



## **Ferrochrome and Ferroalloys market development through volatile 2023 and beyond**

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**UNICHROME AG**

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*Industry data is sourced from ICDA, InTheRightVein, FerroalloyNet, LME, Fastmarkets MB, ISSF, UN Trading Data, Eurostat, OANDA.*





## **UNICHROME AG introduction**

- **UNICHROME AG** has broad activities and deep expertise in the areas including trading of ferroalloys, base & minor metals, ores, as well as mining, production, costs, consumers value in use and market pricing mechanisms.
- **UNICHROME AG** has a global network and long-term relations with its partners in Europe, CIS, Asia, Africa and the Americas.
- Over the past several years many commodity markets have shown volatile behavior. Cr ore and FeCr indexes were at the top of the most volatile indicators for metals and commodities in general. We believe the market requires a mechanism which will allow all market participants to assess real-time supply/demand balance, evaluate options available on the market with better accuracy and financial responsibility. We apply our expertise in the market for chromium and other alloys and develop the way forward.





# Market Overview





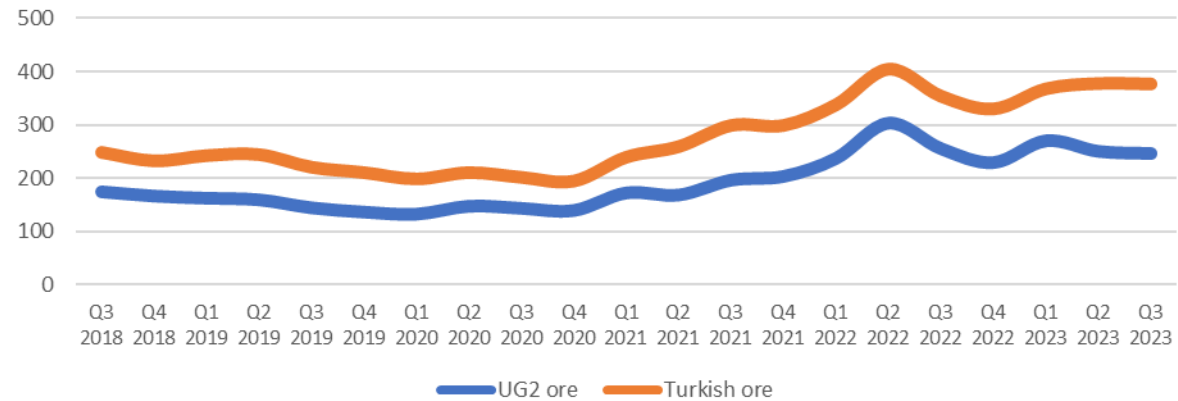
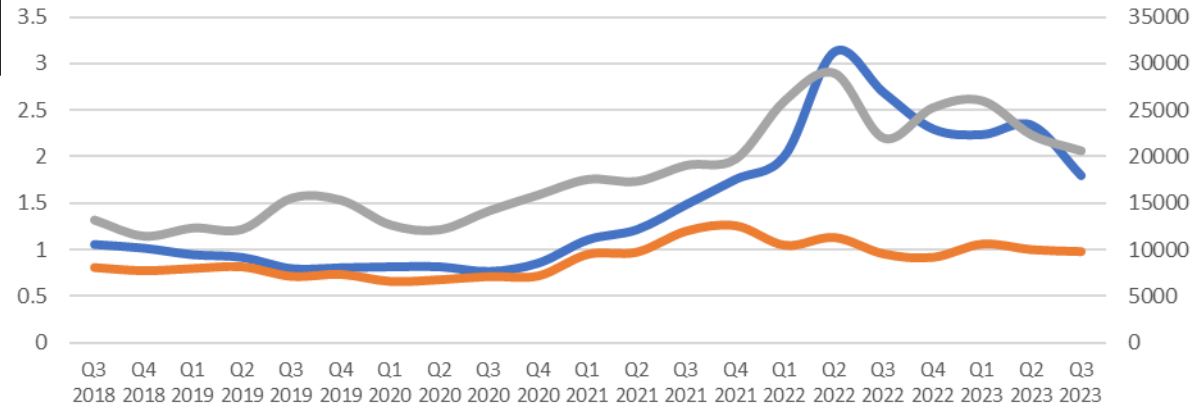
## **Brief Market Summary**

- Demand for ferrochrome was growing faster than supply recently, but current economic downturn could significantly impact demand
- With ferroalloys production being very energy consuming process, 2022 spike in electricity/gas prices had significant impact on both supply and demand
- Emphasis on greener and less carbon polluting production processes is a big challenge for ferrochrome as well as other metals industry
- Extreme level of uncertainty in general economical in and geopolitical situations decreases level of confidence for both steel and ferroalloys industries
- Recession risk, inflation and interest rate increase are having major impact on demand, but also blocks investment from the supply side, thus creating supply risk upon normalization
- Volatility and wide gap between markets for the same products in different regions, as well as between similar products in the same region, makes the market fragmented more than ever before and its discovery almost impossible



## Ferrochrome, ferroalloys and other markets volatility

YTD data from 04/09/2023	Dec-20 YTD	Dec-21 YTD	2023 YTD
<b>UG2</b>	130%	76%	15%
<b>HC FeCr EU MB</b>	91%	2%	-23%
Natural Gas Rotterdam	81%	-51%	-53%
Crude oil Brent	71%	14%	8%
<b>Average China Tender FeCr</b>	54%	-3%	3%
<b>LC FeCr MB</b>	53%	-31%	-23%
S&P 500	40%	-5%	18%
<b>CIF Shanghai Ch Cr</b>	39%	-12%	0%
<b>EU Benchmark Ch Cr</b>	29%	-16%	1%
Tin LME	29%	-34%	1%
<b>FeV EU</b>	28%	-2%	-14%
<b>FeSi MB</b>	22%	-54%	-38%
Nickel LME	22%	1%	-33%
NASDAQ	21%	-5%	41%
Platinum LME	20%	-1%	-11%
Aluminium LME	10%	-22%	-5%
Copper LME	9%	-13%	1%
Gold LME	6%	7%	7%
Cobalt LME	4%	-53%	-34%
<b>SiMn MB</b>	2%	-45%	-26%
Zinc LME	-11%	-30%	-17%
Iron ore	-24%	5%	0%
Palladium LME	-47%	-35%	-32%

