

MARKET-RESEARCH MONOGRAPH SERIES

The Power-Equipment *Supercycle*

A study of the electric-power transmission & distribution equipment market — and the smart-grid battery and industrial-plasma markets that move with it — read through one Korean operating holding company that straddles all three.

KOSDAQ 042370 · Vitzrotech Co., Ltd.

Core market (switchgear, 2025) USD 93– 141bn	Contested CAGR band 5.7–7.7%	Transformer lead times 3–5 yrs	Korea T&D backlog (4 majors) ~KRW 33tn
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Evidence base — five+ research houses per market (range-preserved, never blended); KEPCO 11th Basic Plan for Power Supply & Demand (MOTIE, 2025-02-21); Vitzrotech FY2025 Annual Report (DART rcept 20260323000806, 2026-03-23) for the company-as-evidence section. A market-research study, not investment advice — no price target, no valuation. Prepared by Nathan Research Group, Seoul · 2026-06-18.

Contents

THE ANALYTICAL SPINE

This is a study of a *market* — the electric-power transmission & distribution (T&D) equipment market in its current supply-constrained "supercycle" — told through one participant. We size the market and its two adjacent demand pools, trace five years of demand and a forward five-year forecast with house disagreement preserved as ranges, map the competitive structure, and only then place the company inside it as *evidence of where demand is going*, never as a valuation.

1	The Market <i>sizing across houses, structure, the three-market value chain</i>	5
2	Demand & the Five-Year Past <i>the supercycle drivers; volume, price and mix trajectory; structural shifts</i>	9
3	Forward Forecast (~5 yr) <i>scenario ranges with honest house-disagreement bands</i>	14
4	Competitive Structure & Shares <i>Korean T&D scale, the Li-SOCl₂ oligopoly, fragmented plasma</i>	17
5	The Company Within the Market <i>three subsidiaries as three clean instruments for reading three markets</i>	20
6	Three Market-Environment Scenarios <i>a forward read on the market environment — not a price target</i>	23
7	What the Market Teaches <i>the generalizable lesson from a portfolio of specialists</i>	24
—	Working With Nathan Research <i>compliant expert-network access for primary diligence</i>	25
A	Appendix <i>sources · methodology · glossary</i>	28

HOW TO READ THIS DOCUMENT

The **market is the subject; the company is the lens**. Where research houses disagree on a market's size or growth — and on power equipment they disagree by a wide margin — we **present the range with attribution rather than a false single point**. Vitzrotech's financials appear only as evidence of a market dynamic — no valuation, no price target, no bull-or-bear thesis on the stock.

Executive Summary

THE MARKET, FIRST

The world's electrical grid has become the binding constraint on its own expansion. Lead times for a large power transformer have stretched from **24–30 months before 2020 to three-to-five years today**; more than half of the United States' installed distribution-transformer base — on the order of **~40 million units** — is past service life; and the artificial-intelligence build-out has put **more than half of planned 2026 US data centers at risk of delay for lack of electrical gear**^{PowerMag; Energy News Beat; Yahoo Finance}. This is not a normal cycle. It is a structural supply shortage in the equipment that connects generation to load — transformers, switchgear, circuit breakers — and it is the opening fact of this study.

The market this monograph sizes is the **electric-power transmission & distribution (T&D) equipment** complex, and within it the **switchgear** segment that is most directly relevant to the company we use as our lens. Switchgear is a genuinely large market whose *size is contested*: across five research houses, the 2025 figure spans **USD 93–141bn**, growing at a band of **5.7%–7.7%**^{M&M; Mordor; FBI; Precedence; Insight Partners} — the spread driven almost entirely by how heavily each house weights data-center and AI demand. We keep the band; we do not invent a midpoint.

Two adjacent markets move on the same root driver — electrification plus grid digitization. The **smart-grid / advanced-metering (AMI)** pool grows far faster (a 10.6%–17.5% band) and pulls demand for both switchgear *and* the lithium-thionyl-chloride (Li-SOCl₂) primary cells that power smart meters; and a small, fast **industrial-plasma / fusion-device** niche (plasma technology USD 3.45bn at 5.9%–6.8%; the fusion-device sub-niche at 18.4%) rides national science and space programs.

Our lens is **Vitzrotech** (KOSDAQ 042370), an operating holding company whose three subsidiaries sit in exactly these three markets — and that is precisely why it is a useful instrument. Each subsidiary is a clean read on one market.

Vitzro Electric reads the switchgear supercycle: its medium-voltage breaker ASP rose **+40% in two years** while volume stayed flat — the supercycle showing up in *price*. **Vitzrocell** reads the AMI battery wave — the group's largest segment at 56.2% of revenue, growing faster than the "narrow" cell market. And **Vitzro Nextech** reads the plasma/fusion niche as optionality. The market study reads each market through its instrument.

THE LENS, STATED

This is a study of the **power-equipment market and its two adjacent demand pools**, told through a company that happens to straddle all three. The supercycle lifts the entire Korean T&D complex — whose four majors carry a combined order backlog of **~KRW 33tn**, five-to-six years of work^{KED Global; Businesskorea}. Vitzrotech rides it at the **component / medium-voltage tier**, not the transformer-giant tier — a ~1/40th-of-Hyosung-Heavy specialist whose edge is integration depth, not scale. Read the company as the market's price signal, capture rate and optionality made visible.

1 The Market

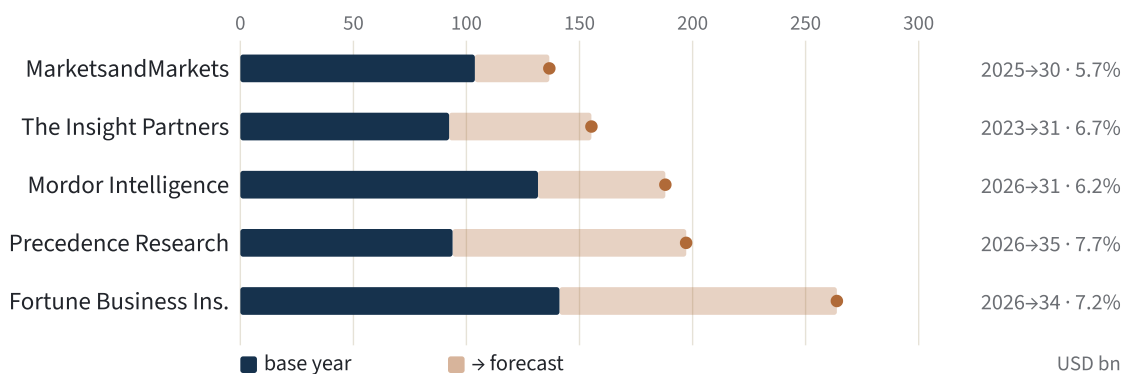
SIZING · STRUCTURE · VALUE CHAIN

The umbrella market is **electric-power T&D equipment** — transformers, switchgear, circuit breakers, cables and protection — sized by Grand View at roughly **USD 203–210bn in 2021–22, reaching USD 326.5bn by 2030 at 5.7%**^{Grand View Research}. Asia-Pacific is the single largest regional pool at **~52% of T&D-equipment revenue** — and Korea's KEPCO grid build sits inside it. Our lens-company participates at the **switchgear / circuit-breaker / vacuum-interrupter** tier, not the transformer tier the Korean giants dominate.

