



China Pellet and Pellet Feed Market Study

SMM
Shanghai Metals Market

China Pellet and Pellet Feed Market Study

SMM bases on primary research, internal database and modelling, successfully help our client deeply understand China Pellet and Pellet Feed Market

Project Background

Our clients wish to conduct a study to understand the market dynamics of the China market for imported pellet and pellet feed. Also they want to have a overall understanding of China's pellet capacity, production and cost.

To have a deep understanding of China imported pellets and pellet feed, future forecasting and development trends.

To assess future application opportunity of imported pellet for client to realize growth in China market

SMM Methodology

Main Research Methodology:

- **Desktop Research:** SMM databases, industry public reports, etc. to comprehensively understand China pellet and pellet feed market
- **Primary Research:**
 - Industry level: conduct in-depth interviews with industry experts from domestic steel and iron ore market, CISA, etc.
 - Company level: conduct in-depth interviews with different steel mills, pellet plants and iron ore mines

Key Output

China pellet market overview

- China pellet demand
- China pellet supply
- China pelletizing cost breakdown

China pellet feed market overview

- China pellet feed demand
- China pellet feed supply
- China pellet feed cost breakdown

China pellet and pellet feed pricing mechanism

China pellet supply and demand forecast

China pellet feed supply and demand forecast

China import pellet demand forecast by considering policy, steel mills' profit, freight, etc.

China import pellet feed demand forecast by considering policy, pellet plant' profit, freight, etc.

China DRI evolution

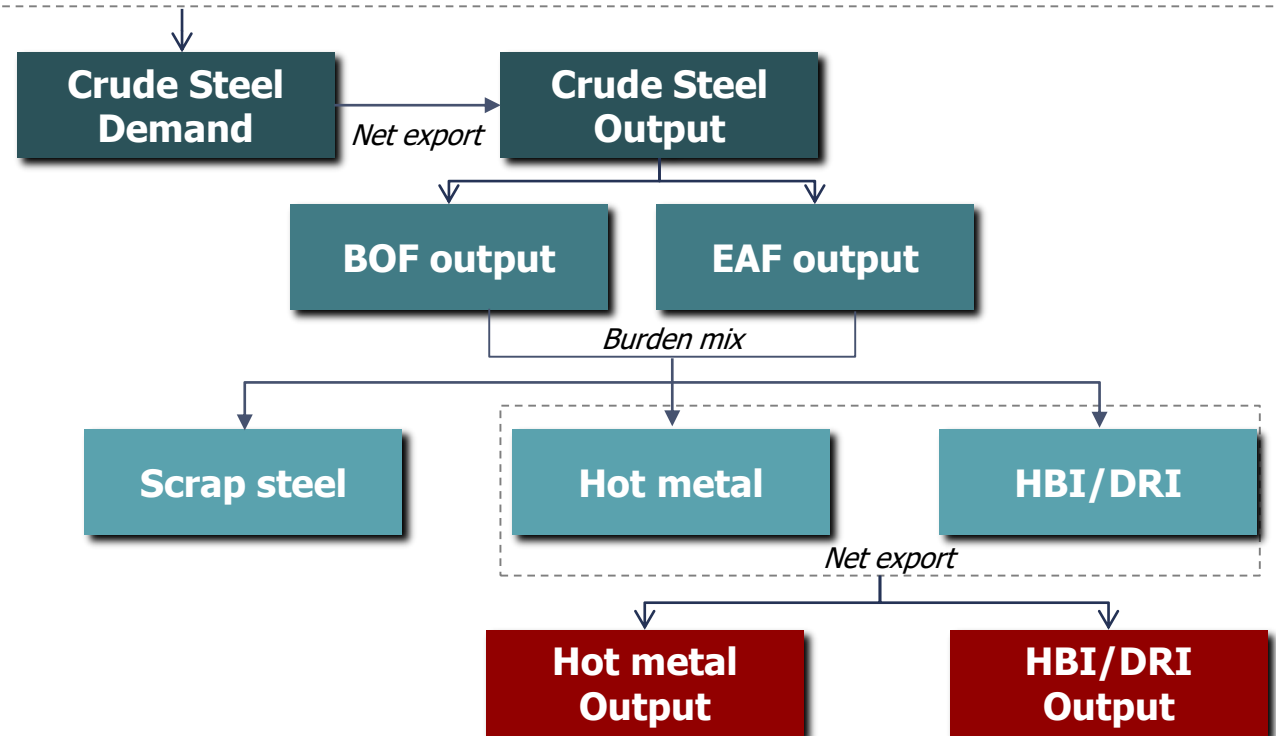
Pellet and pellet feed S&D model

SMM makes forecast of China's crude steel, pig iron and HBI/DRI output through methodology of bottom-up

6 Major Steel Downstream



- SMM makes steel demand forecast by analysis on expected output and unit steel consumption of 6 major downstream based on forecast of China GDP growth rate from the World Bank
- Due to characteristic of oversupply and few steel export and import in China's steel industry, we get demand of crude steel is basically equal to output.
- By analysis on steel scrap supply and usage ratio, we can get the forecast of pig iron and HBI/DRI output in the following years.



