

Indonesia Base Metals 101

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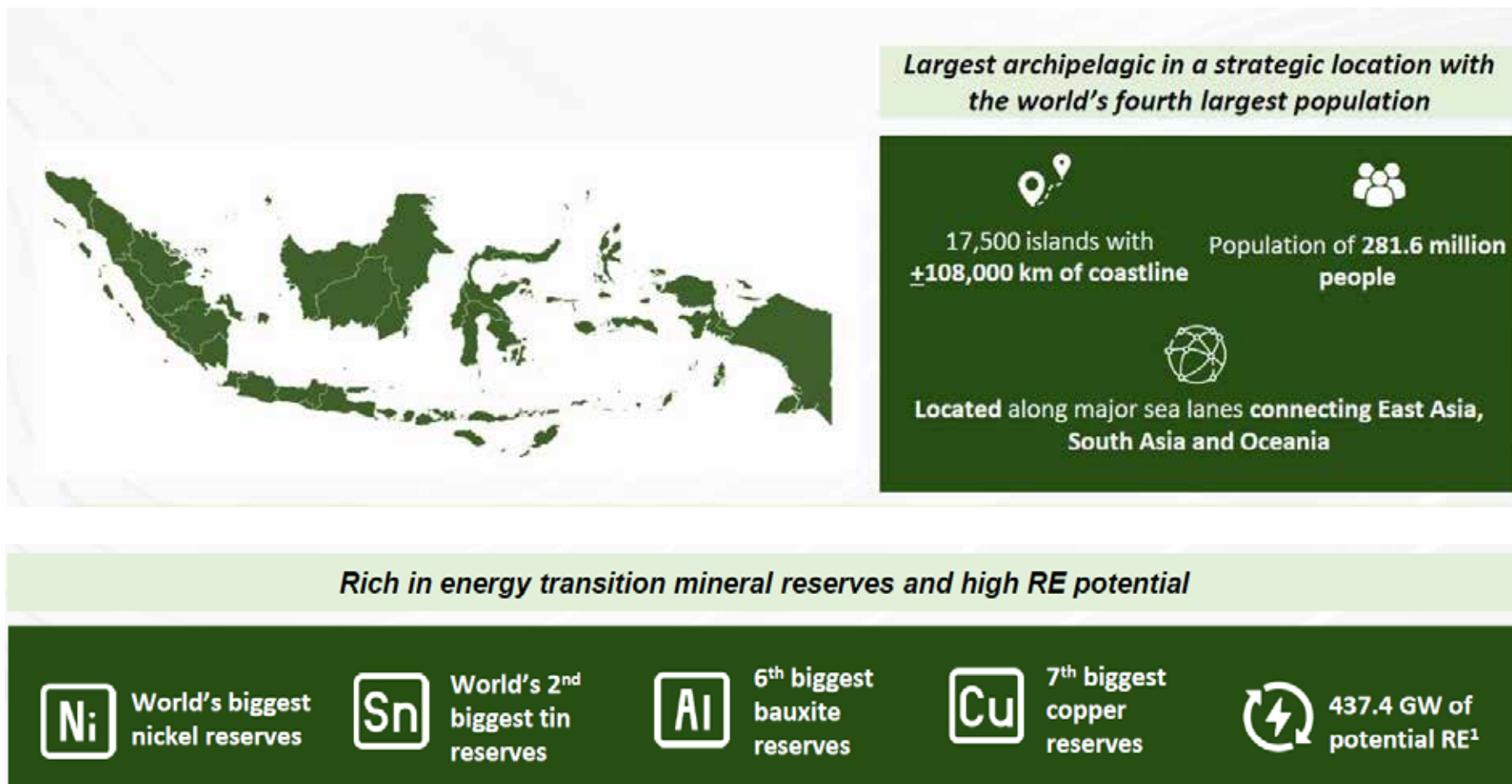
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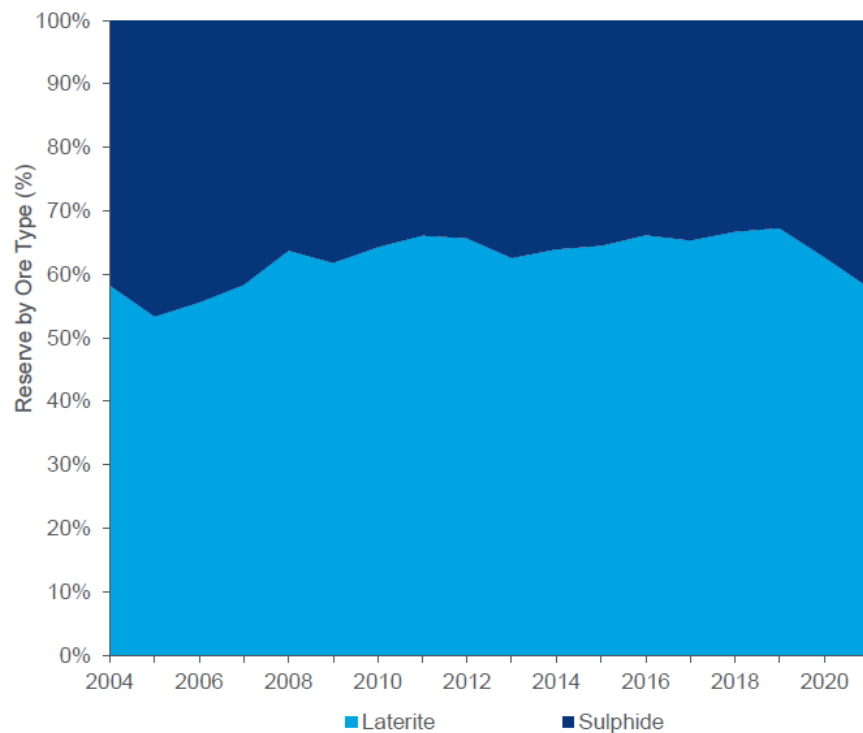
Indonesia at a glance