The core market is large — and its size is genuinely contested

Switchgear is the segment most relevant to this study, and it is where the houses disagree most. Exhibit 1 plots every house's 2025 base and forecast end-point. The 2025 figure ranges from **USD 92bn (Insight Partners) to USD 141bn (Fortune Business Insights)** — a ~50% spread that is base-year and scope driven. The honest move is to carry the band, attributing the high end to heavier data-center / AI weighting.

Exhibit 1 · The switchgear market, sized across five houses — base year → forecast (the contested core)



Source: MarketsandMarkets, The Insight Partners, Mordor Intelligence, Precedence Research, Fortune Business Insights. Bars show each house's base-year size; dot = its forecast end-point. Ranges preserved, never blended (research \$01).

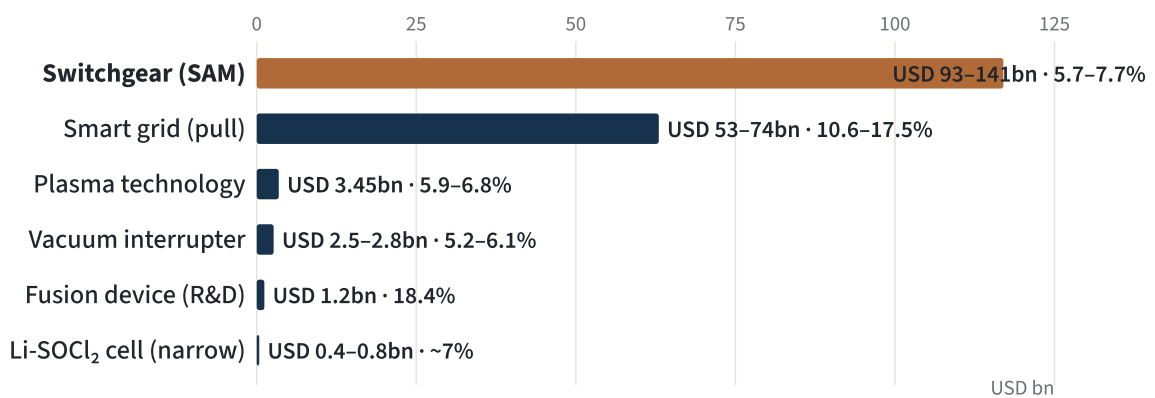
RANGE DISCIPLINE

We do **not** collapse USD 93–141bn into one number. The spread is the information: it measures how much of the supercycle each house has already underwritten into its base. The CAGR band of **5.7%–7.7%** is the same disagreement expressed forward — Precedence and FBI price aggressive AI demand; MarketsandMarkets keeps a conservative base.

One holding company, **three markets** of very different size

The company we use as a lens straddles three markets that differ by orders of magnitude in size and growth. Exhibit 2 places them on one scale. The switchgear SAM (the title market) dwarfs the others; the smart-grid demand pool is smaller but grows far faster; and the component, battery-cell and fusion-device niches are small absolute markets where position, not scale, is the story. This is the structural reason the company is a *portfolio of specialists* rather than a scale champion (\$4–\$5).

Exhibit 2 · The three markets the group straddles — 2025 size, log-of-scale apart



Source: research \$01 (M&M / Mordor / FBI / Precedence / Insight Partners for switchgear; Precedence / M&M / EMR for smart grid; Grand View / Verified MR for plasma; ResearchAndMarkets / IndustryARC / DataM for VI; Coherent MI for fusion device; Grand View narrow def. for Li-SOCl₂ cell). Sublabels carry the kept ranges.

Segmentation — where the **structural shift** lives

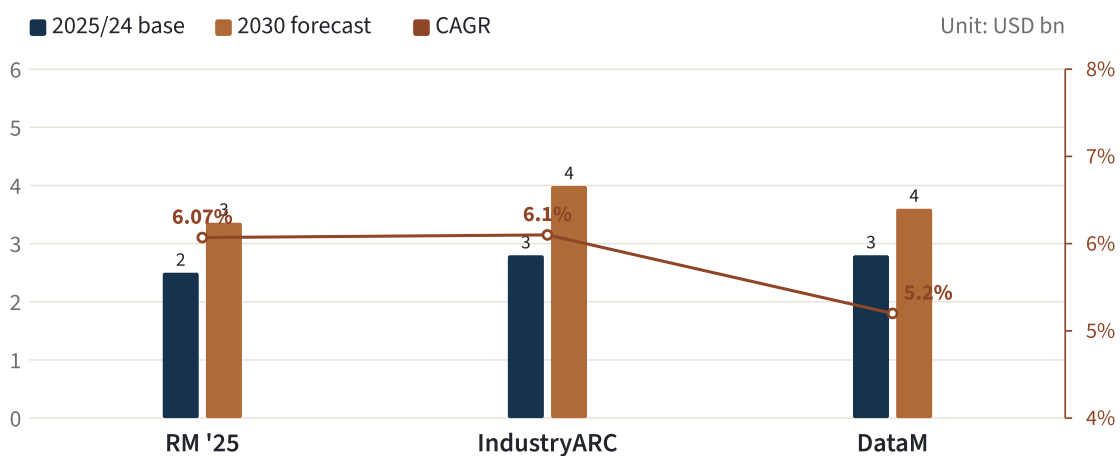
- ▶ **By insulation:** air / gas (SF₆) / **vacuum** — the structural shift; the SF₆ phase-down favors vacuum (§2).
- ▶ **By voltage:** LV / **medium-voltage (2–36kV)** / HV — MV is the largest class in Korea; MV held ~42.2% of the circuit-breaker market in 2024 (vacuum-interrupter report, §01).
- ▶ **By end-use:** utility (KEPCO) / industrial / commercial / **data-center** — the last is the supercycle driver.
- ▶ **Battery by chemistry:** Li-SOCl₂ / Li-MnO₂ / EDLC supercapacitor; by end-use, smart meters / military comms / oil-&-gas downhole / IoT.
- ▶ **Within AMI:** electricity metering = **62.7%** of the market; APAC ≈ 41% — the demand engine for smart-meter cells.
- ▶ **Plasma / special:** engineer-to-order project work — fusion heating, accelerators, rocket combustors, wind tunnels. Order-driven, not capacity-driven.

