



Battery metals

EV supply chain: key factors bottlenecking ramp-up over the next five years

14 September 2022

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WEBSITES

References in this presentation to information on websites (and/or social media sites) are included as an aid to their location and such information is not incorporated in, and does not form part of, this presentation.

Introductions

James Wellsted, Head of Investor relations & Corporate affairs



SFA(Oxford) introduction

– Henk de Hoop

Battery basics

– Lakshya Gupta

Power train and EV battery trends

– Lakshya Gupta

Lithium

– Lakshya Gupta

Sibanye-Stillwater

– Unique, global portfolio of green metals

– James Wellsted

Q&A

SFA (Oxford) - Consulting analysts in tomorrow's commodities and technologies

Henk de Hoop, CEO

SFA
Oxford



1 H Hydrogen 1.009	3 Li Lithium 6.941	24 Cr Chromium 51.9961	27 Co Cobalt 58.933195	28 Ni Nickel 58.6934	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.9055	46 Pd Palladium 106.42	47 Ag Silver 107.8682	77 Ir Iridium 192.227	78 Pt Platinum 195.084	79 Au Gold 196.966589
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SFA's client network

Long-term relationships with significant players across the mine to market supply chain





Battery basics

Lakshya Gupta, SFA (Oxford)

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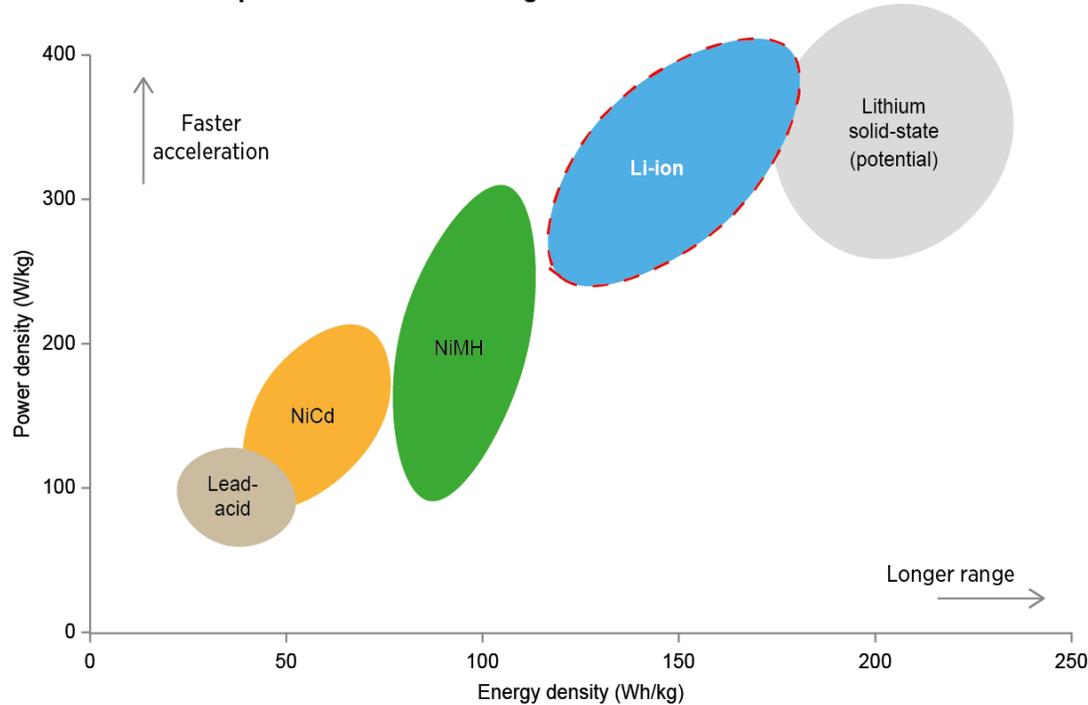
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Battery 101

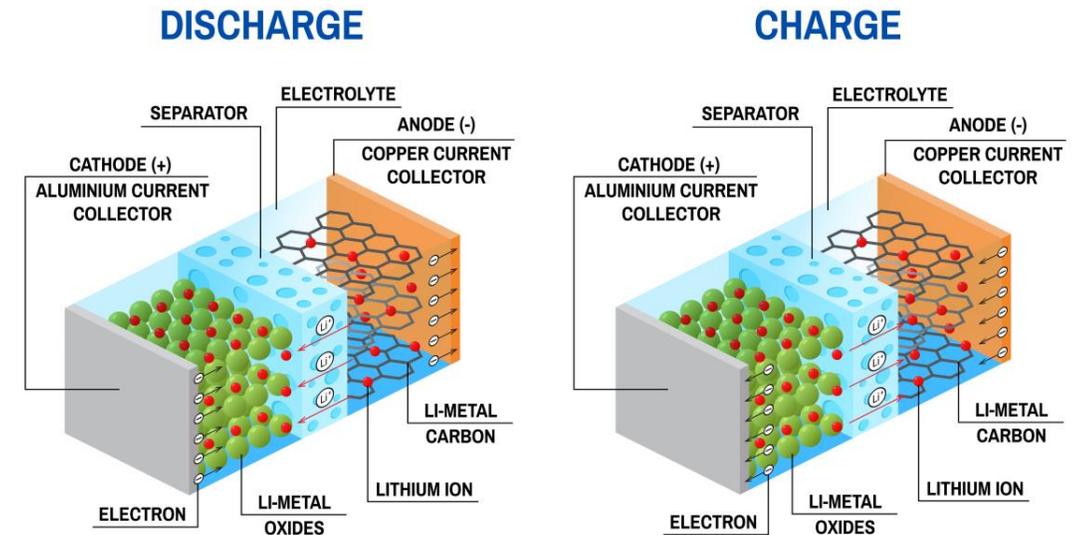
Lithium-ion has become the industry standard

Performance envelope for commercial rechargeable batteries



- **Lithium-ion batteries have the highest potential performance** relative to other commercial rechargeable batteries.
- **Required in BEVs to have acceptable performance**, based on consumer expectations from ICE cars.

LITHIUM-ION BATTERY



- **Performance is determined by composition of cell components.**
- Ions move through the separator during normal operation, between the two electrodes of the cell.

EV battery chemistries

Cathode metals make up bulk of battery bill of materials

Battery pack component	Commodity	2021 commodity price	Contained value in one tonne of cells					
			NMC111	NMC532	NMC622	NMC811	NCA	LFP
Casing	Steel	\$849/t	\$127	\$127	\$127	\$127	\$127	\$127
Current selector	Aluminium	\$2,476/t	\$124	\$124	\$124	\$124	\$124	\$124
	Copper	\$9,318/t	\$652	\$652	\$652	\$652	\$652	\$652
Anode	Graphite	\$2,472/t	\$447	\$447	\$447	\$447	\$447	\$447
Cathode	Lithium	\$14,162/t	\$326	\$326	\$326	\$326	\$326	\$198
	Nickel	\$18,459/t	\$1,200	\$1,791	\$2,141	\$2,843	\$2,880	-
	Cobalt	\$51,393/t	\$3,341	\$2,004	\$2,004	\$976	\$1,490	-
	Manganese	\$3,934/t	\$240	\$216	\$142	\$71	-	-
	Aluminum	\$2,476/t	-	-	-	-	\$10	-
	Iron	\$259/t	-	-	-	-	-	\$29
Total value			\$6,457	\$5,687	\$5,963	\$5,566	\$6,056	\$1,577



Powertrain and EV battery trends

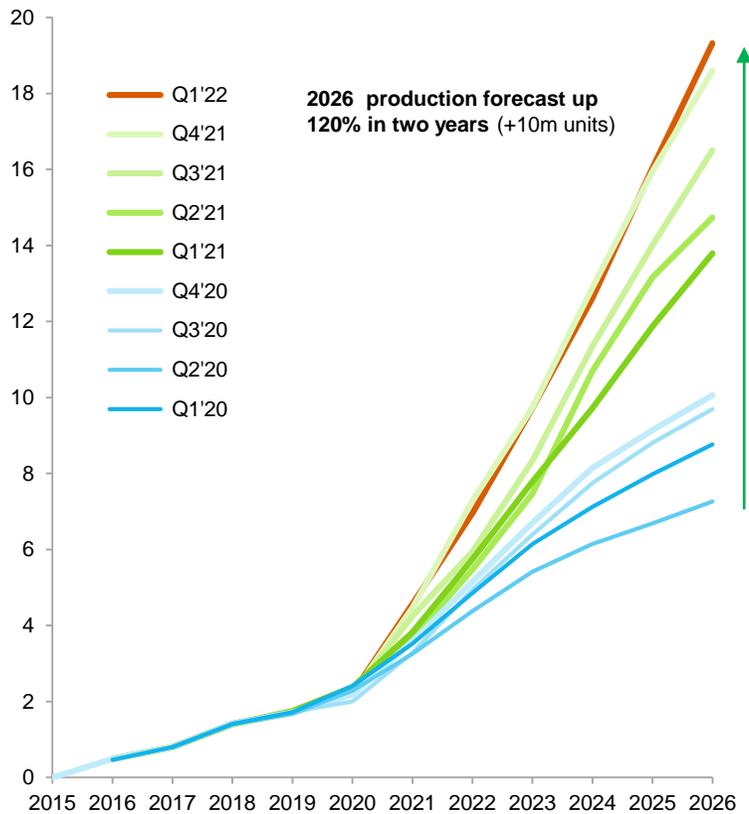
Lakshya Gupta, SFA (Oxford)

