Nickel & Cobalt in the Battery Market

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Mining for and with the Electric Vehicle

IOM3, 297 EUSTON ROAD, LONDON NW1 3AD

29-30 January 2020

The Backdrop: Global EV Sales as a Total Share of Vehicle Sales

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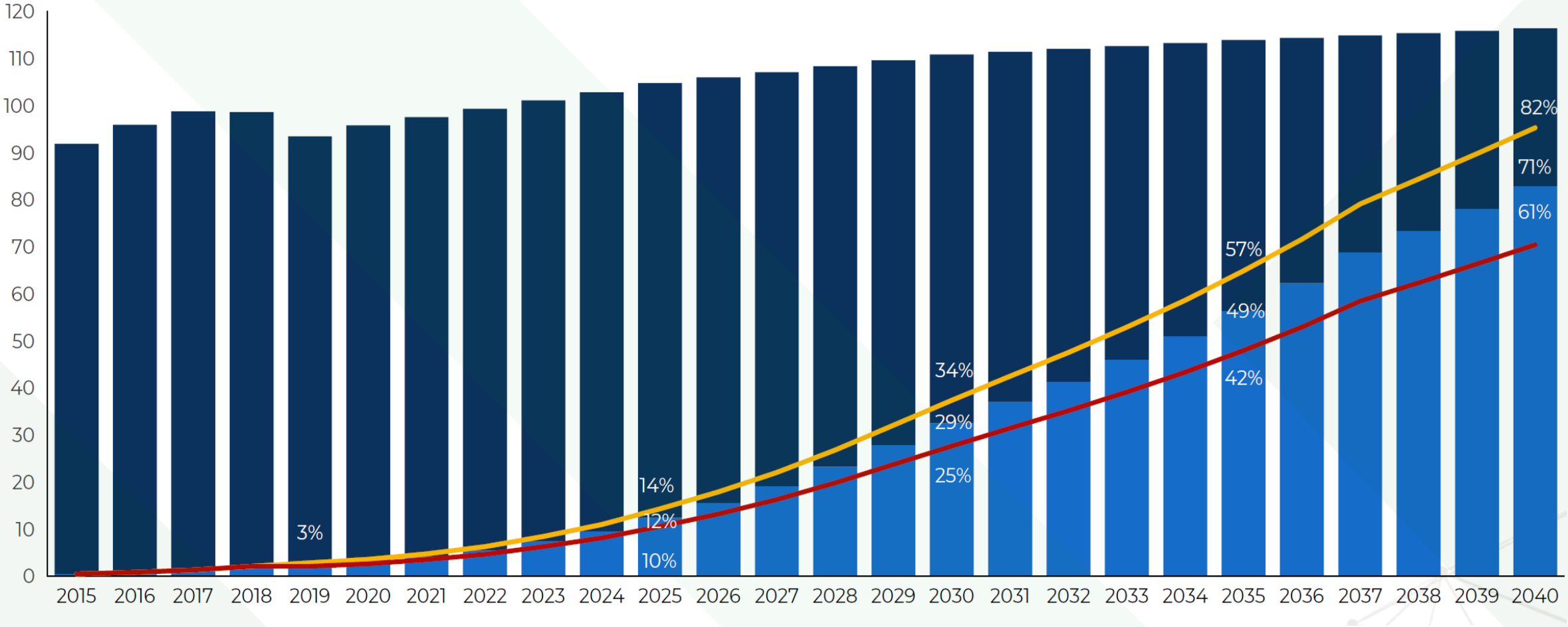

All ICE Vehicles Sold

Total Electric Vehicles Sold Base Case

EVs Upside

EVs Downside

Source : rho motion; Benchmark Mineral Intelligence

Battery Nickel (& Cobalt)

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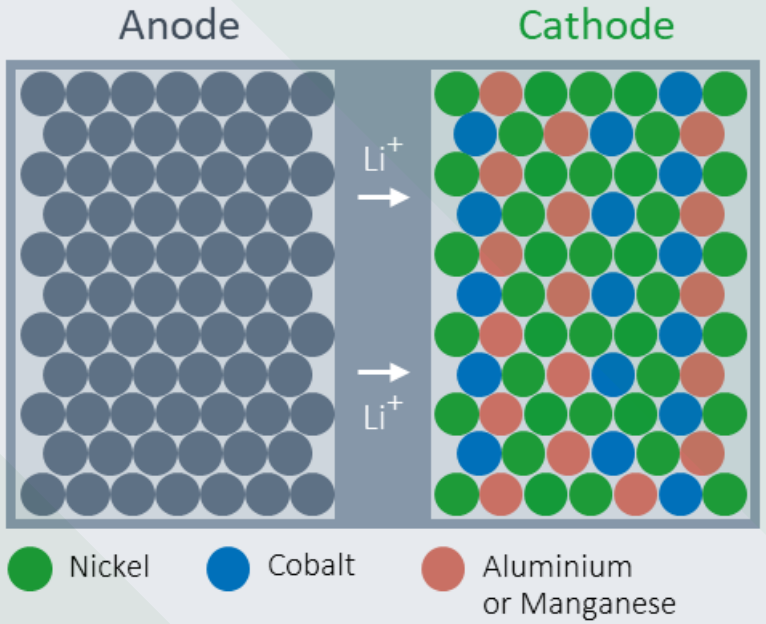
Inside an Electric Vehicle Lithium-Ion Battery (LiB)



LiB are characterised by their type of cathode material

- N C A — Nickel Cobalt Aluminium e.g. Tesla >80% Ni
- N M C — Nickel Manganese Cobalt e.g. Nissan where Ni:Mn:Co ratios have moved from 1:1:1 to 5:3:2 & 6:2:2 & moving towards 8:1:1

