Metal demand 2050 - steel, copper, nickel.

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STOCKHOLM, SWEDEN

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RMG Consulting

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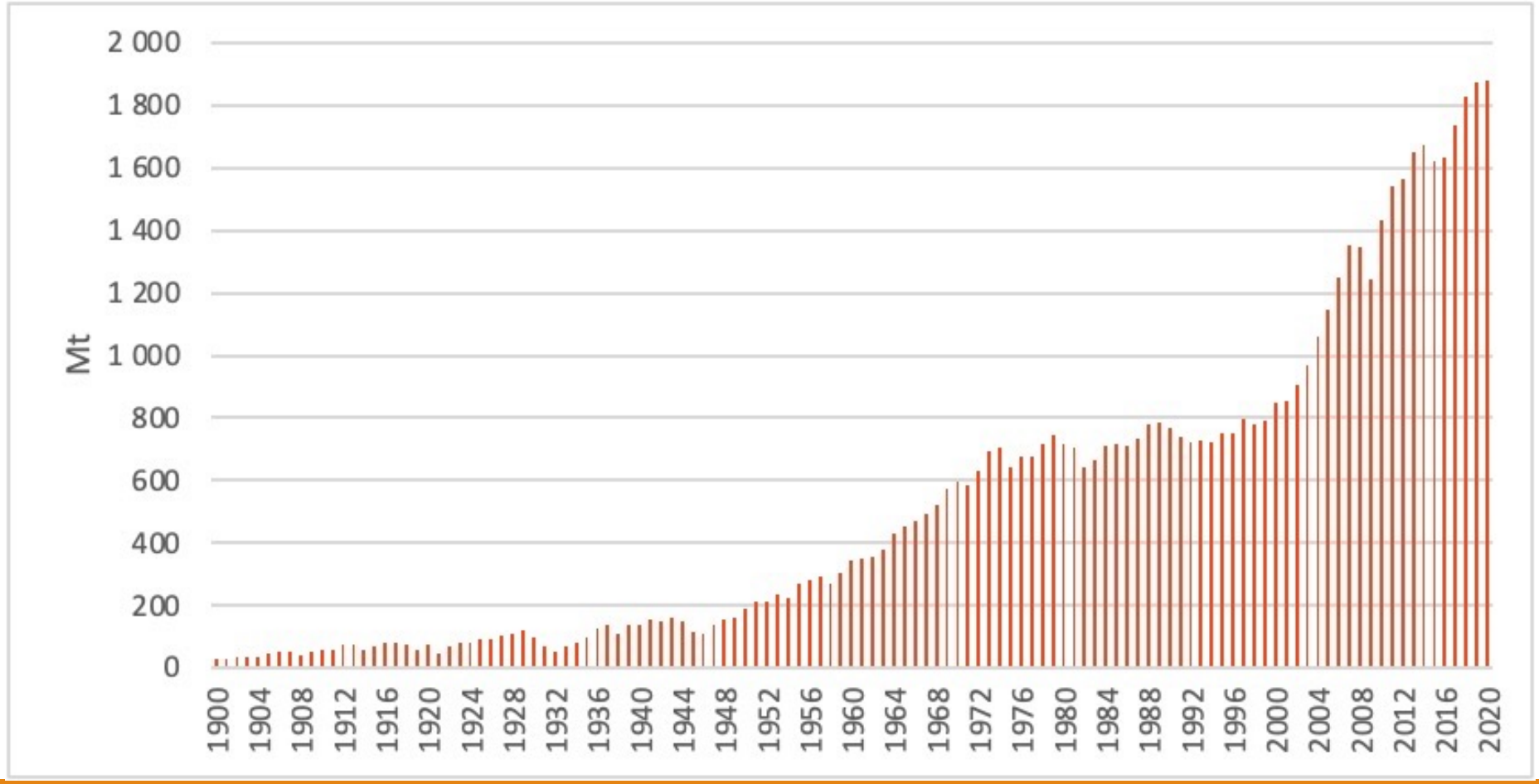
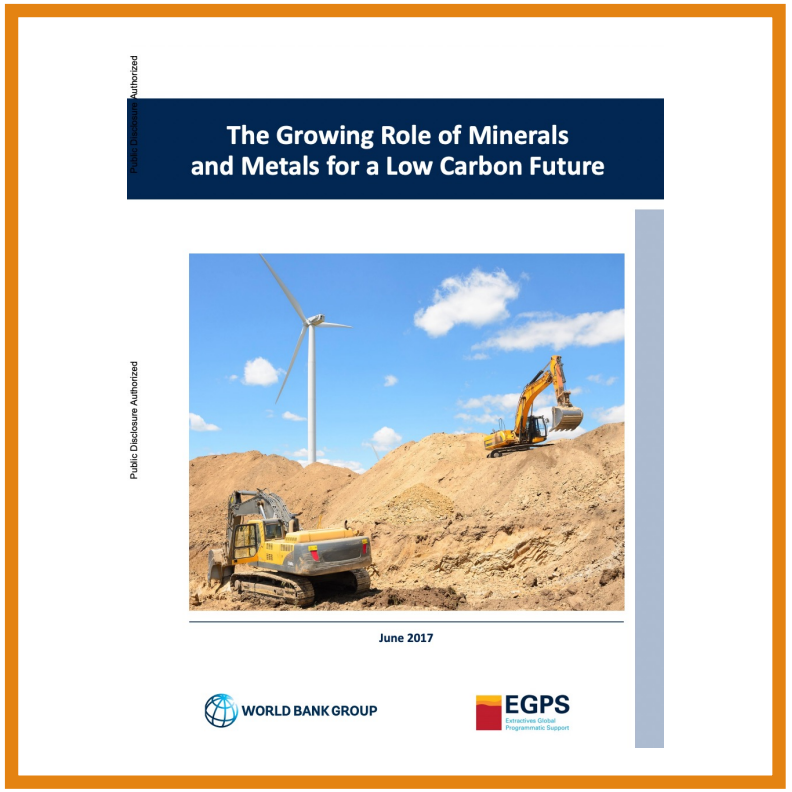
The report

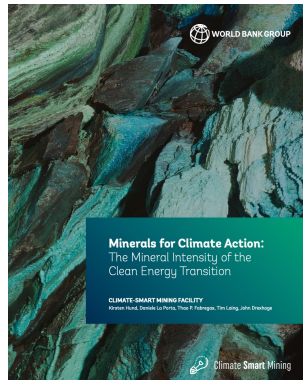
- The World Bank, the extractives energy & extractives department
- what is the societal metal demand from general economic development
- If history can say anything about the future, what does it say?
- Is metal demand presented underestimating total demand, and developing countries, demand.