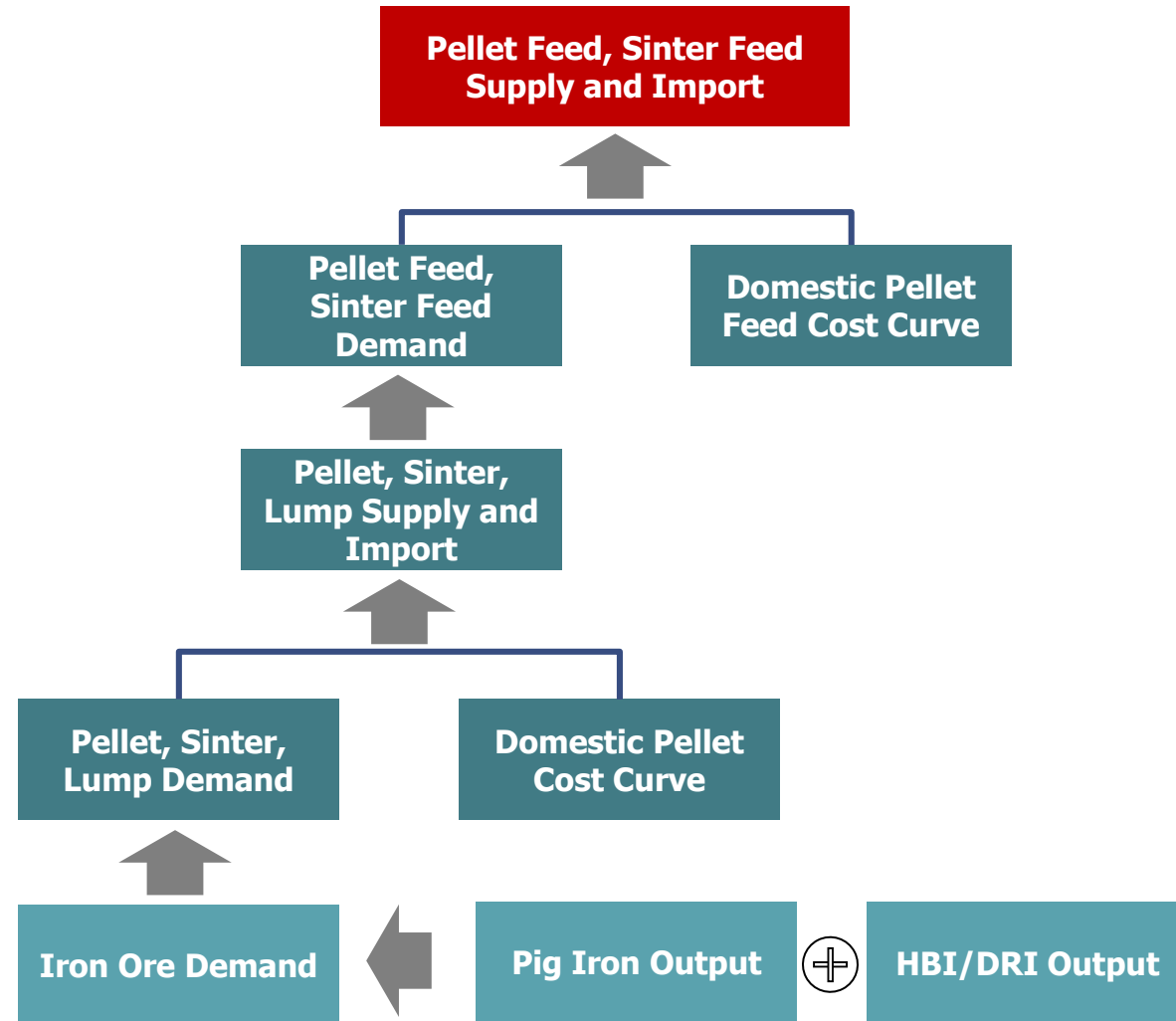
Pellet and pellet feed S&D model

Bottom-up methodology is applied from pig iron output to pellet feed and pellet domestic production forecast

