MBK Partners – Young Poong consortium's Opinion on Korea Zinc's New Business Plans

January 2025

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Troika Drive: Overpromised, Not Yet Delivered

- The current management's Troika Drive initiatives were conducted simultaneously on all fronts but have not made much progress aside from the nickel sulfate/precursor business.

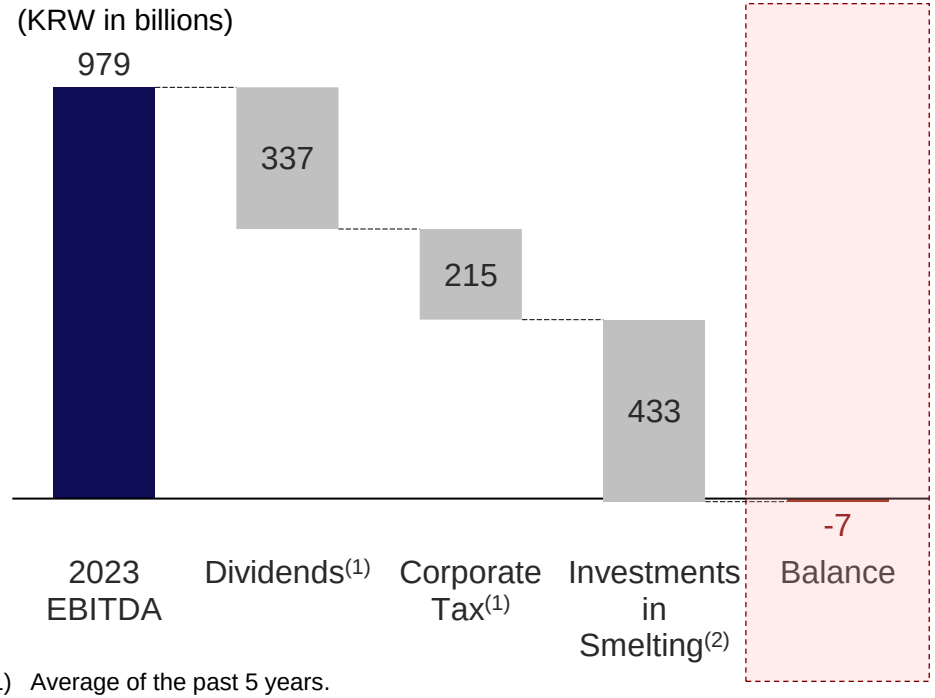
		Promises	vs.	Delivery
Resource Recycling	**E-waste** (Electrolytic Copper)	■ Acquire Igneo and Kataman to secure feed for not only e-waste but also battery recycling		■ Post-acquisition, it was revealed that Igneo has (i) limited collection network and (ii) processing capabilities; **Korea Zinc needs to build its own capabilities or seek additional partnership** ■ Construction of a **plant in Georgia, US** which was being planned during the acquisition, was **called off**
	Solar Panel Recycling (Silver)	■ Leverage Igneo's "proven technology" to add two plants and six hubs in North America		
	EV Battery Recycling (Nickel, Cobalt, Lithium)	■ Plans to build a waste battery pre-treatment plant abroad in 2023		■ Plant constructions **have been delayed/cancelled**, with no future plans announced
EV Battery Materials	**Nickel Sulfate/ Precursors**	■ Build a new "all-in-one nickel smelter" ■ Mass-produce/sell precursors in partnership with LG Chemical		■ Smelter construction on track **without delay** ■ New sourcing plan after the expansion required
	Copper Foil	■ (2Q '22 IR) "mass-production preparations on track"; scheduled for 3Q '23 ■ (2Q '23 IR) Mass-production to begin in 4Q '23		■ 1.5 years after the 2Q '23 IR, **mass production has yet to begin, with no updates announced**
Renewable Energy / Hydrogen	**Solar/ Wind**	■ KRW 8.3 trillion CAPEX investment in Australia until 2033 to expand power generation capacity (4.6 GW)		■ Roughly 10% progress in development vs. target ■ **No specific plans announced for the remaining 90%** requiring KRW 8 trillion in investments
	Green Hydrogen	■ Target production of roughly 280 kt of green H_2 annually by 2030; plan to start test production by end of 2024		■ **Need further R&D;** technical feasibility and economics not yet validated