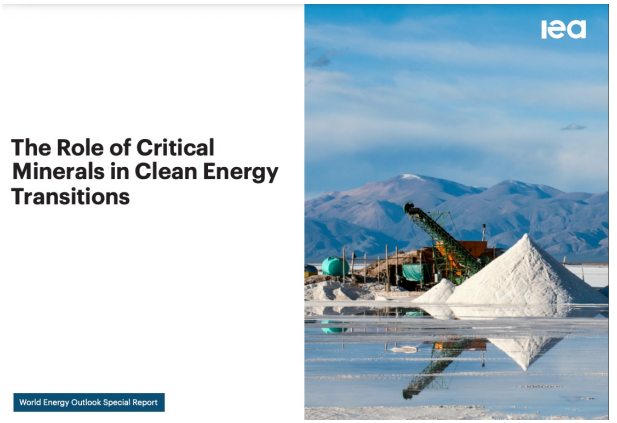
Steel production 1900-2020 (Mt)

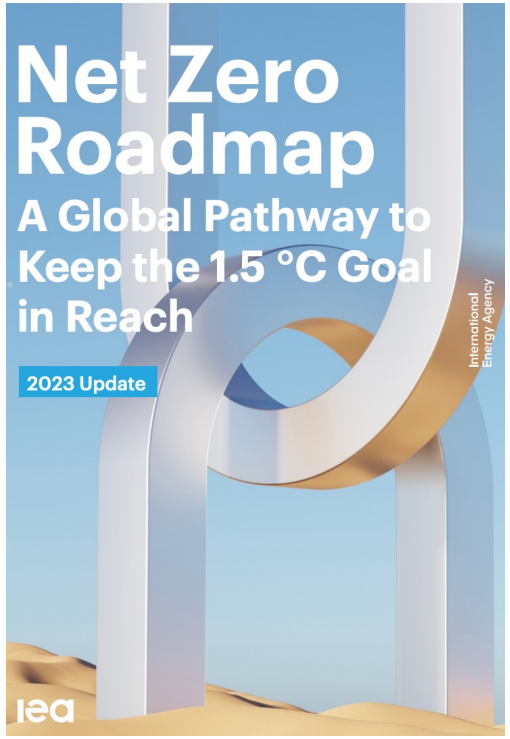


Have you read these?









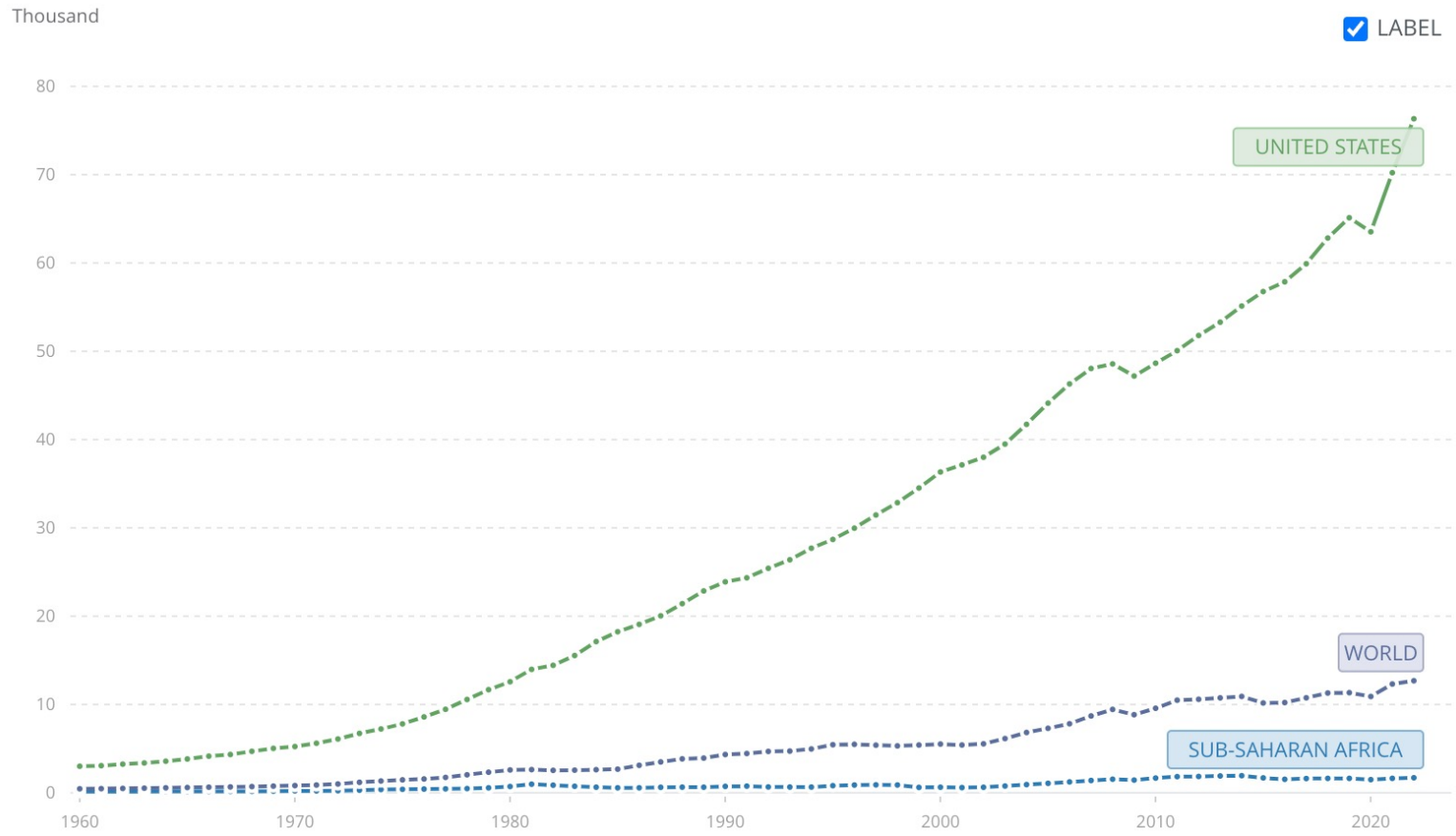
Do you know what they say about the demand for steel in 2050?