Pellet Feed and Pellet Supply & Demand Forecast Methodology

Assumptions

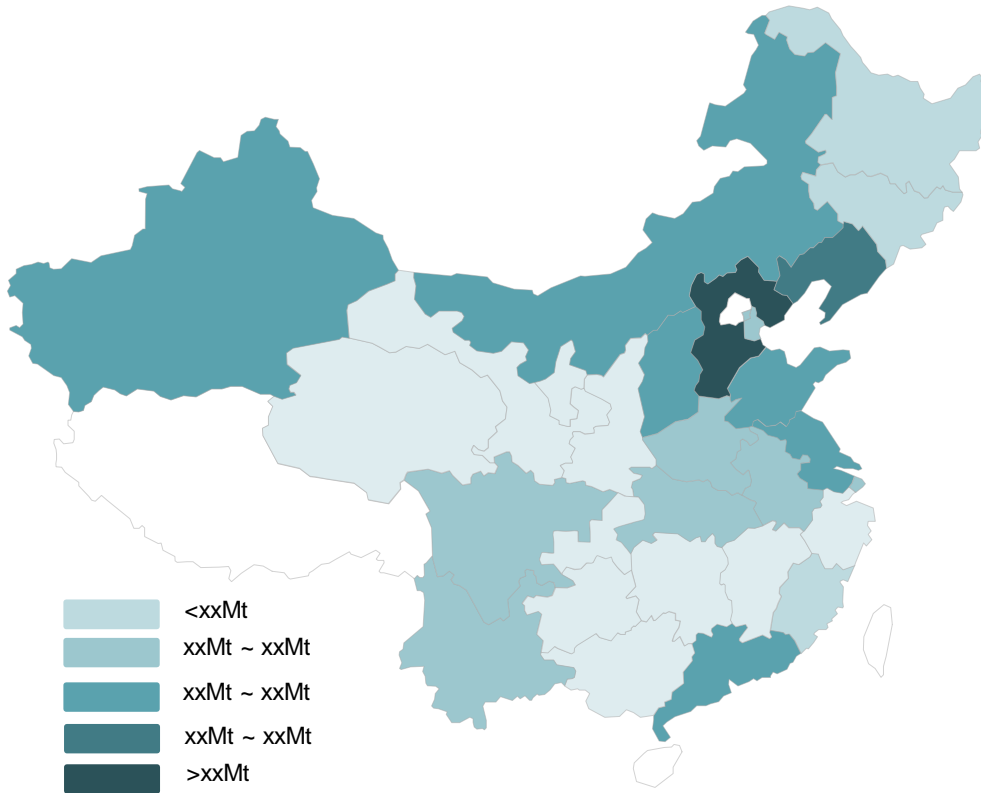
- ▶ Pellet and lump premium against sinter will keep stable.
- ▶ Weighted average feed Fe content will be unchanged.
- ▶ Pellet, sinter and lump ratio is decided based on the supply & demand balance of the materials, along with premiums of pellet and lump.
- ▶ Domestic pellet prices in future is forecasted, in order to get domestic pellet output and imports, through future pellet cost curve.
- ▶ Domestic pellet feed prices in future is forecasted, in order to get domestic pellet feed output and imports, through future pellet feed cost curve.



China Pellet Capacity Distribution

China pellet plants are mainly distributed in north China with integrated and RK&SF dominating

China Pellet Capacity Distribution in 2018



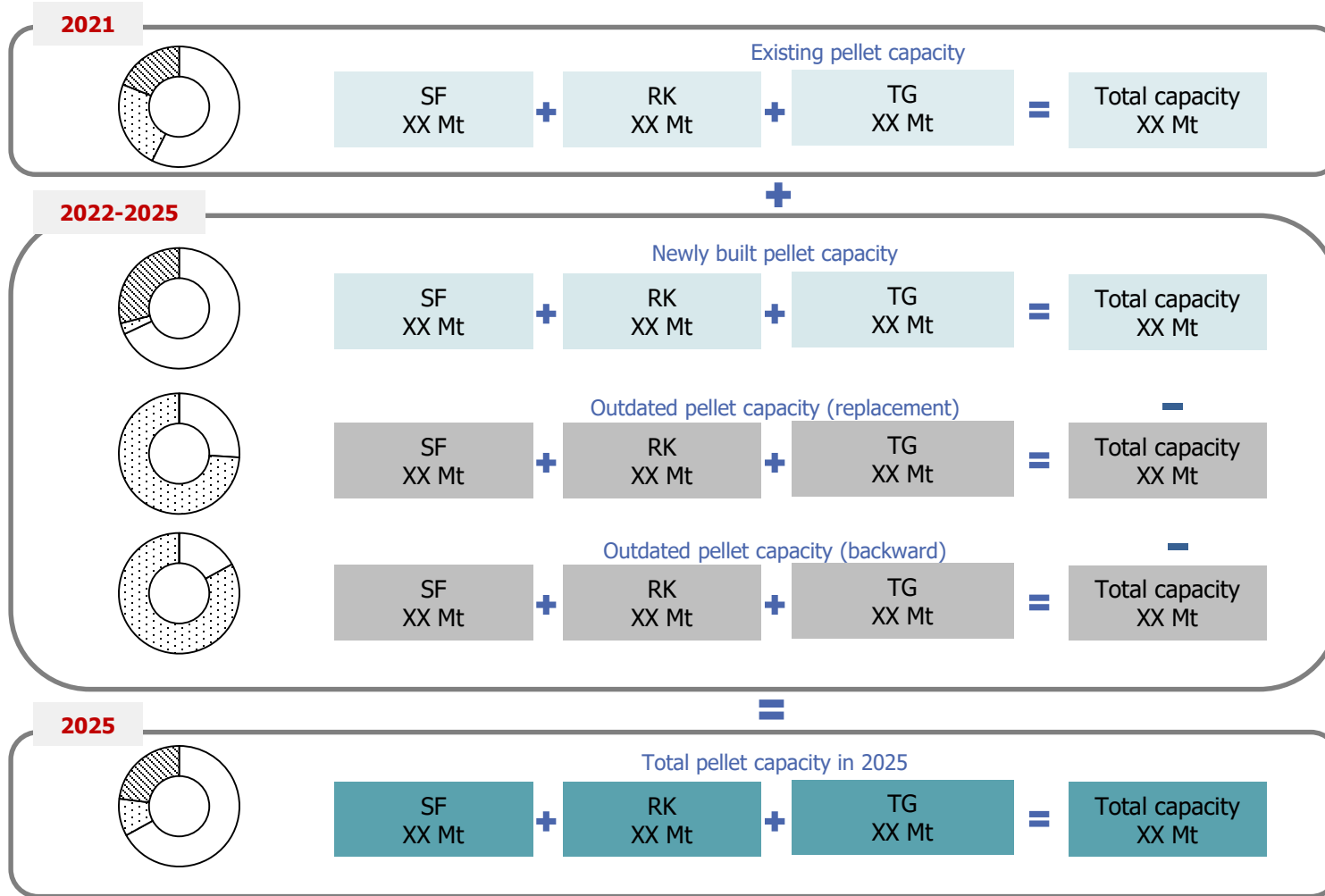
TG: Travelling Gate
RK: Rotary Kiln
SF: Shaft Furnace