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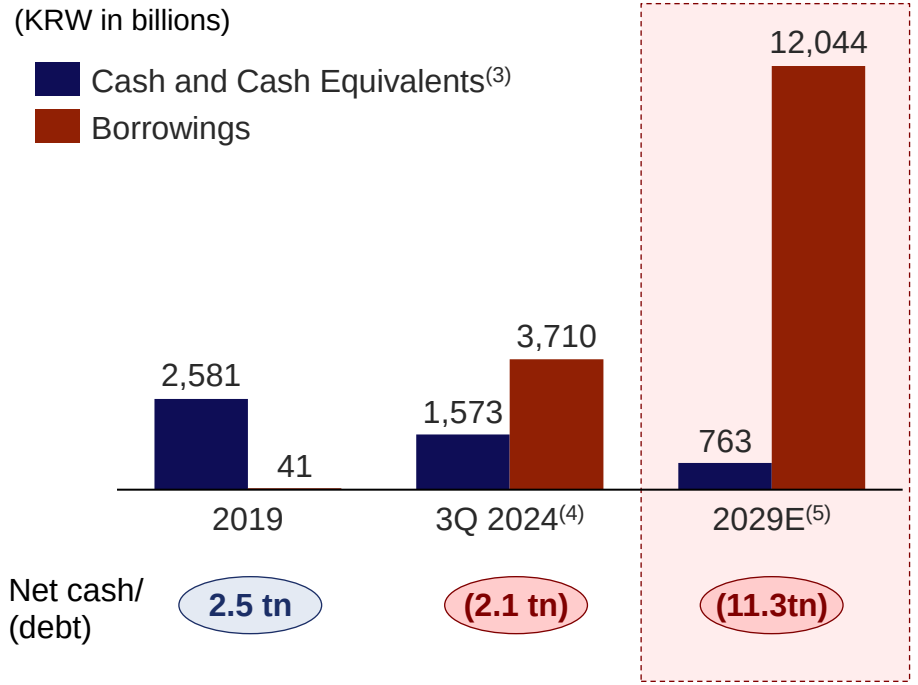
KRW12 trillion+ of Debt Expected by 2029 Under Current Plan

- If the current investment plan is executed, Korea Zinc is projected to incur more than KRW 12 trillion of debt by the end of 2029.
- This is because contrary to the management plan, significant negative cashflow is expected should the Company continue to deploy capex before securing necessary capabilities that are critical to the success of the new business.
- The Company announced during the 2023 Investor Day that 20% of the required funding will be financed with cash on hand (KRW 2 trillion). However, the Company currently has KRW 2.1 trillion of net debt after depleting cash on the self-tender offer. It is even more unclear how the current management is planning to conduct new business development as promised.

Borrowing Required to Sustain Smelting Business



Expected Debt after the Company's Planned Investment



(1) Average of the past 5 years.
(2) Annual average CapEX investment in smelting for 2024-2029 as stated in company IR presentation.
(3) Sum of total cash, cashable assets, short-term investment assets, and short-term deposits at financial institutions, with restricted cash subtracted.
(4) Figures at end of 3Q '24 adjusted to reflect (i) change in cash and borrowings to pay for public purchase of own stocks and (ii) cash inflow from selling Hanwha shares.
(5) MBKP estimates based on Troika Drive's expected profitability and investment amounts stated in IR materials.

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The Consortium's Proposal: Prioritize Investments

- The Consortium agrees that new business development is key to creating value at Korea Zinc. However, the Consortium believes that the timing of investment and implementation plan for each business must be revisited.
- The current management plans to invest KRW 12 trillion simultaneously across all new business areas without fully considering Korea Zinc's current capabilities, current market trends and funding capacity.
- By comprehensively examining Korea Zinc's competitive edge and market environment of each business, the Consortium will prioritize the initiatives to maximize the efficiency of resources deployed.

Accelerate
Decelerate

The Consortium's Business Proposal for Troika Drive

			Required Capabilities	Market Environment	Proposed Business Plan
Resource Recycling	A	**E-waste** (Electrolytic Copper)	✓✓	✓✓	High priority investment; near-term focus on acquiring feed sourcing and processing capabilities
	B	**Solar Panel Recycling** (Silver)	✓	✓	Develop capabilities and focus on sourcing raw materials to be prepared when markets take off post-2030
	B	**EV Battery Recycling** (Nickel, Cobalt, Lithium))	✓✓	✓	Although markets are expected to take off post-2030, continue to invest given high-priority and immediate synergies with the EV battery material business
EV Battery Material	C	**Nickel Sulfate/ Precursors**	✓✓	✓	High priority investment; near-term focus on the successful production of "all-in one" Nickel Smelter (2025-2026)
	D	**Copper Foil**	✓	✓	Given the current "chasm" in EVs, invest selectively but continue to build mass-production capabilities
Renewable Energy	E	**Solar/Wind**	✓	✓	Invest on a project-by-project basis given significant CapEx requirement and long payback period
	E	**Hydrogen (H_2)**	✓	N/A (Market yet to take-off)	Focus on tech R&D and gradually expand investment along with the evolution of the green hydrogen industry

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New Business Plan (preliminary)

- Carefully review each new business initiative to prioritize resources to enhance the “quality” of investments, not “quantity.”
- New business expansion will be driven after thoroughly reviewing both the evolution of the market environment and the right investment approach (i.e. direct investments vs. indirect investments such as outsourcing or partnerships).