	Net Zero Emissions by 2050 Scenario							CAAGR (%) 2022 to:	
	2010	2021	2022	2030	2035	2040	2050	2030	2050
Indicators									
Population (million)	6 967	7 884	7 950	8 520	8 853	9 161	9 681	0.9	0.7
GDP (USD 2022 billion, PPP)	114 463	158 505	163 734	207 282	238 066	270 050	339 273	3.0	2.6
GDP per capita (USD 2022, PPP)	16 429	20 104	20 596	24 329	26 892	29 479	35 044	2.1	1.9
TES/GDP (GJ per USD 1 000, PPP)	4.7	3.9	3.9	2.8	2.3	2.0	1.6	-4.1	-3.1
TFC/GDP (GJ per USD 1 000, PPP)	3.2	2.6	2.6	1.9	1.5	1.3	1.0	-3.9	-3.3
CO_2 intensity of electricity generation (g CO_2 per kWh)	528	464	460	186	48	3	- 4	-11	n.a.
Industrial production (Mt)									
Primary chemicals	515	713	719	861	905	916	[illegible]	2.3	0.7
Steel	1 435	1 960	1 878	1 973	1 966	1 958	1 957	0.6	0.1

sectors where it is most challenging to tackle emissions directly. Material efficiency alone reduces demand for cement and steel by 20%, saving around 1 700 Mt CO_2. Of the emissions

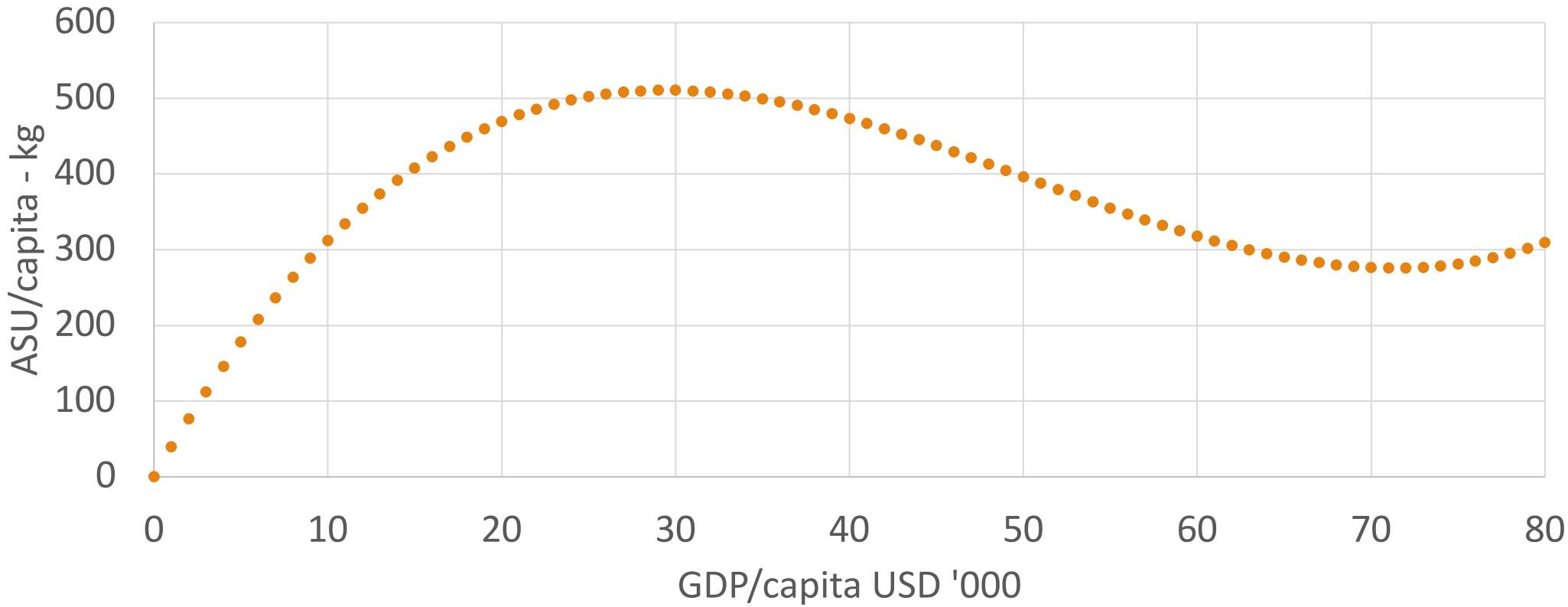
IEA , p 69

Are we using metals because we are rich, or did we get rich from using metals?