BEV light-vehicle production revisions

BEV outlook more than doubled globally within two years

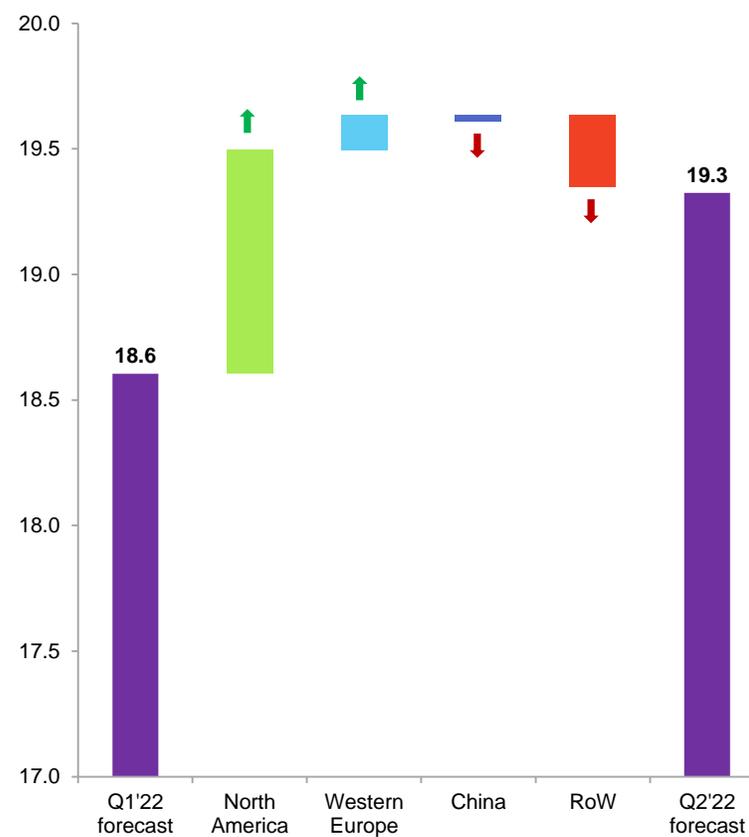
Global BEV production forecasts

million units



2026 BEV forecast revisions by region

m units



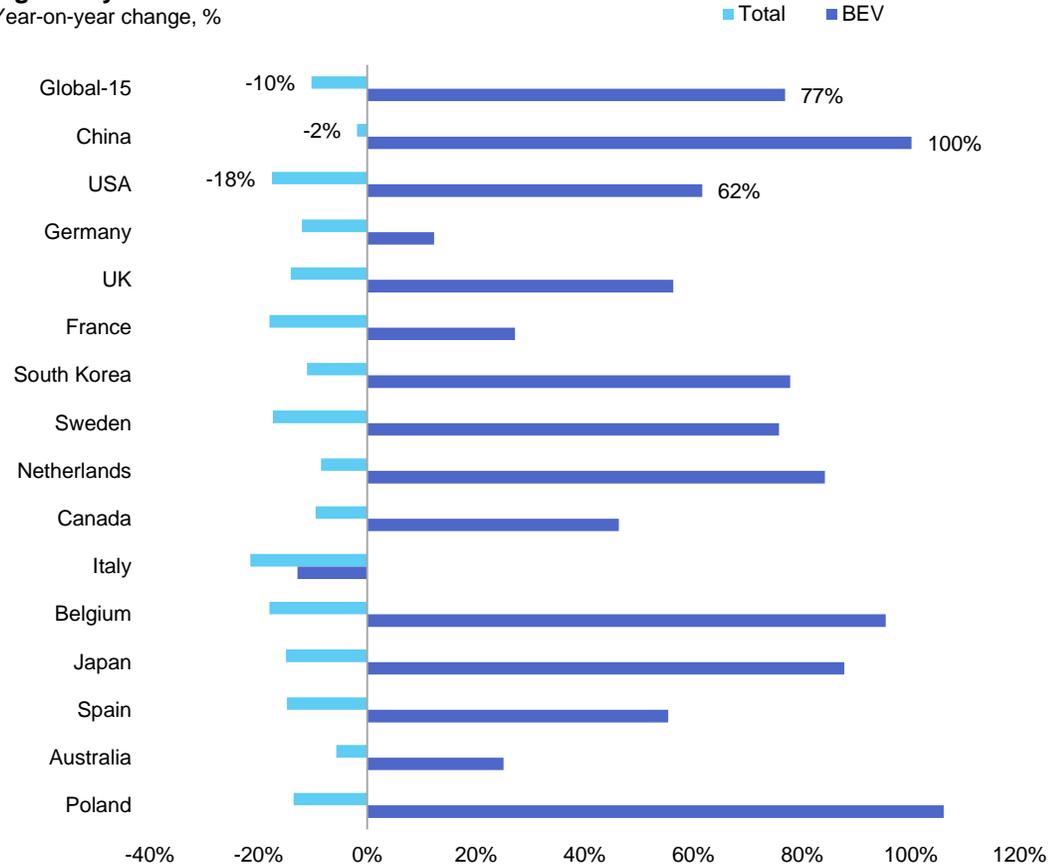
- **BEV production appear to be weathering the global component supply disruptions better than ICE vehicle production.**
- **Most recent upgrades driven by North America**, as multiple OEMs commit to upgrading production footprint in the region. This has since been further accelerated by the passing of the Inflation Reduction Act.