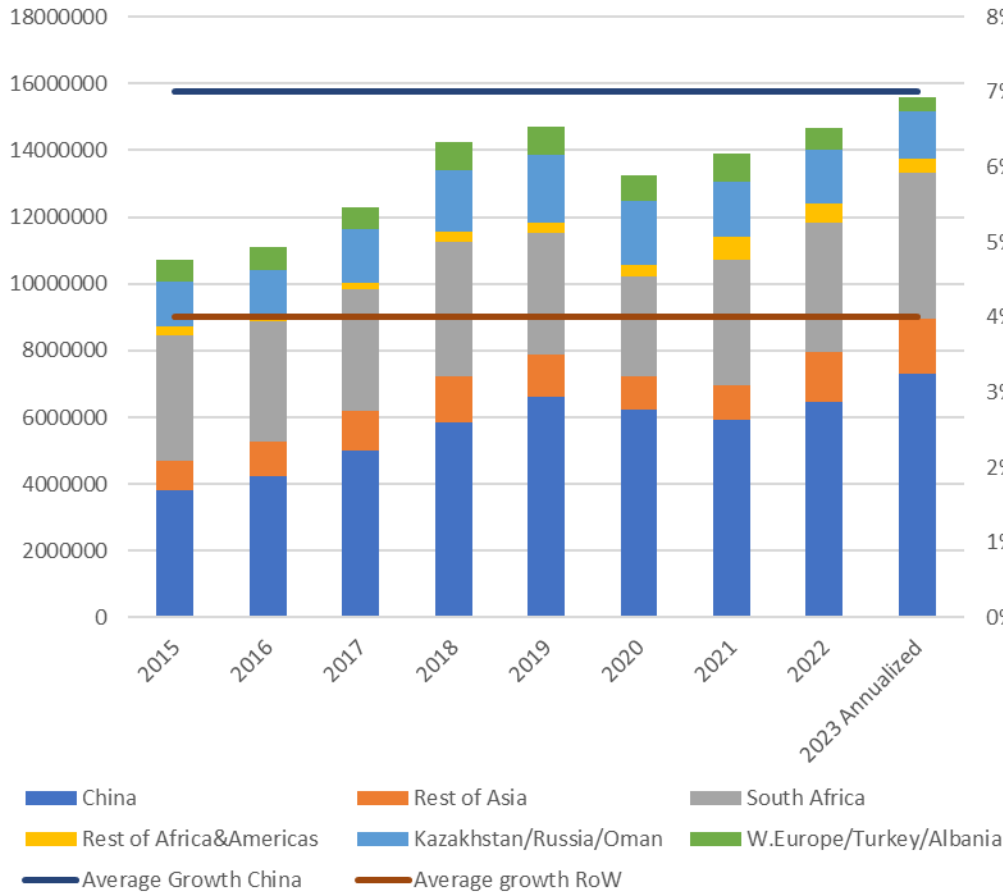


Source: IntheRightVein, LME, Ferroalloy.net, Fastmarkets MB



# Stainless Steel vs HC Fe Cr production by region

HC FeCr Production by regions



- Stainless production in 2022 reached 55.3 million tonnes, a decrease of 5% over 2021 and an increase of 6% over 2019
- In Q1 2023 ISSF announced a 5% production drop in 2023 vs 2022, with current annualized production at 54.7 million tonnes, a 1% decrease from 2022
- FeCr production in 2022 rose by 5% over 2021, with another 6% increase in 2023 (based on Q1 data)

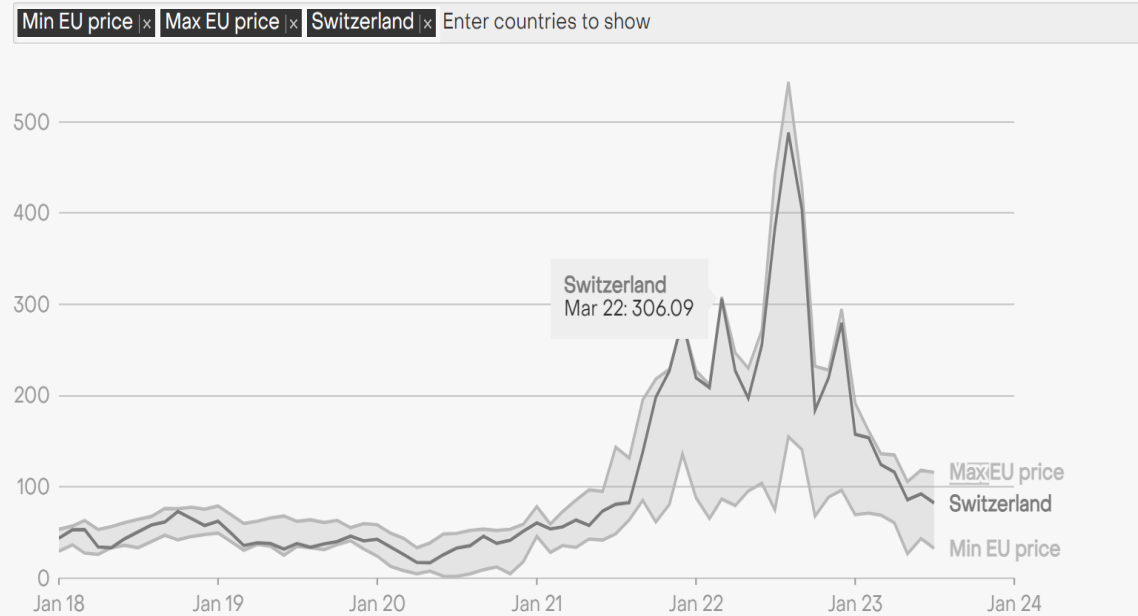
Below overview of FeCr by regions in 2022:

- **China**
  - Capacity increased to 14.02 million tonnes, a 2% increase over 2021, while production rose to the record 6.45 million tonnes.
- **South Africa/Zimbabwe**
  - Production now is significantly above to the pre-pandemic level of 2019
  - Hercul, Richards Bay and Mogale remain idled
  - ESKOM continues to struggle with electricity supply, thus further increases in tariffs are possible
  - TransNet also had issues with railway operations as well as port gluts
- **Kazakhstan and Russia**
  - 2022 production decreased by 5% comparing to 2021, due to current complex geopolitical situation
- **India**
  - Production return to the level of 2019, slightly below record production in 2017
- **Turkey, Sweden, Finland and Albania**
  - Three out of four showed decrease in production, driven economic and political factors, with a total decrease of 21% over 2021

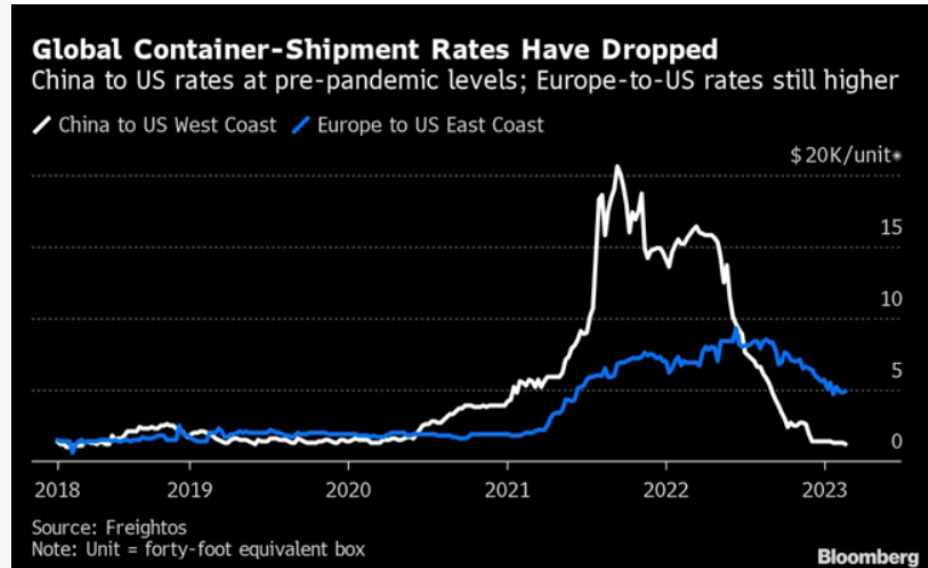


## FeCr Supply Cost Pressure Components

- Main cost components in ferrochrome/ferroalloys production include electricity, raw materials, coke, labor and logistics.
- The industry moved from low demand in 2020, to high demand in 2021, while experiencing steep price in the logistics cost. Currently both electricity and logistics costs return to the level of September 2021
- Growing inflation and interest rates could escalate labor and raw materials cost in the near future.



Source: [ENTSO-e](#) · Prices are average day-ahead spot prices per MWh sold per time period; Max and min prices refer to the highest and lowest average values of any country in the EU in that period



**EMBER**





## On top there are new variables having their significant impact on ferrochrome/ferroalloys amongst many other metals

### Average price 0.25 Euro per kWt

In tonnes per tonne of finished product	Energy consumption kWth	Energy price per lb of Cr in Euro
<b>High Grade HC FeCr</b>	3000-3500	0.52-0.61
<b>Low Grade HC FeCr</b>	3000-3500	0.57-0.66
<b>Charge Cr</b>	3000-3500	0.68-0.79
<b>Refined FeCr</b>	3600-3800	0.63-0.66
In tonnes per tonne of finished product	Energy consumption kWth	Energy price per tonne in Euro
<b>FeSi</b>	8500	2125
<b>FeNi</b>	8300	2075