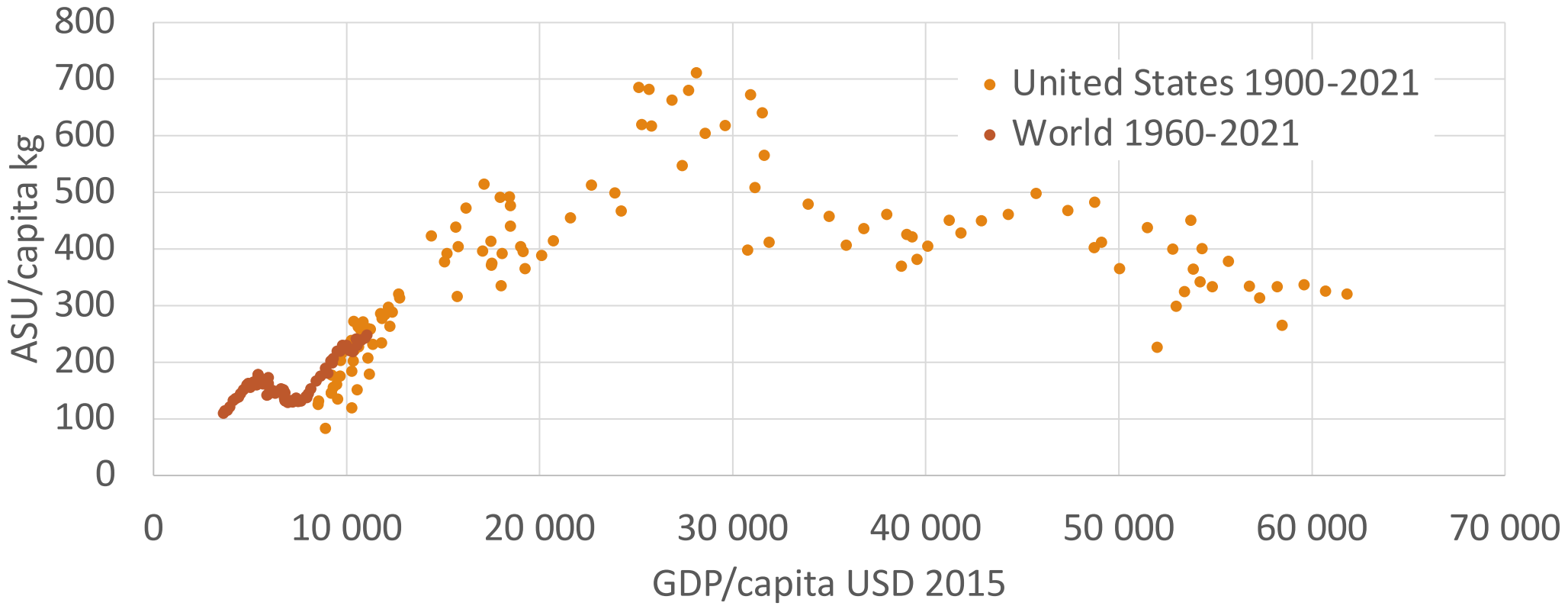


Source: World Bank

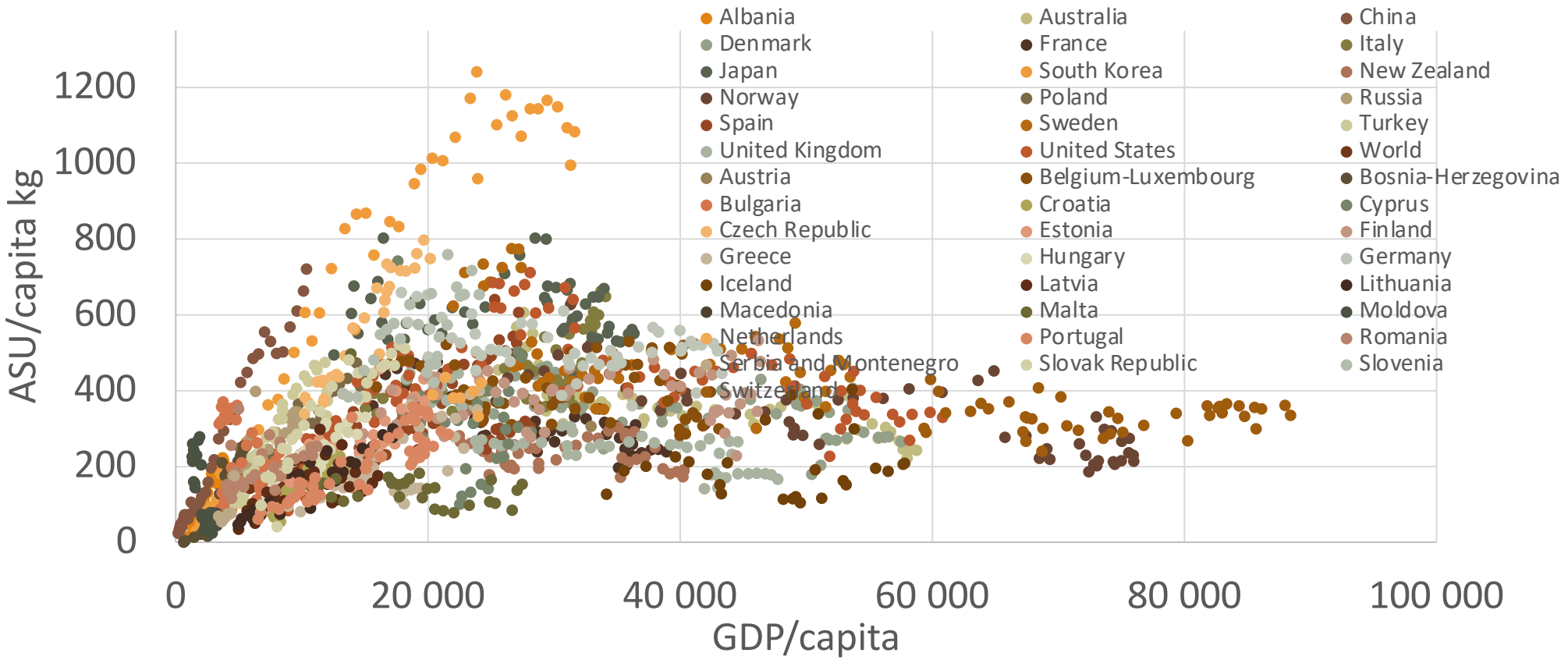
Intensity of Use