Global BEV sales: H1'22

Strong consumer demand for EVs globally

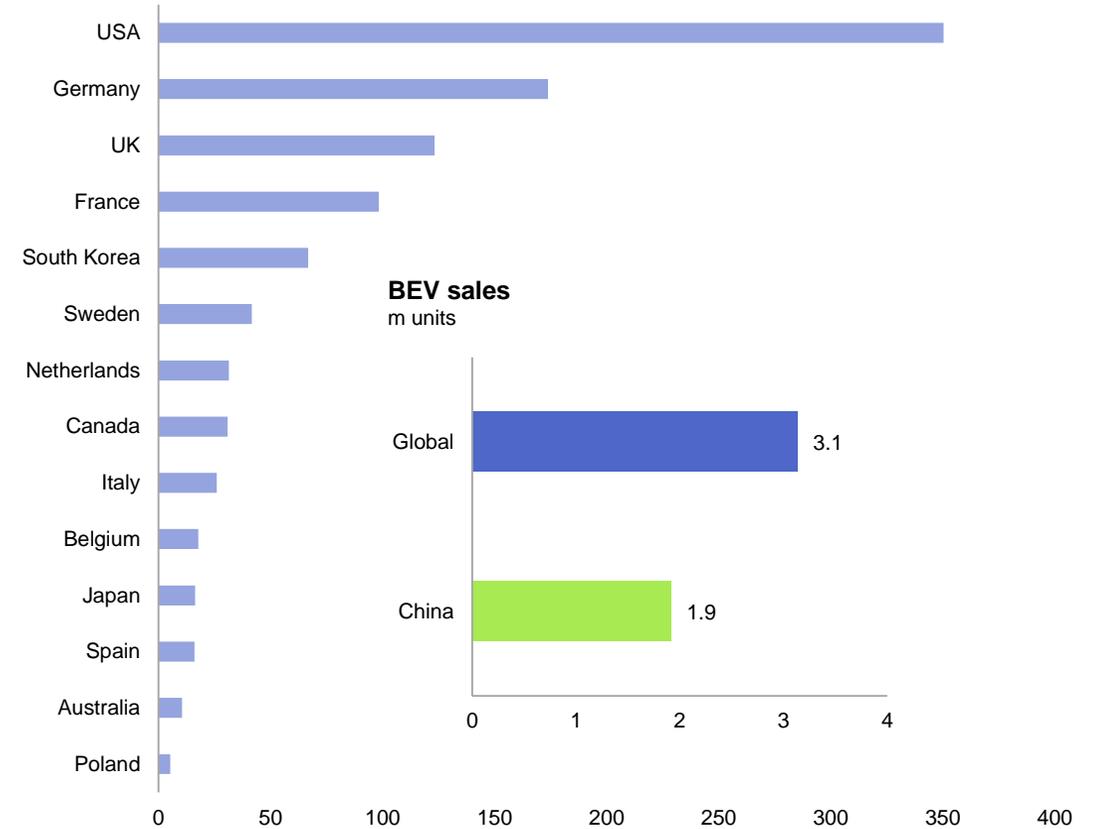
Light-duty vehicle sales: H1'22

Year-on-year change, %



BEV sales excl. China: H1'22

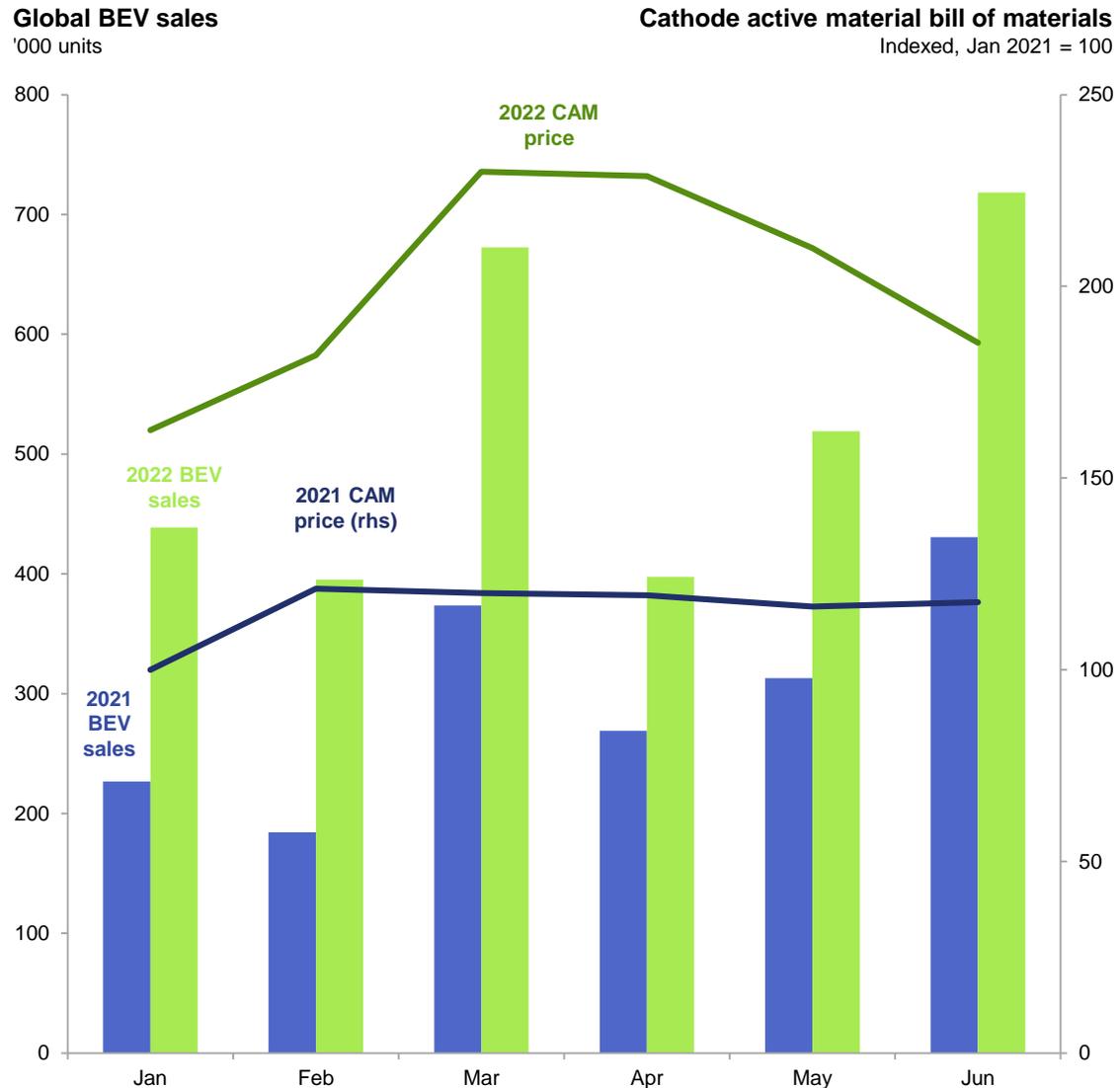
'000 units



- **BEV sales in China doubled in H1'22**, capturing 61% of global sales over the period.
- **Almost all of the top 15 EV markets registered positive year-on-year growth in BEV sales**, despite declining overall vehicle sales.

Commodity price impact

Are EV sales inelastic to raw material prices?



So far in 2022, EV sales have appeared inelastic to battery metal prices. This could be due to a number of factors:

- Strong demand pull
- OEMs not passing on rising production costs
- Boost in EV demand as a result pent-up savings post Covid
- OEMs prioritising EV production during chip shortages

Reality is likely a combination of these but weighted towards the first two points as...

... the latter two do not justify EVs outperforming the rest of the automotive sector.



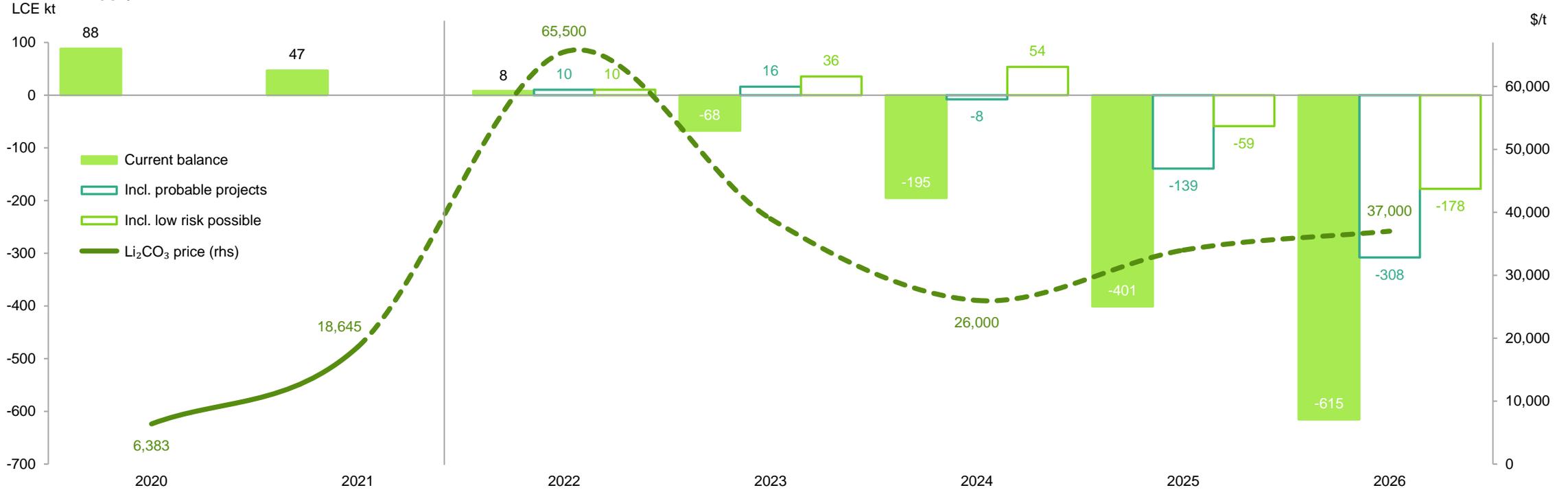
Lithium – The ubiquitous battery metal

Lakshya Gupta, SFA (Oxford)