> Our lithium ion batteries should be called Nickel-Graphite…
>
> Elon Musk

Nickel Market Supply Chain - 2019

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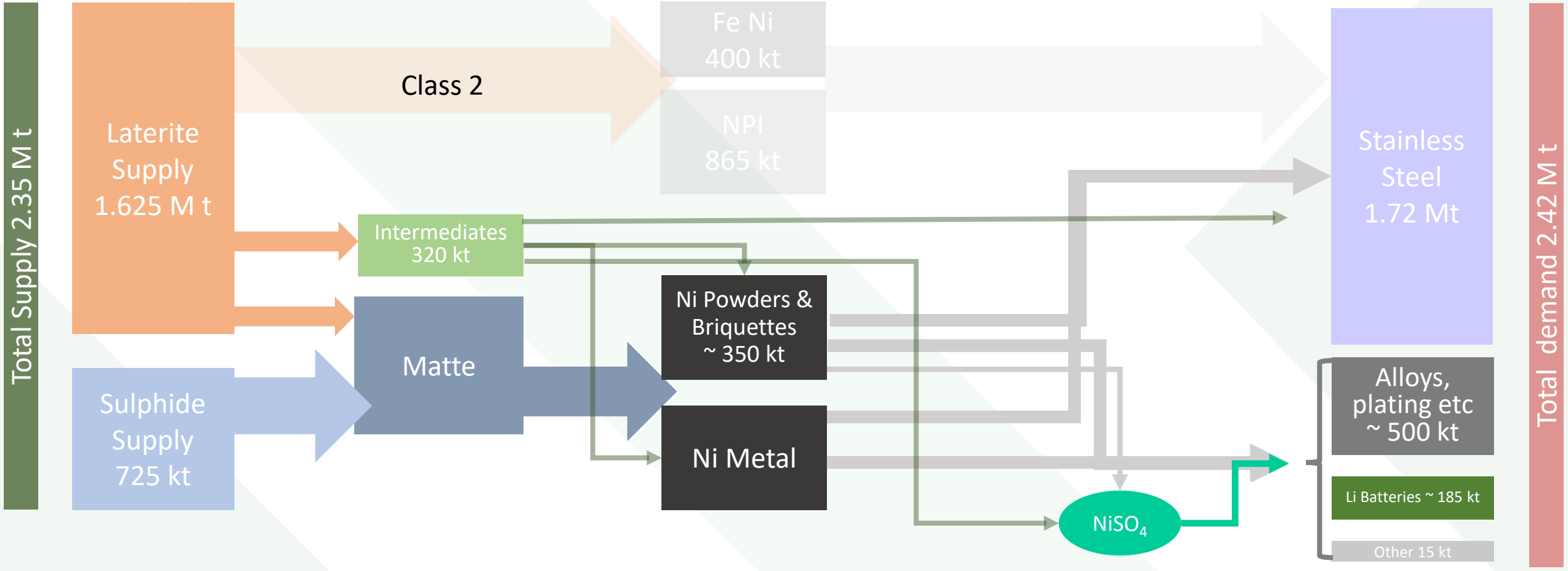

Source : NorNickel, Roskill, Wood Mackenzie, UBS, Mckinsey, BRN

Forecast Nickel Market Supply Chain 2030

Probable Projects into Production

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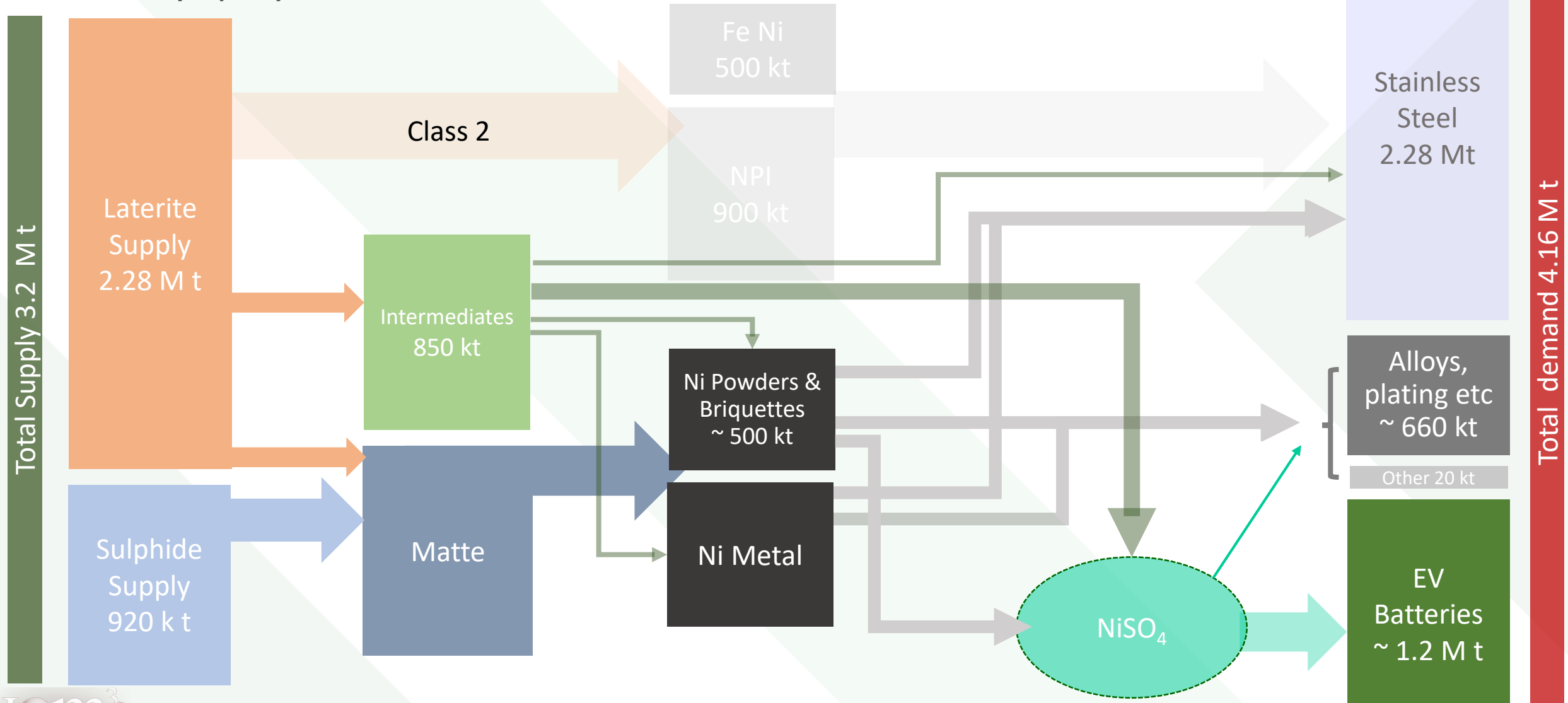
Ni Metal Refinery capacity = 3.45 Mt