The component sub-market — the **vacuum interrupter**

One level below switchgear sits the **vacuum interrupter (VI)**: the proprietary component inside a vacuum circuit breaker. It is a tighter, more agreed market than switchgear because its scope is narrower — **~USD 2.5–2.8bn in 2025, reaching ~USD 3.4–4.0bn by 2030 at a 5.2%–6.1%**

band ResearchAndMarkets; IndustryARC; DataM Intelligence. It matters because the lens-company is vertically integrated *down to this component* — making its own VI rather than buying it in, the structural differentiator we test in \$4–\$5.

Exhibit 3 · The vacuum-interrupter component sub-market — tighter house agreement than switchgear



Source: ResearchAndMarkets (2025→30 6.07%), IndustryARC (2024→30 6.10%), DataM Intelligence (5.2%). A narrow component scope produces a tight 5.2%–6.1% band — research \$01.

The demand-pull market — **smart grid & AMI**

The bridge between switchgear and smart-meter batteries is the smart-grid / AMI wave: both ride the same metering and grid-digitization spend. It is not the company's direct revenue line; it is the *demand engine* beneath two of its three segments.

THE DEMAND-PULL BAND, KEPT

Smart grid spans **~USD 53bn (Precedence, 2025) to ~74bn (M&M, 2024)** at a **10.6%–17.5%** band; AMI sits at **~USD 20bn** growing **10.7%–12.8%** Precedence; M&M; EMR; Mordor; Allied/Strategic MR. The width is definitional — what each house counts as "smart grid." Within AMI, electricity metering is **62.7%** of the market and APAC \approx 41% — the geography and end-use that pull both the switchgear and the smart-meter-battery lines this study tracks.

The value chains — where a **participant sits** decides its margin

Three markets imply three value chains. The structurally important fact in each is the same: depth of vertical integration determines whether a participant captures price or merely passes it through.

POWER / GRID VALUE CHAIN

Raw materials (contacts, insulation, breaker coils) → **component makers (vacuum interrupters, relays/IEDs)** → switchgear / switchboard assemblers → EPC / panel builders → utilities (KEPCO), industrial buyers, data-center developers. The integrated participant in this study makes its own VI → VCB / breakers → switchboards. **Raw materials are 45.5% of consolidated revenue (FY2025, down from 49.0%)**^{DART 20260323000806} — a direct read on how far down the chain a vertically-integrated maker reaches.

BATTERY VALUE CHAIN

Li-SOCl₂ cell (vertically integrated, low cost-of-goods ratio cited as a moat) → pack assembly / supercapacitor differentiation → smart-meter OEMs, military comms, oil-&-gas, IoT. The clearest demand node is the smart-meter OEM, and within it the five major Indian meter makers — the single fastest-growing AMI geography.

PLASMA / SPECIAL VALUE CHAIN

Engineer-to-order project work → fusion heating devices (KSTAR, ITER), particle accelerators, rocket combustors / gas generators (Nuri / KSLV), hypersonic wind tunnels. Order-driven and lumpy by construction — a market sized by national-program budgets, not by installed base.

THE STRUCTURAL READ

All three markets share one root driver — **electrification plus grid digitization** — expressed three ways. The title market (switchgear) is supply-constrained with pricing power; the demand pool (AMI) is volume-led and faster; the niche (plasma/fusion) is small, lumpy and optionality-rich. A participant's *position in the value chain*, not its size, is what this study is built to read.

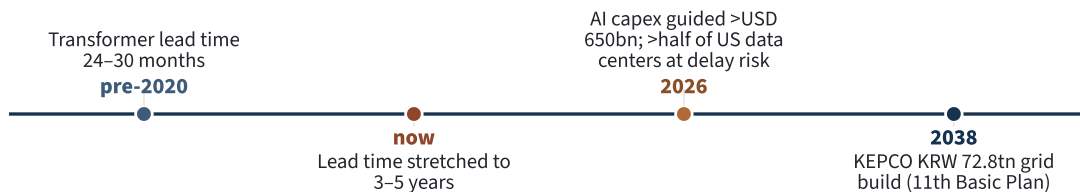
2 Demand @ the Five-Year Past DRIVERS · TRAJECTORY · SHIFTS

The opening fact organizes the whole demand picture: the power-equipment market is in a **structurally constrained supply state, not a normal cycle**. Transformer lead times of three-to-five years, ~40 million end-of-life US distribution transformers, and a data-center build-out that made electrical gear the bottleneck resource have turned demand into a *supply-constrained* phenomenon — the kind that shows up first in price.

Demand drivers, by market

- ▶ **Power / grid:** the AI data-center electrical-gear shortage (a constraint, not a cyclicity); aging-grid replacement (the US ~40M-transformer wave); and Korea's build-out — **KEPCO to invest KRW 72.8tn by 2038** (70 transmission lines, 3,855 km) plus KRW 10.2tn distribution = **>KRW 80tn**, with some estimates near KRW 113tn total
T&D^{11th Basic Plan, MOTIE 2025-02-21.}
- ▶ **Battery:** AMI / smart-meter mandates (smart meters ≈ 40% of Li-SOCl₂ demand); IoT proliferation; military comms; oil-&-gas downhole sensing.
- ▶ **Plasma / special:** KSTAR / ITER fusion programs (KSTAR record: 100 million °C sustained for 48 seconds^{Space.com; EurekAlert;}; Korea's space program (Nuri / KSLV combustors and gas generators); methane-propulsion and hypersonic R&D.
- ▶ **The common root:** electrification + grid digitization — one driver, three expressions, which is why a single holding company can straddle all three credibly.