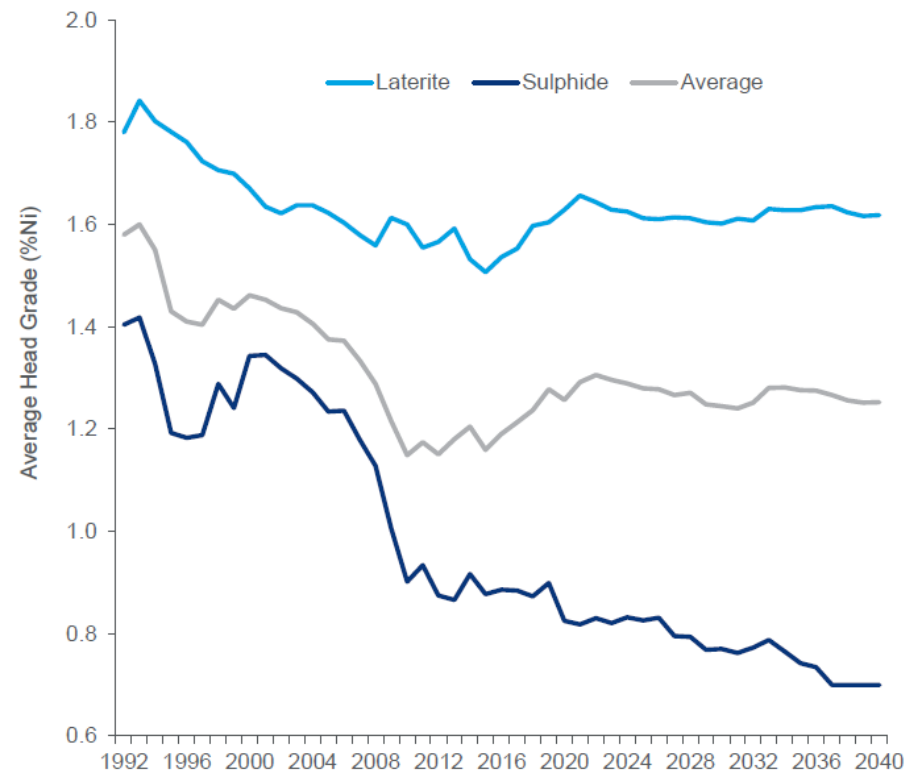
Source: CGS-CIMB Research, Coordinating Ministry of Maritime and Investment

Nickel Laterite vs Sulphide

Nickel reserves by ore type, %, 2004 - 2021



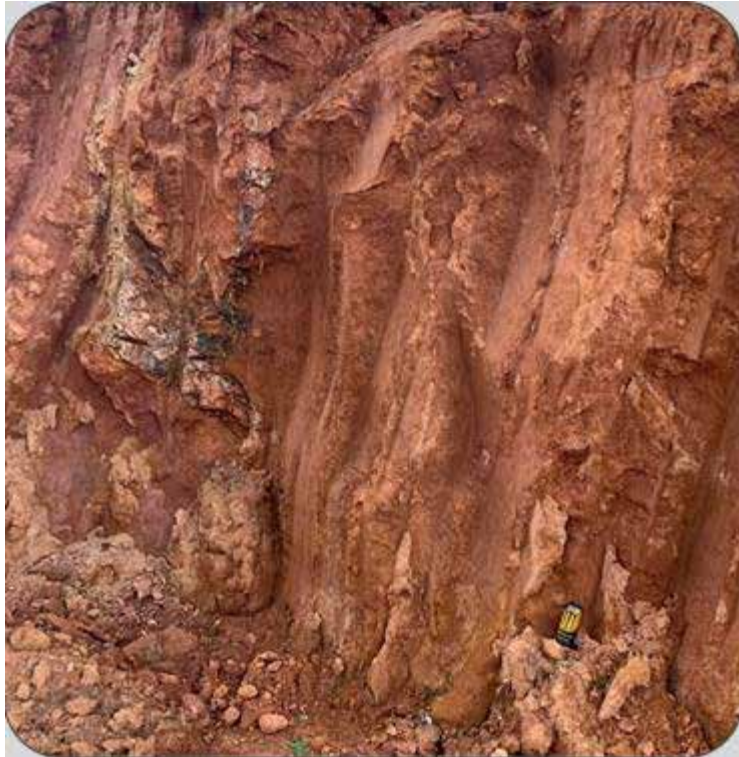
Average head grades for laterite and sulphide ores, % Ni, 1992 - 2040



Source: CGS-CIMB Research, Wood Mackenzie

Laterite – saprolite and limonite

Saprolite ore



Limonite ore



Source: CGS-CIMB Research, Google Images

Nickel supply chain

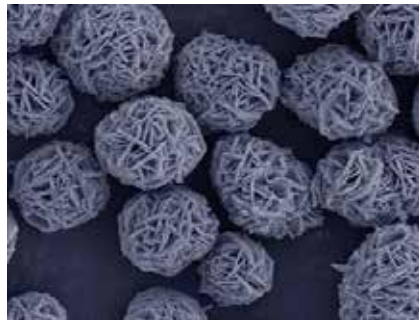


Source: CGS-CIMB Research, Google Images

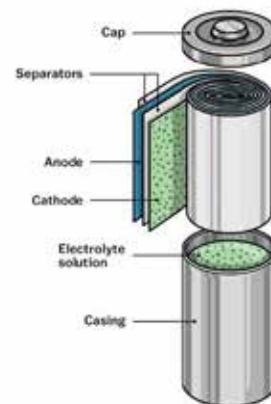
Nickel supply chain (cont'd)



Nickel Sulphate
(NiSO₄)