Market summary

Prices may have peaked; set to stabilise at historically high levels

Lithium supply-demand balance

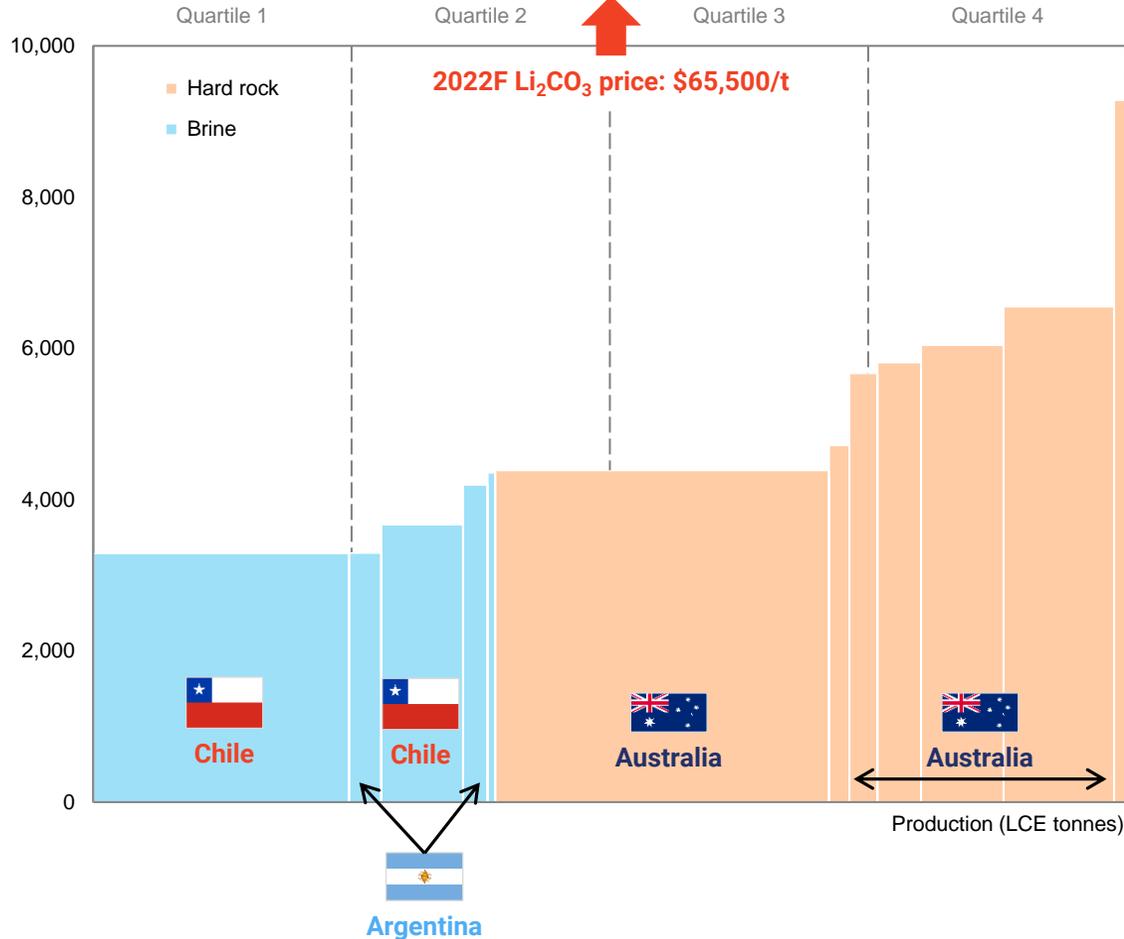


- **Prices may have peaked, but they remain at extremely high levels** for both lithium carbonate (Li₂CO₃) and lithium hydroxide (LiOH).
- **The lithium market is forecast to move to mounting deficits** from next year onwards, but supply from 'probable' and 'low-risk possible' projects could potentially keep the market balanced through to 2025.
- **Prices are likely to reach a floor in 2024, before starting to rise to incentivise higher-risk projects.**