Alternative Plan by Initiative

Maintain Current Plan
Adjust Direction/Investment Schedule

			2025E	2026E	2027E	2028E	2029E	2030E
Resource Recycling	A	**E-waste** (Electrolytic Copper)	Obtain raw material collection & pre-processing capabilities		Expand capacity based on progression of the business			
	B	**Solar Panel Recycling** (Silver)	Access raw material suppliers and customers in-line with Phase-1 expansion (20kt)		Expand capacity based on results of the Phase 1 expansion			
	B	**EV Battery Recycling** (Nickel, Cobalt, Lithium)	Establish scrapyard network, partner with OEMs to obtain raw material suppliers, customers		Review processing plant construction plan (incl. potential outsourcing/partnership as opposed to building in-house production facility)			
EV Battery Material	C	**Nickel Sulfate/ Precursors**	Focus on mass-production, cost-competitiveness of the all-in-one nickel smelter		Capacity expansion needed but timing and degree to be determined based on progression of the business			
	D	**Copper Foil**	Complete Plant 2	▪ Carefully adjust timing of investment based on turnaround of the EV market ▪ Focus on acquiring customers and track record for utilization improvement of existing 26kt capacity rather than immediately expanding capacity				
Renewable Energy	E	**Solar/Wind**	Operate MacIntyre & add new PPAs	▪ Review feasibility and economics of Ark Energy’s existing pipelines ▪ Acquire equity partners for each shortlisted pipeline opportunity				
	E	**Hydrogen**	Enhance capabilities (e.g. acquire customers and partnerships) to be ready when the Hydrogen economy takes off; review business feasibility of the ammonia business					

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New Business Plan Comparison: MBKP-Young Poong Consortium vs. Korea Zinc's IR Projections

- The Consortium projects cumulative revenues from Korea Zinc's new business to be KRW25.8 trillion over the next five years. The main areas the Consortium's projections diverge from Korea Zinc's IR projections are EV battery material and resource recycling. Korea Zinc's projections are overstated because it does not reflect: (i) the current demand-supply imbalance caused by the EV chasm and oversupply of copper foil; and (ii) the missed opportunity to obtain essential capabilities by acquiring Igneo Holdings.
- While the Company has a series of questionable investment plans based on overly optimistic margin projections, the Consortium intends to prioritize investments and remain efficient and rational in deploying capex to improve the Company's margins and maintain strong cash flow.

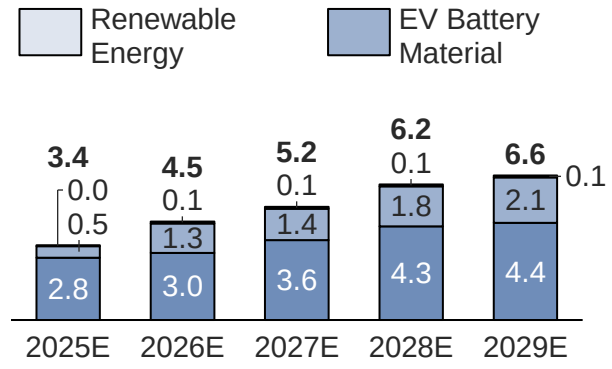
Revenue and Cash Flow Projections from Troika Drive Over the Next Five Years

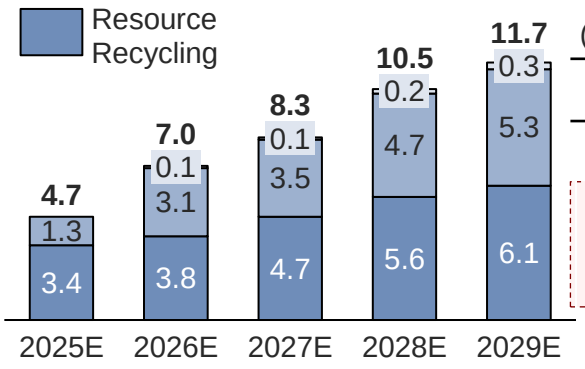
MBKP-Young Poong Consortium

Korea Zinc IR Projections

2025-2029 Cumulative

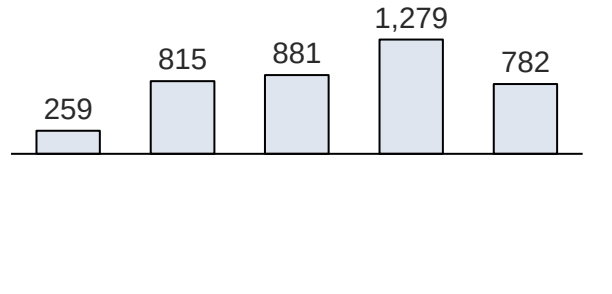
Revenues (KRW tn)

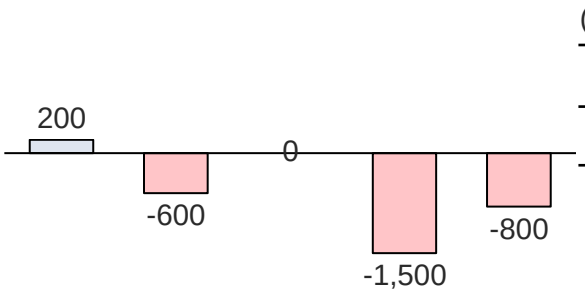




(KRW trillion)	MBKP-YP	KZ IR
Total	**25.8**	**42.2**
Renewable Energy	0.4	0.7
EV Battery Material	7.2	17.9
Resource Recycling	18.2	23.6

Cash Flow[1] (EBITDA – CapEx) (KRW bn)





(KRW trillion)	MBKP-YP	KZ IR
Cumm. Cash Flow	**4.0**	**(2.3)**
Cumm. CapEx	**2.4**	**10.5**