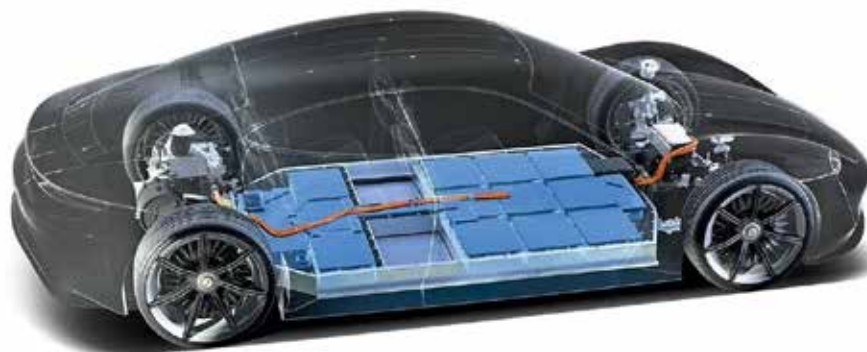
Ternary precursor



EV Battery cells -
Cathode
components



EV Battery pack



Electric vehicles

Source: CGS-CIMB Research, Google Images

Nickel smelters technology and products

Nickel-pig-iron (NPI)



MHP



Nickel matte

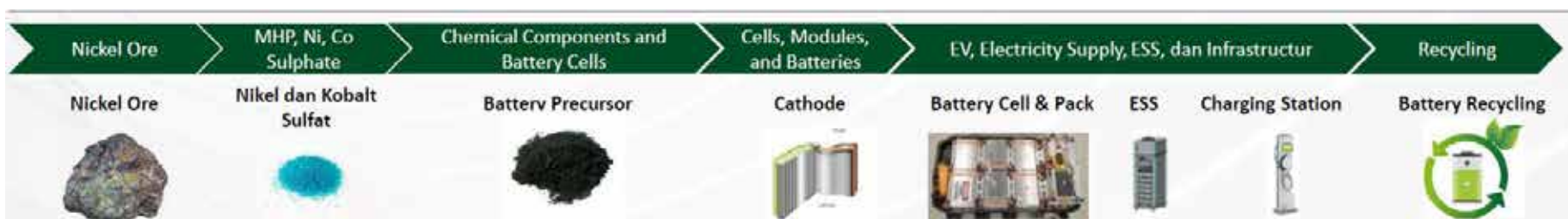
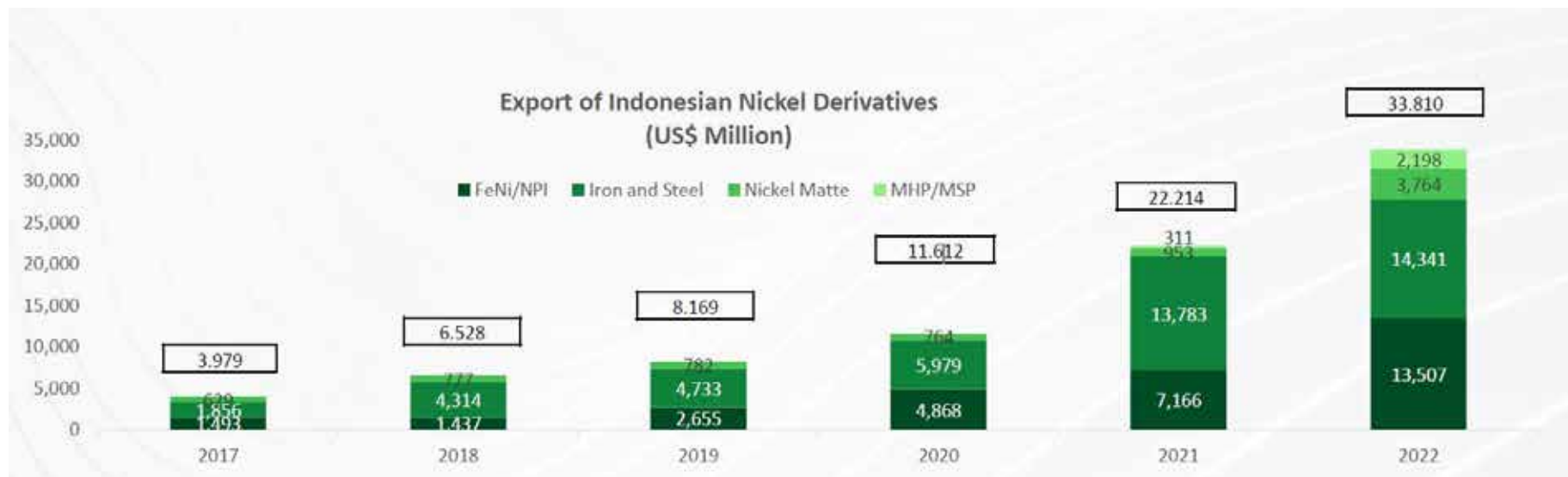