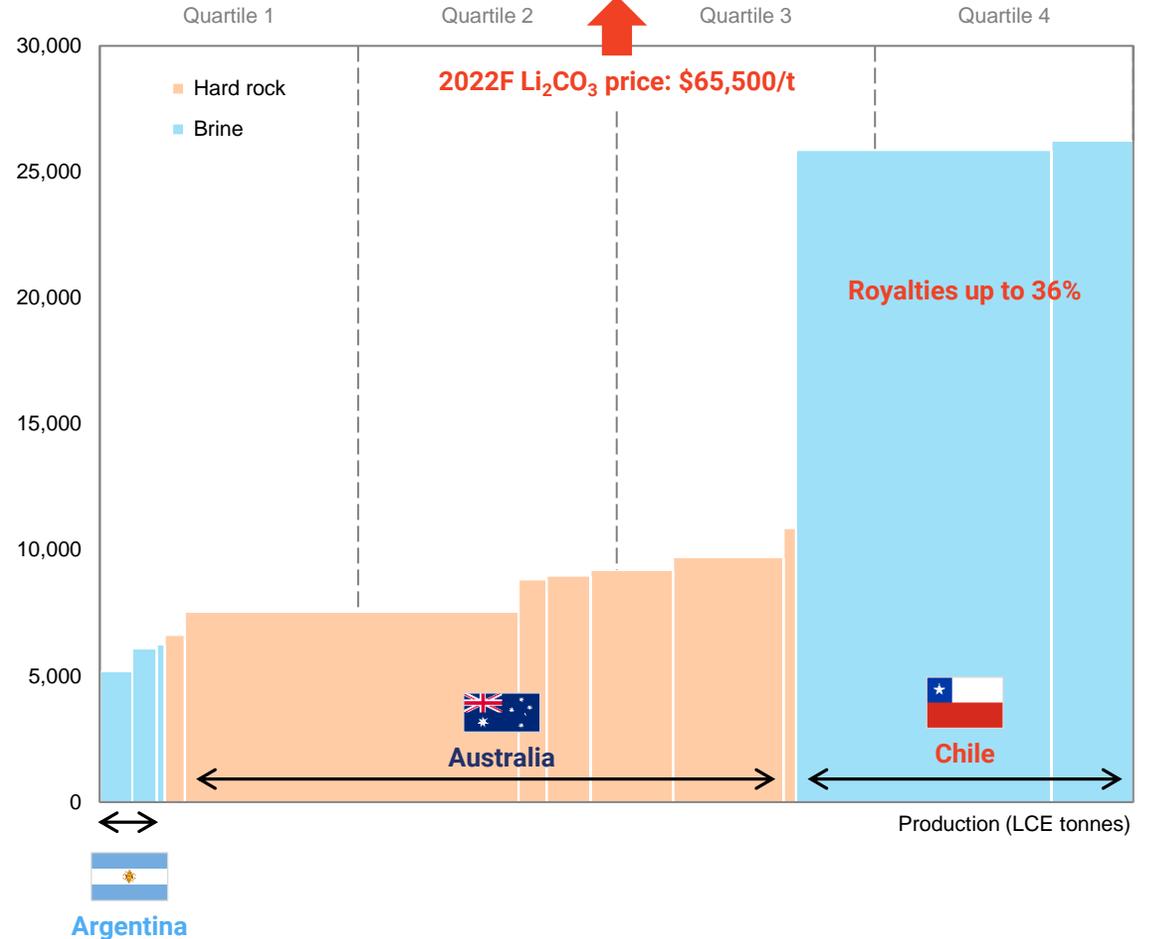
Production costs

Very healthy margins in 2022; high royalties for Chilean operations

Operating costs excl. royalties: 2022
US\$/t LCE

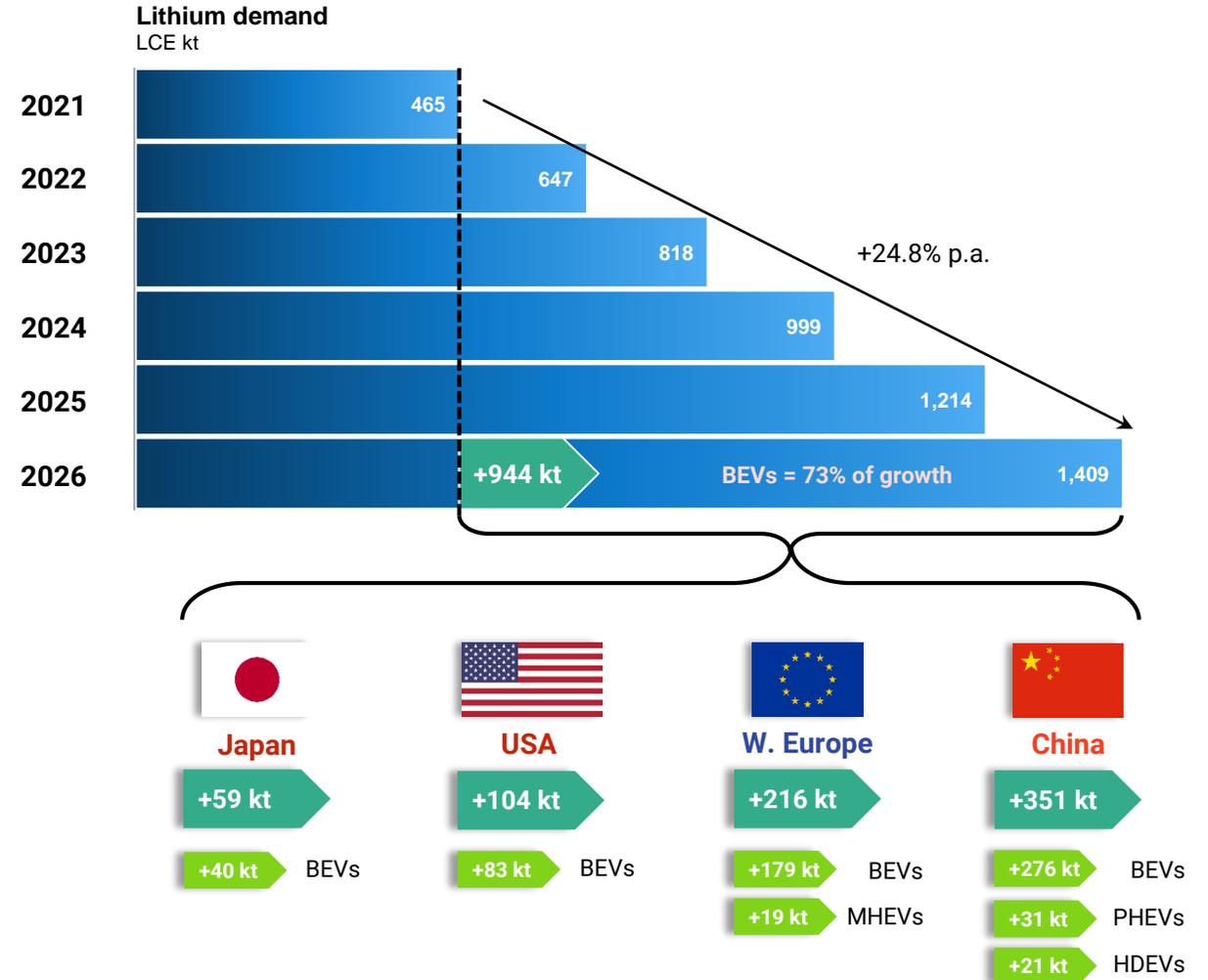
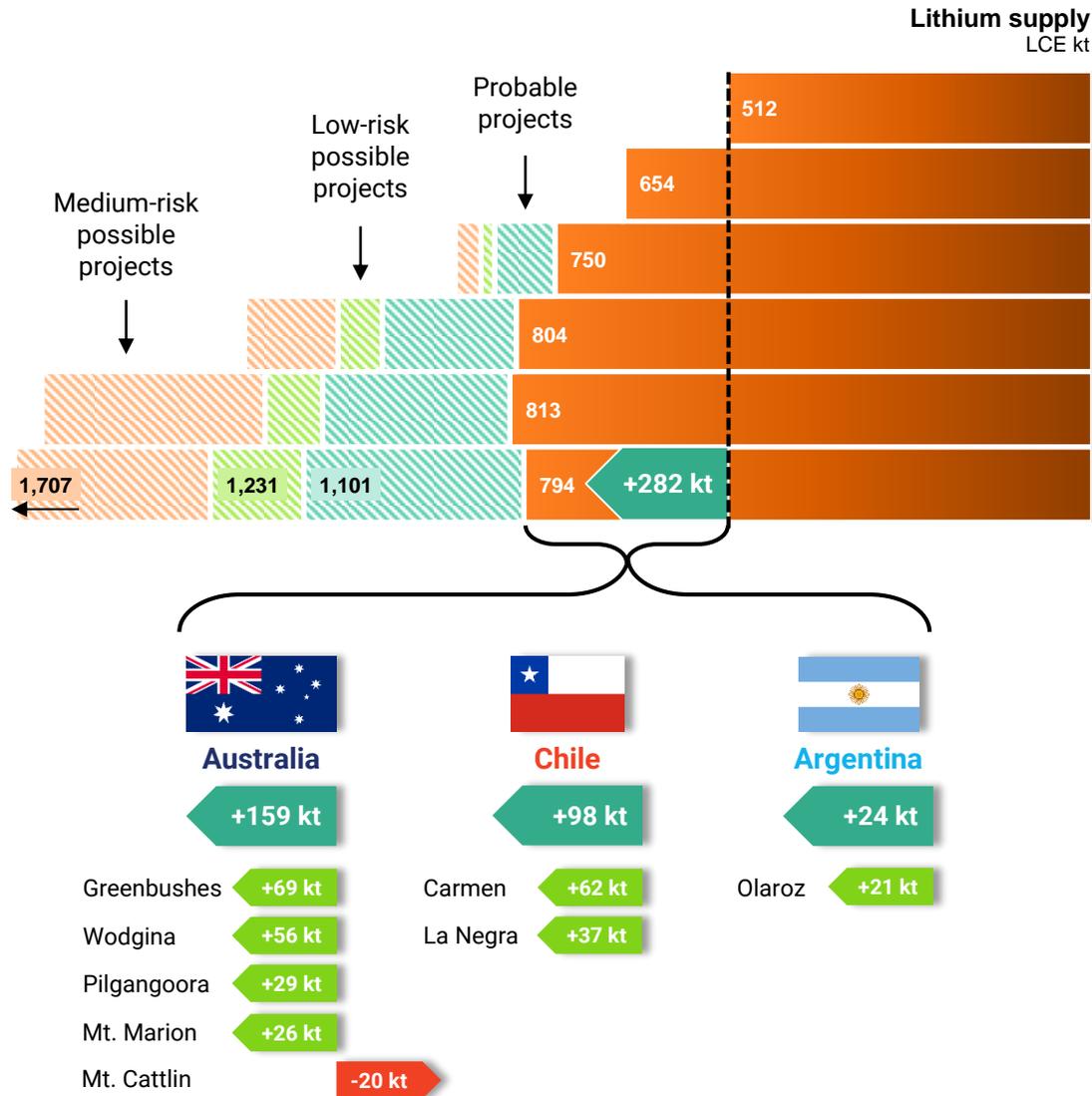


Operating costs incl. royalties: 2022
US\$/t LCE



Lithium supply vs. demand

Supply stagnates as BEV demand proliferates

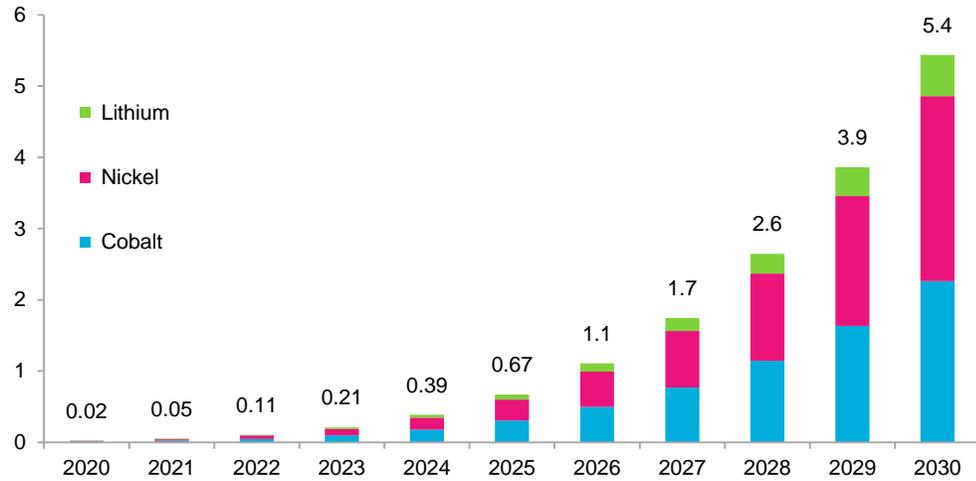


Battery recycling

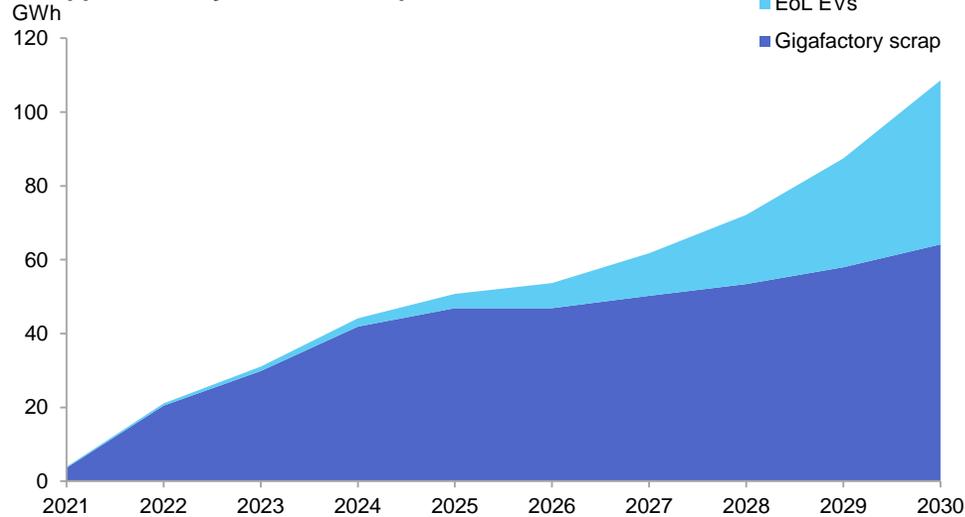
Rapidly growing but does not displace requirements from new mines

