

Copper Outlook: Electrification and a weak \$ vs Trade War

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Kenneth Hoffman, CFA provides advisory service to a select few major corporations, governments, and financial firms. Ken is a well-known global metals advisor to leading global companies. He has spent more than 25 years in investments, managing and directing tens of billions of USD in global investments as a Portfolio Manager, and global Director of Research for various large funds including Millenium Partners and Reservoir Capital.

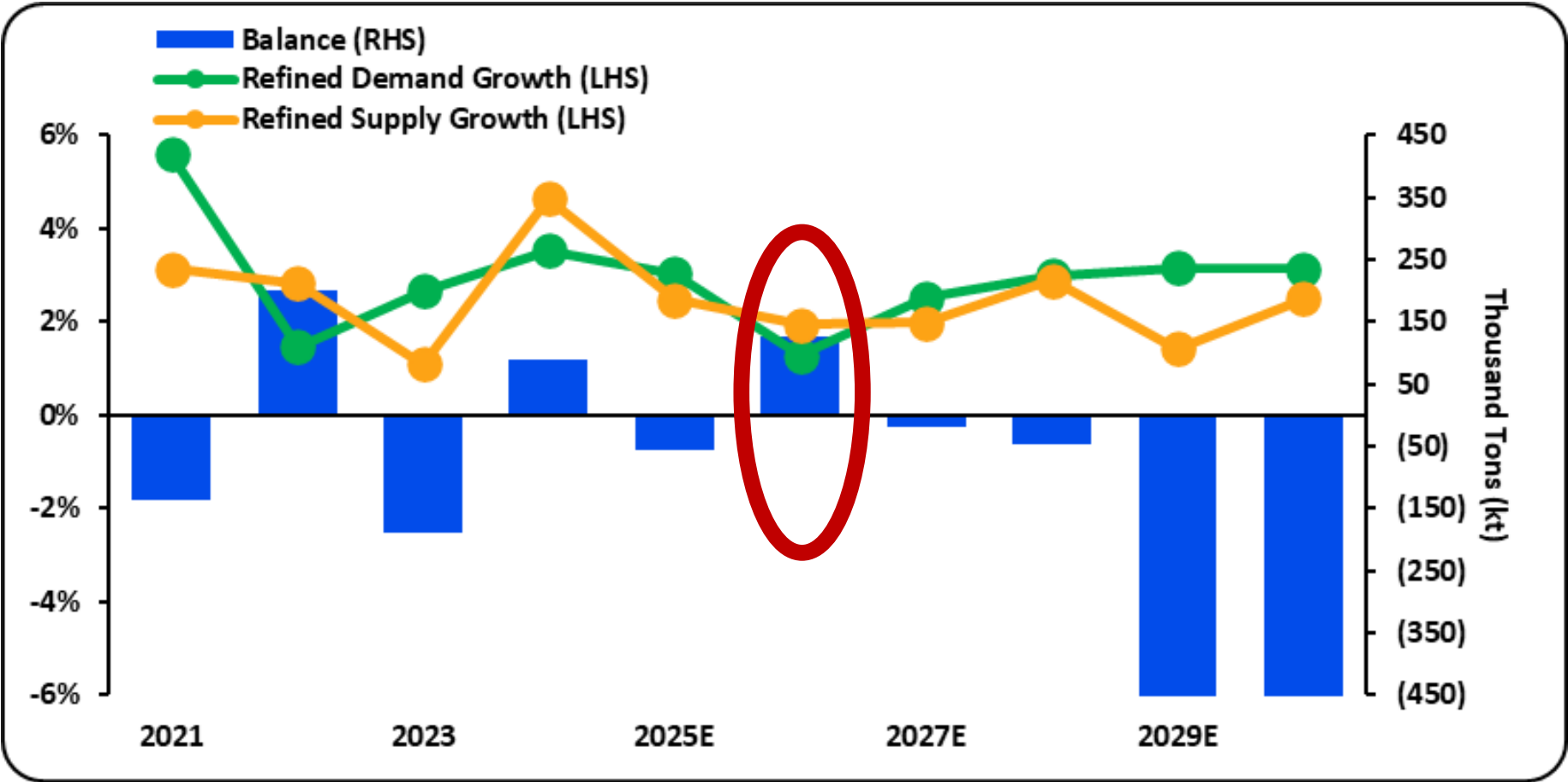
In late 2016, Mr. Hoffman agreed to join McKinsey's Global Energy & Mining practice (GEM) to lead the work for both mining company strategy in gold, copper, nickel, manganese, and lithium as well as battery raw material value chains. He has worked on more than 100 due diligences up and down the value chain, from the analysis of lithium assets, more than a dozen direct lithium extraction technologies, manganese, copper, separator, electrolyte, carbon additives, battery recycling, etc.