Exhibit 4 · The supercycle, in four structural facts — why demand is supply-constrained, not cyclical

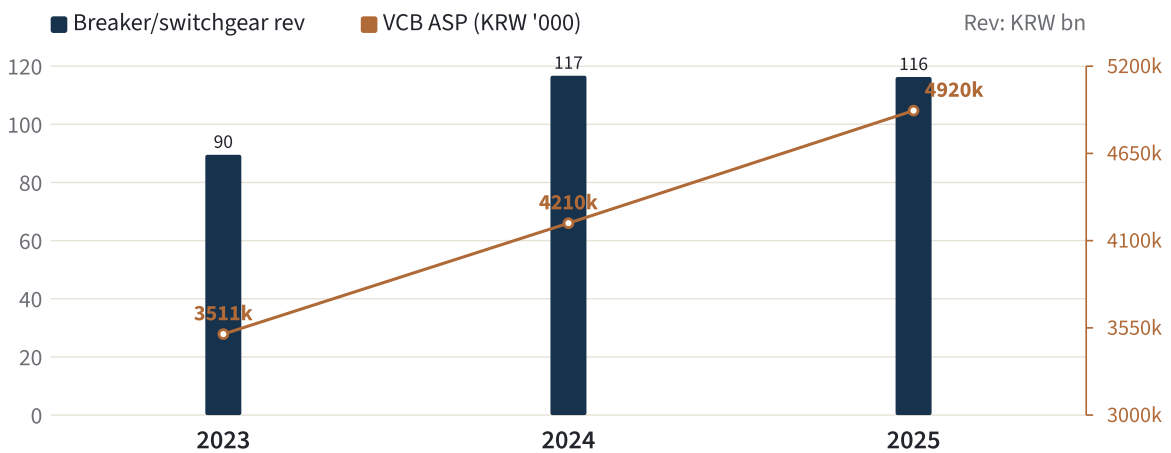


Source: PowerMag, Build.inc, Energy News Beat, Yahoo Finance, 11th Basic Plan for Power Supply & Demand (MOTIE 2025-02-21). A market-side chronology, not a company event log.

The cleanest read of the supercycle: price, not volume

Because the market is supply-constrained, the supercycle shows up first in *price* — and the lens-company's filings give a clean reading of exactly that. The medium-voltage vacuum-circuit-breaker average selling price rose **KRW 3,511k → 4,210k → 4,920k across 2023–2025 — up 40% in two years**^{DART 20260323000806}. Over the same period, power-breaker *revenue* held essentially flat (KRW 116.7bn → 116.3bn) — because capacity was flat. The upside arrived as price, which is the signature of a supply-constrained market.

Exhibit 5 · The supercycle, priced — MV breaker ASP up +40% while segment revenue stayed flat (a market read)



Source: DART 20260323000806 (segment-sales table + ASP disclosure, verified in XML). Flat revenue on a +40% ASP means volume was capacity-capped — the market priced, it did not expand the line.

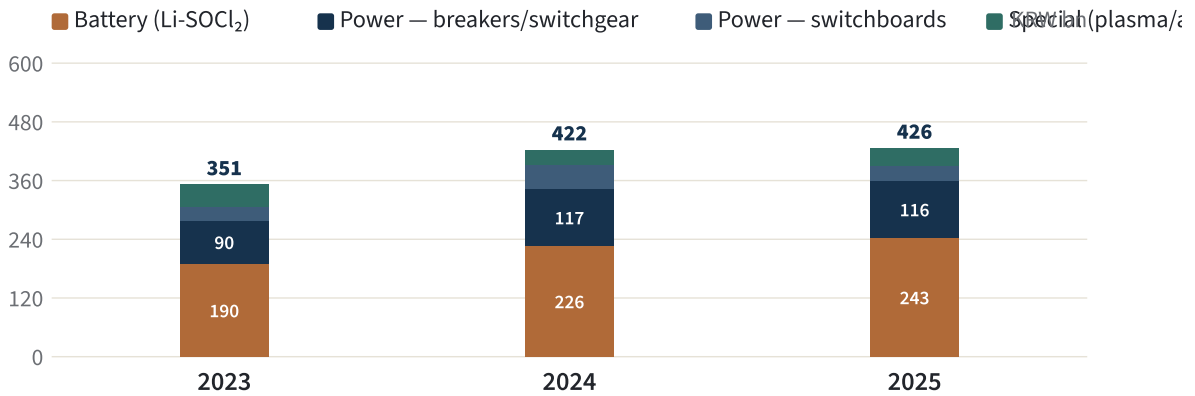
WHY THIS IS MARKET EVIDENCE, NOT COMPANY PERFORMANCE

A single maker's breaker price is a noisy thing on its own. But a **+40% two-year ASP move against flat capacity** is the local print of a global supply shortage — the same shortage that stretched transformer lead times to 3–5 years and put data centers at delay risk. We read the price as the *market's* signal, surfaced through a participant that happens to disclose it. Capacity stayed flat at **KRW 225bn/yr** (VCB 25 / ATS 30 / other 170) across 2023–25 — there was no capex-led line expansion to convert demand to volume.

The five-year mix — a **battery-led** demand picture

Read as market evidence, the segment trajectory says where demand actually flowed. Exhibit 6 stacks the four revenue lines: the **battery (Li-SOCl₂) line grew +28% over two years to KRW 243.0bn, now 56.2% of the group** — the AMI wave captured; power breakers stepped up with the supercycle then plateaued on flat capacity; switchboards and the special segment swing on project / engineer-to-order timing.

Exhibit 6 · Segment-revenue mix, 2023–2025 — the demand that actually flowed (a market mix read)

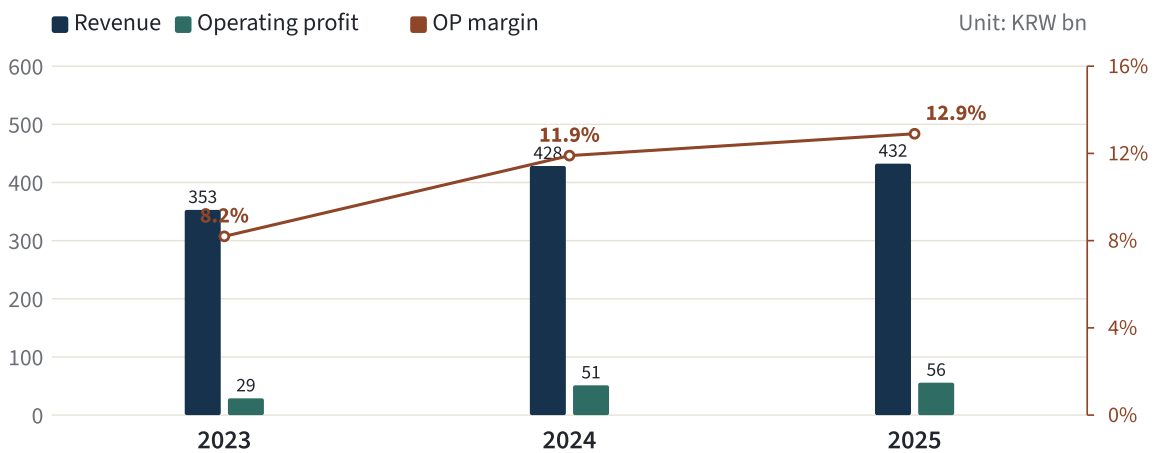


Source: DART 20260323000806 segment-sales table. Battery is the scale + growth engine (+28% over two years); power breakers flat 2024→25 (capacity-capped); switchboards and special lumpy on project/ETO timing.