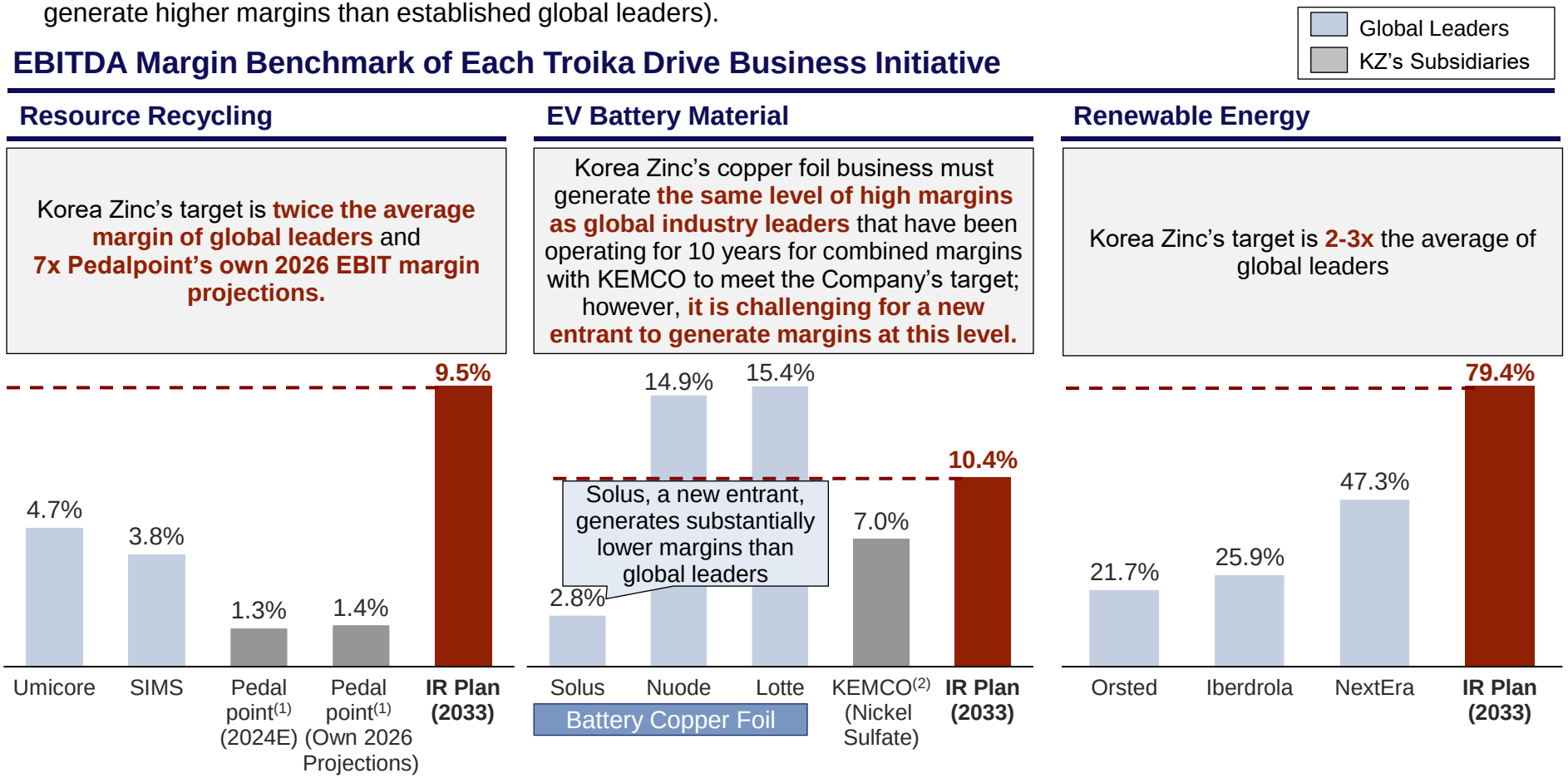
Source: Korea Zinc's 2023 IR Presentation (chart figures in the IR Presentation estimated to the nearest KRW trillion).
(1) Consolidated EBITDA and CapEx basis.

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Korea Zinc's Overly Optimistic New Business Margin Projections

- The only profitability projection disclosed by the Company related to Troika Drive is its 2033 target EBITDA margins.
- The Company's EBITDA margin target is highly aggressive compared to EBITDA margins of global leading comparable companies, not to mention both the actual results and own projections of Korea Zinc's subsidiaries. The Company has not provided an explanation as to how the EBITDA margin target can be justified (e.g., how the new entrant Korea Zinc can generate higher margins than established global leaders).

EBITDA Margin Benchmark of Each Troika Drive Business Initiative



Note: Figures represent average margins from 2021-2023, unless otherwise stated.

(1) Only EBIT projection was disclosed.