He is one of the main presenters at metal and mining forums as well as global battery conferences and global media, including an opening keynote at PDAC, FMF (The Future Minerals Forum in Riyadh), Fast Markets events in Asia, North America, Europe and South America), the London Metals Exchange Week conferences (HK and London), the Australian AUSIMM general gathering, etc. He has been featured in BNN Bloomberg, KITCO, the WSJ, Financial Post, The Financial Times, etc.

Mr. Hoffman is on the Board of Advisors for "The Battery Show" the largest event in North America as well as an advisor to FastMarkets "Volta Awards"

Mr. Hoffman has held his CFA designation since 1995 and CIM since 2025

Copper will be a fight of electrification vs Trump



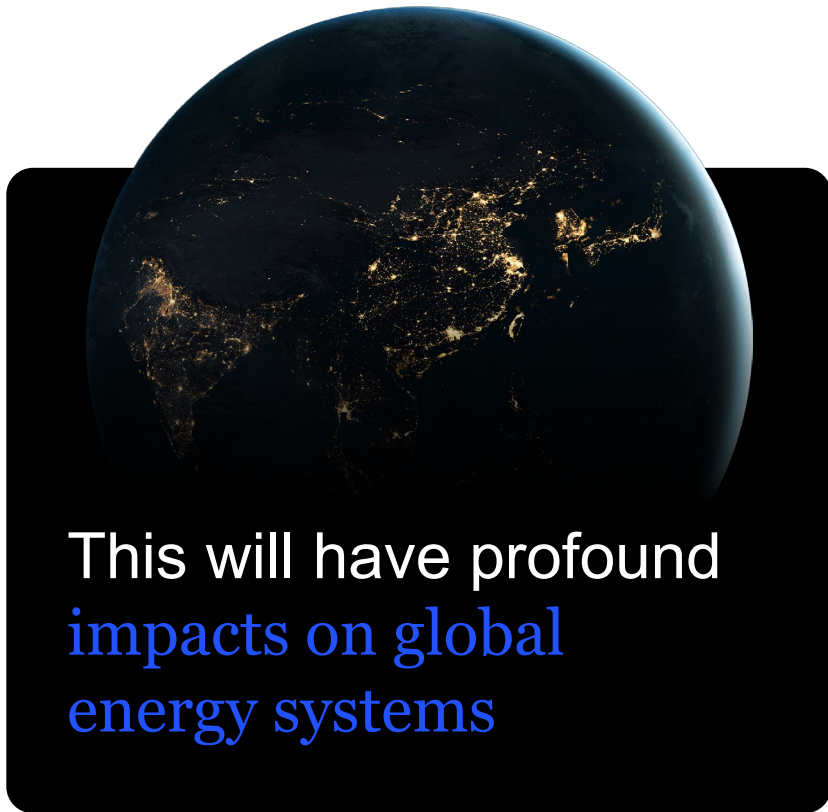
**The Bull Case:
Electrification and the US
Dollar demise**

We have entered an age of the “electrification of everything”