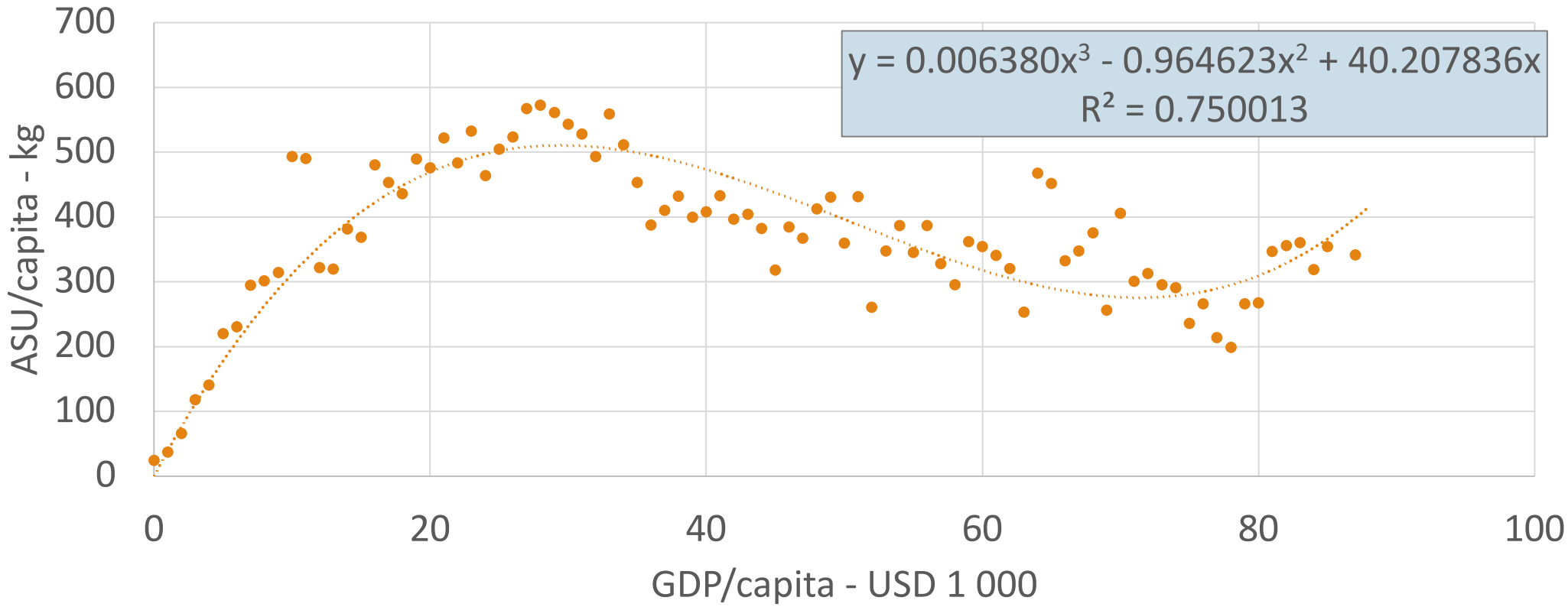
IoU an example



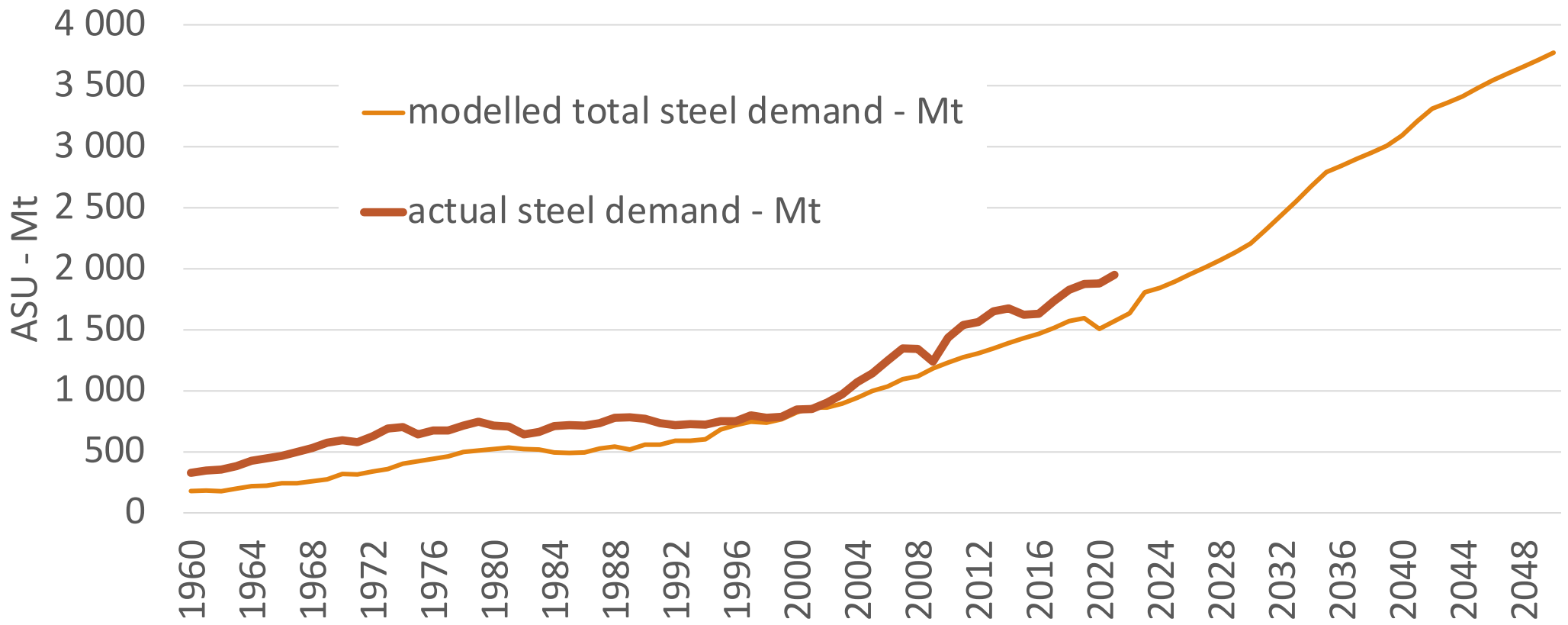
Data – how it actually is