Source : AABC 2020, NorNickel, Roskill, Wood Mackenzie, UBS, Mckinsey, BRN

Supply Demand – a more conservative view

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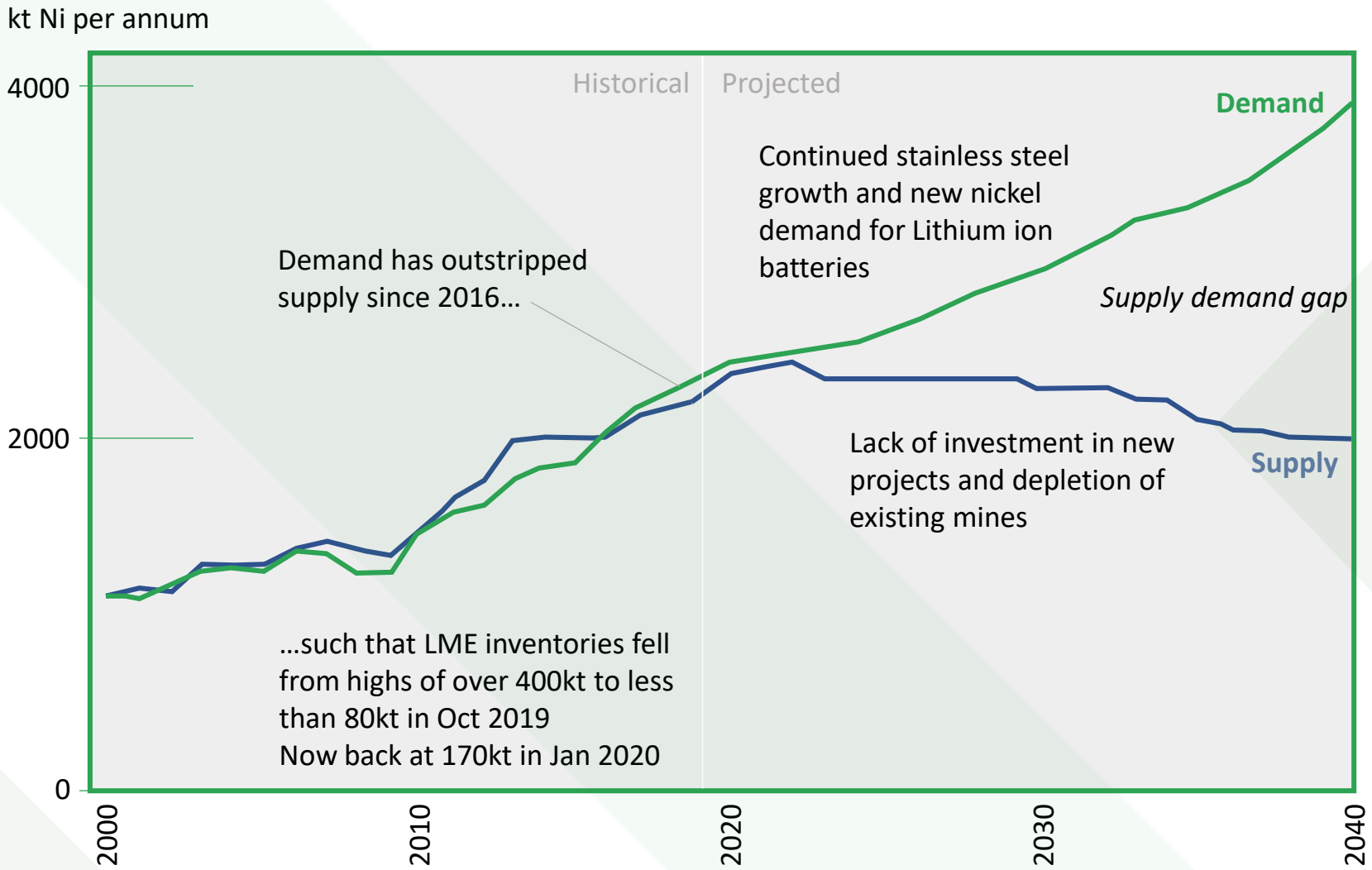

Source: Bloomberg, **Wood Mackenzie**, BRN

EV & Incremental Nickel Demand Forecasts

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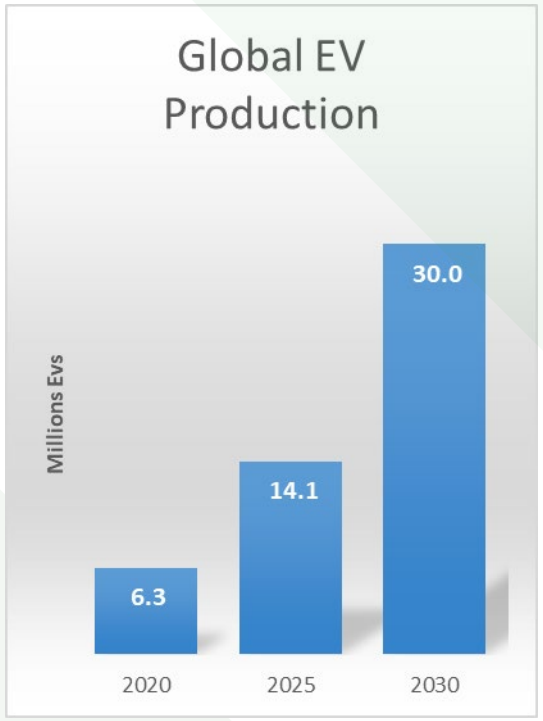
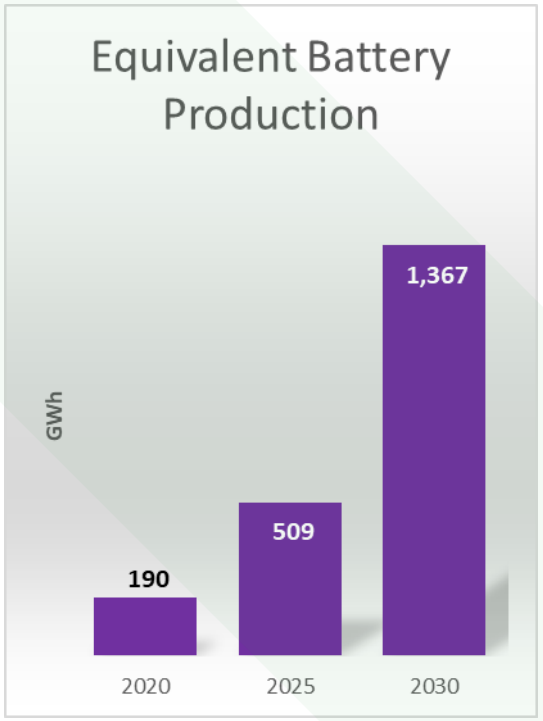
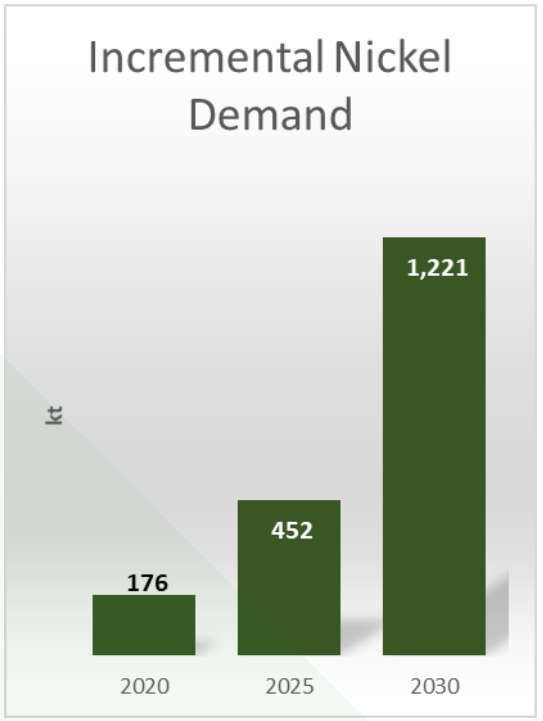