Consolidated economics — **margin expansion on a flat top line**

At the consolidated level (the only meaningful figure — the parent is a holding shell at KRW 10.9bn standalone), the story is **margin expansion from 8.2% to 12.9% across 2023–25 on a roughly flat 2024→25 top line**^{DART 20260323000806} — i.e., pricing and mix, not volume. That is exactly what a supply-constrained market produces for a well-positioned participant. The lift comes from the segment-revenue mix above (a battery-led, price-led demand picture) rather than from line-volume growth.

Exhibit 7 · Consolidated trajectory — margin expansion (8.2%→12.9%) as the market priced (company-as-evidence)



Source: DART 20260323000806, verified to structured CFS (fnlItSinglAcnt.2025.11011.CFS.json). Margin lift on flat top line = the supply-constrained market expressed in a participant's economics.

Structural and regulatory shifts **reshaping the market**

- ▶ **SF₆ phase-down** — environmental regulation pushing away from gas-insulated toward **vacuum / eco-switchgear**, structurally favoring vacuum-interrupter makers.
- ▶ **Grid-modernization / metering mandates** — drive both switchgear and smart-meter batteries off the same AMI wave.
- ▶ **Data-center power constraint** — turns electrical gear into the bottleneck resource; demand is supply-constrained, not demand-constrained.
- ▶ **Korea permitting bottleneck (the honest counterweight)** — multiple Seoul Economic Daily reports (2026-04/05) describe transmission projects stalling nationwide; a 2026 "People Fund" transmission-financing proposal is a policy response.
- ▶ **Capacity discipline** — flat power-segment capacity (KRW 225bn/yr) means near-term upside is ASP-led, not volume-led — a structural cap on how fast any participant converts the supercycle.

THE HONEST COUNTERWEIGHT TO THE BULL CASE

Korean grid-driven demand faces a **permitting / transmission bottleneck**. The demand (KEPCO's committed KRW 72.8tn) is real, but the *timing* of build-out is at risk — which would push order conversion to the right for every participant in the chain. This is a genuine downside the supercycle narrative tends to ignore, and we carry it into the forward scenarios (§3, §6). It is a *market-timing* risk, not a demand-existence risk.

Net: the five-year past shows a market whose demand is structurally committed but whose *delivery* is constrained on both sides — by manufacturer capacity and by grid permitting. The result, read through a well-placed participant, is margin expansion on price rather than a volume boom. That framing carries directly into the forecast.

3 Forward Forecast (~5 yr)

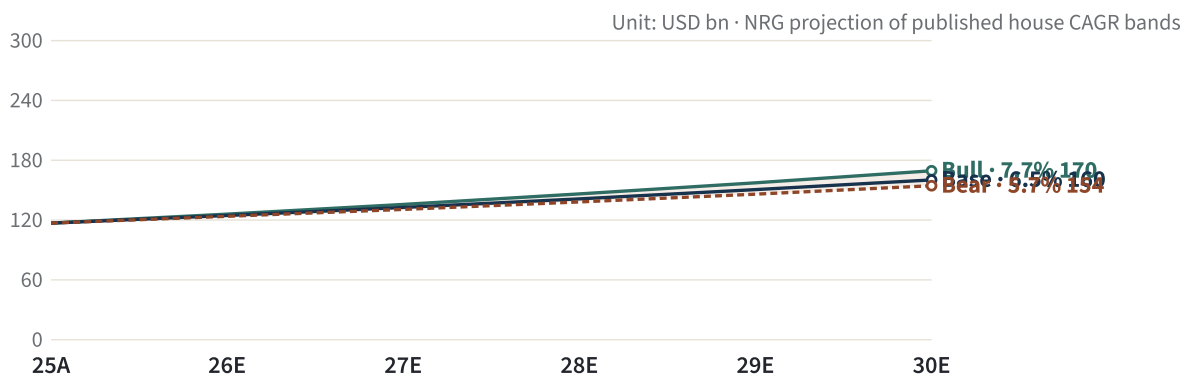
BANDS, NOT POINTS

The forward read keeps the same discipline as the sizing: **preserve the bands**. The title market (switchgear) is structurally supported, but its growth rate is genuinely contested — and the contest is the most useful output, because it measures how much AI / data-center demand the market has already underwritten.

The core market grows — at a **contested 5.7%–7.7%**

Exhibit 8 projects the switchgear market forward from a 2025 base of ~USD 117bn (midpoint of the kept USD 93–141bn range) under the three CAGR scenarios the houses publish: a **bull 7.7%** (Precedence — aggressive AI weighting), a **base ~6.5%** (mid of five houses), and a **bear 5.7%** (MarketsandMarkets — AI capex normalizes). The fan is the *market's* size, not any company's revenue.

Exhibit 8 · Forward switchgear-market forecast — three CAGR scenarios, USD bn (the market, not a company)



Source: NRG projection compounding the published switchgear CAGR bands (Precedence 7.71% bull, five-house mid 6.5% base, M&M 5.7% bear) off a USD 117bn 2025 base (midpoint of the kept USD 93–141bn range). Illustrative of the band, not a point forecast.

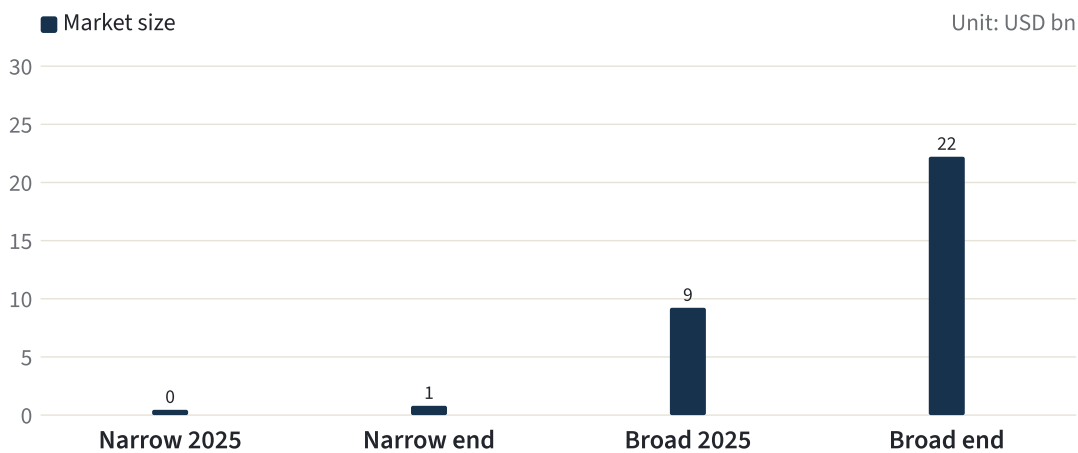
WHAT THE BAND MEASURES

The gap between the bull and bear paths is **USD 15bn by 2030** on the same starting market — the dollar value of the disagreement about AI / data-center demand. The market is supported in every scenario; the question the houses are really arguing about is *how fast*, and the answer turns on data-center capex durability.