Nickel sulphate



Source: CGS-CIMB Research, Google Images

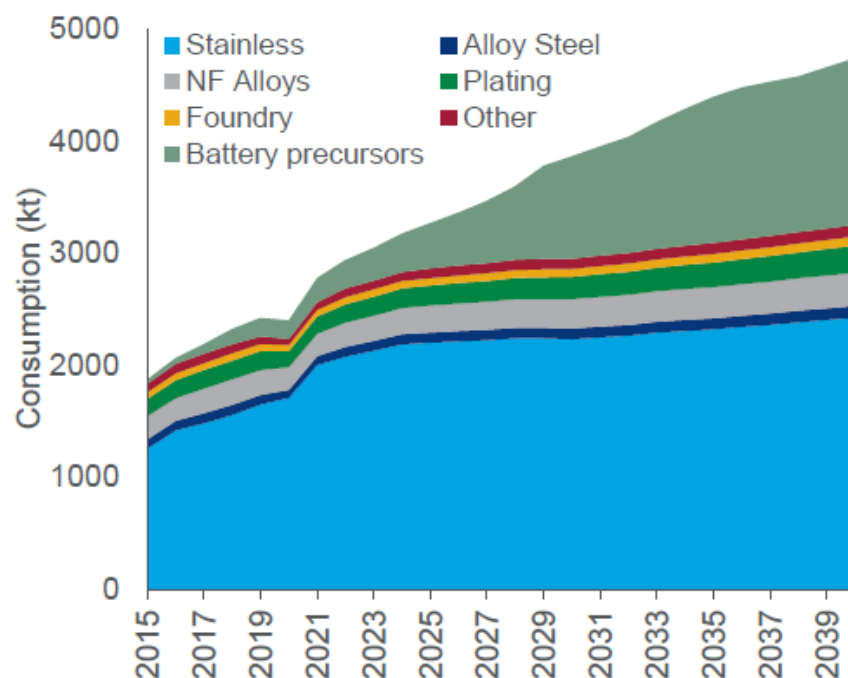
Nickel smelters technology and products



Source: CGS-CIMB Research, Coordinating Ministry of Maritime and Investment

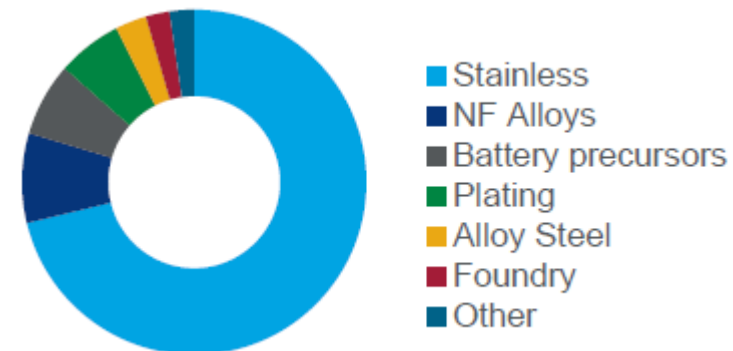
Nickel end-usage

Global nickel demand by first use