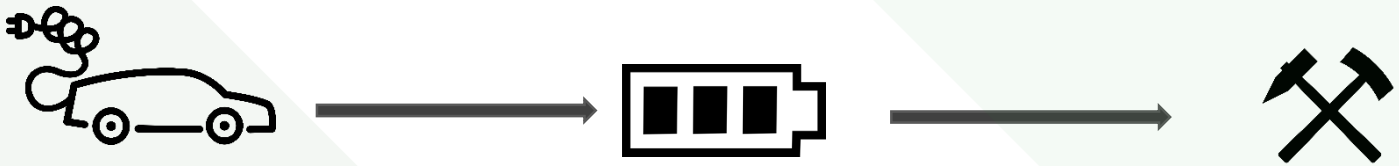




2025 = 40% of 2019 Class 1 supply

2030 = >100% of 2019 Class 1 supply

> 48 x 25 k tpa projects (BRN's Piauí Project)



Note: Evs are passenger vehicles only & includes PHEV & BEV; PHEV battery pack 12kWh, BEV in 2020 40kWh, 2025 56kWh and 2030 65kWh. NMC 622 in 2025 and 811 in 2030.

Source : Consensus AABCE Jan 2020 Wiesbaden

Why Heap Leaching of Nickel Laterites ?

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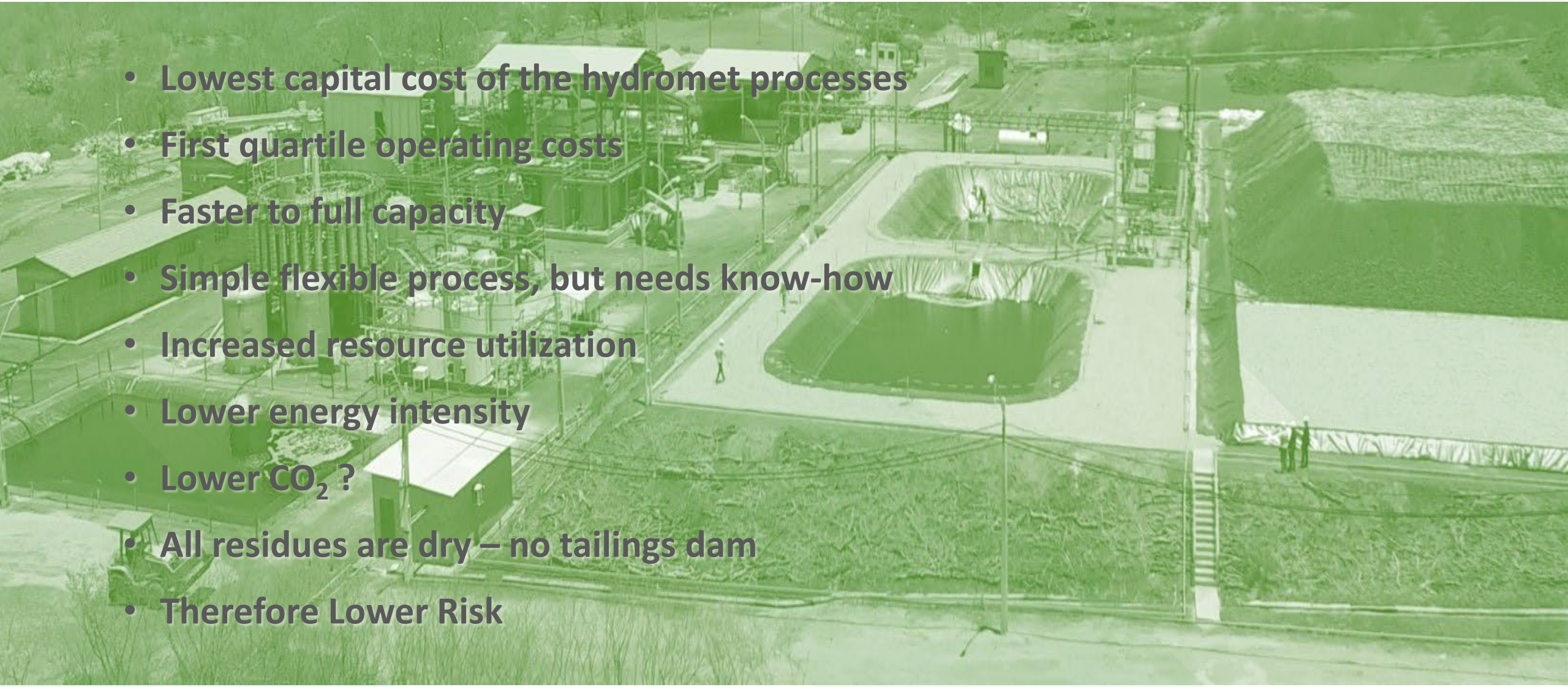

- Lowest capital cost of the hydromet processes
- First quartile operating costs
- Faster to full capacity
- Simple flexible process, but needs know-how
- Increased resource utilization
- Lower energy intensity
- Lower CO_2 ?
- All residues are dry – no tailings dam
- Therefore Lower Risk

Costs and Incentive Nickel Price

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Project Type	Typical Capacity	Capital Intensity	Nickel Price req'd for 30% IRR (pre tax)	Operating Cost
	kt pa	US $/t annual Ni	US $/t	US $/t
Small Sulphides (Aus)	5 to 8	11,000-18,000	> 13,900	5,000-9,500
Large low grade S (Can)	20 to 50	28,600-57,300	>22,000	3,000-8,500
NPI China	10 to 60	5,100-13,250	>13,000	8,000-14,000
NPI Indonesia	10 to 60	6,600-15,450	>12,000	7,000- 12,000
FeNi	20 to 60	33,000-80,000	> 15,000	4,850-9,000
Chinese HPAL Indonesia	30 to 50	13,250-30,000	> 15,000	8,000-9,000
HPAL	15 to 60	75,000-150,000+	> 19,000	5,500-25,000
Heap Leach	10 to 40	17,500-35,000	> 11,000	4,850-8,800
PNP	**25**	**17,590**	**11,000**	**6,130**