Cathode metal value contained in scrapped BEVs (global)

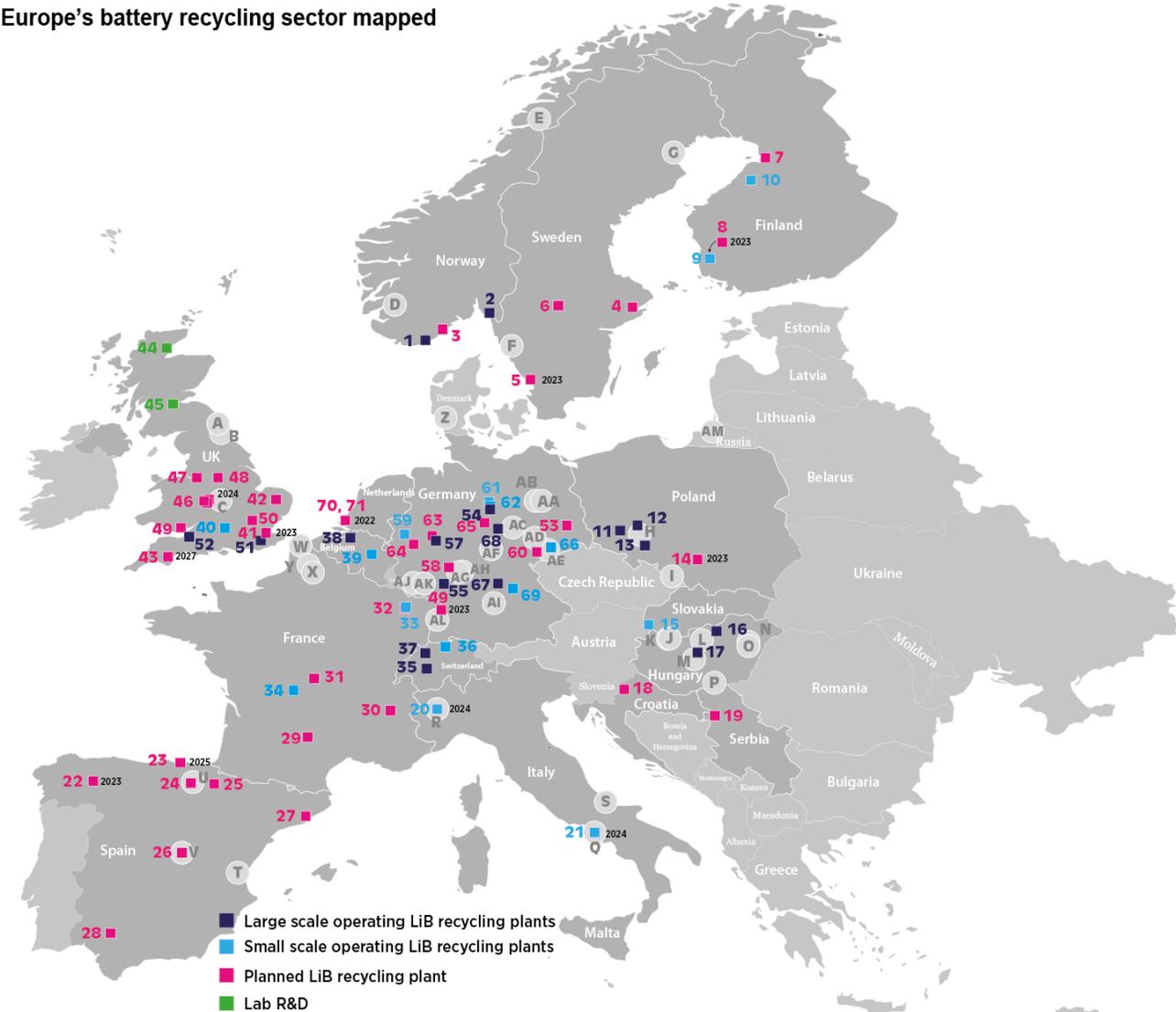
US\$ bn, 2021 avg. commodity prices



Scrapped LiBs by source - Europe



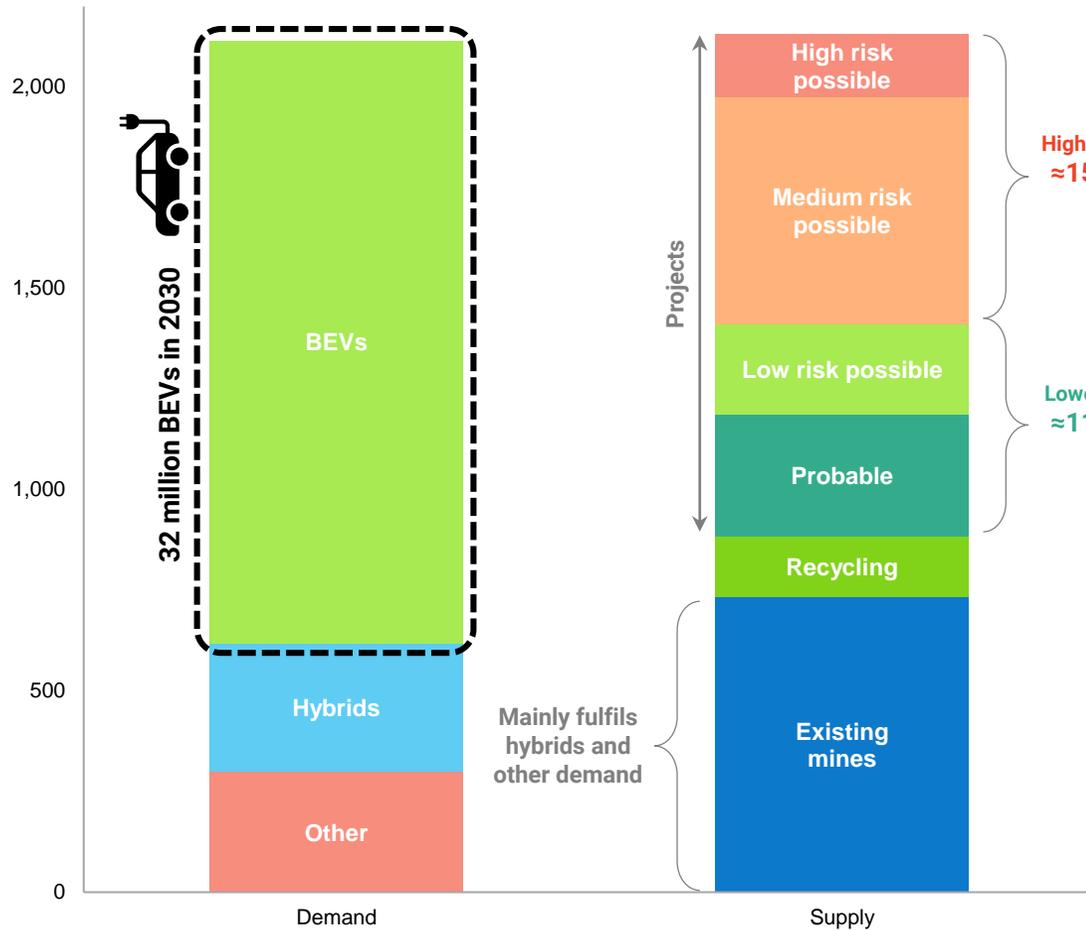
Europe's battery recycling sector mapped