- China pellet capacity mainly distributed in Hebei, accounting for xx%. Of which, steel integrated pellet plants and independent pellet plants account for xx% and xx%, respectively.
- In terms of pelletizing type, shaft furnace accounts for the largest proportion of xx%. In recent years, the proportion of rotary kiln grew fast, reaching xx% in xx.

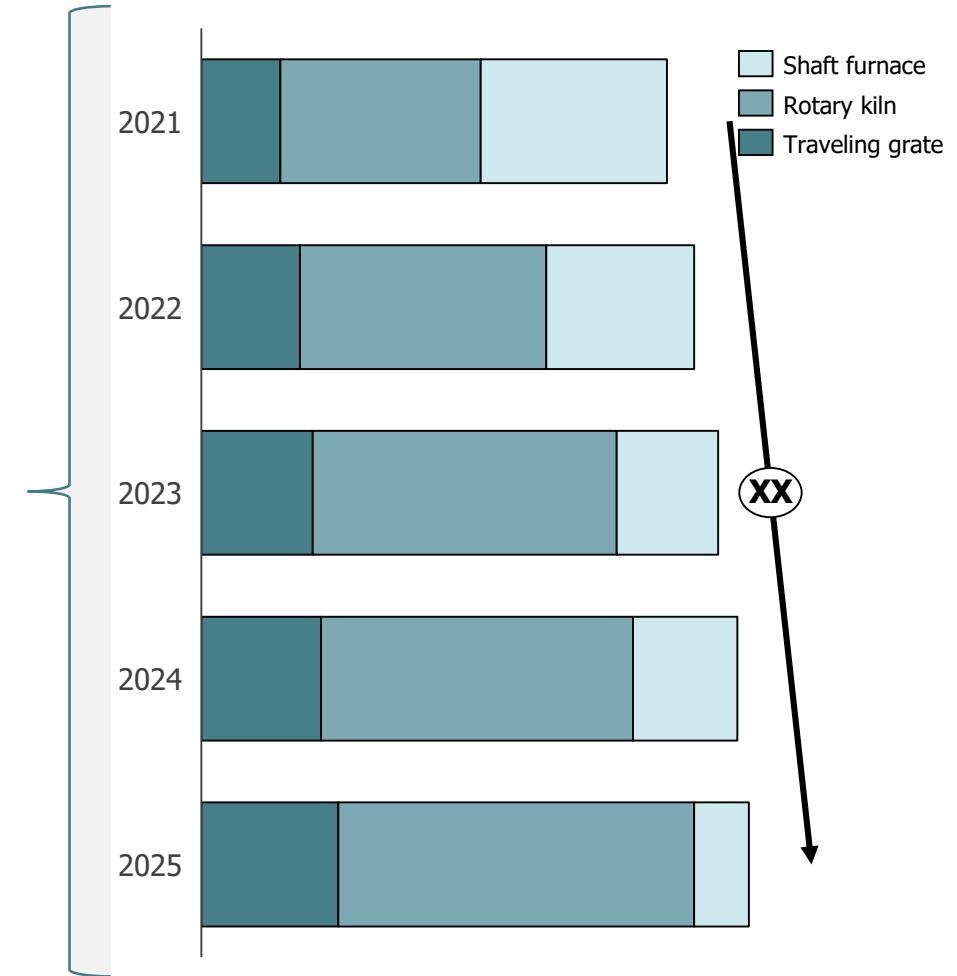
4-level segmentation of capacity capacity