### Average price 75 Euro per tonne

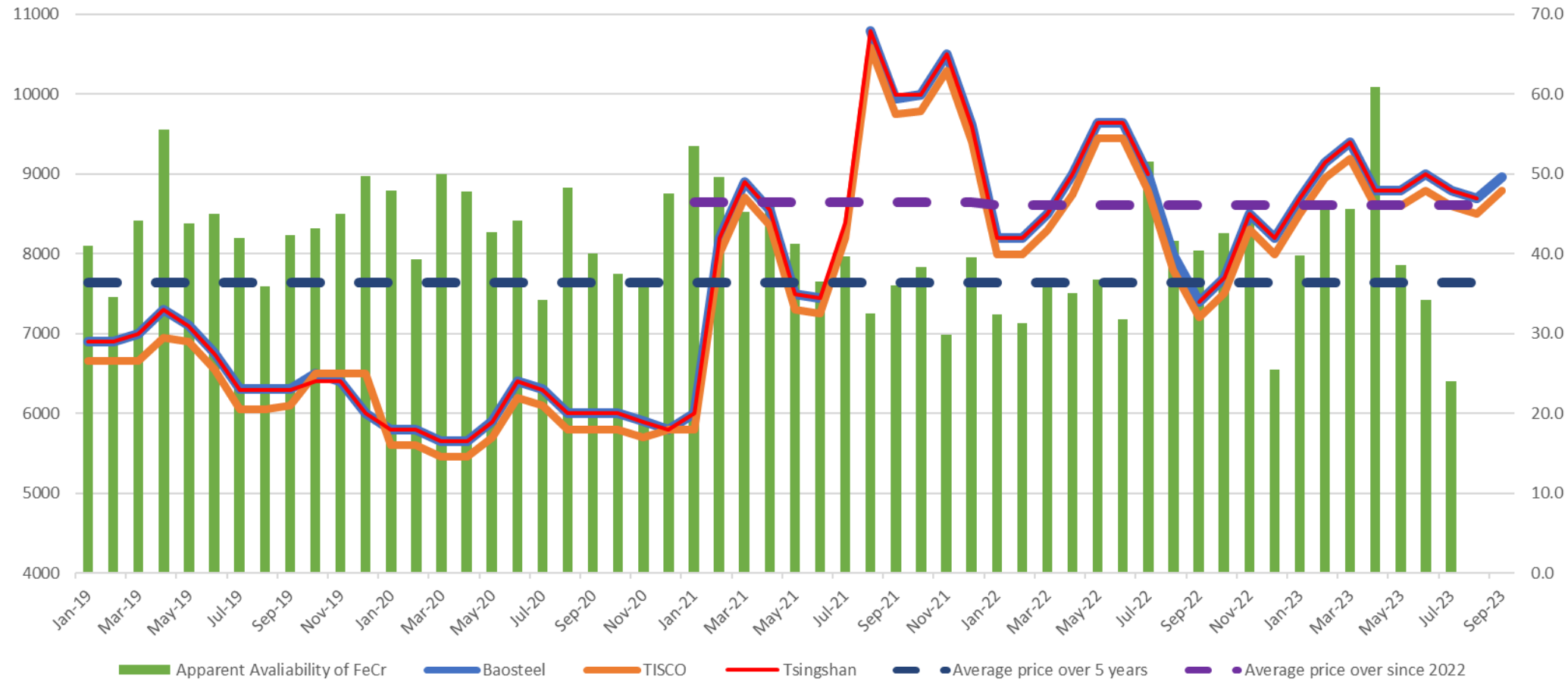
In tonnes per tonne of finished product	CO2 emissions range	CO2 price per lb of Cr in Euro
<b>High Grade HC FeCr</b>	4-5.6	0.21-0.29
<b>Low Grade HC FeCr</b>	5.8-7	0.33-0.40
<b>Charge Cr</b>	2.2-5.2	0.15-0.35
<b>Refined FeCr</b>	1.7-8.1	0.09-0.42
In tonnes per tonne of finished product	CO2 emissions range	CO2 price per tonne in Euro
<b>FeSi</b>	3.5-14	263-1050
<b>FeNi</b>	2.3-7.5	173-563

\*The data in the above table, comes from publicly available sources and subject to change based on future availability. All the calculation were done considering different production methods, as well as use of different power sources. Energy prices vary by region even more than the FeCr prices





### China Tender Prices vs Monthly Apparent FeCr Availability



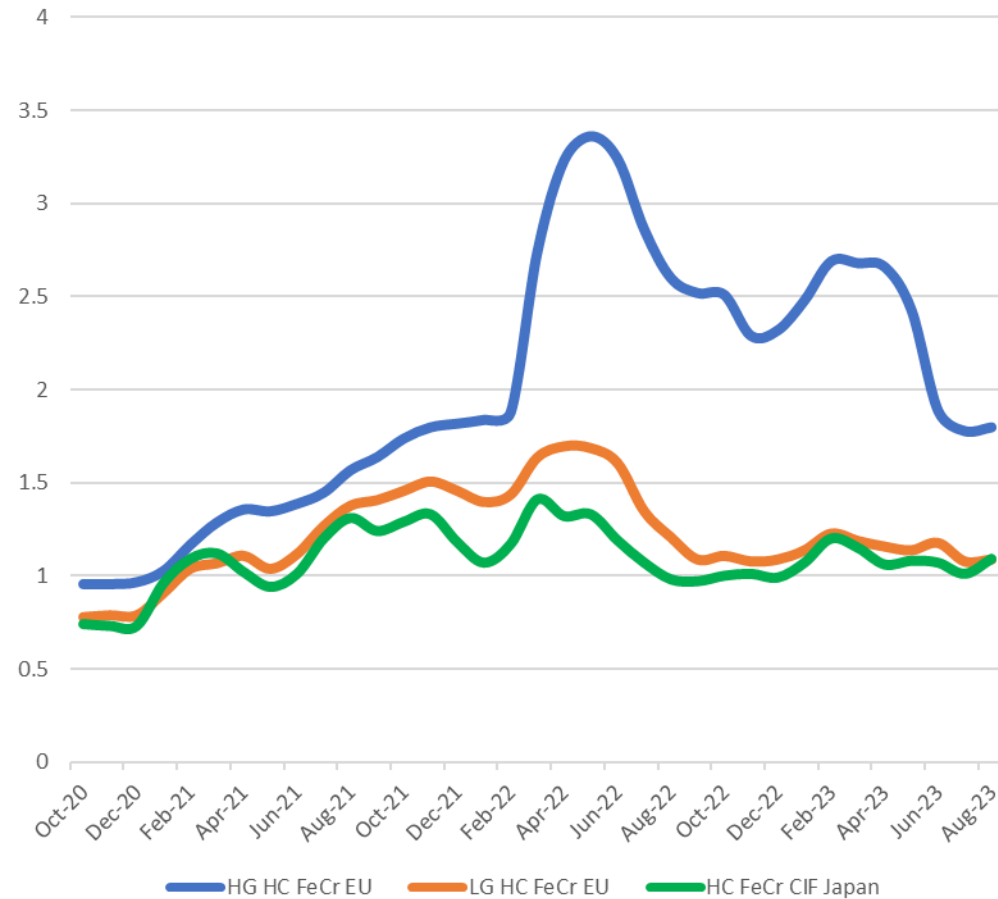
Source: Ferroalloy.net





## FeCr price difference between similar products

FeCr price difference between similar products



- From the graphs before and on the left, one can see that price gap has started to affect products based on geographical location, EU/USA vs China domestic prices. This gap increased in size substantially in H2 2021 and H1 2022. While products in China and EU/USA are significantly different (Ch Cr vs HG HC FeCr), the graph on the left illustrates correlation between similar products in different locations
- All the products on that graph are considered HC FeCr, but with slightly different chemical composition, but a very large price gap, especially between High Grade HC in Europe and Low-Grade HC in Japan
- Current gap has decreased since last half year, however its is on high level, based on the logistical and numerous other constraints between major suppliers of HG HCFeCr and suppliers of other grades