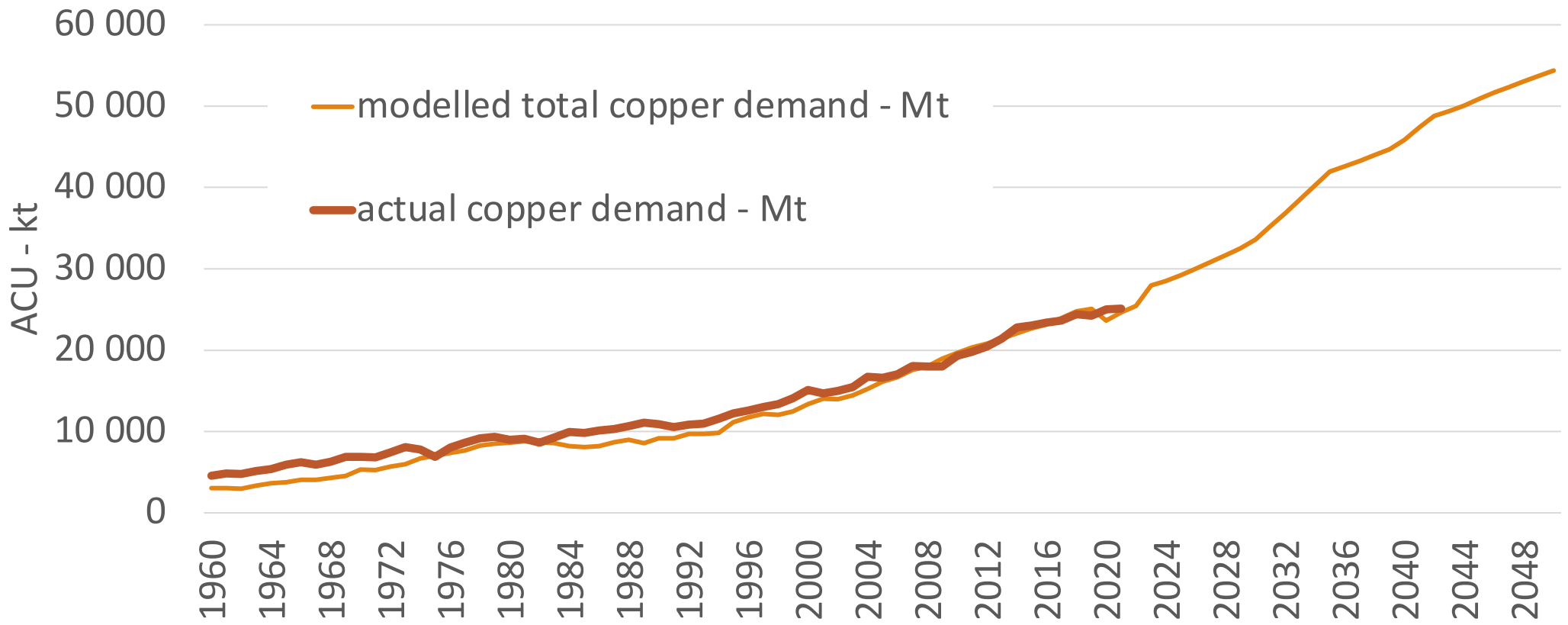
Steel ASU/capita per GDP/capita



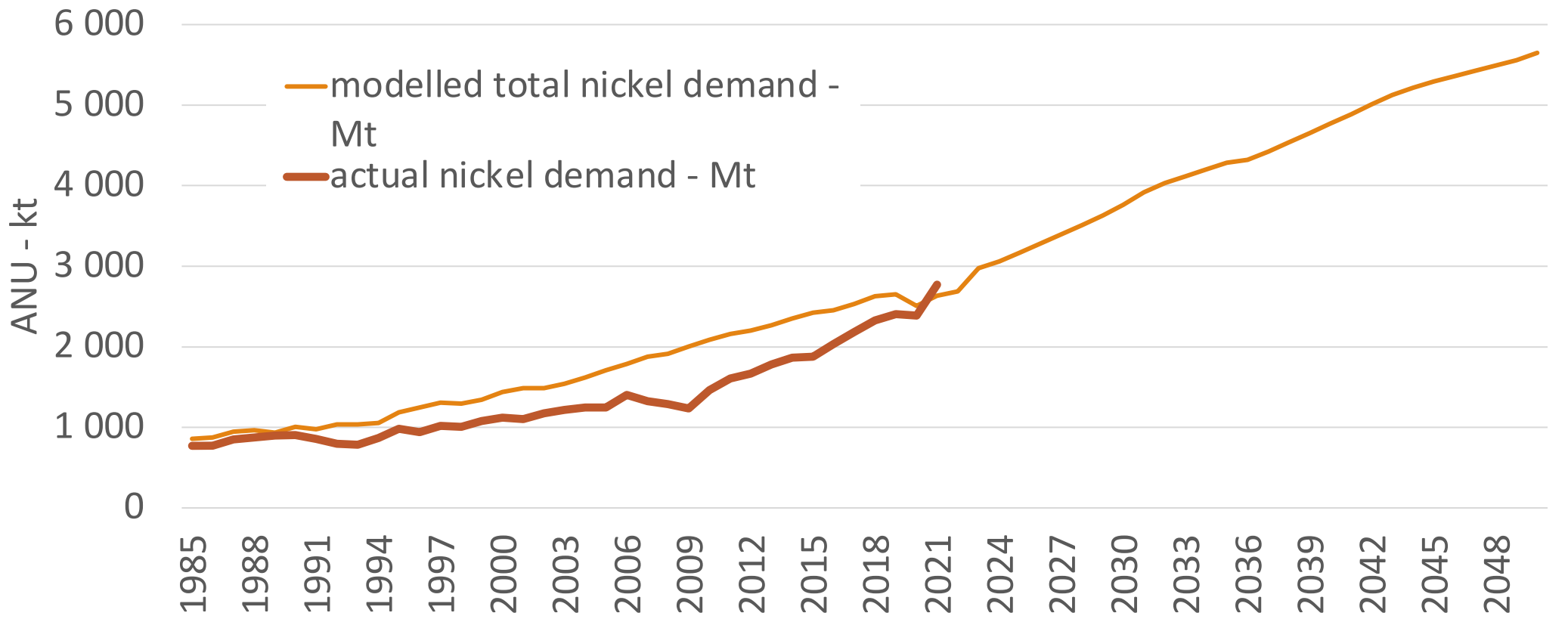
Steel demand 1960-2050 (Mt)



