36	-2.34	-3.46	-4.57	-5.84	-5.50	-22.09
RUS	-0.04	0.00	0.08	0.17	0.07	0.83	1.19	1.69	2.13	2.51	2.83	3.07	14.54
IDN	0.24	0.47	0.70	0.90	1.00	1.03	1.19	1.46	1.66	1.79	1.82	1.95	14.20
BRA	-0.93	-1.77	-2.55	-3.27	-4.04	-4.92	-5.42	-5.85	-6.16	-6.39	-6.46	-6.64	-54.39

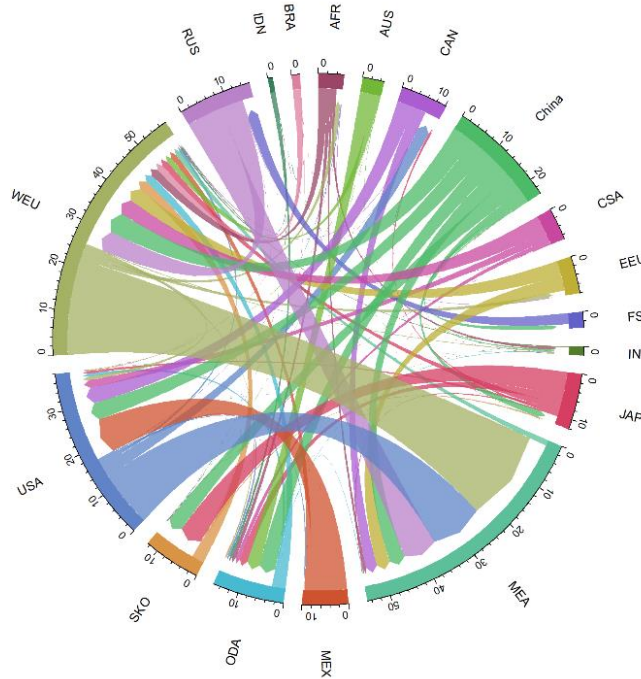
Table S10 – Regional GDP gains and losses in USD bn – PLUS scenario

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
AFR	0.26	0.58	0.98	1.36	1.35	1.43	1.78	2.52	3.17	3.53	3.96	4.68	25.60
AUS	-1.00	-2.05	-3.07	-4.10	-5.10	-6.24	-7.17	-7.91	-8.68	-9.52	-10.29	-11.14	-76.27
CAN	0.08	0.19	0.33	0.50	0.54	0.53	0.63	0.80	0.95	1.04	1.11	1.41	8.12
CHI	8.43	17.76	28.01	38.89	49.45	60.73	72.86	85.60	97.74	108.69	119.61	130.86	818.62
CSA	0.43	0.92	1.47	2.01	2.32	2.56	3.09	3.86	4.55	5.11	5.58	6.28	38.16
EEU	0.11	0.26	0.45	0.67	0.80	0.88	1.10	1.41	1.70	1.95	2.16	2.53	14.02
FSU	0.11	0.25	0.43	0.61	0.68	0.75	0.93	1.27	1.58	1.80	2.02	2.35	12.78
IND	-0.06	-0.15	-0.29	-0.45	-0.72	-1.23	-1.85	-2.70	-3.68	-4.77	-6.09	-6.70	-28.70
JPN	-0.27	-0.51	-0.62	-0.56	-0.92	-1.64	-2.19	-3.16	-3.97	-4.57	-5.12	-4.74	-28.26
MEA	0.38	0.82	1.20	1.31	0.77	0.22	-0.35	-0.81	-1.81	-3.32	-5.65	-6.99	-14.23
MEX	0.04	0.10	0.17	0.27	0.32	0.31	0.40	0.55	0.73	0.96	1.26	1.74	6.86
ODA	0.38	0.66	0.66	0.24	-1.06	-3.18	-5.15	-6.80	-9.00	-11.71	-15.14	-18.06	-68.15
SKO	0.11	0.21	0.26	0.27	0.19	0.28	0.23	0.20	0.19	0.23	0.22	0.72	3.11
USA	0.58	1.27	2.16	3.12	3.23	3.38	3.55	3.75	3.96	4.19	4.44	7.80	41.42
WEU	0.09	0.22	0.40	0.60	-0.14	-1.51	-2.81	-4.48	-6.49	-8.71	-11.46	-11.28	-45.55
RUS	0.00	0.09	0.22	0.37	0.30	1.15	1.55	2.10	2.60	3.00	3.31	3.72	18.42
IDN	0.23	0.47	0.70	0.92	0.99	0.97	1.10	1.36	1.52	1.57	1.46	1.55	12.85
BRA	-0.89	-1.67	-2.36	-2.95	-3.64	-4.45	-4.85	-5.19	-5.39	-5.54	-5.50	-5.31	-47.75

3.2. Bilateral trade flows

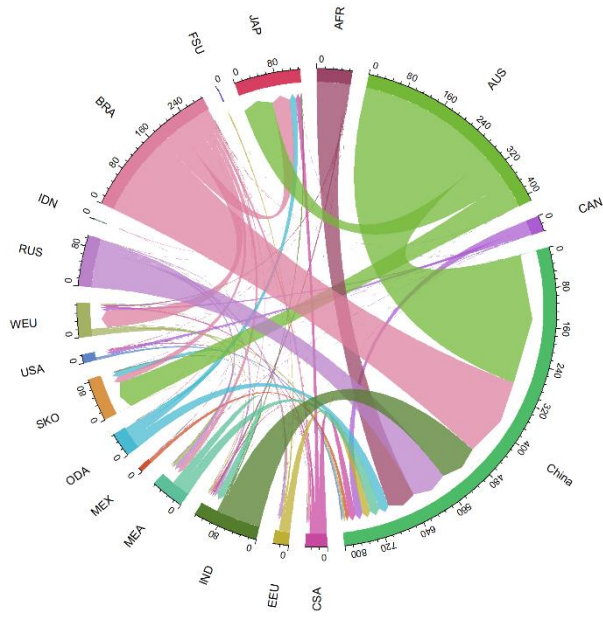


A) 2011 - BASELINE

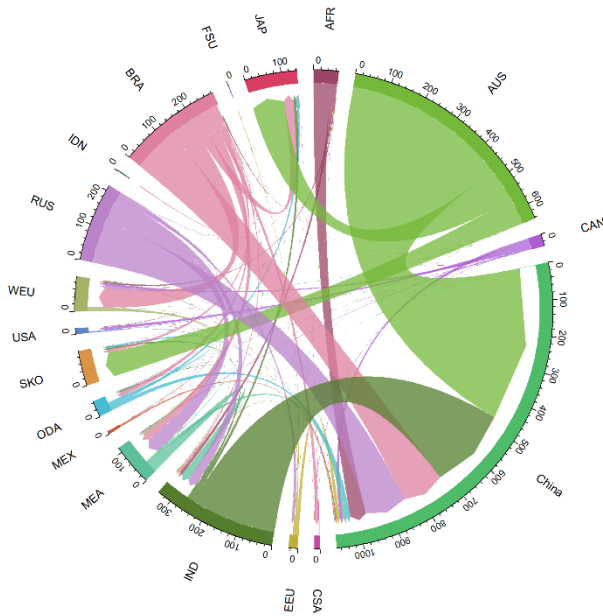


B) 2030 - BASELINE

Figure S1 – Baseline obsolete scrap trade between macro-regions - in million metric tons



A) 2011 - BASELINE



B) 2030 – BAESLINE

Figure S2 – Iron mining trade between macro-regions - in million metric tons