Guide to Military Drones

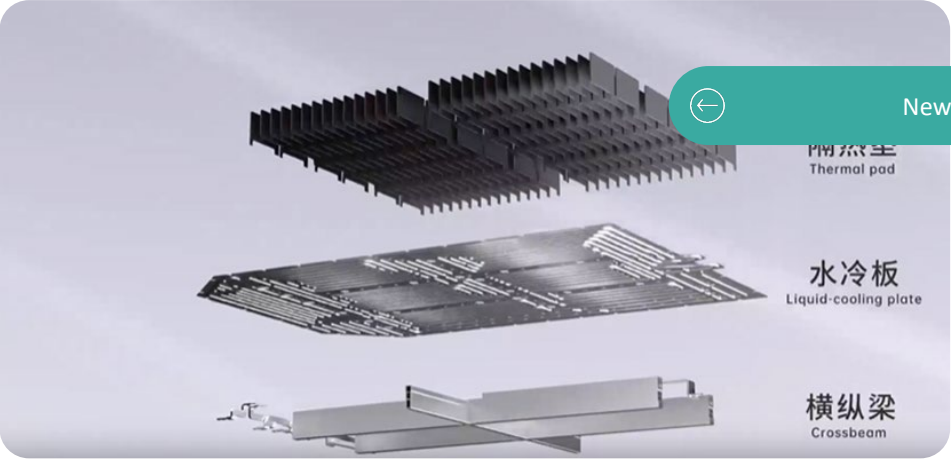
Drone Model	Wingspan	Weight	Max flight time	Unit cost (without infrastructure)
Reaper MQ-9	20 meters	2,220 kg	14 hours	\$16.9 million
Global Hawk RQ-4	40 meters	6,800 kg	32+ hours	\$131.4 million
LUNA	4.2 meters	40 kg	8 hours	\$310,000
FULMAR	3 meters	20 kg	8 hours	\$1.1 million
Black Hornet	120 mm rotor span	18 grams	25 minutes	\$40,000



CATL's 255 Wh/kg pack design is best in class... others in China looking to top



Increase in efficiency allows for use of less expensive metals or maximum range, a massive increase in metals per vehicle



← New copper lattice

These packs have:

- Nearly double the lithium
- More than double the copper**
- Large amounts of phosphates, manganese, and nickel (depending upon chemistry)





The first thing western companies should target is near

80%

Volume utilization efficiency

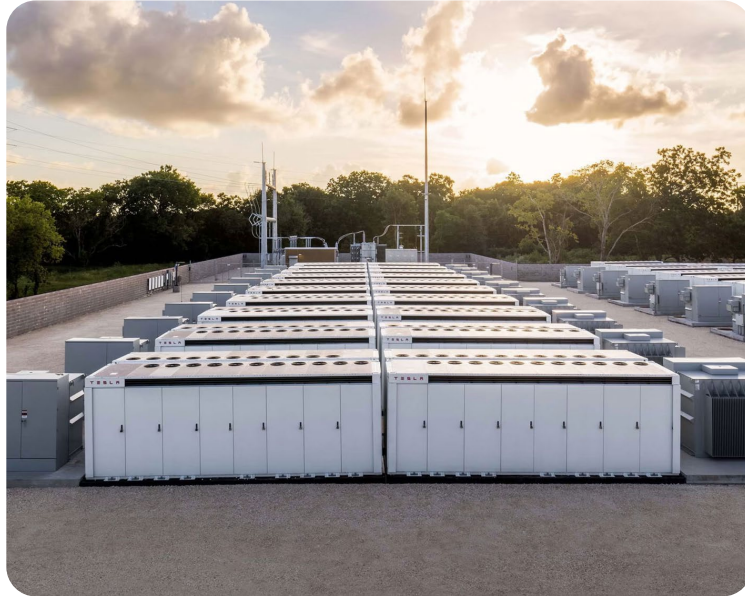
Current top western brands are

<55%

with many even below 50%.