China Level	Region	Province Level	Integrate Level	Technology level
China	Northeast	Liaoning	Integrate	TG/RK/SF
		Jilin	Independent	RK/SF
		Heilongjiang		SF
North		East Hebei		TG/RK/SF
		South Hebei	Integrate	RK/SF
		Shanxi	Independent	RK/SF
		Tianjin		RK/SF
		Inner Mongolia		TG/RK/SF
East		Jiangsu		RK/SF
		Anhui		RK/SF
		Fujian	Integrate	SF
		Jiangxi	Independent	RK/SF
		Zhejiang		SH
South		Guangdong	Integrate	RK/SF
		Guangxi	Independent	RK/SF
Central		Henan	Integrate	RK/SF
		Hunan	Independent	RK/SF
		Hubei		RK/SF
Southwest		Yunnan		RK/SF
		Guizhou	Integrate	RK
		Sichuan	Independent	RK/SF
		Chongqing		RK/SF
Northwest		Shaanxi		SF
		Xinjiang	Integrate	RK/SF
		Ningxia	Independent	SF
		Gansu		SF

China Pellet Capacity Evolution

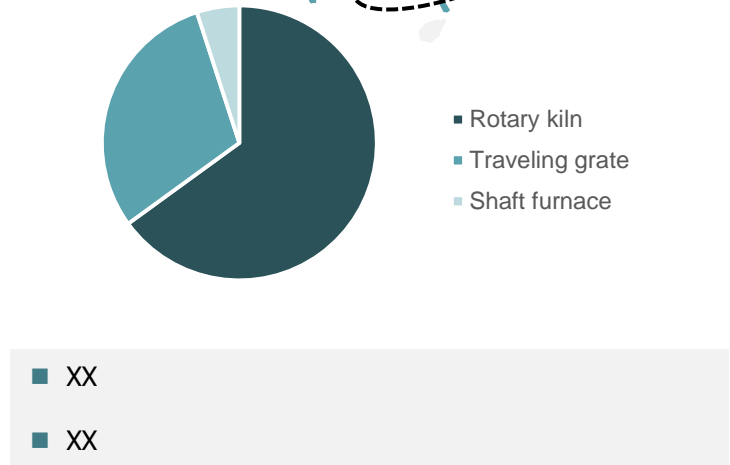
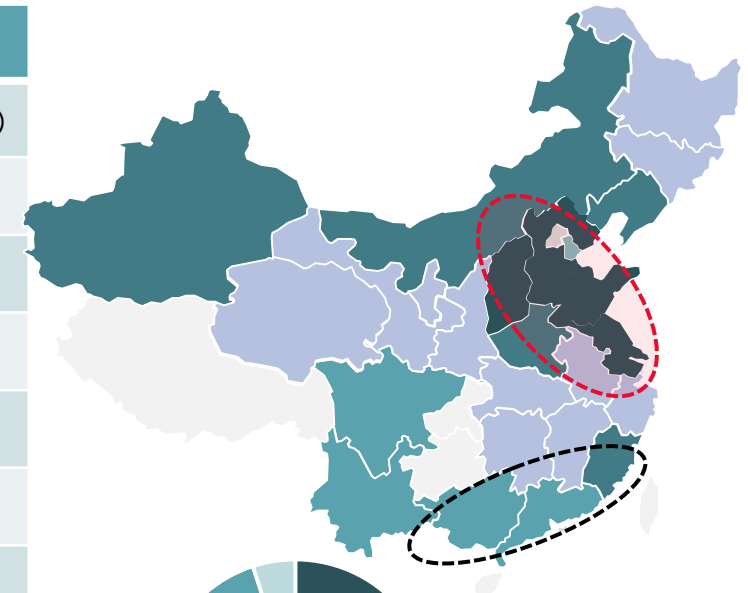