The battery market's forecast is a **definitional split**, not a single CAGR

The lens-company's largest segment sits in the Li-SOCl₂ market — and here the houses do not merely disagree on a rate, they disagree on the *boundary of the market* by an order of magnitude. The **narrow definition** (the pure Li-SOCl₂ cell) is ~USD 0.4–0.8bn growing ~6.7%–7%; the **broad definition** (cell-plus-system) is ~USD 8–9bn growing up to 15.7% Grand View / Market Report Analytics (narrow); Research Nester / Valuates (broad). We present both, labeled — never blended.

Exhibit 9 · The Li-SOCl₂ market — a definitional split (narrow cell vs broad system), shown labeled not blended



Source: Grand View narrow cell def. (2024 USD 0.40bn → 2033 USD 0.80bn, ~7%); Valuates broad system def. (2025 USD 9.23bn → 2031 USD 22.21bn, 15.7%). Gap #1 — the cell-vs-system boundary differs by ~20×; never blended.

THE HONEST READ

Vitzrocell's own FY2025 battery-segment revenue — **KRW 243.0bn ≈ USD 171M**^{DART 20260323000806} — is *larger than the entire "narrow" market estimate*, and the segment grew +15.3% in FY2025, at the **aggressive (broad) end** of the CAGR band. That single fact is the clearest evidence the narrow definition is too tight and the broad one too loose — and that the participant is gaining share, most plausibly in Indian AMI. The truth sits between the two definitions; the honest move is the band.

The component and the niche

The vacuum-interrupter sub-market grows at a tight **5.2%–6.1%** (\$1, Exhibit 3) — the steady backbone. The plasma-technology market grows **5.9%–6.8%**, while the **fusion-device niche grows fastest at 18.4%** off a small USD 1.2bn base (to ~USD 3.3bn by 2030)^{Coherent MI} — high optionality on the smallest current weight. We deliberately exclude the broad "fusion energy" multi-hundred-billion figures: that is the generated-energy market, a different scope entirely (Gap #2).

Forward forecast — summary of the bands

The table below collects every market's forward band in one place. The discipline throughout: where a market's growth is contested, the contest is shown; where the market boundary itself is contested (Li-SOCl₂), both definitions are carried.

Exhibit 10 · Forward ~5-yr market forecast — bands by market, with the driver of disagreement

Market	2025 size	CAGR band	Driver of disagreement
Switchgear (core SAM)	USD 93–141bn	5.7–7.7%	data-center / AI weighting + base-year scope
Vacuum interrupter (core IP)	USD 2.5–2.8bn	5.2–6.1%	narrow scope → tight agreement
Smart grid (demand pull)	USD 53–74bn	10.6–17.5%	definitional breadth of "smart grid"
AMI (battery engine)	~USD 20bn	10.7–12.8%	metering-rollout pace assumptions
Li-SOCl₂ — narrow (cell)	USD 0.4–0.8bn	~6.7–7%	cell-only market boundary
Li-SOCl₂ — broad (system)	USD 8–9bn	up to 15.7%	cell-plus-system boundary (Gap #1)
Plasma technology	USD 3.45bn	5.9–6.8%	plasma-tech vs torch vs surface-treat scope
Fusion device (niche)	USD 1.2bn	18.4%	device/R&D niche only (NOT "fusion energy", Gap #2)

Source: research \$03 (M&M, Mordor, FBI, Precedence, Insight Partners; ResearchAndMarkets, IndustryARC, DataM; Grand View, Valuates, Research Nester; Coherent MI). Ranges preserved with attribution; no single-point precision where houses diverge.

THE SINGLE MOST IMPORTANT DOWNSIDE IS TIMING, NOT DEMAND

Across every market band, the demand is structurally supported. The dominant *downside* is not that demand fails to materialize — it is **Korean transmission-permitting risk** delaying the conversion of committed KEPCO spend into orders, compounded by flat manufacturer capacity. The forward picture is therefore one of *committed demand meeting constrained delivery* — supportive of price, uncertain on the speed of volume.

4 Competitive Structure & Shares

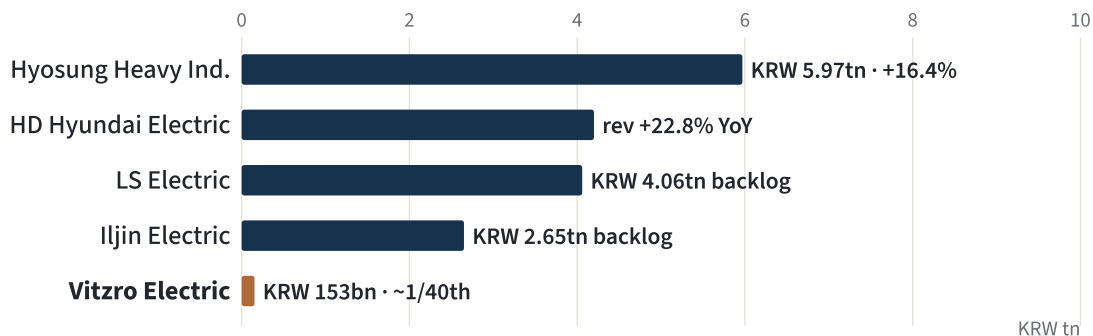
THREE MARKETS, THREE STRUCTURES

Three markets imply three distinct competitive structures — and the lens-company is a **niche / specialist** in each, not a scale leader. The useful question is not "how big is it" but *where in each value chain it competes, and with what proprietary IP.*

Power equipment — a **scale hierarchy** the company sits far down

The Korean T&D complex is dominated by four majors whose combined order backlog reached **~KRW 33tn (Q3-2025) — five-to-six years of work**^{KED Global; Businesskorea}. They own the HV-transformer and gas-insulated-switchgear tiers. Exhibit 11 puts the scale gap in one frame: the power arm, at ~KRW 153bn, is roughly **1/40th of Hyosung Heavy's KRW 5.97tn.**

Exhibit 11 · Korean T&D scale hierarchy — Vitzro Electric is a ~1/40th-of-Hyosung-Heavy specialist (FY2025 rev, KRW tn)



Source: KED Global, Businesskorea, THE ELEC, Korea Herald, DART 20260323000806 (Vitzro Electric power-segment ≈ KRW 153bn). The giants own HV transformers / GIS; the lens-company owns the MV-switchgear + vacuum-interrupter slice — research \$04.