SPOT Jan 27th 2020 = US $ 12,630/t

Total Probable Projects Capex = US $ 30 Billion

Total Upside Projects Capex = US $ 42 Billion

Nickel Price

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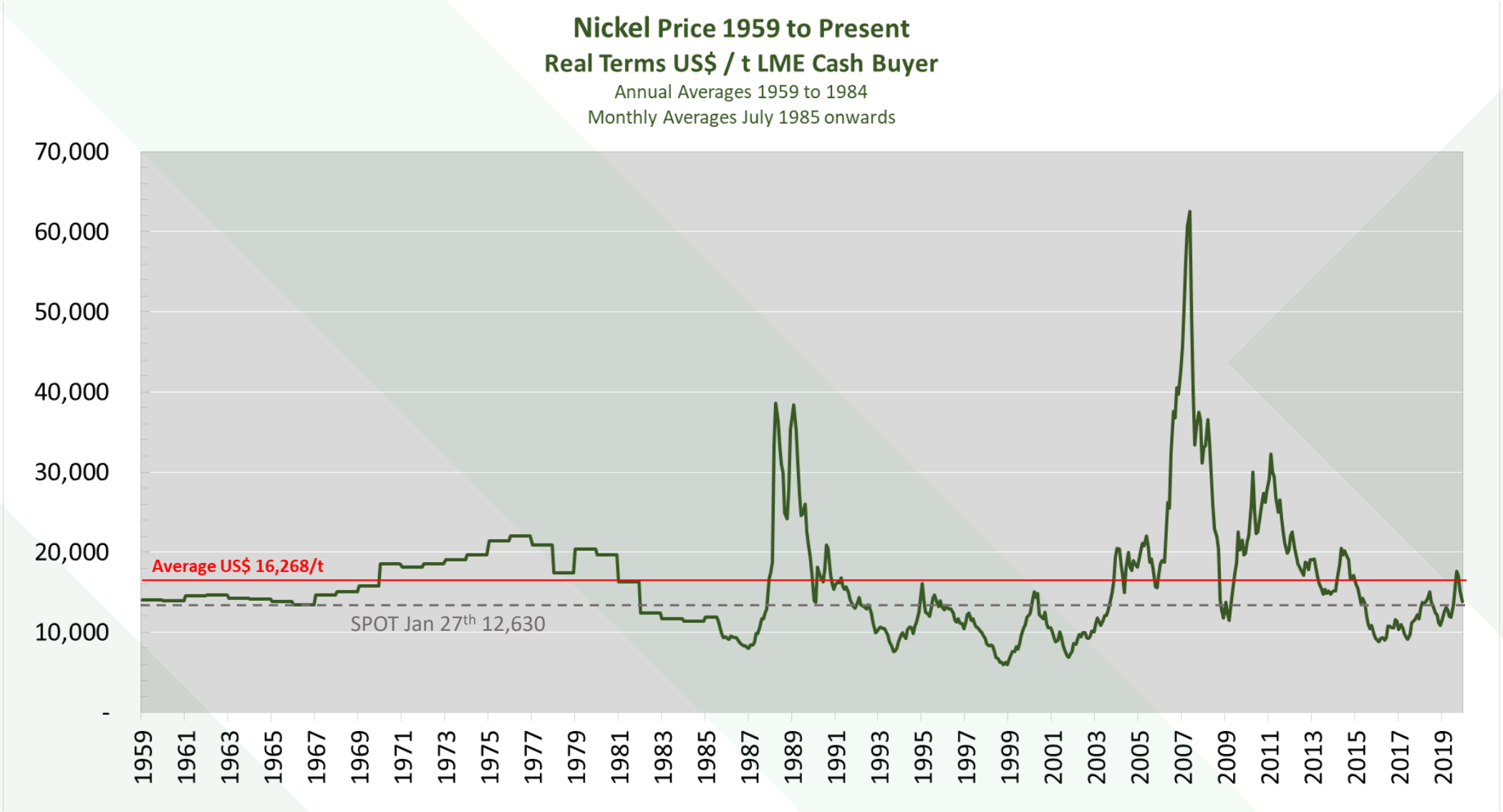

Source : LME

HPAL Cost Overruns

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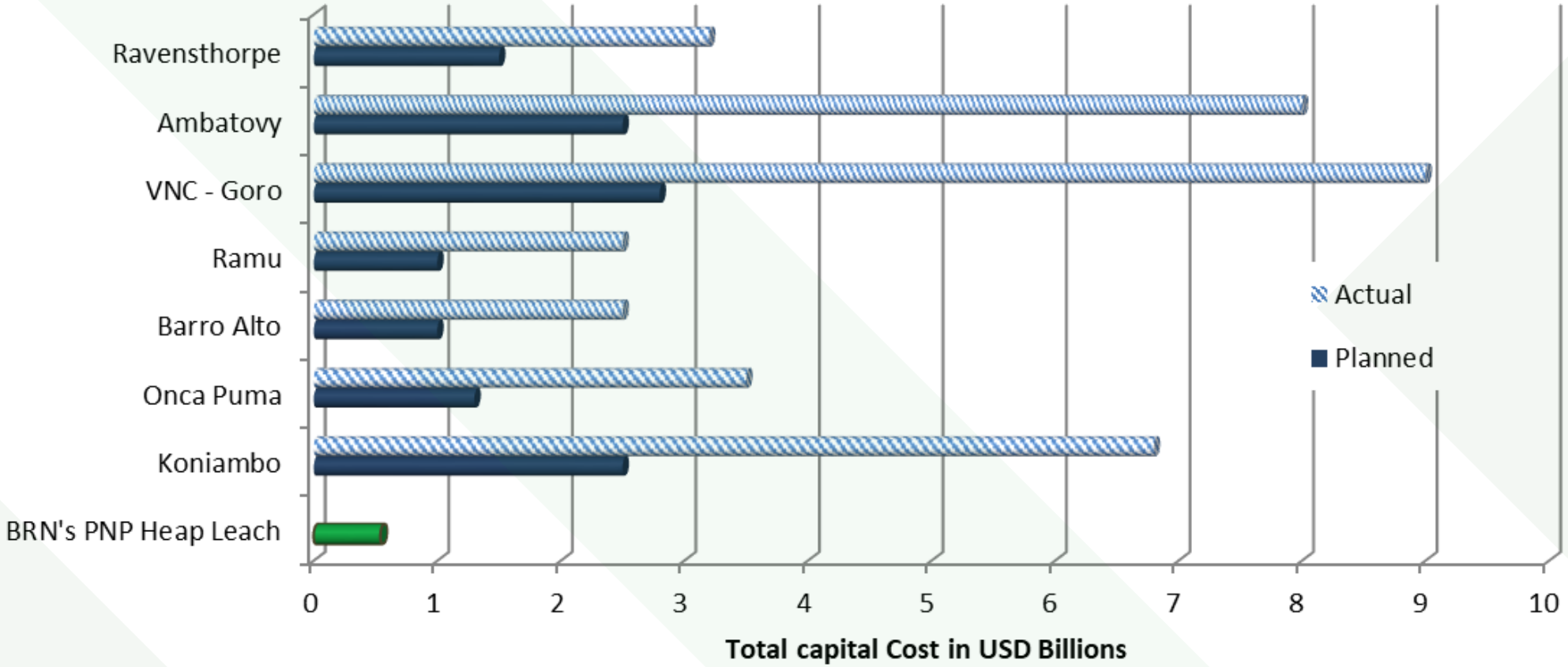