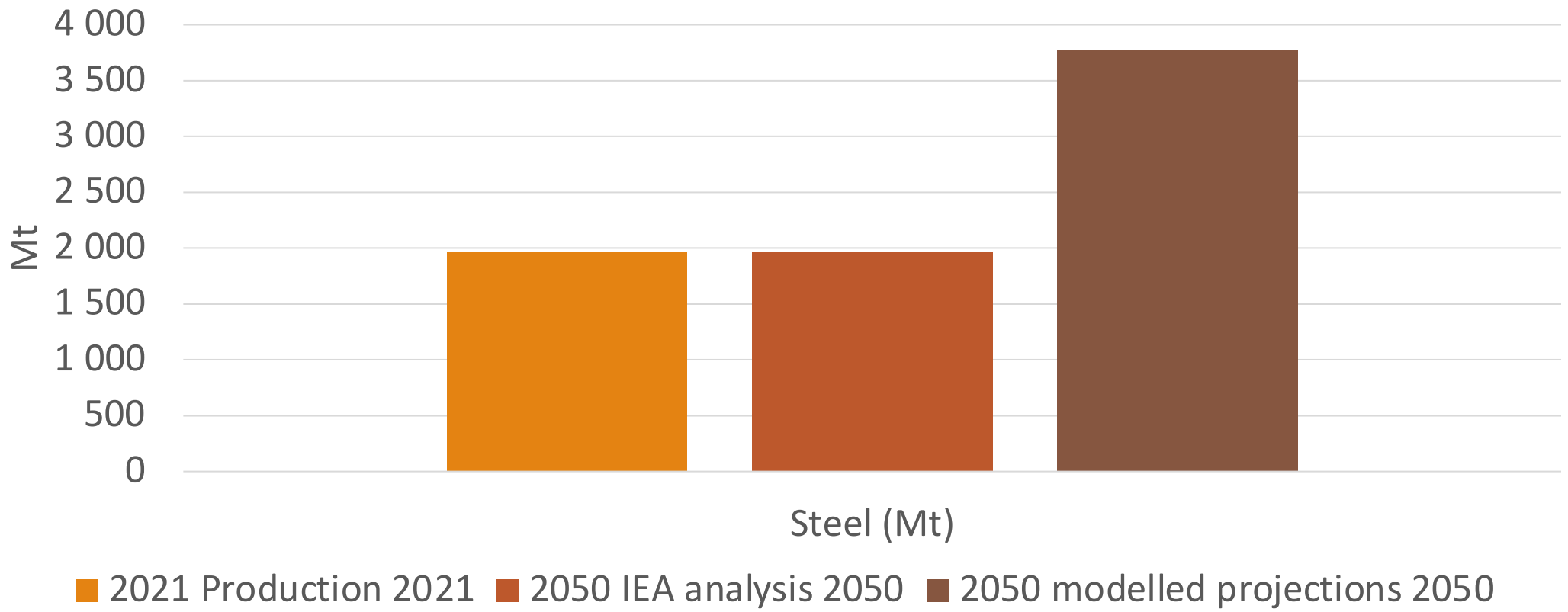
Copper demand 1960-2050 (kt).



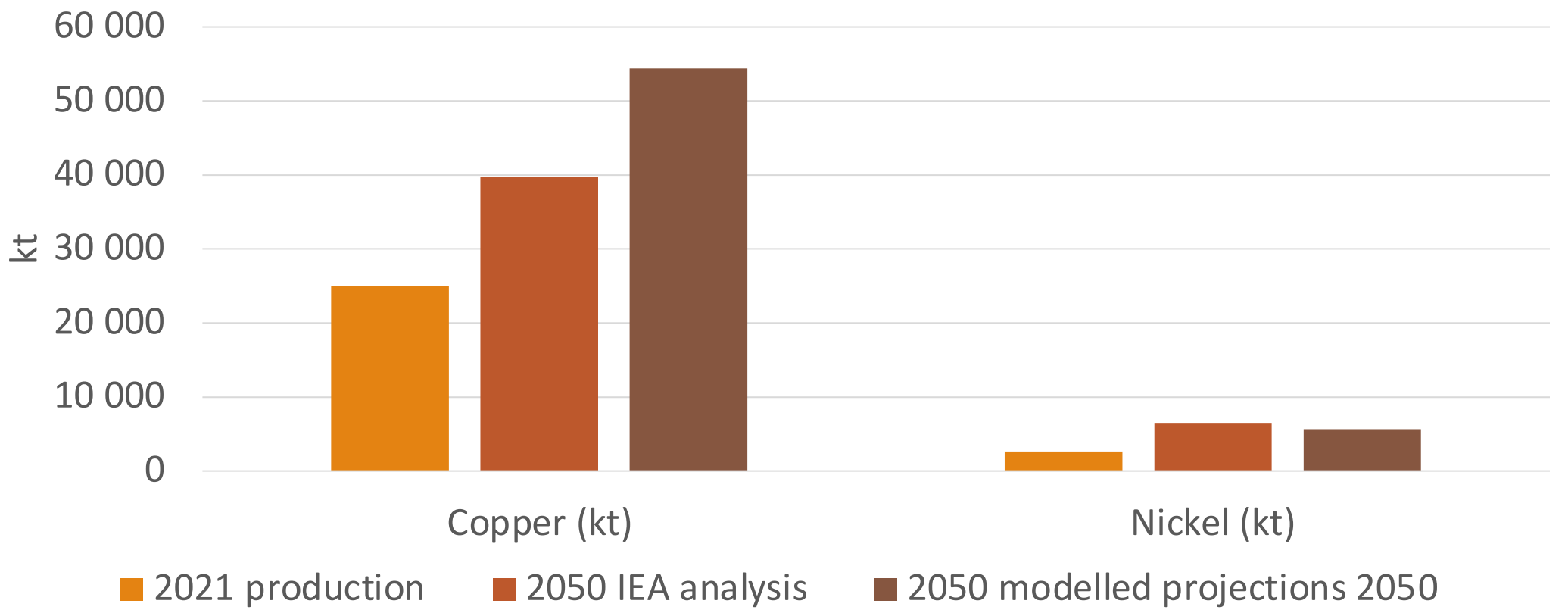
Nickel demand 1985-2050 (kt)