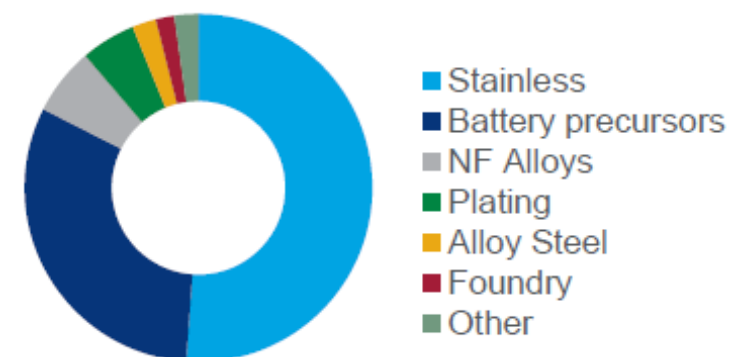


Source: CGS-CIMB Research, Wood Mackenzie

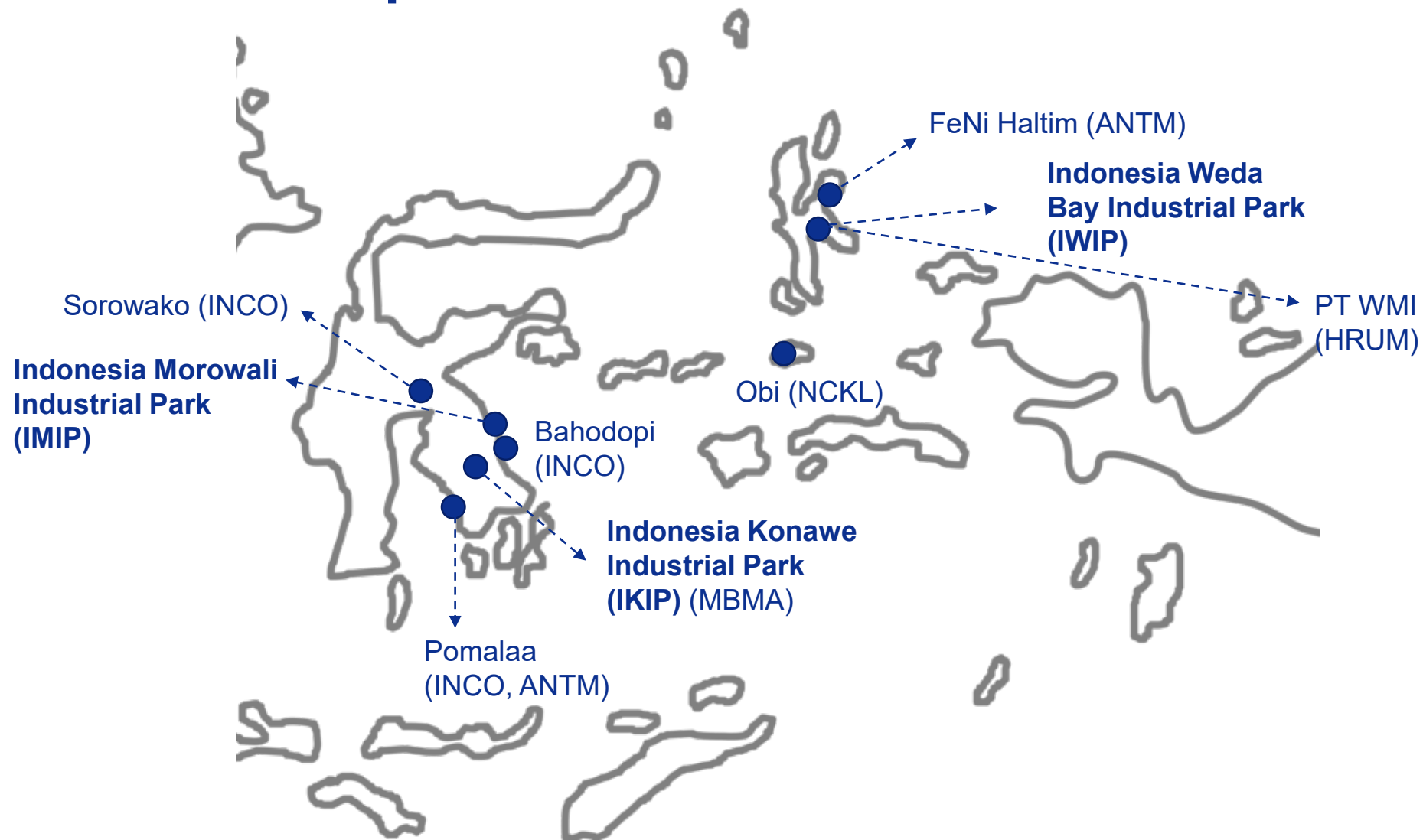
2020



2040



Indonesia Nickel Map



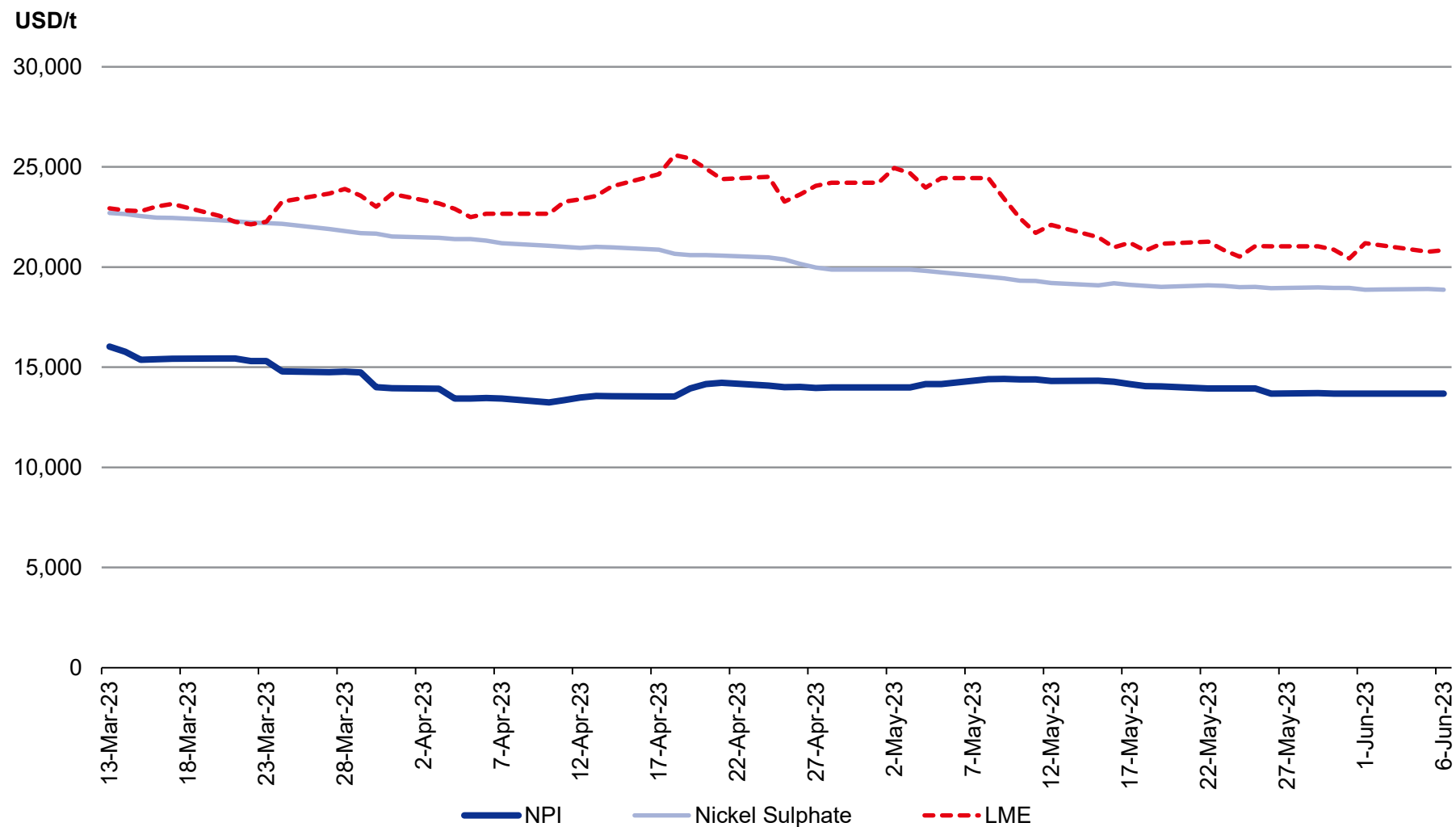
Source: CGS-CIMB Research, Companies

Indonesia Nickel Capacity (listed companies)