HPAL Ramp-ups

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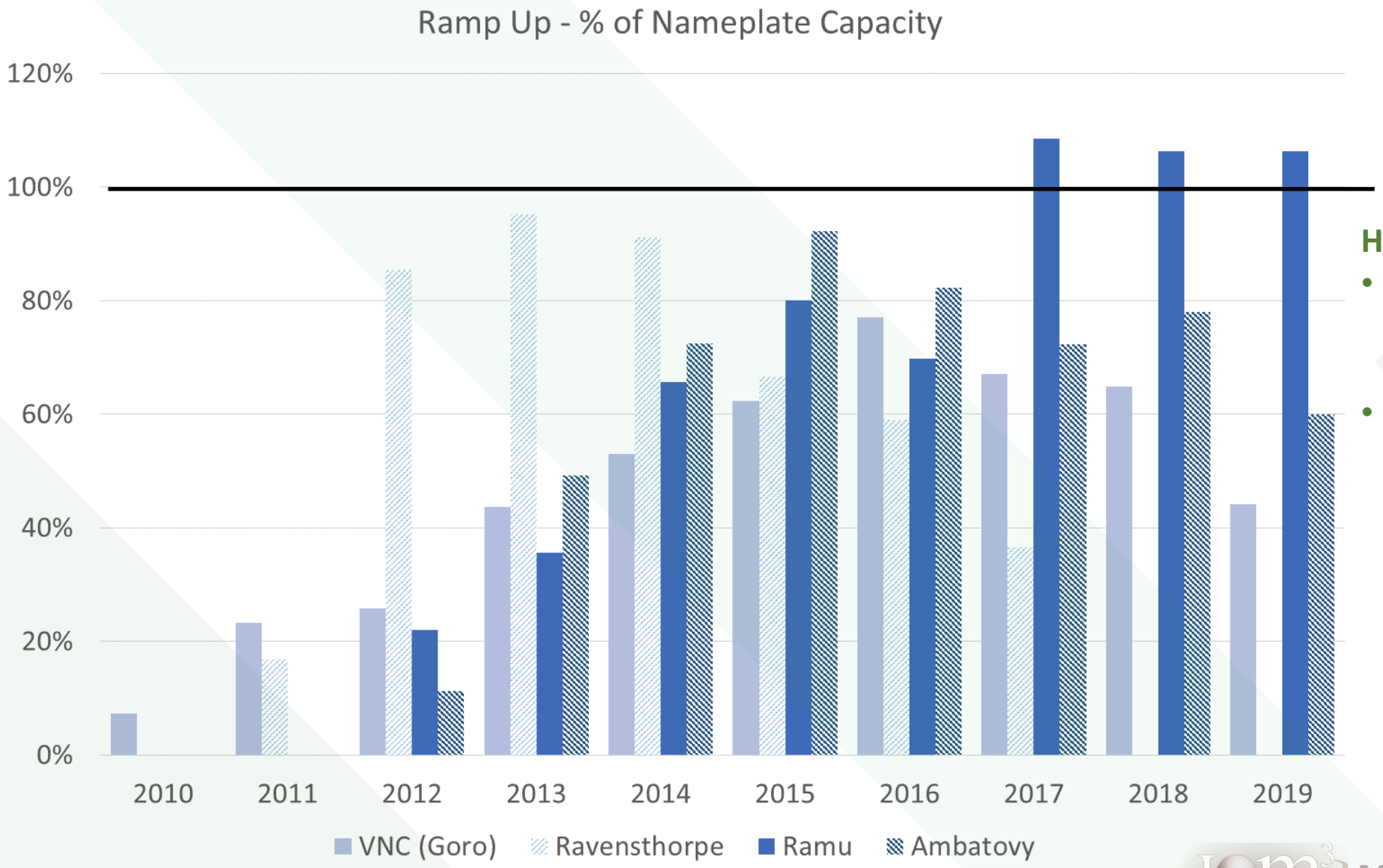

Heap Leach:

- **1st NHP 3 months after 1st leach irrigation turned on**
- **Fully Ramped up 9 months later**

0→100% 12 months

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Increased Resource Utilisation

% of mined (above cut-off grade ore) processed

- FeNi or HPAL: 45% to 60%
- HL + FeNi/HPAL: 80% to 85%

  (Heap leach integration of existing projects)
- HL 100%

VNC Goro

Ambatovy

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BRN's Heap Leach Timeline

NTUA Greece	1992-1999	Lab scale < 10kg 1 large column
BRN team Albania	1999-2003	Lab scale < 10kg
BRN team Turkey	2003-2010	Heaps > 15,000 tonnes
BRN team Colombia	2006-2009	Heaps > 20,000 tonnes
BRN team Philippines	2009-2011	Heaps > 5,000 tonnes
Brazilian Nickel Brazil	2014-present	Heaps > 8,000 tonnes