Using innovative pack designs increases pack density to as high as 255 Wh/kg, up from the 160 Wh/kg in the West, this move allows for lower cost cathode materials while increasing range of vehicles to the magical 1,000 km, plus helps reduce charging times to under 15 minutes (4C)

Pure Lithium's long cycle life, high density completely changes the game for stationary storage applications



Tesla MegaPack

CATL

LMFP

3.9
MWh

160-180
LFP (Wh/kg)

50%
pack density

9.0
MWh

170-190
LFP (Wh/kg)

73%
pack density

14.0-18.0
MWh

225-255
LFP (Wh/kg)

80%-85%
pack density

Chinese battery demand has surged in 2025, with ESS leading the way

Chinese battery production

	1H24	2024	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	1H25	Jul-25
Ternary	126.9	275.6	20.7	19.3	23.8	23.5	27.2	29.5	144.0	29.5
% Change YOY			-8.8%	30.4%	-1.7%	3.5%	23.6%	43.9%	13.5%	28.3%
LFP	302.0	810.3	87.0	81.0	94.0	95.0	96.0	100.0	553.0	104.0
% Change YOY			107.1%	179.3%	84.3%	72.7%	57.4%	56.3%	83.1%	51.8%
Total	428.9	1,085.9	107.7	100.3	117.8	118.5	123.2	129.5	697.0	133.5
% Change YOY		47.1%	66.5%	129.0%	56.6%	52.5%	48.4%	53.3%	62.5%	45.9%



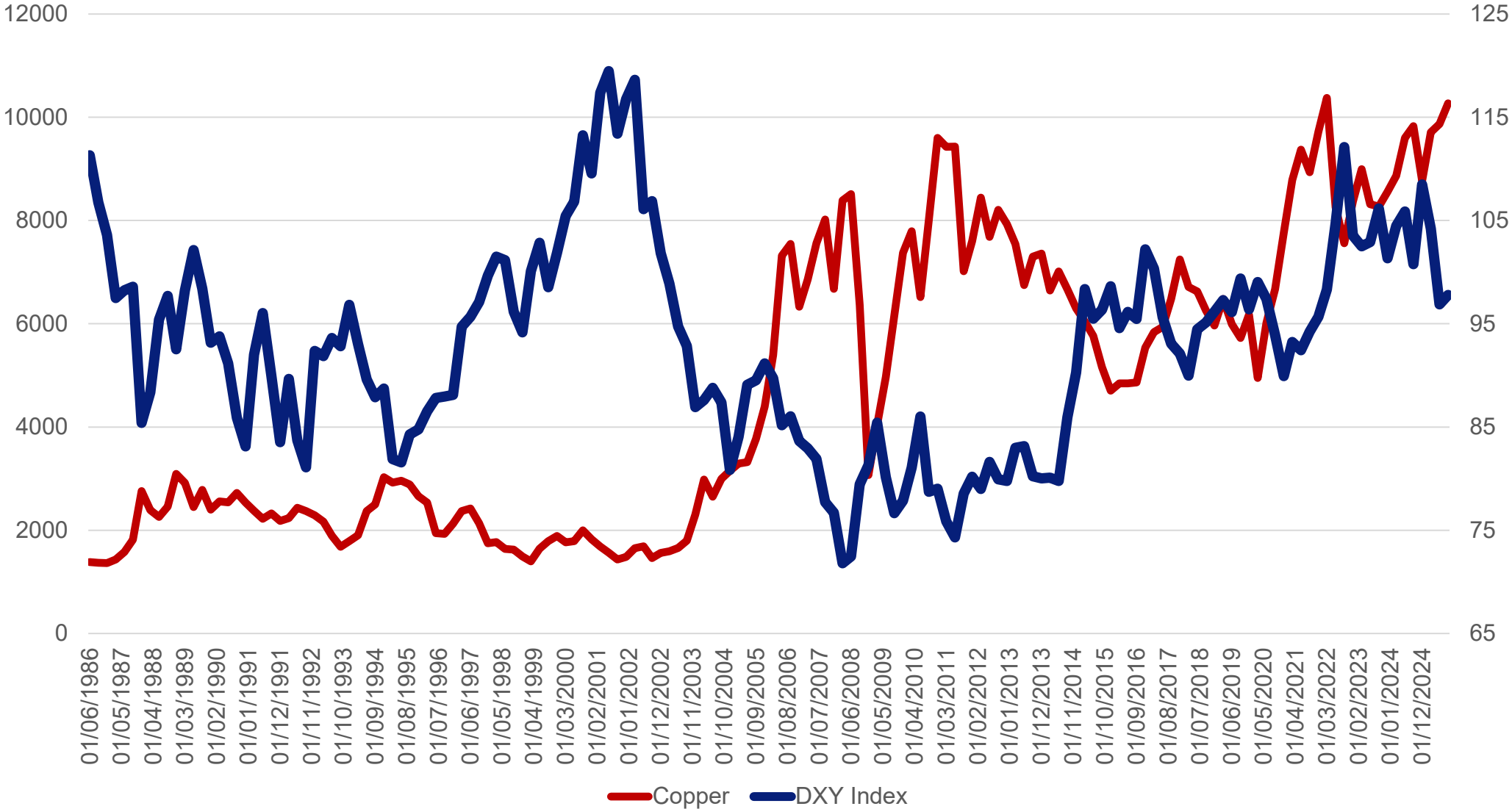
LFP production **has risen from 70% to nearly 80%** of overall production over the past year.