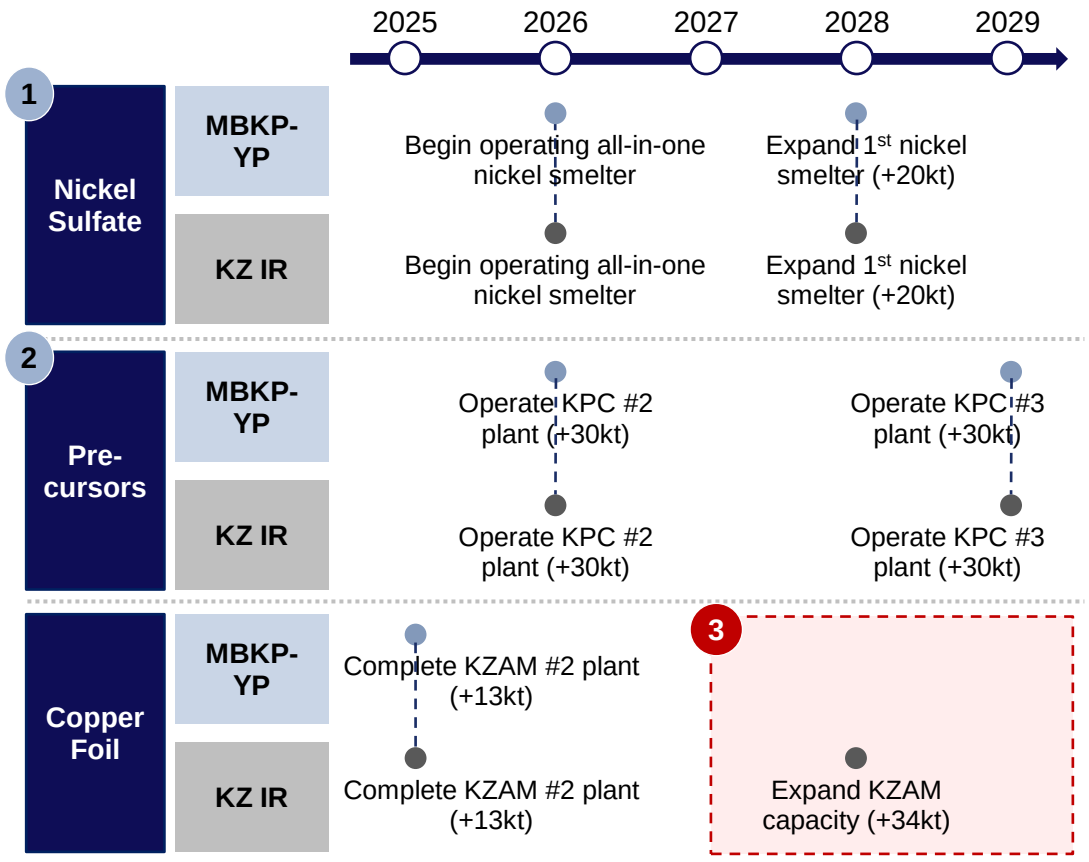
(2) KEMCO's 2023 EBITDA margins of -12.5% assumed as an outlier and averaged 2021-2022 margins instead.

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EV Battery Material Plan Details

- The main area the Consortium's projections diverge from Korea Zinc's IR projections regarding EV battery material is copper foil. The Consortium believes that industry prospects and Korea Zinc's competitive advantage are much more favorable in nickel sulfate and precursors and will proceed according to the Company's plan.
- The Consortium believes it will be difficult to generate meaningful revenues and earnings from the EV copper foil business in the short run, due to the on-going EV chasm and oversupply. Currently, the most pressing goal is to develop customer relationships so that the Company can start building a track record of sales after the #2 plant construction is completed in 2025.