Projects	Processing facility	Product	Capacity (ktpa)	Completion	Ownership (%)
Vale Indonesia					
Sorowako Matte	RKEF	NickelMatte	75,000	Operating	100% INCO
Bahodopi	RKEF	FeNi	73,000	2026F	49% INCO, 51% Shandong Xinhai
Pomalaa	HPAL	MHP (Ni & Co)	120,000	2026F	30% INCO, 17% Ford, 53% HNC
Sorowako	HPAL	MHP (Ni & Co)	60,000	2027F	30% INCO, 70% Huayou Nickel Cobalt (HNC)
Merdeka Copper Gold					
Tujuh Bukit Oxide	Open-pit	Gold & silver	120,000	Operating	100% Merdeka
Tujuh Bukit Porphyry	Underground mining	Copper conc. to cathode	80,000	2027F	100% Merdeka
Wetar	Sx/Ew	Copper cathode	20,000	Operating	100% Merdeka
Pani	Open-pit	Gold & silver	250,000	2H25F	70% Merdeka
Merdeka Battery Materials					
Acid Iron Metal (AIM)	Pyrite, chloride plant	Sulphuric Acid, Iron, etc		2Q24F	80% Merdeka Battery, 20% Tsingshan
IKIP HPAL 1	HPAL	MHP (Ni & Co)	120,000	2025F	25% MBM (intention to 66%)
IKIP HPAL 2	HPAL	MHP (Ni & Co)	120,000	2026F	40% MBM
SCM Mine	Open-pit	Saprolite & limonite ore	48mn limo 12mn sapro	Jul-23	51% MBM, 49% Tsingshan
BSI	RKEF	NPI	19,000	Operating	50.1% MBM, 49.9% Tsingshan
CSI	RKEF (NPI-matte)	NPI to matte	19,000	Operating	50.1% MBM, 49.9% Tsingshan
Zhao Hui Nickel (ZHN)	RKEF (NPI-matte)	Matte	50,000	Apr-24	50.1% MBM, 49.9% Tsingshan
Harum Energy					
PT Position	Open-pit	Saprolite & limonite ore	3mn, up to 6mn	EndFY23F	51% Tanito Harum Nickel (THN)
Infei Metal Industri	RKEF	NPI	28,000	Operating	48% Tanito Harum Nickel (THN)
Westrong Metal Industri	RKEF (NPI-matte)	Matte	44,000- 56,000	4Q23F	20% Tanito Harum Nickel (THN)
Aneka Tambang					
Mempawah	Smelter	Grade Alumina	1,000,000	EndFY24F	40% ANTM, 60% Inalum/Mind ID
FeNi Haltim	RKEF	FeNi	13,500	EndFY23F	100% ANTM
CNGR	OESBF	NPI	80,000	2025F	0% ownership for now, only supply ore
CATL	8 RKEF & 1 HPAL	MHP & FeNi	55,000 MHP	na	na
LG Energy Solution	na	na	na	na	na
Weda Bay Nickel (WBN)	RKEF	NPI	na	na	10% ANTM, 90% Eramet Tsingshan