Source: Electrios

Stationary Storage to be the fastest growing segment of energy storage, cost competition here will be the key to “who wins”

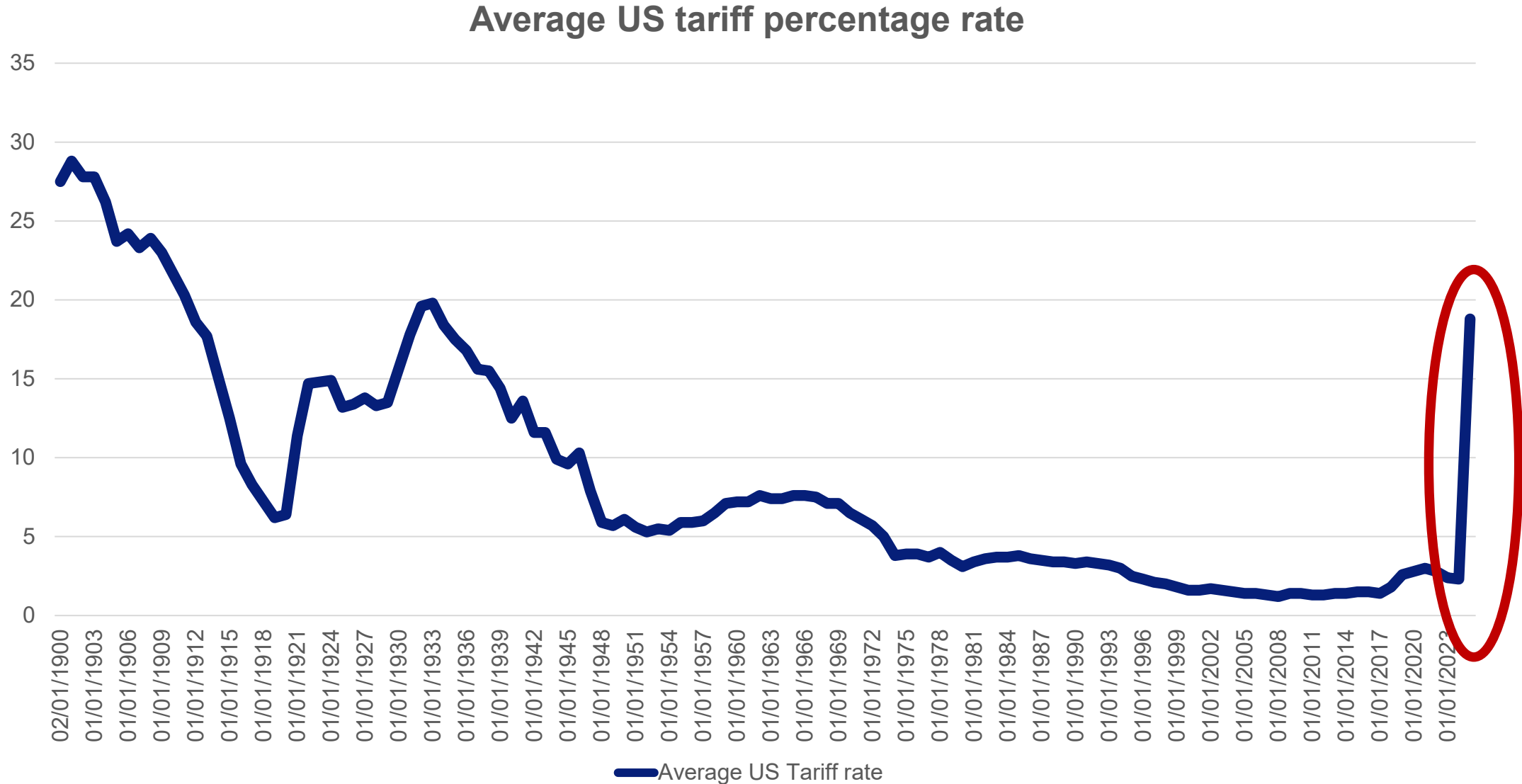
	2020	2021	2022	2023	2024	2025	2030	2035
Passenger EVs	150	304	515	700	864	1,070	4,000	6,500
Commercial EVs	9	21	43	70	104	158	400	700
E-Buses	10	8	11	8	13	17	30	50
Other formats	16	30	47	39	65	90	150	250
Stationary Storage	12	22	38	96	335	680	3,000	6,500
Total	197	385	654	913	1,381	2,015	7,580	14,000
YOY % Growth		95.4%	69.9%	39.6%	51.3%	45.9%	30.3%	20.0%