EV Battery Material Business Plan Comparison



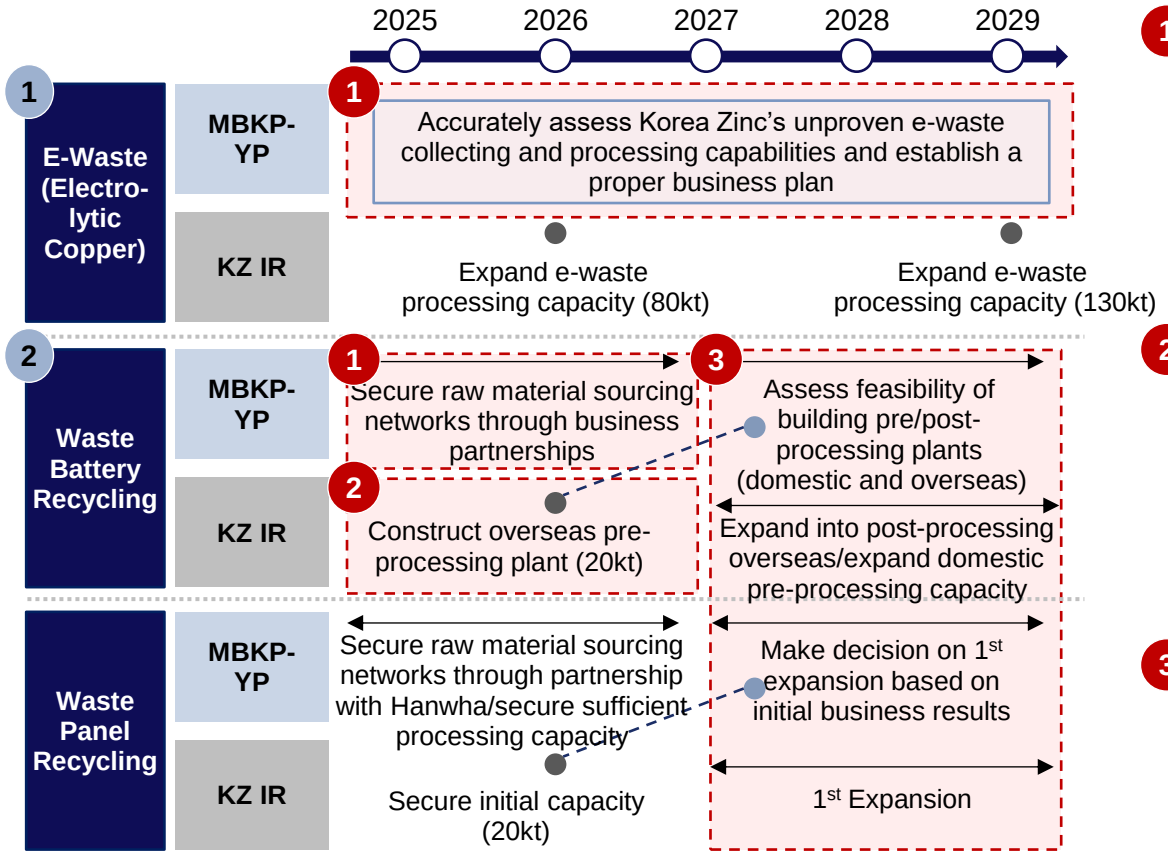
Description

1. The Consortium believes industry prospects, competitive dynamics and Korea Zinc's competitive advantage are positive. Therefore, **successfully operating the All-in-One Nickel Smelter as planned and developing sales capabilities** is the highest priority.
2. The precursor business through KPC is expected to steadily grow under the partnership with LG Chemical. Therefore, the Consortium will proceed **according to the Company's plan.**
3. The Consortium will finalize the construction of the #2 plant currently under way, **but plans to flexibly adjust the capacity expansion scheduled for 2028 based on market conditions.**
   - Market conditions: due to the EV chasm, the original production plan has been delayed by more than one year.
   - Sales: Since multiple copper foil manufacturers already have long-term contracts with battery manufacturers, it will take time for Korea Zinc to develop sales opportunities and build a track record.
   - In addition, since new entrants are forced to accept lower spreads (60%-70% of global leaders), initial margins are expected to be lower compared to the Company's plan.

Resource Recycling Plan Details

- The success of the resource recycling business depends primarily on whether the Company can secure a steady supply of e-waste, waste batteries and waste panels. The Company failed to realize its initial plans to establish a meaningful business by acquiring Igneo Holdings and has yet to provide a clear explanation on whether it obtained its own scrap collecting and pre-processing capabilities.
- Waste battery and waste panel processing demand is expected to ramp up in 2030. Therefore, it is important to establish a sound business foundation by building the necessary capabilities step-by-step, rather than building facilities all at once.