BRN's Heap Leach Know-how

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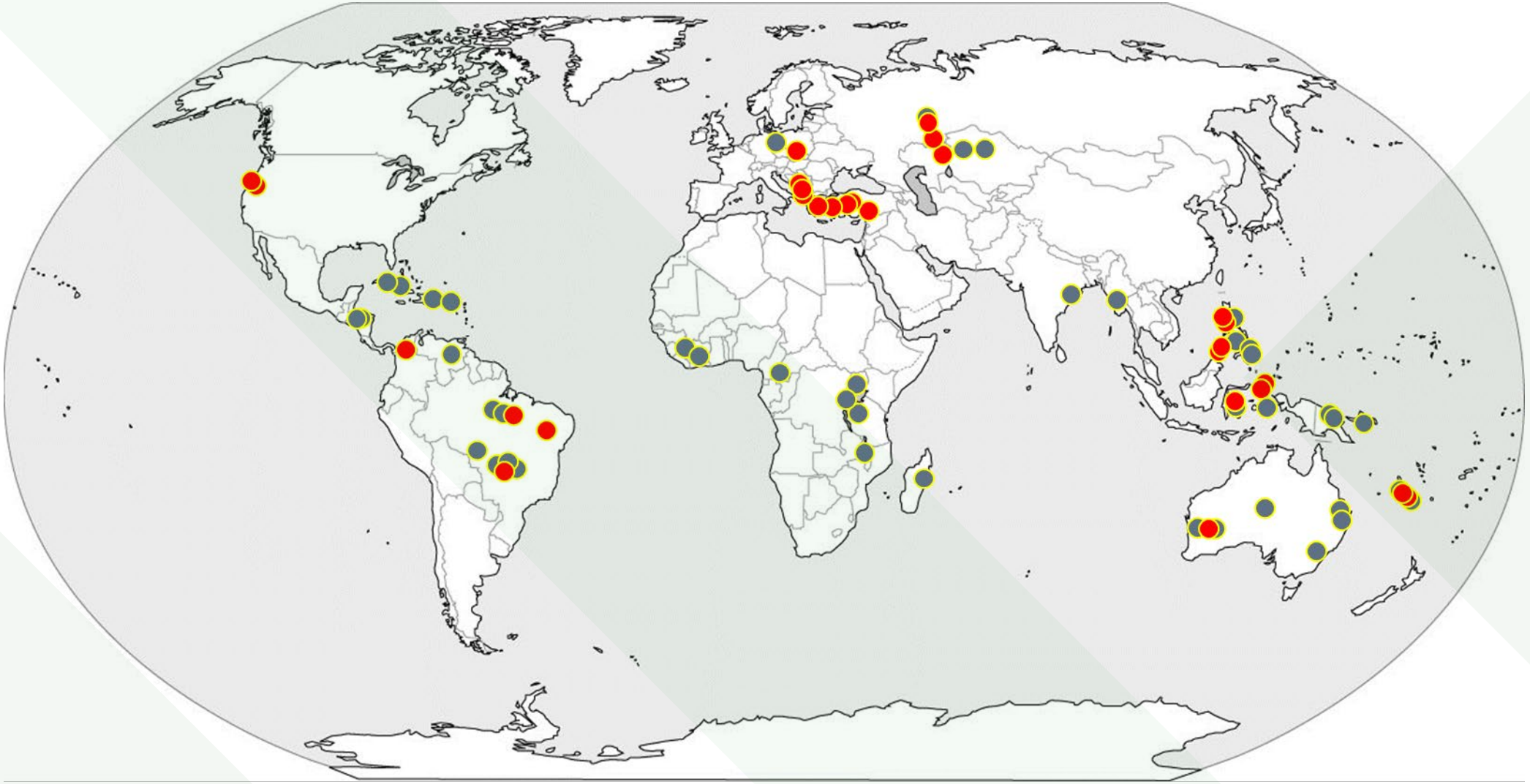

BRN's Piauí Nickel Project

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Energy & CO_2 Important!

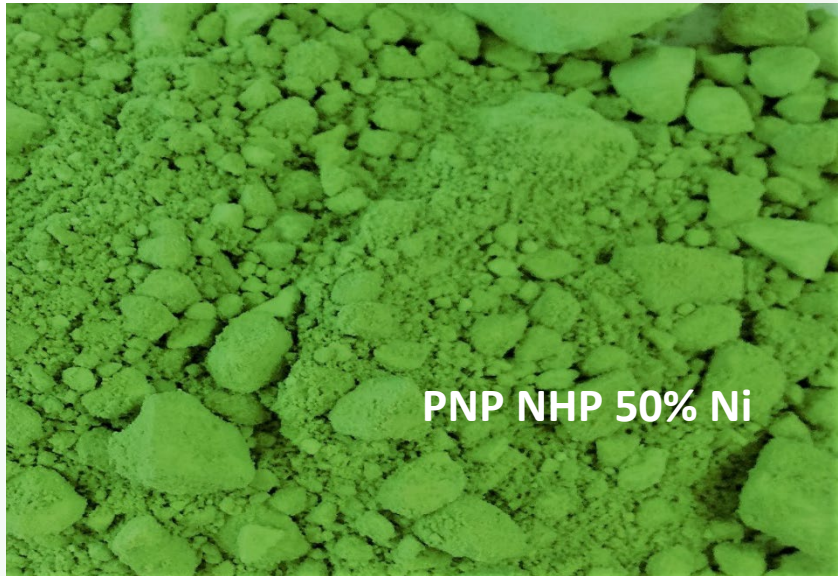
- On site sulphuric acid plant produces all of the power necessary and is ***carbon*** free.
- Simple heap leach technology is less energy intensive than many nickel production routes.
- ∴ excess carbon free energy is sold to the Brazilian national grid.

  HPAL of equal size would require an additional 15-20KW power, HL sells 12-15KW back to grid.
- CO_2 capture in the impurity removal circuit (uses limestone as a precipitant) possible in the future
- Nickel Hydroxide intermediates as final product ~50 % Ni (dry basis)

  Better for transportation.

Carbon neutrality is possible with

- **CO2 capture**
- **Vehicle fleet 100% electrified**
- **all backup power as renewable/ESS**



PNP Project

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Operations

25,000tpa Ni

900tpa Co

Maximum Exposure[3]

US$465million

around one-third of that of competing technologies

C1 Operating costs[4]

US$ 2.78/lb

in the lowest quartile of cost curve

After-tax cash generation[5]

US$198million

Expected annually

NPV_{10}

US$ 1,140

(US$ 893 million after tax)

IRR

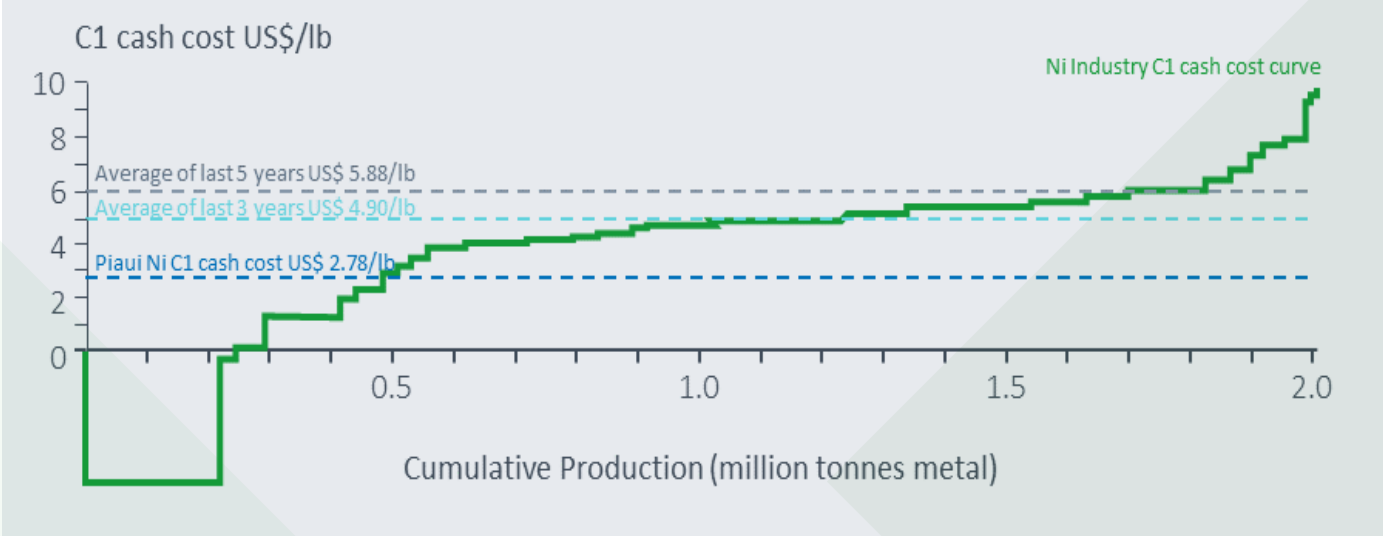
53%

(46% after tax)