A weak Dollar has led to surging copper prices



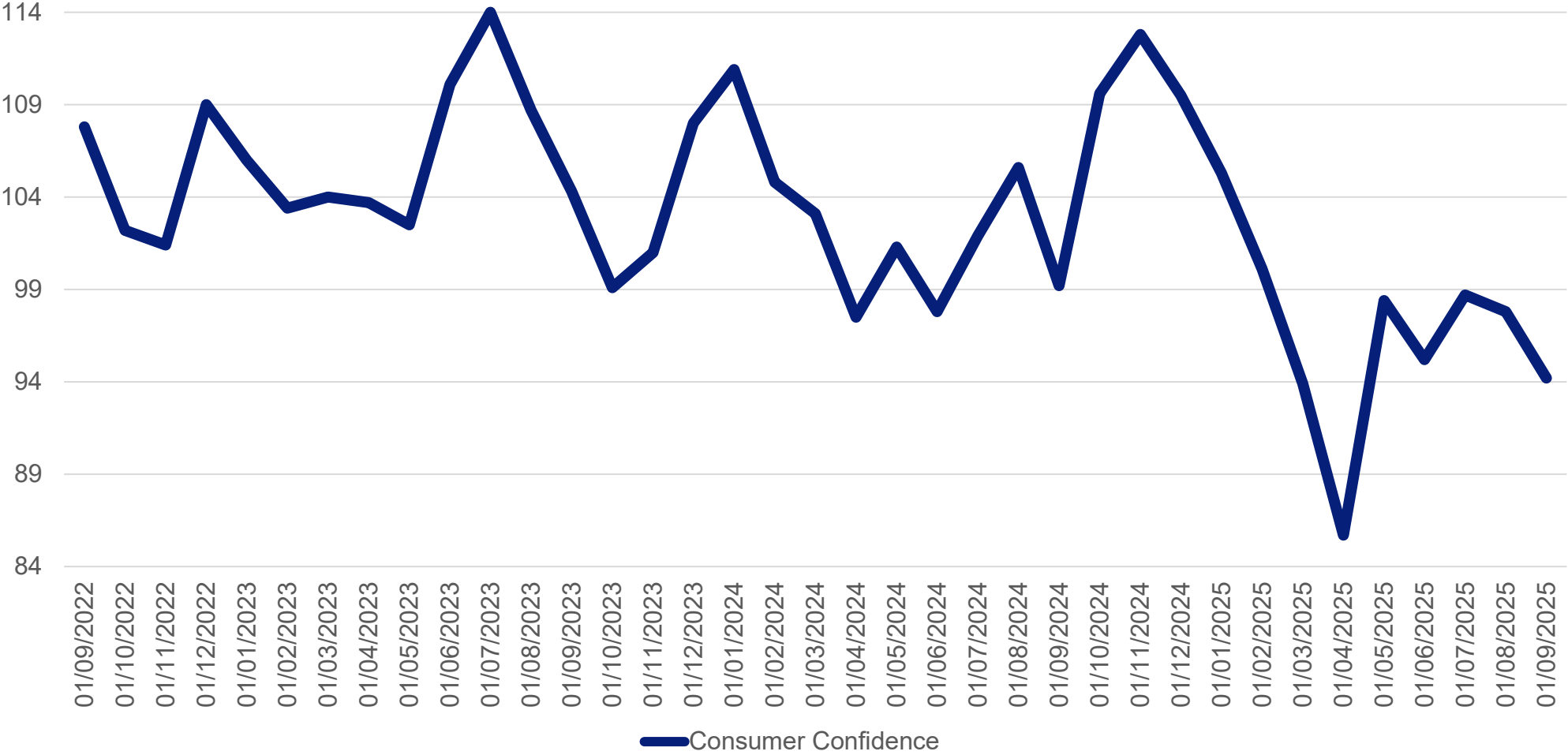
The Bear Case: Trump and his economic destruction