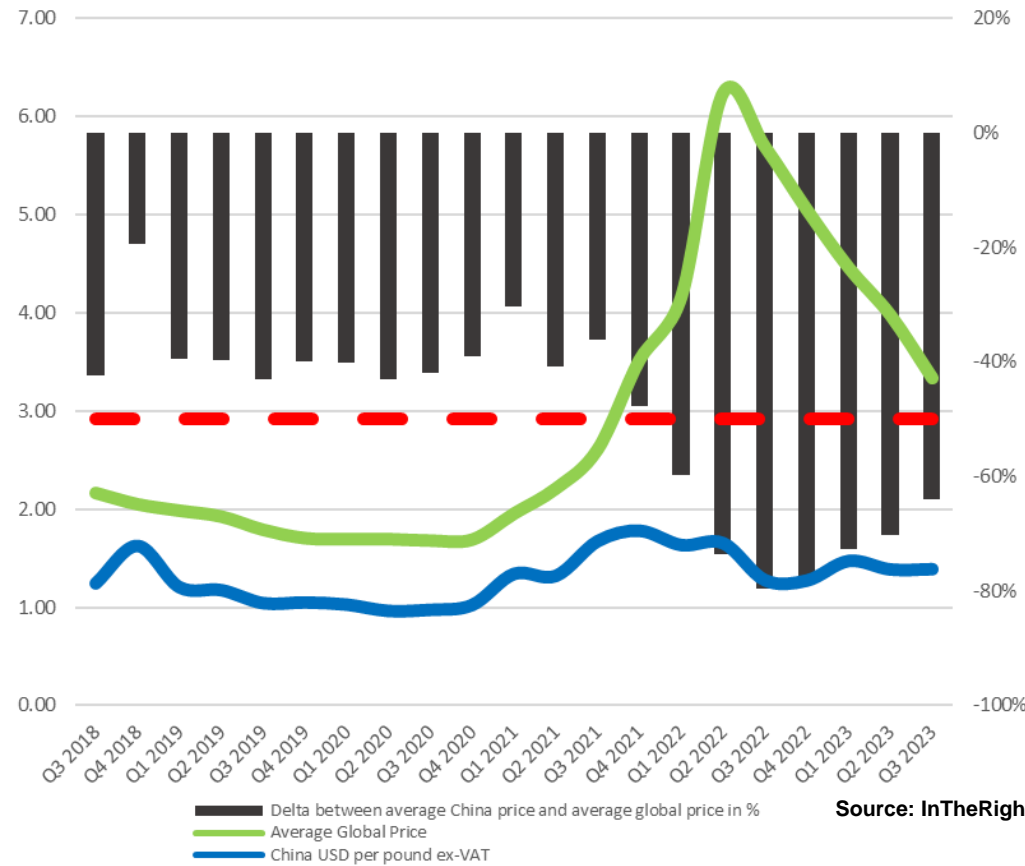
Source: Fastmarkets MB



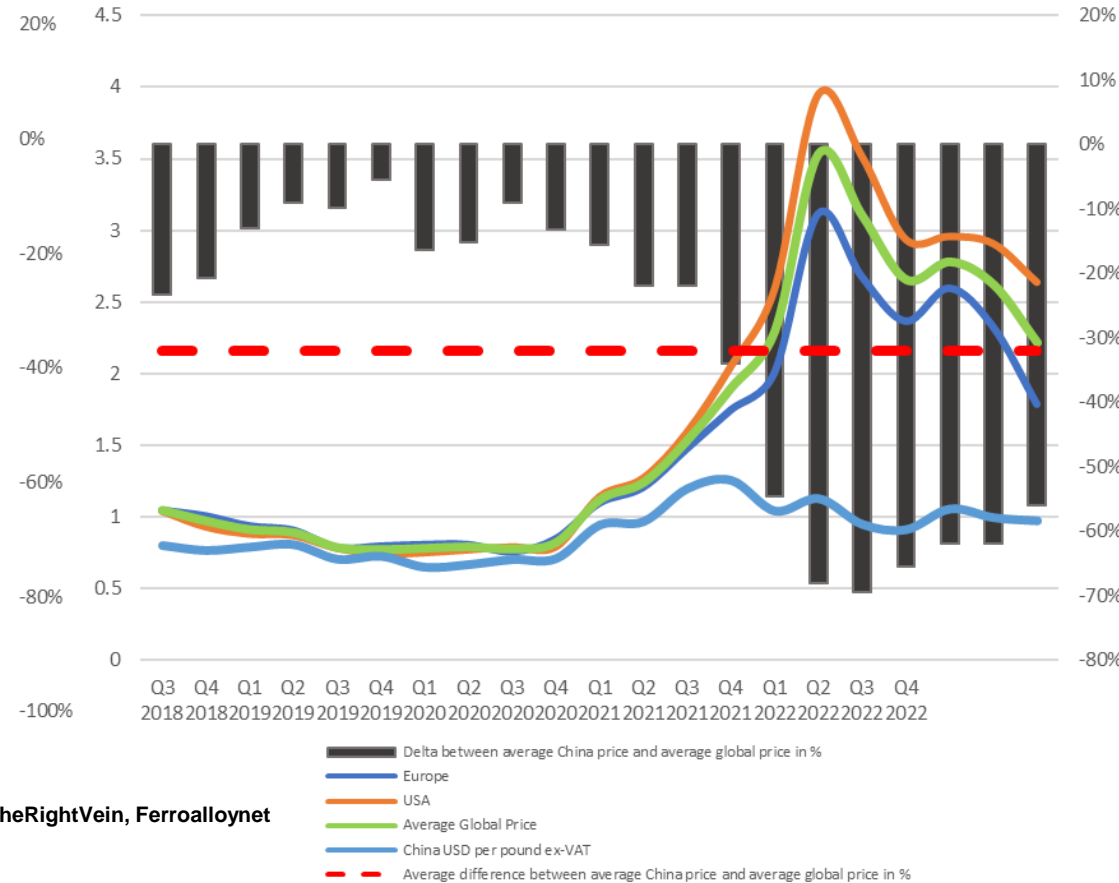
## Historically high level of the gap between FeCr prices in EU/USA versus domestic FeCr prices in China