□ RK: Rotary Kiln ▨ TG: Travelling grate ▩ SF: Shaft furnace

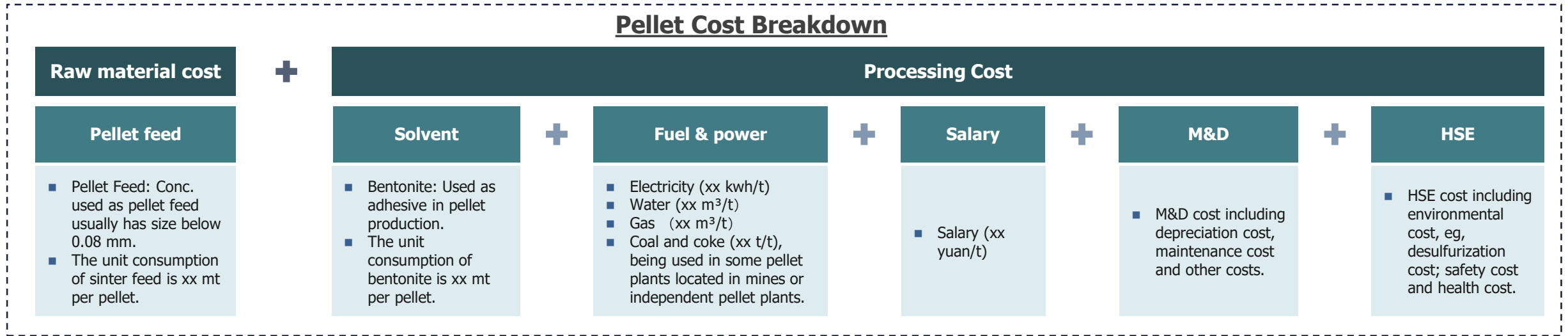


China Pellet Projects under Construction or Proposed

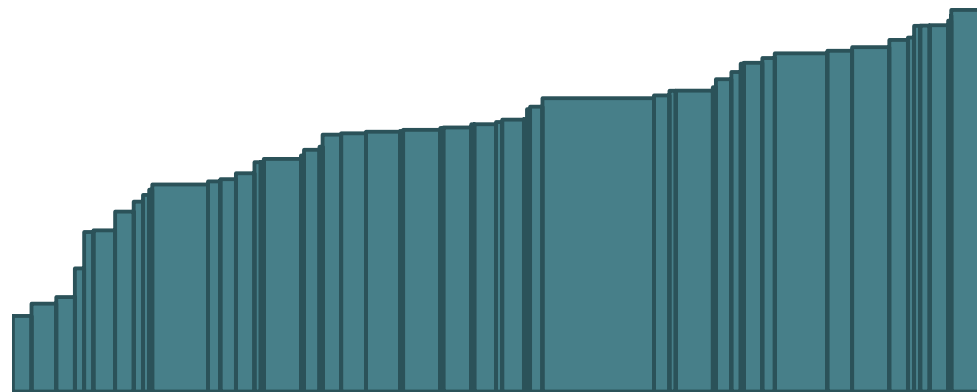
China Pellet Projects under Construction or Proposed								
Province	Company Name	Category	Independent/Steel Integrated	Starting Time	Completion Time (E)	Progress	Facility	Capacity (Kt)
Hebei	SM1	Pellet	Steel Integrated	2017	2018	Construction	Travelling Grate	XX
Hebei	SM2	Pellet	Steel Integrated	2018	-	Construction	Rotary Kiln	XX
Sichuan	SM3	Pellet	Steel Integrated	-	-	Proposed	Rotary Kiln	XX
Shandong	SM4	Pellet	Steel Integrated	2017	2018	Construction	Rotary Kiln	XX
Shandong	SM5	Pellet	Steel Integrated	2017	2018	Production	Rotary Kiln	XX
Gansu	SM6	Pellet	Steel Integrated	2017	-	Construction	Shaft Furnace	XX
Fujian	SM7	Pellet	Steel Integrated	2018	2019	Construction	Rotary Kiln	XX
Shanxi	SM8	Pellet	Independent	-	-	Proposed	Rotary Kiln	XX
Shanxi	SM9	Pellet	Independent	2017	2018	Construction	Rotary Kiln	XX
Shanxi	SM10	Pellet	Independent	2018	2020	Construction	Rotary Kiln	XX
...



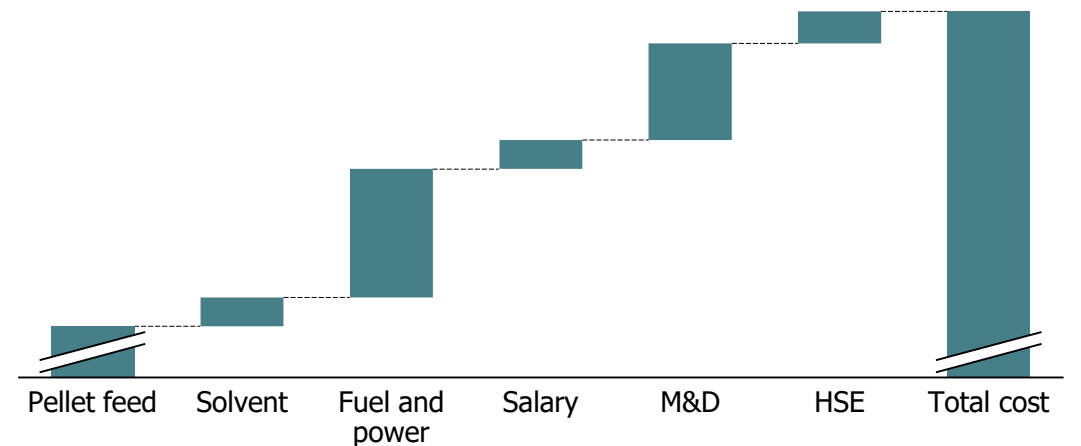
Pellet Production Cost Curve



China pellet production cost curve



China pellet production cost breakdown



Pellet Industry Policy

Pellet industry policy

Market entry

According to the revised and released "Guidance Catalog for Industrial Structural Adjustment (2023 Edition)" by the National Development and Reform Commission