The fallout

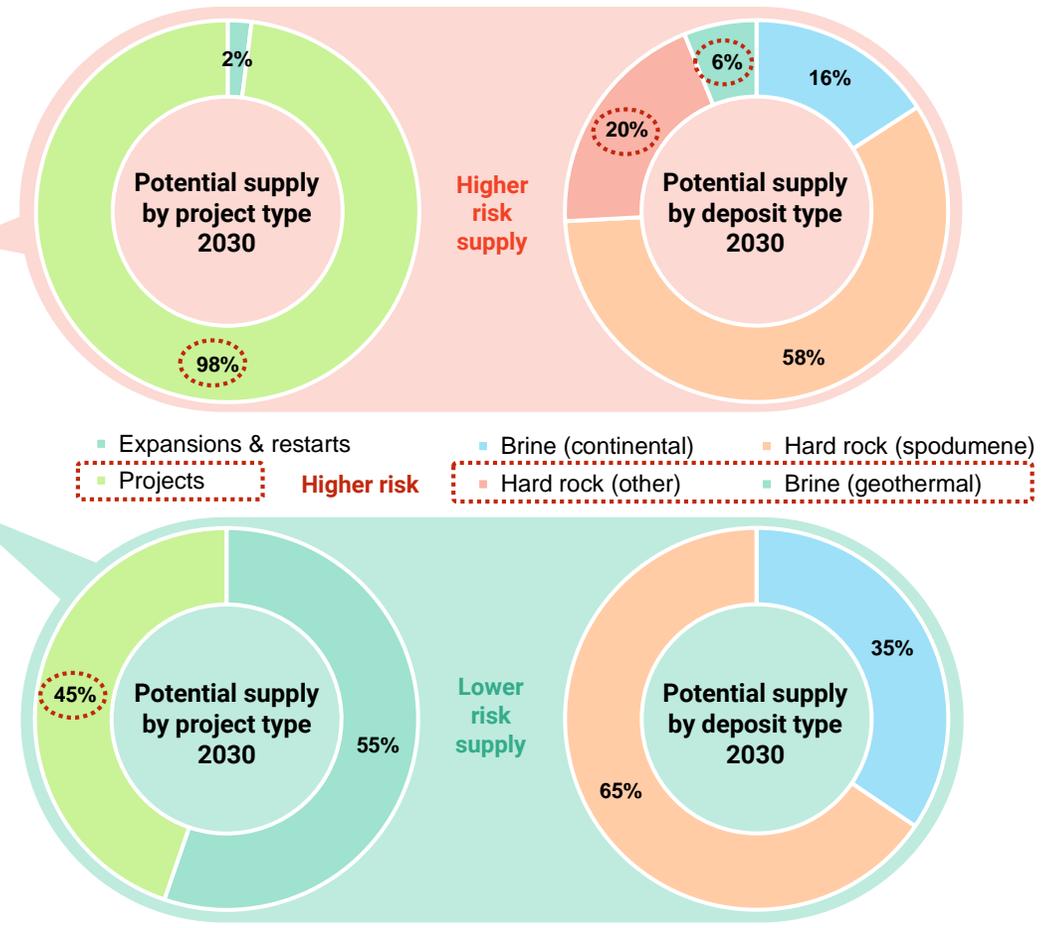
Project execution risks could jeopardise 15 million BEVs (48%) in 2030

Lithium demand vs. supply in 2030 incl. projects
LCE kt



Higher risk supply
≈15.4 million BEVs

Lower risk supply
≈11.2 million BEVs



Conclusion

EV trends

- BEV sales continue to surprise to the upside, despite significant macro and logistical headwinds
- Important to appreciate regional differences in fleet penetration
- OEMs keep upgrading EV production targets, committing large sums of capital to transition to EVs
- Governments continue to influence consumers through a carrot and stick approach

Lithium markets

- Incoming structural impediments could slow growth rates from mid-decade
- Significant execution risk perceived in lithium project pipeline
- Total potential impact of roughly 15m BEVs by 2030

- This could provide a longer tail to cleaner ICE cars, and hence PGM demand, in the 2nd half of the decade

Sibanye-Stillwater –

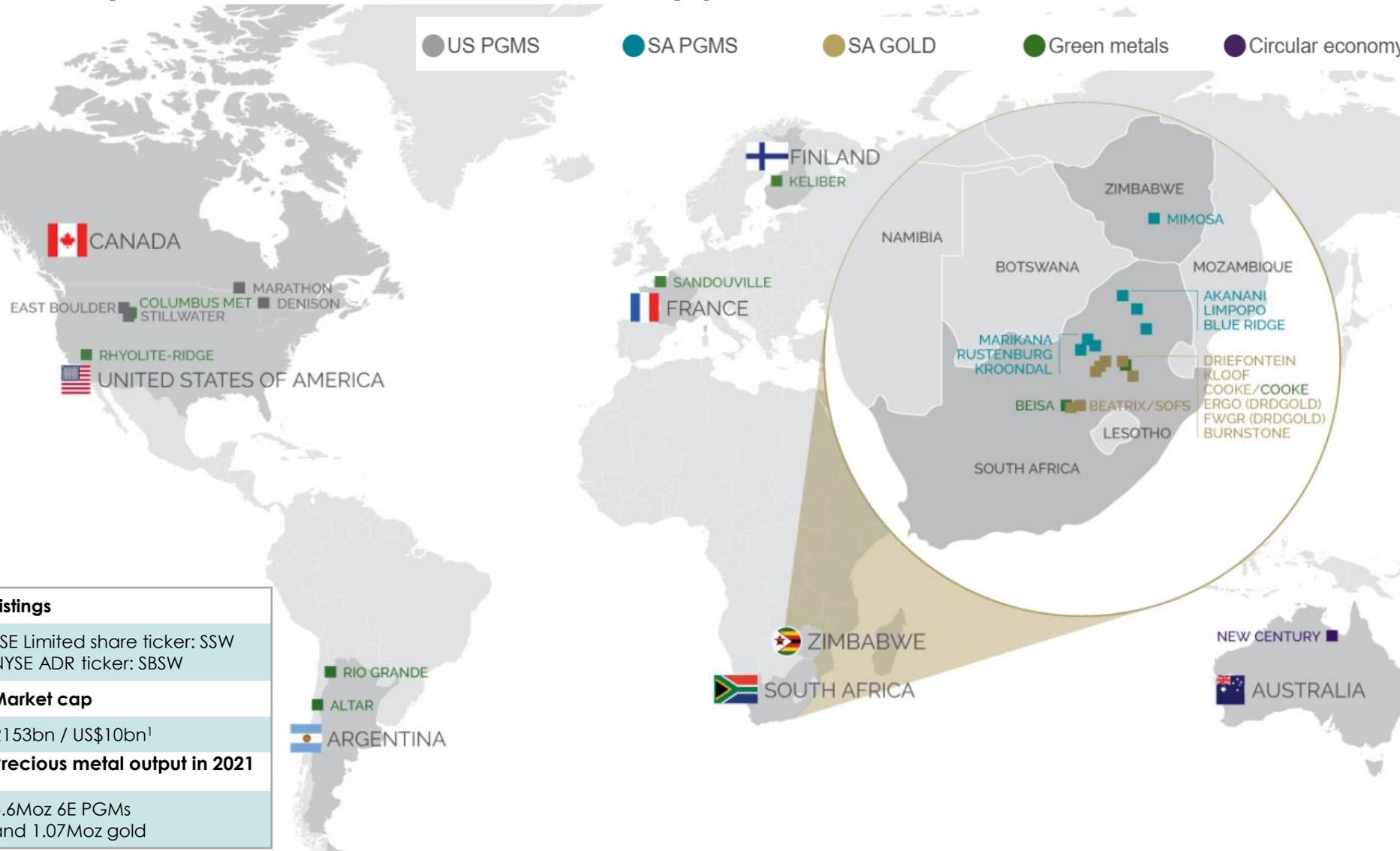
Unique, global portfolio of green metals

James Wellsted



Sibanye-Stillwater – diverse commodity portfolio across five continents

● US PGMS
 ● SA PGMS
 ● SA GOLD
 ● Green metals
 ● Circular economy

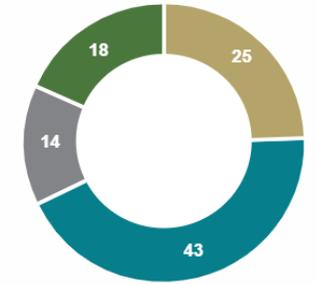


Listings
 JSE Limited share ticker: SSW
 NYSE ADR ticker: SBSW

Market cap
 R153bn / US\$10bn¹

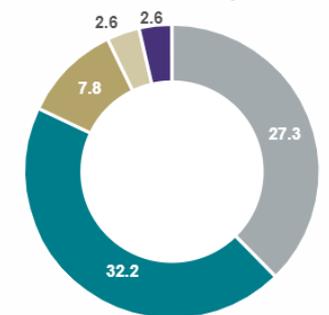
Precious metal output in 2021
 3.6Moz 6E PGMs
 and 1.07Moz gold

Production (%)