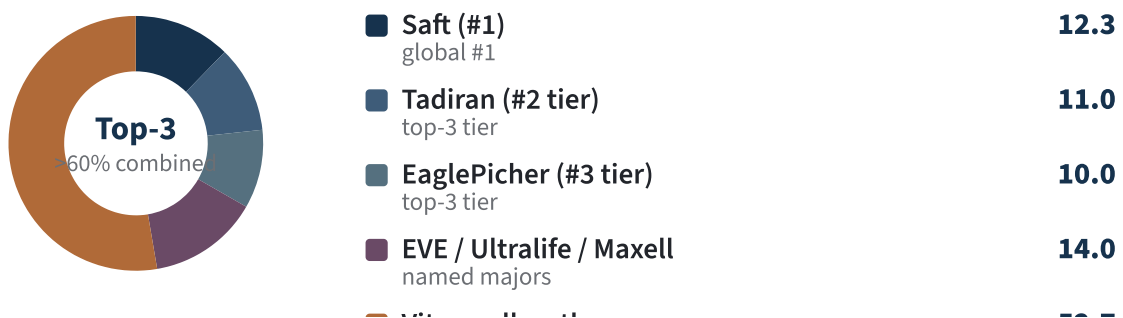
WHERE THE SPECIALIST COMPETES

The supercycle lifts the *entire* Korean T&D complex; the lens-company participates at the **medium-voltage switchgear + proprietary vacuum-interrupter ("VIDER")** tier — the component depth most assemblers must buy in. Its edge is **integration depth at the component**, not scale. That is a structurally different competitive position from the transformer giants, and it is why its economics (12.9% OP margin) come from specialization, not volume leadership.

Lithium primary battery — a concentrated global oligopoly

The Li-SOCl₂ market has the opposite structure to power: a concentrated global oligopoly where the **top three hold >60% combined** — Saft (≈12.3%, #1), Tadiran, and EaglePicher — with EVE Energy, Ultralife and Maxell as named majors. Tadiran / Saft market-share reports; PitchBook. The lens-company's battery arm, Vitzrocell, *is itself listed among the major global manufacturers*, and is strongest in the AMI / smart-meter end-use — claiming **#1 share supplying India's five major smart-meter makers**, the single fastest-growing AMI geography.

Exhibit 12 · The Li-SOCl₂ battery market — a concentrated oligopoly (top-3 >60%); the lens-company is a named major



Source: Tadiran / Saft market-share reports, PitchBook, EMIS (research \$04). Saft ≈12.3% (#1); Tadiran / EaglePicher complete the top tier. Vitzrocell is among the named global majors and claims #1 in Indian AMI; the residual is illustrative of structure, not exact shares.

Plasma / fusion / aerospace — a fragmented niche

The third market is fragmented with no clean share table (Gap #6). The plasma arm, Vitzro Nextech (KOSDAQ 488900, 69.02%-owned), is a national-program supplier — fusion heating devices (KSTAR, ITER), particle accelerators, rocket combustors / gas generators (Nuri), hypersonic wind tunnels. It is currently **sub-scale at KRW 36.6bn, profit targeted from 2027 and a 2030 target of >KRW 100bn revenue / ~KRW 20bn operating profit** Vitzro Nextech guidance — ~3× current scale. Competitive position here is qualitative: optionality, not an established share.

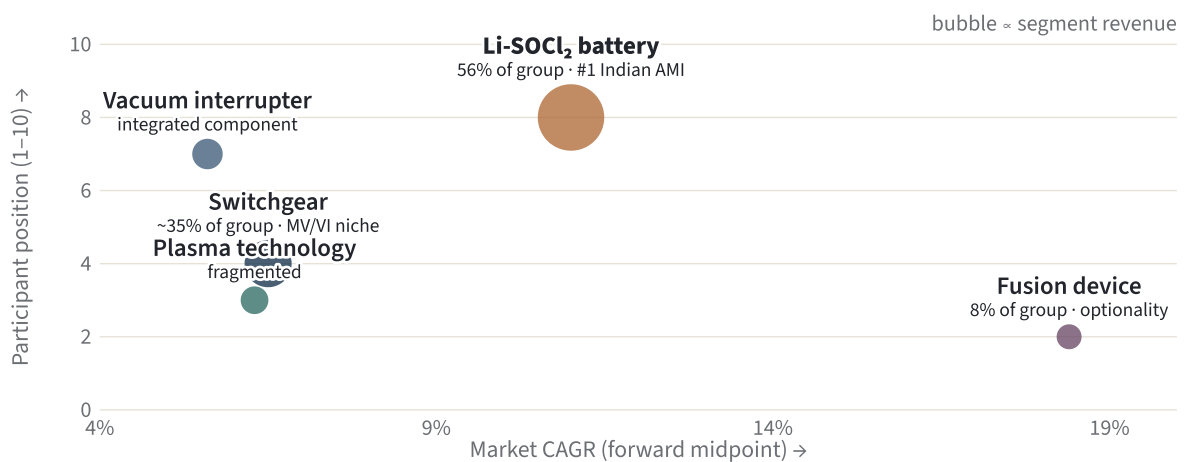
THREE STRUCTURES, ONE PATTERN

The lens-company is a **specialist in all three markets and a scale champion in none** — a deep-but-small component specialist in power switchgear, a genuine top-tier global specialist in Li-SOCl₂ batteries (its strongest position), and a fragmented-niche optionality play in plasma / fusion. The competitive thesis is not about winning a market on scale; it is about *holding defensible specialist positions across three markets that share one demand root*.

The three markets, mapped — growth versus the participant's position

Exhibit 13 maps the three markets the group competes in on two axes: market growth (the forward CAGR midpoint) against the lens-company's competitive strength in each. The pattern is unmistakable — its *strongest* position (Li-SOCl₂ batteries) sits in a fast market; its *largest absolute market* (switchgear) is one where it holds only a deep component niche; and its *fastest* market (fusion device) is where it is smallest. This is the geometry of a portfolio of specialists.

Exhibit 13 · The three markets, mapped — market growth vs the participant's competitive position (bubble = segment revenue)



Source: NRG synthesis of research \$01/\$03 (market CAGR midpoints) and \$04 (competitive position). Position score is an NRG ordinal read of competitive strength, not a market share. A market map, not a stock map.

The synthesis: the group's consolidated profitability (12.9% OP margin, FY2025) comes from **specialization and integration depth, not volume leadership**. The power supercycle lifts the whole Korean complex; this participant rides it at the component tier, while its battery arm carries the scale and its plasma arm carries the optionality. The market study reads all three markets through these three positions.

5 The Company Within the Market

PRODUCTS AS MARKET PARTICIPATION

Having sized the markets and mapped the structure, we place the company inside — strictly as *evidence of market participation*. Vitzrotech is an **operating holding company** whose standalone parent revenue is only KRW 10.9bn; the meaningful figure is the consolidated KRW 432.3bn^{DART 20260323000806}, earned through three subsidiaries, each a clean instrument for reading one market.