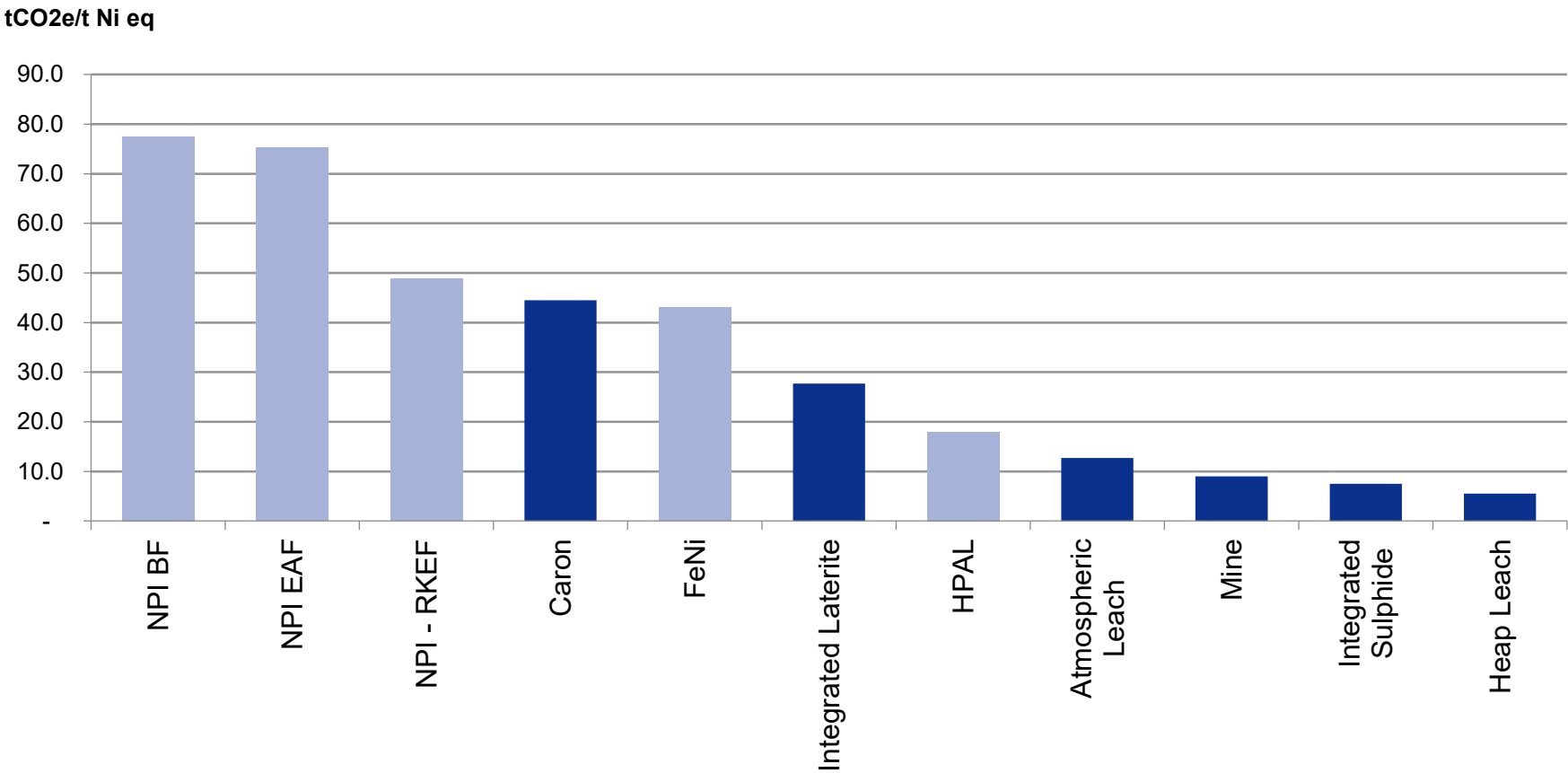
Source: CGS CIMB Research, Companies

Every Ni products have different supply/demand



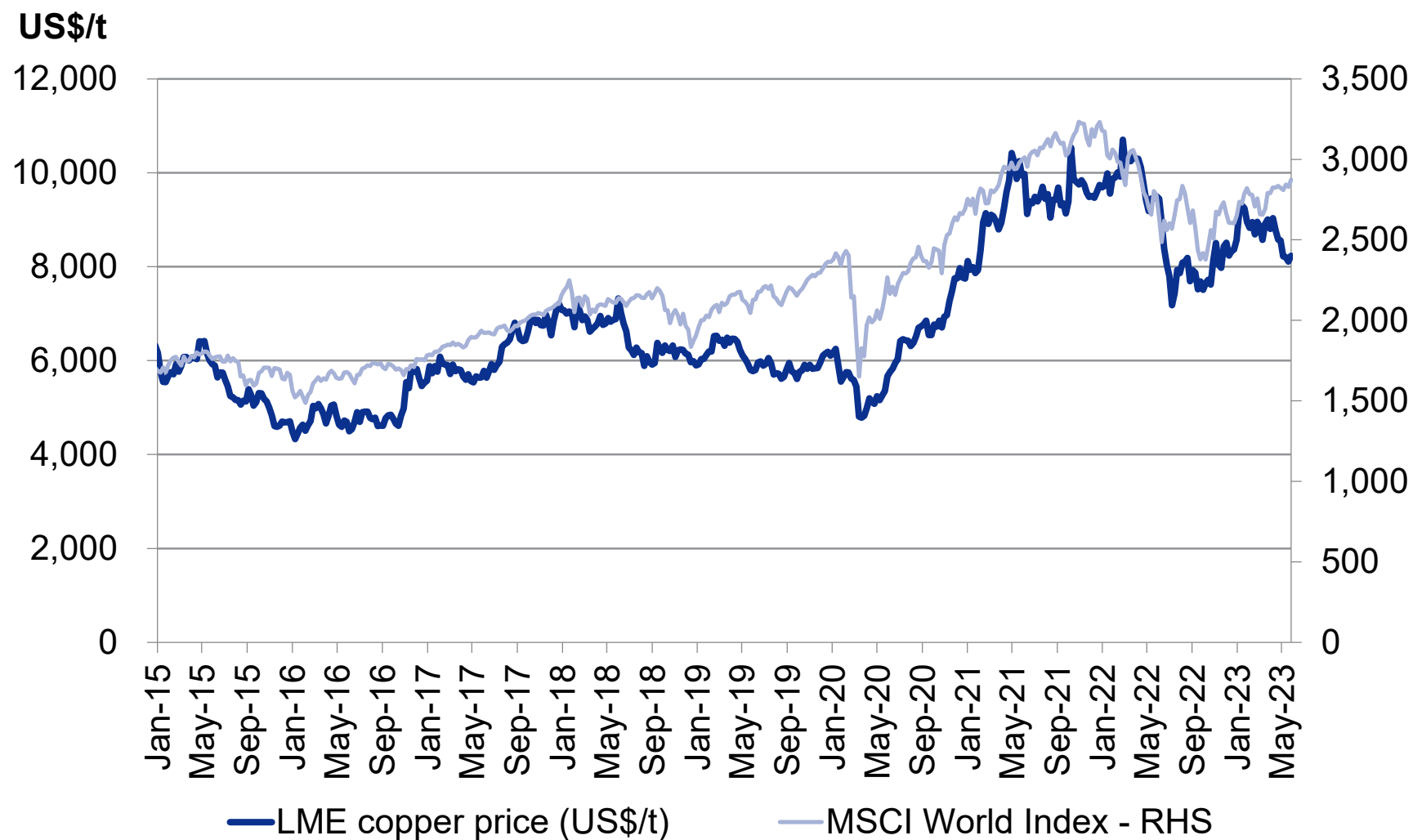
Source: CGS-CIMB Research, Bloomberg, Shanghai Metal Market

Environmental impact



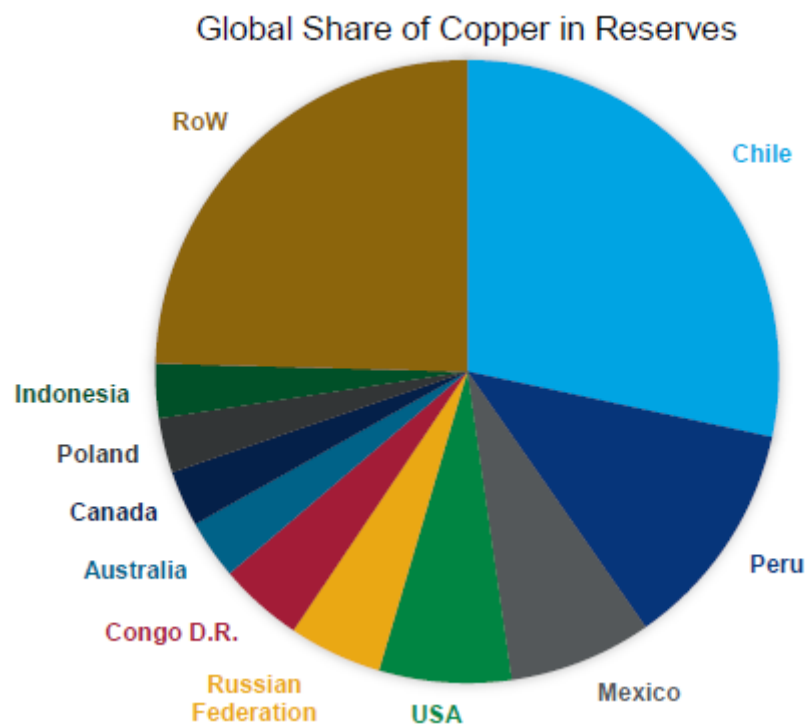
Source: CGS-CIMB Research, Wood Mackenzie