Pricing (US$)[6]

Ni 7.00/lb

Co 18.00/lb

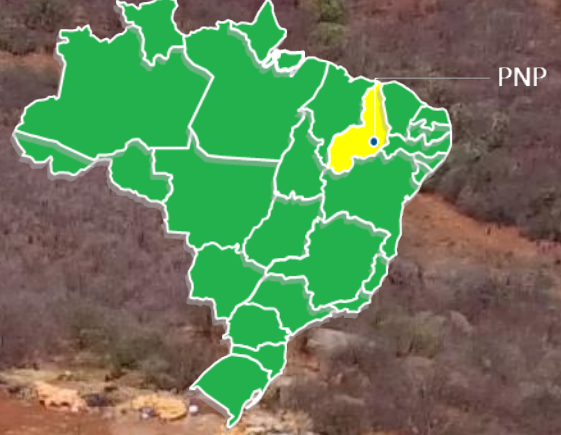


Sensitivity Analysis	Ni Price (US$/lb)	Co Price (US$/lb)	NPV_{10}[1] (US$M)	IRR[1] (%)
Base Case	7.0	18.0	1,140	53
Low	4.5	12.0	247	21
CE LT[2]	8.25	26.09	1,599	71
High	10.0	30.0	2,264	92

[1] Pre-Tax
[2] Consensus Economics Long-Term
[3] Total Project incl. working capital allowance
[4] After accounting for refining charges and by product credits
[5] Average of first 10 years
[6] Analysts' long-term consensus
Ni price = US$ 7.89/lb
Co price = US$ 21.35/lb

All figures on this slide are estimates and are based on Brazilian Nickel's cash flow model projections

Brazilian Nickel and the Piauí Nickel Project



- **Advanced, low cost, nickel and cobalt project in Brazil**
- **Robust economics at conservative pricing**
- **Compelling prevailing nickel supply/demand fundamentals**
- **Potential transformational impact on nickel and cobalt demand from electric battery market revolution**
- **Advanced development project with 72 million tonnes @ 1.0% Ni and 0.05% Co**
- **Measured (73%) and Indicated Resources, based on 76,000 m of drilling**
- **Environmental Permits (LPs) awarded 2019**

ESG

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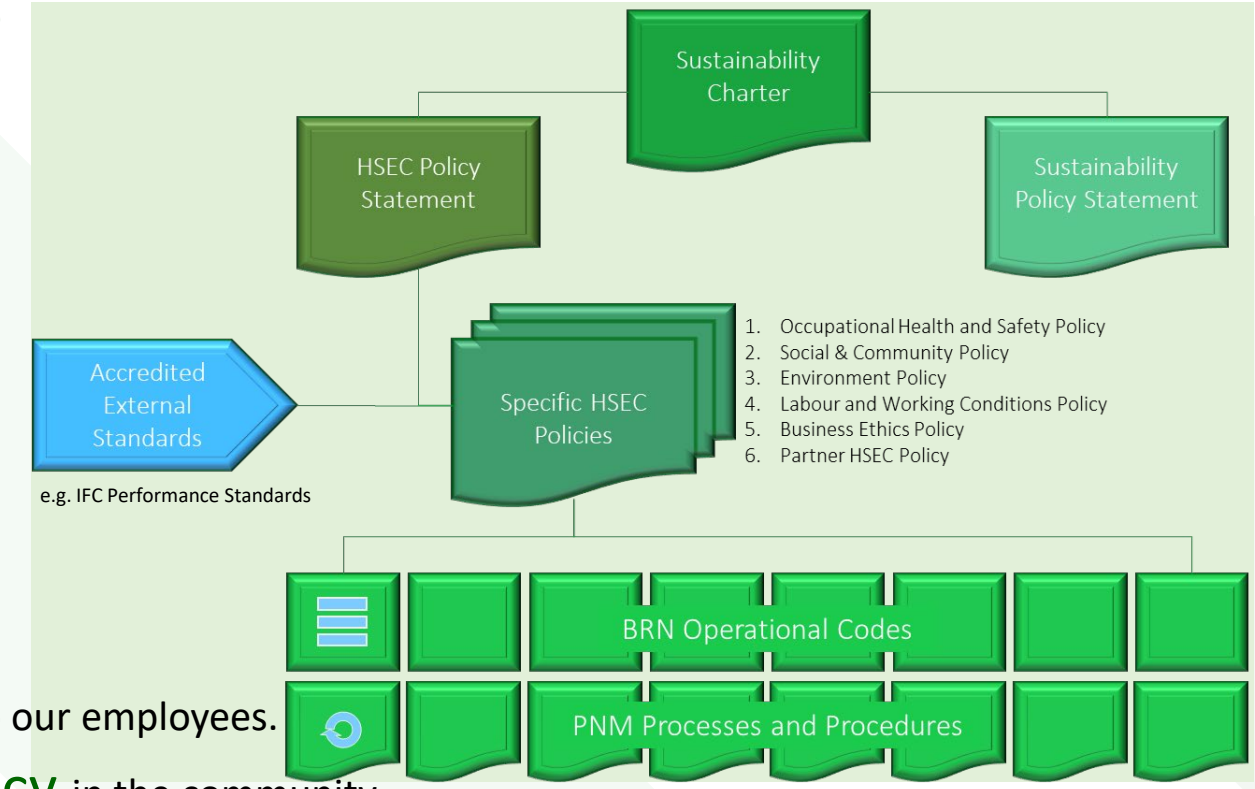
BRN's Sustainability Charter

… provide long-term benefits through continuous improvements in health, safety and environmental performance … sharing the benefits of our activities with the communities within which we operate.



We will achieve this by:

- Targeting Zero Harm to our employees.
- Leaving a positive legacy in the community
- Conserving and where possible enhancing the natural environment.
- Respecting and protecting the rights of employees and host communities.
- Doing Business Responsibly and Transparently
- Ensuring adequate return for shareholders.

Key Take-Aways

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- Nickel demand for Li-ion batteries by 2030 could be >1.2 Mt pa (>100% of 2019 Class 1 Nickel)
- Supply currently cannot meet that demand unless
  - More funding becomes available
  - Significant increase in Ni prices to attract investors and enable projects with higher operating costs
- BRN's Heap Leach Technology can help supply the new nickel and cobalt demand
  - At lower cost to the miner and the customer
  - With a lower overall carbon footprint, and aiming for carbon neutrality
  - In a sustainable, socially and environmentally acceptable way.

Please remember that mining projects often take at least 10 years to production, more from early exploration

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Nickel and Cobalt

Made Easy