The price difference can be attributed to cost pressure between China and RoW

### LC FeCr EU/USA Prices vs China domestic price



### HC FeCr EU/USA Prices vs China domestic price



Source: InTheRightVein, Ferroalloy.net





## Summary and market outlook

### **STRENGTHS: Ferrochrome market recovered from 2020 downturn and now enters correction stage after 2021/H1 2022:**

- Despite most of the chrome-related products' prices going into the correction phase, stainless-steel production and demand should support new levels in short to mid-term
- India is playing more and more significant role given large population and one of the lowest stainless-steel use per capita in the world
- Indonesia has become the second largest stainless-steel producer, with growth from 680k in 2017 to almost 5 million in 2021

### **WEAKNESSE AND THREATS: Ferrochrome industry faces other significant risks such as:**

- Demand for ferrochrome was growing faster than supply over the last few years, while current economic downturn could significantly lower demand for chrome related products
- General uncertainty related to high risk of recession
- High inflation and rate increase, in combination of economic recession risk, lead to below low level of economic outlook confidence
- Export/import duties combined with logistics constraints and other restrictions
- Electricity volatility and regional fragmentation
- Consequent chrome market fragmentation and extreme volatility result in lack of guidance for future chrome market development

### **OPPORTUNITY: Moving forward:**

- Ferrochrome market requires new mechanism in order to find realistic balance between supply and demand, considering all the complex current and anticipated parameters (quality, region, energy consumption, carbon footprint) in the supplier's costs versus consumer's value in use and to ensure long-term sustainable development from both producers and consumers perspective.





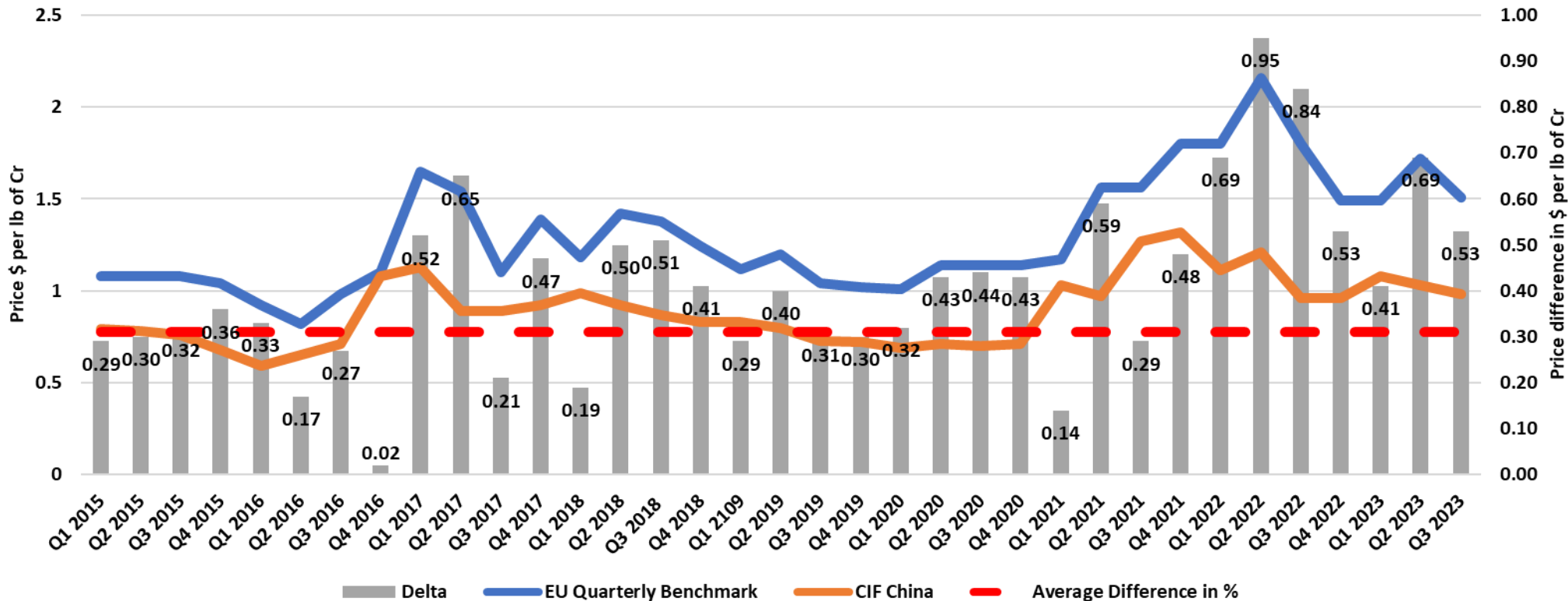
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# **FeCr and ferroalloys market moving forward**





EU Benchmark vs EU HC FeCr



The above graph represents one of the most puzzling aspects of the ferrochrome industry. The chart shows the gap between European Quarterly Benchmark and CIF China South African FeCr price. It is the same or similar material, but the numbers represent the price indexes for two different markets. Even though historically logistics costs were relatively low, even with the current cost increase, they remain a fraction of the price gap, especially with China having 0% import tax on FeCr products.