Dr. Copper – The only metal with Ph.D degree

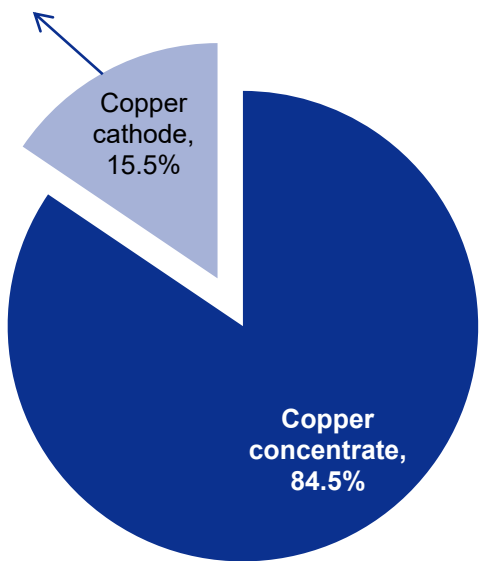


Source: CGS-CIMB Research, Bloomberg

Copper reserves



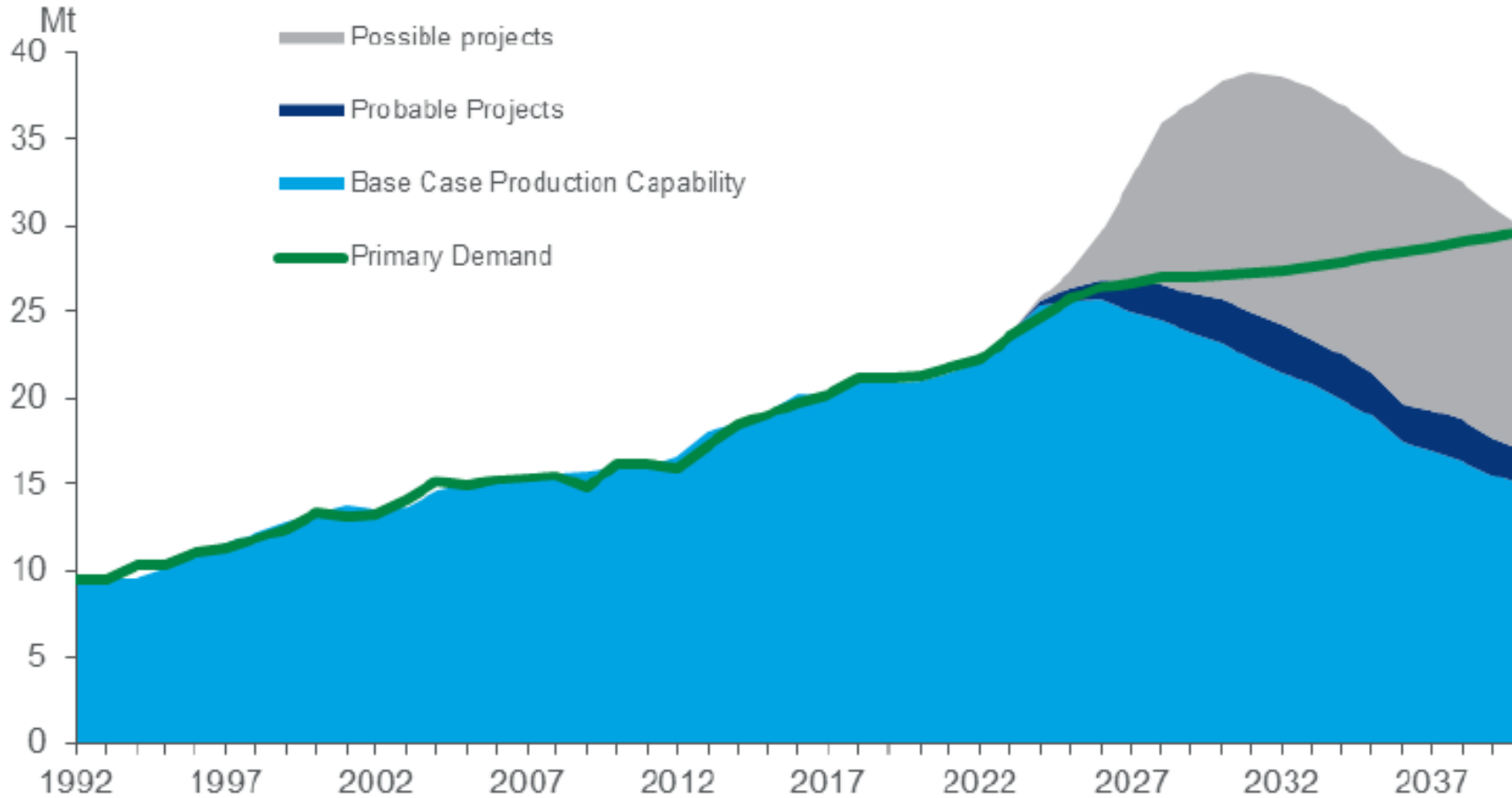
Mostly processed
by SxEw



Source: CGS-CIMB Research, Wood Mackenzie

The long-term supply gap cases

Global copper supply and primary demand



Source: CGS-CIMB Research, Wood Mackenzie

By-products of copper

Gold



Silver



Molybdenum



Source: CGS-CIMB Research, Google Images

Copper in Indonesia

**Grasberg mine –
Freeport Indonesia**



**Batu Hijau mine –
Amman Mineral Nusa Tenggara**



**Wetar copper mine –
Merdeka Copper Gold**



Source: CGS-CIMB Research, Companies, Google Images

Copper in Indonesia (under development stage)

**Gorontalo Minerals copper mine –
Bumi Resources Minerals**



**Tujuh Bukit copper mine –
Merdeka Copper Gold**



Source: CGS-CIMB Research, Companies, Google Images