Resource Recycling Plan Comparison



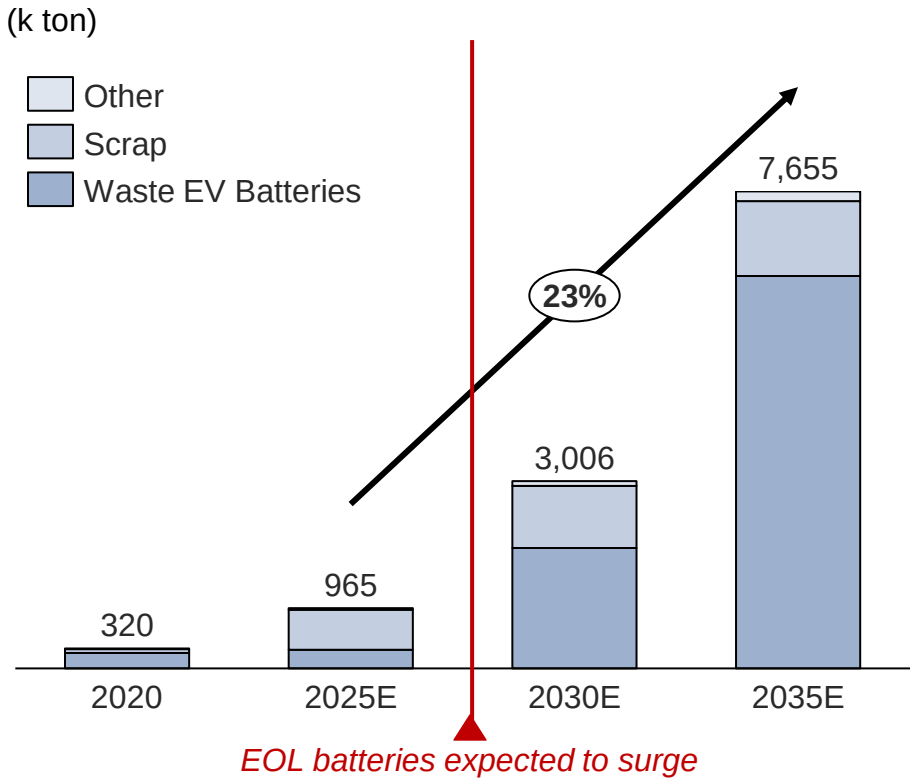
Description

1. The Company **failed to obtain its own e-waste/waste batter collecting and pre-processing capabilities by acquiring Igneo Holdings.** Currently, Igneo and Kataman seem to engage mainly in low-margin trading (i.e., procuring waste collected by 3rd parties) instead of directly collecting waste through its own hubs. Need to review alternative solutions, including forming business partnerships or acquiring additional companies.
2. At the time of acquisition, Igneo Holdings announced that it plans to build a waste battery recycling plant in Savana, Georgia. However, **after the acquisition, the plant construction plan was dropped and no additional plans have been announced**. Therefore, the feasibility of building a pre-processing plant must be re-evaluated and alternative methods to obtain relevant capabilities must be reviewed.
3. Demand for waste battery/waste panel processing **is expected to ramp up in 2030.** Also, Korea Zinc failed to realize its initial plans to obtain the critical scrap collecting capabilities. Therefore, it is important to **build necessary capabilities step-by-step, rather than just building facilities** to gain leadership after 2030.

[Back-up] Global EV Battery Recycling Market Forecast

- The global waste EV battery recycling market is set for rapid growth for the next 10 years, driven by the expansion of electronic vehicles and tightening regulations related to recycling.
- Until 2030, when end-of-life ("EOL") battery volume is expected to take off, scrap produced from battery manufacturers are expected to comprise roughly 50% of total feed. For the new business to be successful, Korea Zinc must (i) secure a steady supply of scrap from manufacturers by partnering with battery manufacturers prior to 2030 and (ii) expand the Company's direct collection network before the market takes off.

Global Waste EV Battery Recycling Market



Source: LCM, Marklines, Fitch, BMO, IHS

Commentary

Market Outlook

- Until 2030, when EOL battery volume is expected to surge, securing **scrap from manufacturers(defective products)** will be critical.
- After 2030, the recycling cycle of waste batteries will significantly drive market growth.

Growth Drivers

EV Expansion

- Global EV battery sales projected to grow at 20.3% CAGR from 2021 till 2030.
  - Increased battery production and EV growth expected to generate large volumes of scrap
  - Global EV sales expected to grow from 5.9 mm in 2021 to 28 mm by 2030

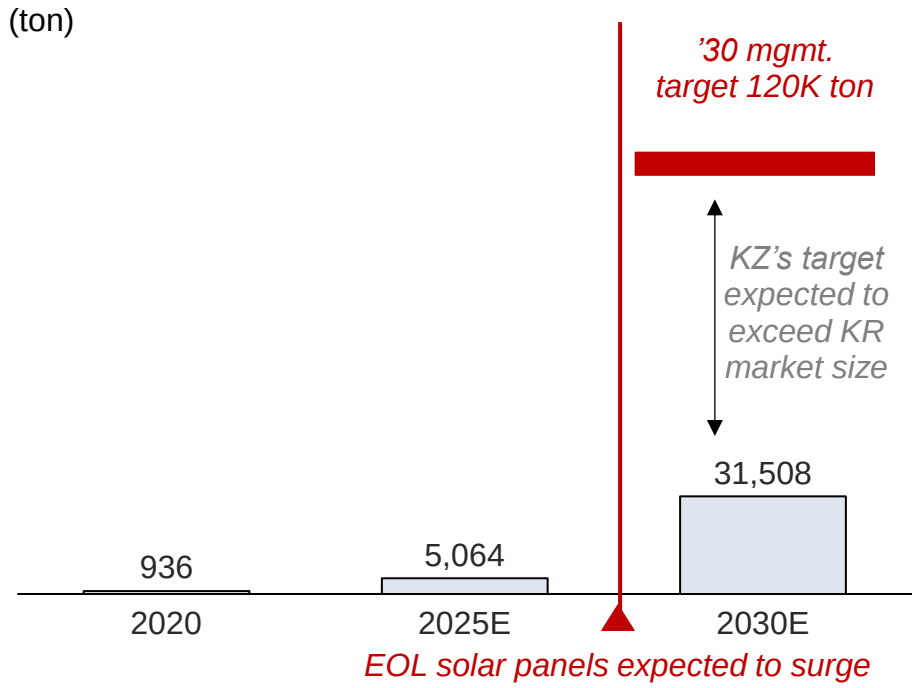
EV Recycling Regula-tions

- Policy revisions to boost EV battery recycling.
  - The EU mandated the use of recycled material in certain parts of battery manufacturing (EU Battery Regulation began to take effect in 2024)
  - Waste EVB collection rate target: 45% in 2020 → 65% in 2030

[Back-up] Domestic Waste Solar Panel Recycling Market Forecast

- Similarly, it is necessary to secure scrap from manufacturers until 2030, when EOL solar panel volume is expected to take off. The recycling market is expected to take off around 2030.
- Korea Zinc reportedly plans to focus on the domestic waste solar panel recycling business. However, the estimated volume of domestic waste solar panels is roughly 3.2k tons, which is significantly short of the Company 2030 target capacity of 120k tons.
- To ensure the successful execution of the new business, Korea Zinc must (i) secure a steady supply of scrap from manufacturers by partnering with solar panel manufacturers prior to 2030 and (ii) expand the Company's direct collection network before the market takes off. Particularly, since the end-users of e-waste, waste batteries and waste panels are very different, it is essential to evaluate the Company's capability to secure substantial volumes of waste panels overseas.