## Exchange tradable vs non-exchange tradable metals

### Exchange traded metals



### Non-exchange traded metals



### Why ferroalloys were not available for exchange trade in warehouses, like base metals?:

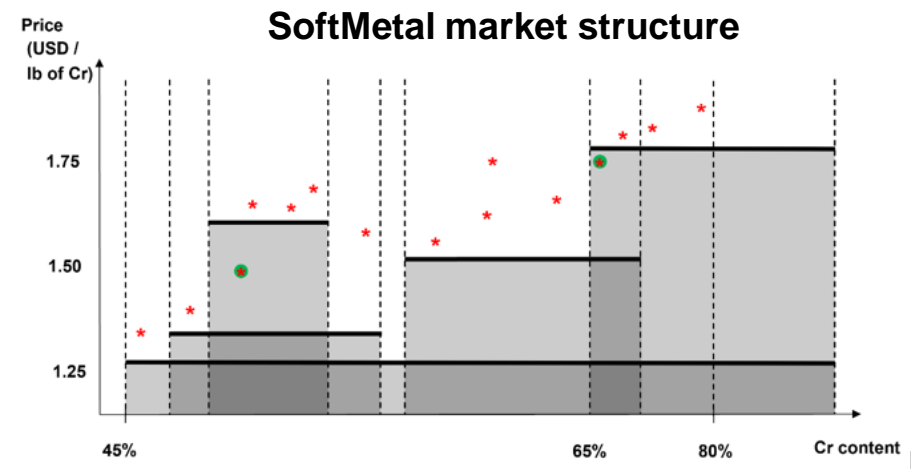
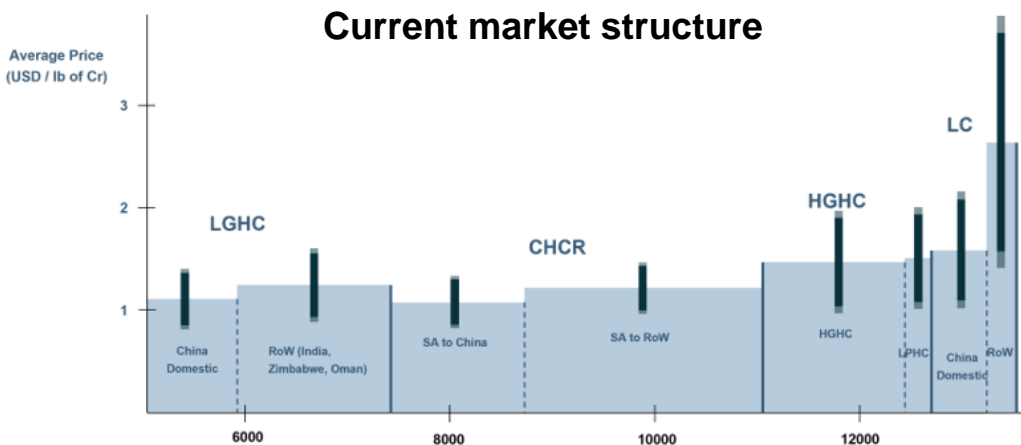
- Multichemical quality parameters variable in wide range makes comparison difficult, due to the lack of uniform standard.
- Depending on individual range of chemical composition for these parameters' each product, even within the same class have its own value in use and cost, which depends on individual producer from one side and consumer from the other side
- Due to the above reasons, any standardization leads to decrease of liquidity and lack of publicly agreed product value
- Consequently, classic exchange mechanisms were not successfully applied to trading of ferroalloys and similar products





## Technology for market going forward

Based on the modern development of auction theory, which takes into account all variety of parameters without sacrificing transparency and liquidity, we have developed SOFTMETAL for trading of warehouse receipts for ferrochrome and other alloys, safely stored in independent warehouses:



- Buyers bids (for a Cr range)
  - ★ Sellers asks (for material with particular Cr content)
  - Matched order
  - Matching area
  - Negotiation area
  - ⋮ Tailored market exchange-like area \*
- \* defines unique picture of competition similar to a classical exchange for particular users, but boundaries are soft and can be changed by the participant according to its quality needs and liquidity requirements

### Price fluctuation range over the year (2021)

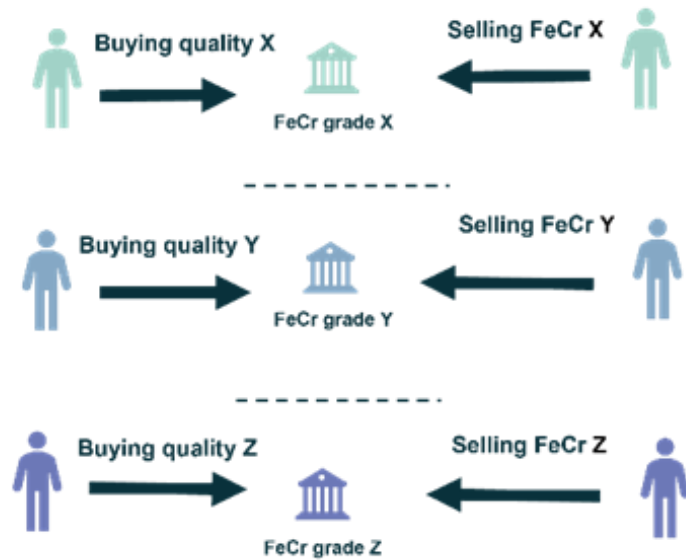
LGHC RoW: EU price  
 CHCR SA to RoW: yearly average EQB - 20%  
 HGHC HGHC: FM EU  
 LC RoW: FM EU

To learn more about SOFTMETAL you can access its webpage at: <https://softmetal.ch/>





On classic exchanges each contract is traded on a different trading floor



On SoftMetal's multi-quality platform buyers negotiate with sellers by changing their parameters' range and their price