Encouraged:

- ✓ High-efficiency pellet production such as traveling grate
- ✓ Blast furnace high proportion pellet
- ✓ Gas-based shaft furnace direct reduction low-carbon ironmaking (excluding coal-to-gas)

Restricted:

- ~ Pelletizing equipment with a single machine capacity of less than 1.2 million tons per year (except ferroalloy and pellets for casting)

Outdated:

- × Pellet shaft furnace below 8 square meters

Therefore, the current traveling grate pellet production technology will become the mainstream of pellet production, and the shaft furnace pellet production technology will gradually be eliminated.

Environmental requirements

On April 28, 2019, the Ministry of Ecology and Environment, the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Finance, and the Ministry of Transport jointly issued the "Opinions on Promoting the Implementation of Ultra-Low Emissions in the Steel Industry".

- The sintering machine head and pellet roasting flue gas ≤ 10 mg/m³/h
- SO₂ ≤ 35 mg/m³/h
- NO_x ≤ 50 mg/m³/h

Nowadays, the dust removal, desulfurization and denitrification equipment supporting the newly built pellet production line can make the emissions of flue gas particulate matter, sulfur dioxide and nitrogen oxides far below the ultra-low emission standard.

Energy consumption requirements

In the grate machine-rotary kiln production process, the waste heat of the ring cooler is utilized to the maximum extent, and the waste heat is basically recovered, effectively reducing heat energy consumption. However, the waste heat of the shaft furnace pelletizing project is rarely used and most of it is discharged externally.

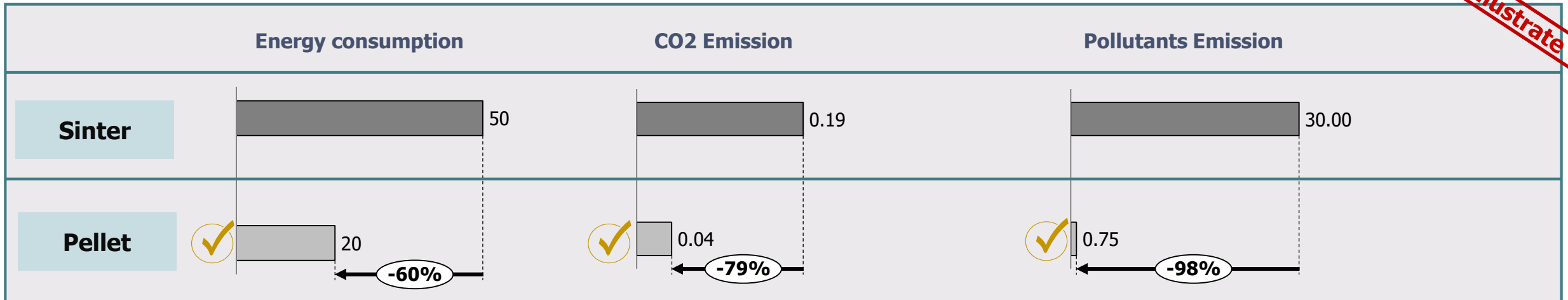
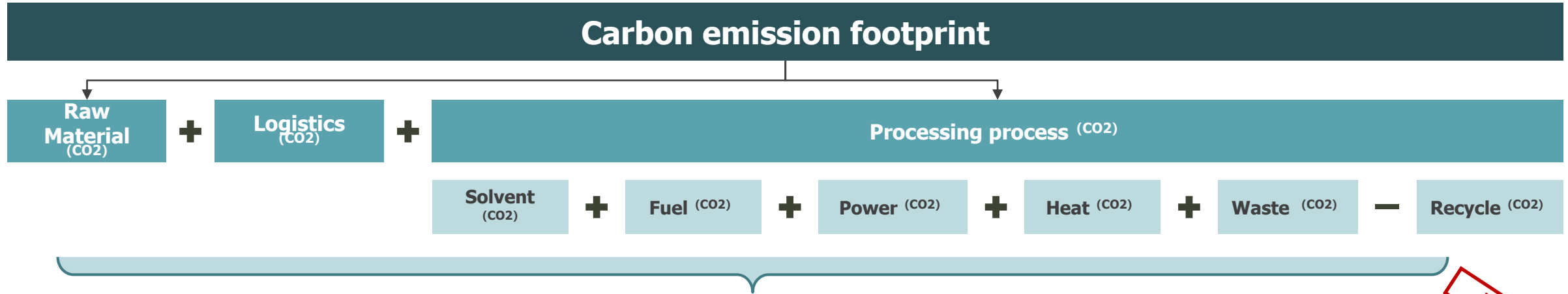
- The energy consumption of the 1.2 million tons/year grate machine-rotary kiln pellet project is <23kg/t.
- The energy consumption of the shaft furnace pelletizing project is >28kg/t.