Domestic Waste Solar Panel Recycling Market



Source: LCM, Marklines, Fitch, BMO, IHS

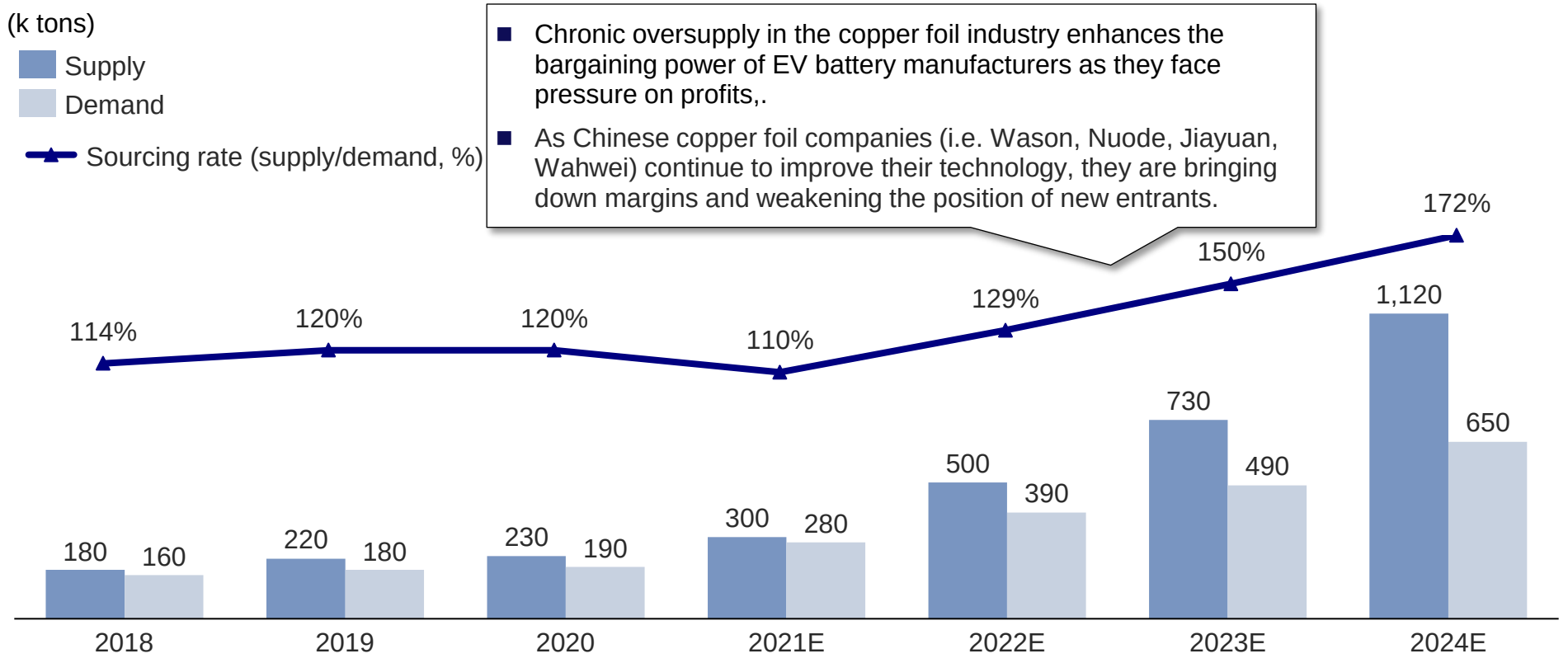
Commentary

- Until 2030, when EOL solar panel volume is expected to surge, **securing scrap from manufacturers** will be critical.
- Given that solar panels are used for 15-20 years, a small volume of solar panels installed in the 2000s are starting to come out as waste panels. The recycling market is expected to **take off around 2030,** when large number of solar panels that were installed in mid-200s to 2010 is expected to come out as waste panels.
- Domestic waste panel volume in 2030 is expected to reach roughly 3.2k tons p.a. Considering the Company's 2030 target capacity of 120k tons, it is essential to secure substantial volumes of waste panels overseas.
  - Despite Korea Zinc's close business relationship with Hanwha, **it is unclear whether the Company can secure enough volume overseas.** In early 2024, Hanwha Q Cells announced the partnership with leading U.S. recycling company, Solarcycle, and continues to build its own eco-system in the world's largest solar panel market.

[Back-up] Global EV Battery Copper Foil Market Forecast

- The global copper foil market continues to see oversupply as electric vehicles are stuck in a chasm. As a result, bargaining power of global battery manufacturers continue to grow. Chinese copper foil manufacturers are also supplying low-margin products based on their improving technology and cost competitiveness. If Korea Zinc enters the market now, as a new entrant without any track record, the Company will inevitably be forced to set its prices at what the Chinese companies are offering.

Global Copper Foil Market (2018-2024E)



Source: SNE Research

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