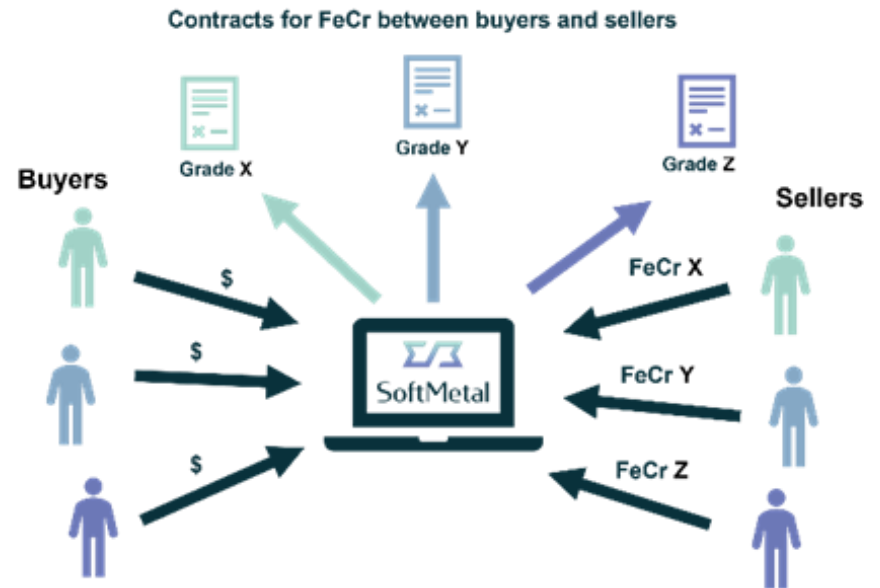


Fig.2. Classic exchange vs SoftMetal auction



**Global Filters**
[Save this filter](#)

- ALL
- Carbon 0 - 9.5%
- Chromium 45 - 100%
- Silicon 0 - 7%
- Phosphorus 0 - 0.05%
- Sulphur 0 - 0.07%
- Size 0 - 300mm
- Northern Europe +6 more
- EU +10 more
- Duty paid +3 more
- EU +10 more
- Duty paid +3 more
- Carbon Footprint 10MT / MT of FeCr

**Asset Purchase**

Order Type

Order Reference

Quantity MT

Price \$/lb of Cr

Trading Limit Consumption

Inventory MT

■ Competing for available offers
 ■ Competing for potential offers
 ■ Own orders
 ■ Relevant within my quantity

Order Type	Quantity	Price	Competing for available offers	Competing for potential offers	Own orders	Relevant within my quantity	
50MT		3.4000	5	0			
		2.8000	1	0	0		
		2.7000	5	0			
		2.6000	5	0			
		2.4100	1	0	0		
		2.4000	1	5	0		
		2.3900	5	0			
	100MT		2.3800				
			2.0000	2	0		
	5MT		1.9000			5	
		1.8000	4	0			

**Snapshot of SoftMetal order book with Global Filters on the top**


## Global Metrics

Last Price   Mean Price

	Northern Europe	Southern Europe	South Korea	China	North America	South Africa	Other
<b>HGHC</b>	<b>\$1.8</b> 10MT 17:28 16/08/23 Bid: 1.75 /Ask: 1.8	<b>\$2.95</b> 10MT 15:45 17/07/23 Bid: - /Ask: -	N/A	<b>\$1.55</b> 5MT 13:46 23/05/23 Bid: - /Ask: -	<b>\$3</b> 50MT 15:45 17/07/23 Bid: - /Ask: -	N/A	N/A
<b>LGHC</b>	<b>\$2.3</b> 5MT 18:29 08/08/23 Bid: - /Ask: -	<b>\$1.2</b> 5MT 19:34 15/05/23 Bid: - /Ask: -	N/A	<b>\$1.04</b> 5MT 16:14 15/05/23 Bid: - /Ask: -	<b>\$1.55</b> 40MT 18:29 08/08/23 Bid: - /Ask: -	N/A	N/A
<b>CHCR</b>	<b>\$1</b> 5MT 18:17 15/05/23 Bid: - /Ask: -	<b>\$1</b> 5MT 19:39 15/05/23 Bid: - /Ask: -	N/A	<b>\$1.04</b> 5MT 16:38 15/05/23 Bid: - /Ask: -	N/A	N/A	N/A
<b>LPHC</b>	<b>\$1.8</b> 10MT 17:28 16/08/23 Bid: 1.75 /Ask: 1.8	<b>\$2.95</b> 10MT 15:45 17/07/23 Bid: - /Ask: -	N/A	<b>\$1.55</b> 5MT 13:46 23/05/23 Bid: - /Ask: -	<b>\$3</b> 50MT 15:45 17/07/23 Bid: - /Ask: -	N/A	N/A
<b>C &gt; 4%</b>	<b>\$1.8</b> 10MT 17:28 16/08/23 Bid: 1.75 /Ask: 1.1	<b>\$2.95</b> 10MT 15:45 17/07/23 Bid: - /Ask: -	N/A	<b>\$1.55</b> 5MT 13:46 23/05/23 Bid: - /Ask: -	<b>\$1.55</b> 40MT 18:29 08/08/23 Bid: - /Ask: -	N/A	N/A
<b>LC</b>	<b>\$3.51</b> 5MT 15:39 07/07/23 Bid: 2.4 /Ask: 2.6	<b>\$3.52</b> 5MT 19:52 15/05/23 Bid: - /Ask: -	N/A	<b>\$1.63</b> 5MT 16:45 15/05/23 Bid: - /Ask: -	N/A	N/A	N/A

**Snapshot of SoftMetal Global Metrics and indexes based on products and geographical location**



# Current types of electronic platforms for commodity trading.

## Where does SoftMetal stand amongst competition?

Low/Offline = 0 pt; Medium = 1 pt; High/Yes = 2 pt

Type of Platform	Counterparty search/Negotiation	Delivery Terms Variety	Delivery Execution Control	Liquidity/Financing	Price Discovery	Wide range of Quality Parameters	Score
• Deal/Counterparty search platform	Yes	High	Offline	Offline	Offline	High	6
• Performance/Trade finance facilitation	Offline	High	Yes	Offline	Offline	High	6
• Supply Chain/ Transparency Control	Offline	High	Yes	Yes	Offline	High	8
• Classic Exchange	Yes	Low	Yes	Yes	Yes	Low	8
• <b>SoftMetal a unique trading concept and algorithm</b>	Yes	Medium	Yes	Yes	Yes	High	11





*Partnership with UNICHROME is  
the ticket to the island of reliability  
and sustainable development  
in the turbulent ocean  
of commodity markets*

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**Thank you for your kind attention**



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