The grate machine-rotary kiln pellet production line has the characteristics of low energy consumption level compared with the shaft furnace.

Carbon Emission Footprint

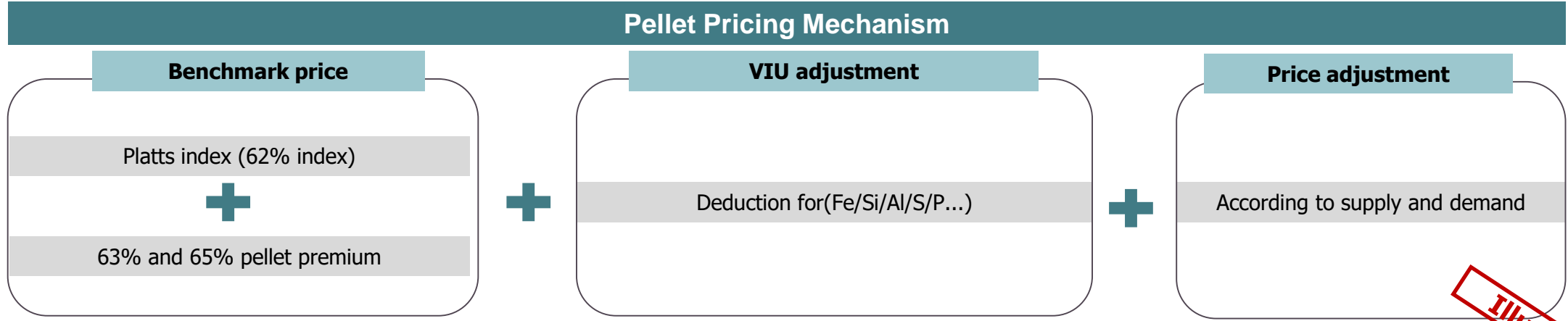
Pellets are environmentally friendly and decarbonized products

Carbon emission footprint



Illustrate

Pellet Pricing Mechanism

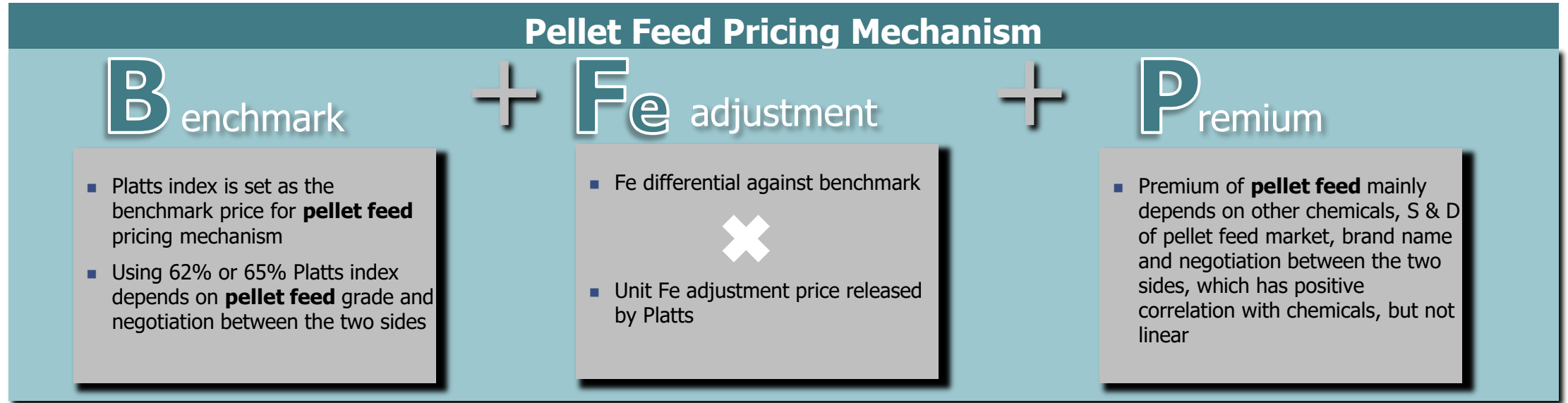


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Specification	Fe	Si	Al	S	P	Tumbler index	CCS(N/P)
Benchmark	62%	8%	1.5%	0.03%	0.04%	90%	1800



Pellet Feed Pricing Mechanism



Benchmark	Fe	S	Si	Al	P	\$/dmt	Fe Differential (\$/dmt)
Platts 62%	62%	0.02%	4.50%	2%	0.075%	61.25	1.2

Illustrate

Pricing Mechanism

Products	Fe	S	Si	Al	P
Ukraine Pellet Feed	65%	0.02%	8.50%	0.19%	0.01%

Benchmark Price (\$/dmt)	Fe Adjustment			Pellet Feed Premium (\$/dmt)	Price (\$/dmt)
Platts 62%	Fe Differential against Benchmark	Unit Fe adjustment (\$/dmt)	Total Fe Adjustment		
61.25	3	1.2	3.6	6	70.85