US Raises Tariffs 1,000% to levels not seen in a century, this will put a massive chill on the US consumer



US Consumer Confidence has turned very bearish

Consumer Confidence



The Bottom Line: Expect a very volatile copper market with more downside in the short term and more upside further out

Keys to 2026 and Beyond:

- The US is expected to see recession in 2026 (if not already in at present)
- US Copper demand expected to fall by 6% in 2026, bringing global demand to 1.2%.
- AI datacenter build will add several million mt to global copper demand, especially as we head towards 2027.
- After 2026 expect large scale deficits and copper to record levels.
- A weaker dollar could back a higher copper price despite demand weakness. Expect a 20%-30% decline in the US\$ over next 2 years.
- Overall, expect an extremely volatile copper price as a very uncertain market deals with constantly shifting trade wars, inflation, and currency volatility

RedCloud Supply/Demand Forecasts

2026 could be a difficult year for copper as the world adjusts to reduced global trade

	Unit	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Calculator Summary											
Refined Demand	kt	24,785	25,150	25,820	26,730	27,542	27,896	28,597	29,453	30,383	31,340
<i>Y/Y Change</i>	%	5.6%	1.5%	2.7%	3.5%	3.0%	1.3%	2.5%	3.0%	3.2%	3.1%
Refined Supply	kt	24,650	25,350	25,630	26,820	27,487	28,022	28,578	29,407	29,828	30,573
<i>Y/Y Change</i>	%	3.1%	2.8%	1.1%	4.6%	2.5%	1.9%	2.0%	2.9%	1.4%	2.5%
Balance	kt	(135)	200	(190)	90	(55)	126	(19)	(46)	(555)	(766)
<i>Change</i>	kt	(565)	335	(390)	280	(145)	181	(145)	(27)	(509)	(211)