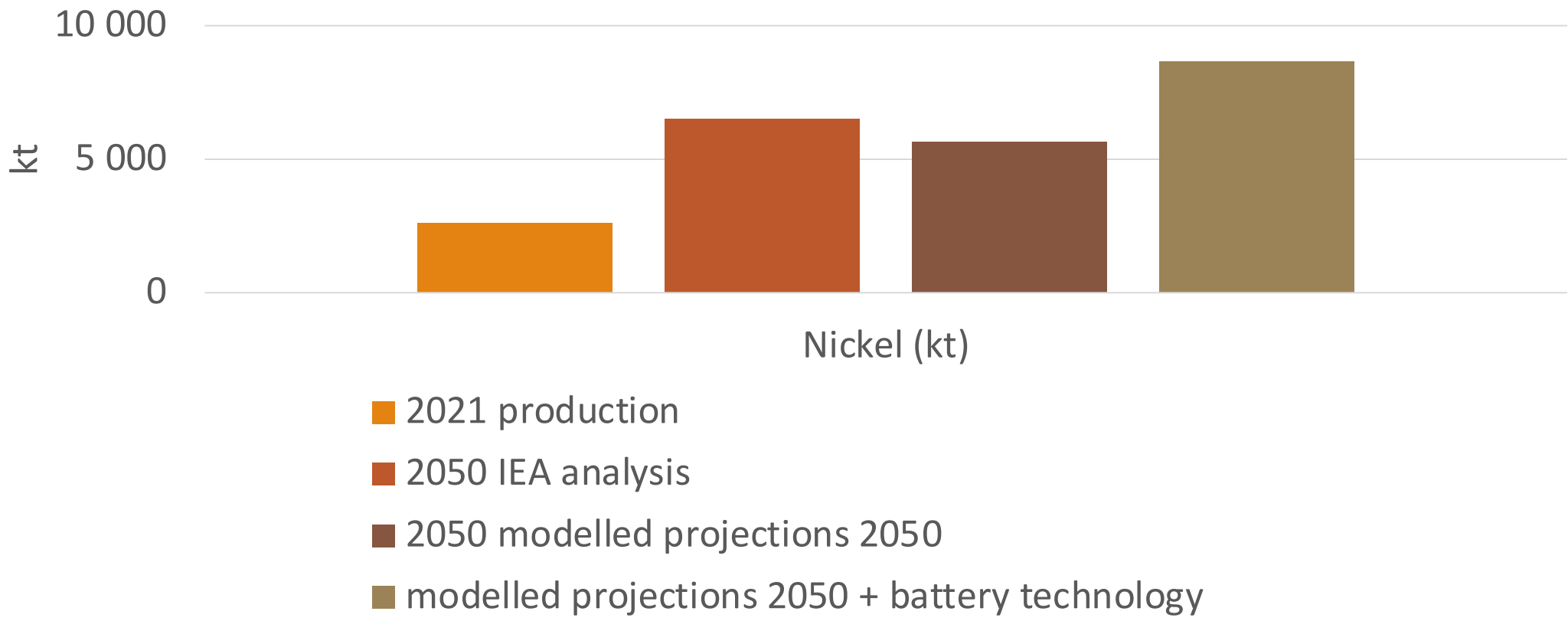
Comparison with the IEA (steel)



Comparison with the IEA (copper & nickel)



Comparison with the IEA (nickel II)



Growth rates

	2021	2050		2021-2050			1991-2021	
	Production 2021	IEA analysis 2050	modelled projections 2050	IEA growth	modelled growth	modelled CAGR	total growth	CAGR
steel	1 962	1 960	3 772	0%	92%	2.3%	166%	3.3%
copper	24 958	39 740	54 377	59%	118%	2.7%	138%	2.9%
nickel	2 608	6 508	5 649	150%	117%	2.7%	223%	4.0%
nickel (modelled projections + battery technology)	2 608	6 508	8 649	150%	232%	4.2%	223%	4.0%

Summary

- Demand for the three metals analysed will grow and reach a projected:
  - 3 772 Mt – Steel
  - 54 377 kt – Copper
  - 5 649 kt – Nickel
- The growth rates are in line or lower than the previous 30 year period.
- However, the volumes are larger
  - and remember that there were problems delivering in the previous 30 year period, i.e. prices were volatile
  - however, market forces balanced supply and demand effectively in the previous 30 year period.
- There is a risk that the demand for steel, copper, and nickel have been largely underestimated in reports focusing on the green transition.

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Thank you

Thank you

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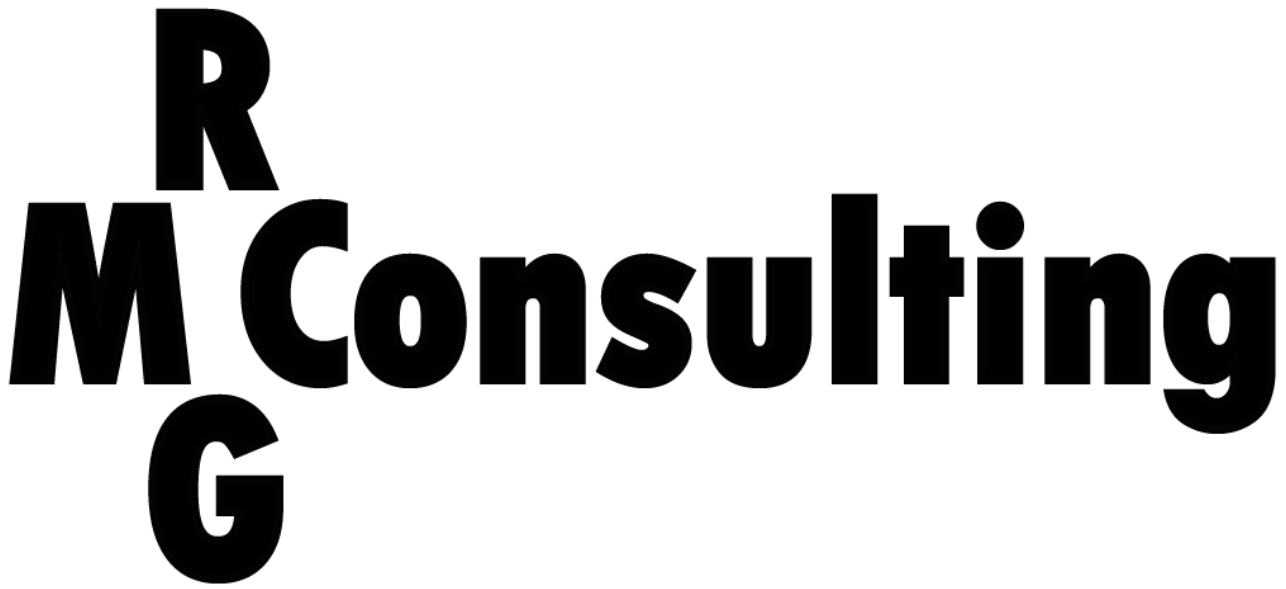
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