Gold	1,073koz
4E PGMs	1.8Moz
US 2E PGMs	570koz
3E PGM recycling	755koz

2021 Precious metals Mineral Reserves (72.5Moz)

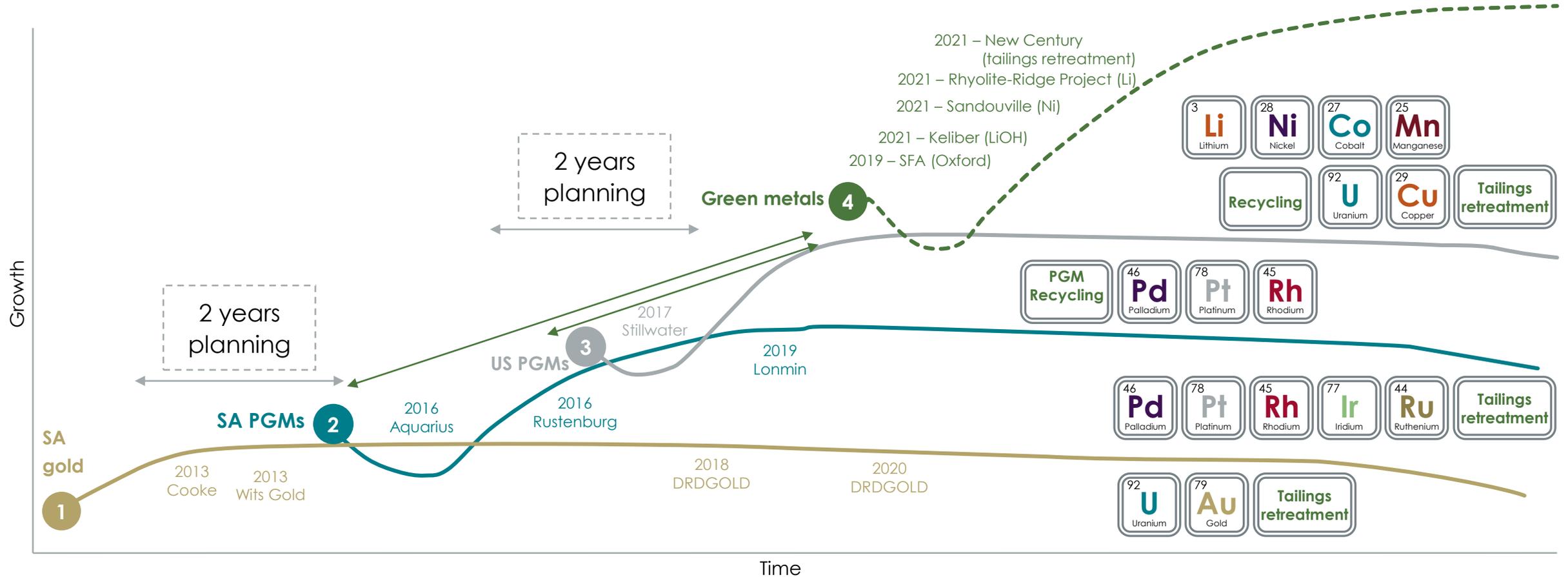


■ US PGM operations
■ SA PGM operations
■ SA Gold operations
■ SA Gold projects
■ DRDGOLD

A diverse portfolio of mining and processing operations and projects and investments across five continents

Considered, deliberate progress on battery metals strategy

- Geographical and commodity diversification creates a more robust and sustainable business



Our value creation benefits all stakeholders in multiple jurisdictions

Securing our value position in unique Keliber lithium project

Keliber is an advanced Lithium Hydroxide project in Finland

- Aiming to be the 1st fully integrated European lithium producer with direct access to the European BEV market
- Investment to date and estimated funding
 - Investment to date of €176m for our 50%+1 shareholding in Keliber
 - Maximum amount to buy out minorities to increase shareholding from 50%+1 ~>80% is estimated at €196m - to be completed by Oct 2022
 - Finnish Minerals Group considering to retain ~20%
 - Sibanye-Stillwater to underwrite a further €104m equity raise
 - Post these investments Keliber would have raised €250m in equity and will then raise minimum of €250m of debt to ensure the project is fully funded
- Definitive feasibility study (DFS) and 31% increase in ore reserves confirms quality and value
- Continued improvement in lithium market outlook
- Permit approvals progressing well with the Kokkola Processing plant environmental permit granted



Positioning for value – supplying critical metals into key regional ecosystems



SANDOUVILLE (Nickel refinery in France)

Acquired 100% on 4 Feb 2022 for €85m. Ramping up nickel products & cobalt production

Prime location- Europe's industrial heart - Le Havre, France's 2nd largest industrial port
Planned scoping studies for Nickel sulphate, PGM autocat recycling and battery metals recycling facilities subject to feasibility studies



RHYOLITE RIDGE (strategic lithium project in the US)

Post granting of permits and conditions precedent - will acquire a 50% interest in project – 7.1% share in Ioneer acquired in Oct 2021 for US\$70m

Boric acid credits position project as first quartile cost producer

Offtakes secured – Ford (5-year from 2025 - 35% of production) & South Korean battery maker Eco

Strategically well placed for future scenarios

- ✓ Positive fundamental outlook for battery metals – strong demand pull & supply challenges
- ✓ PGM business well placed for extended ICE cycle and developing hydrogen economy
- ✓ Green metals portfolio positioned for supply of critical metals into chosen regional supply chains
- ✓ Establishing key partnerships and investments in strategic ecosystems to further our impact as a force for good
- ✓ Unique, diversified portfolio ensures balance & risk mitigation and solid financial position provides significant optionality

3. STRATEGIC DIFFERENTIATORS



Recognised as a force for good



Unique global portfolio of green metals and energy solutions that reverse climate change



Inclusive, diverse and bionic



Instrumental in building pandemic-resilient ecosystems



Questions?

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Appendix

Sibanye we are one
Stillwater

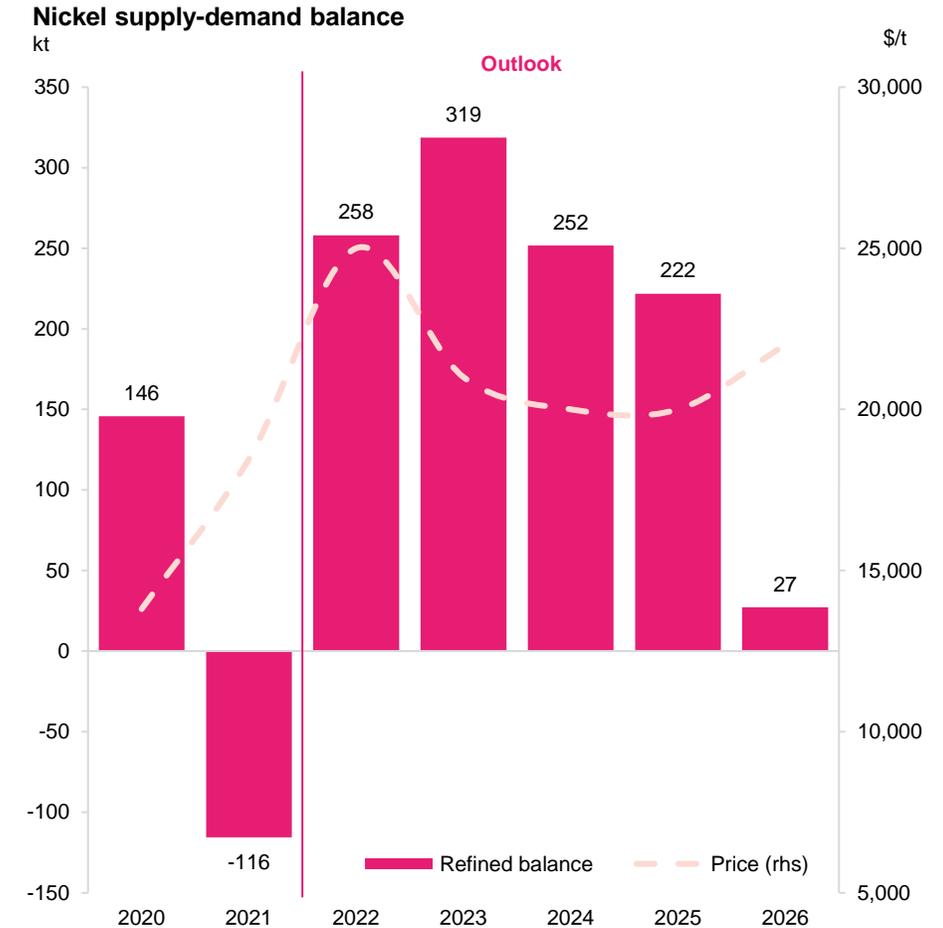


Nickel & Cobalt

Nickel market summary

Surging supply to keep nickel price subdued

- **The nickel market is predicted to return to surplus this year (258 kt).**
- **Refined nickel production is forecast to rise by 18% to 3.1 mt this year**, lifted by rapid expansion of NPI and HPAL production in Indonesia.
- **The pressure on class 1 nickel is easing.**
- **Net nickel demand is forecast to expand by 4% to 2.9 mt in 2022.**
- **SFA forecasts an average price of \$25,000/t in 2022.**
- **The price risks are to the downside** as the economic outlook has deteriorated.



Cobalt market summary

Surplus market in 2022 as supply response arrives

- **The cobalt market is predicted to shift to a 7 kt surplus this year**, as supply growth outpaces demand.
- **Automotive battery demand continues to increase rapidly**, adding 28 kt (+60%) this year to 75 kt (65 kt from BEVs).
- **The market is projected to slip back into deficit in 2023.**
- **The price is forecast to average \$66,750/t in 2022.**
- **The risk of recession in Europe or the US adds some potential demand downside.**
- **Price risks are to the downside** owing to inflationary pressures and slowing economic growth.