China demand vs USA recession will determine copper price

Demand	Unit	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Total Refined Copper Demand	kt	24,785	25,150	25,820	26,730	27,542	27,896	28,597	29,453	30,383	31,340
<i>Y/Y Change</i>	%	5.6%	1.5%	2.7%	3.5%	3.0%	1.3%	2.5%	3.0%	3.2%	3.1%
China	kt	13,069	13,326	14,225	14,796	15,536	16,157	16,723	17,392	18,087	18,811
<i>Y/Y Change</i>	%	3.9%	2.0%	6.7%	4.0%	5.0%	4.0%	3.5%	4.0%	4.0%	4.0%
Europe	kt	3,718	3,783	3,707	3,703	3,703	3,629	3,702	3,776	3,851	3,928
<i>Y/Y Change</i>	%	6.2%	1.8%	-2.0%	-0.1%	0.0%	-2.0%	2.0%	2.0%	2.0%	2.0%
North America	kt	2,398	2,353	2,226	2,289	2,243	2,109	2,109	2,130	2,194	2,260
<i>Y/Y Change</i>	%	5.6%	-1.9%	-5.4%	2.8%	-2.0%	-6.0%	0.0%	1.0%	3.0%	3.0%
Japan	kt	947	900	850	831	840	831	823	831	839	839
<i>Y/Y Change</i>	%	10.8%	-5.0%	-5.6%	-2.2%	1.0%	-1.0%	-1.0%	1.0%	1.0%	0.0%
India	kt	540	680	790	855	941	960	1,008	1,058	1,111	1,167
<i>Y/Y Change</i>	%	16.6%	25.9%	16.2%	8.2%	10.1%	2.0%	5.0%	5.0%	5.0%	5.0%
Emerging Asia	kt	662	733	735	774	797	797	821	845	871	897
<i>Y/Y Change</i>	%	-3.5%	10.8%	0.3%	5.2%	3.0%	0.0%	3.0%	3.0%	3.0%	3.0%
Developed Asia	kt	1,044	1,005	928	973	976	956	956	964	973	982
<i>Y/Y Change</i>	%	4.3%	-3.7%	-7.7%	4.9%	0.3%	-2.0%	0.0%	0.9%	0.9%	0.9%
Rest-of-World	kt	2,408	2,371	2,359	2,509	2,506	2,456	2,456	2,456	2,456	2,456
<i>Y/Y Change</i>	%	14.1%	-1.5%	-0.5%	6.4%	-0.1%	-2.0%	0.0%	0.0%	0.0%	0.0%

Copper supply will grow slightly, major disruption risks could impact supply as seen in 2025

Supply	Unit	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Total Refined Copper Supply	kt	24,650	25,350	25,630	26,820	27,487	28,022	28,578	29,407	29,828	30,573
<i>Y/Y Change</i>	%	3.1%	2.8%	1.1%	4.6%	2.5%	1.9%	2.0%	2.9%	1.4%	2.5%
Total Mined Supply (Pre-Disruption)	kt	21,223	21,911	22,368	22,938	23,656	25,075	25,345	26,218	26,496	27,089
<i>Y/Y Change</i>	%	1.8%	3.2%	2.1%	2.5%	3.1%	6.0%	1.1%	3.4%	1.1%	2.2%
Chile	kt	5,660	5,358	5,265	5,555	5,644	5,853	5,741	5,908	5,825	5,744
<i>Y/Y Change</i>	%	-2.3%	-5.3%	-1.7%	5.5%	1.6%	3.7%	-1.9%	2.9%	-1.4%	-1.4%
Peru	kt	2,282	2,411	2,724	2,640	2,659	2,747	2,686	2,657	2,544	2,396
<i>Y/Y Change</i>	%	6.9%	5.6%	13.0%	-3.1%	0.7%	3.3%	-2.2%	-1.1%	-4.3%	-5.8%
DRC	kt	2,016	2,437	2,610	3,060	3,319	3,574	3,682	3,710	3,692	3,526
<i>Y/Y Change</i>	%	17.3%	20.8%	7.1%	17.2%	8.5%	7.7%	3.0%	0.7%	-0.5%	-4.5%
China	kt	1,823	1,913	1,743	1,756	1,787	1,779	1,770	1,757	1,744	1,731
<i>Y/Y Change</i>	%	7.6%	5.0%	-8.9%	0.7%	1.8%	-0.4%	-0.5%	-0.7%	-0.7%	-0.7%
Zambia	kt	826	784	701	735	792	914	914	925	936	982

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