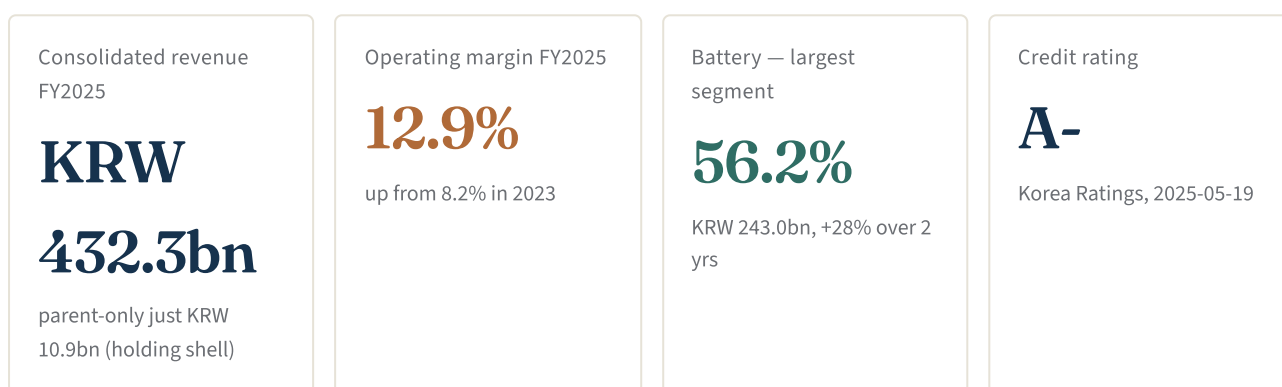


Exhibit 14 · The three subsidiaries as three market instruments — FY2025 (company-as-evidence)

Subsidiary	Market it reads	FY25 rev	% consol.	What its number signals
Vitzrocell	Li-SOCl ₂ / AMI battery	KRW 243.0bn	56.2%	the AMI wave <i>captured</i> (+28% 2yr)
Vitzro Electric	Power switchgear / VI	KRW ~152.7bn	~35.3%	the supercycle <i>priced</i> (VCB ASP +40%)
Vitzro Nextech	Plasma / fusion / aero	KRW 36.6bn	8.4%	the niche <i>as optionality</i> (2030 KRW 100bn target)

Source: DART 20260323000806 (segment-sales table + ownership stakes verified in XML). Stakes: Vitzrocell 34.84%, Vitzro Nextech 69.02%, Vitzro Electric 100%. The company is the lens for reading three markets, not the subject of a valuation.

WHY THIS COMPANY IS A CLEAN INSTRUMENT

Each subsidiary isolates one market's signal — Vitzro Electric prices the switchgear supercycle, Vitzrocell captures the AMI battery wave, Vitzro Nextech holds the fusion / aerospace niche as optionality. Read together they make three markets legible at once, which is why this holding company is the lens for this study.

Products as **market participation**

POWER — VITZRO ELECTRIC → THE MV-SWITCHGEAR + VACUUM-INTERRUPTER SLICE

A vertically-integrated product ladder: own vacuum interrupter ("VIDER") → VCB / MCCB / ATS / ACB breakers → GIS, metal-clad switchgear, MCC, switchboards; protection relays / IEDs ("VIPAM"). This is the cleanest supercycle read in the whole filing — VCB ASP **KRW 3,511k → 4,210k → 4,920k** (+40% in two years) while power-breaker revenue held flat on flat KRW 225bn/yr capacity^{DART 20260323000806}. The market participation is the **MV-switchgear + vacuum-interrupter** slice of the global supercycle, riding KEPCO's grid build and export data-center demand.

BATTERY — VITZROCELL → THE AMI / SMART-METER DEMAND ENGINE

Products: Li-SOCl₂ primary cells + EDLC supercapacitor + ampoule / thin-film; smart-meter comms batteries (Tekcell brand), military comms, oil-&-gas. The market participation is the **AMI / smart-meter battery** demand engine — #1 in the Indian meter market (five major makers), exports to 50+ countries. The single largest segment (56.2%) and primary group profit driver, +28% over two years; battery capacity raised modestly to KRW 332bn (from 322bn) — the only segment with capacity expansion behind it.

SPECIAL — VITZRO NEXTECH → THE FUSION-DEVICE + SPACE-PROPULSION NICHE

Products: plasma waste treatment, ultra-precision vacuum joining, aerospace combustors / gas generators, fusion heating devices, particle accelerators. The market participation is the **fusion-device + space-propulsion** niche — small, high-growth, lumpy (engineer-to-order). KRW 36.6bn (FY2025); 2030 target >KRW 100bn revenue / ~KRW 20bn operating profit, profit from 2027.

Segment economics — capacity, pricing, backlog

The operating signals below are the company-side evidence for the market reads in §1–§3. Each is a market fact surfaced through disclosure, not a performance claim.

Exhibit 15 · Segment-economics signals — the market dynamics, surfaced through disclosure

Signal	Value (FY2025)	What it reads in the market
Power-segment capacity	KRW 225bn/yr (flat 2023–25)	no capex-led expansion → supercycle upside is price, not volume
Battery capacity	KRW 332bn (from 322bn)	the only segment with capacity behind growth → AMI conviction
VCB ASP	KRW 3,511k → 4,210k → 4,920k	+40% in 2 yrs = the supercycle priced
Power backlog	KRW 72.2bn (ordered 153.2 / del. 81.0)	forward cover for the switchgear market read
Raw materials / consol. rev	45.5% (from 49.0%)	vertical-integration depth — value-chain reach
Consolidated OP margin	8.2% → 11.9% → 12.9%	margin lift on flat top line = supply-constrained market priced

Source: DART 20260323000806 (capacity, ASP, backlog, raw-material ratio verified in XML). Gap #4: segment OP is not disclosed — profitability cannot be split by market without estimation; Gap #7: special-segment backlog figure truncated in the XML extract.

A DISCLOSURE LIMIT WORTH STATING

Vitzrotech discloses **segment revenue only, not segment operating profit** (Gap #4). The consolidated margin lift (8.2% → 12.9%) is real but cannot be cleanly attributed to one market from disclosure alone — though the VCB ASP rise and the battery scale-up are the most plausible drivers. We flag this rather than estimate a split. The special-segment backlog figure is also truncated in the XML extract (Gap #7).

Read as a whole, the company is the case-in-point because each subsidiary is a clean instrument: Vitzro Electric is the supercycle *priced*, Vitzrocell is the AMI wave *captured*, and Vitzro Nextech is the fusion / aerospace niche *as optionality*. The consolidated economics — margin expansion on a battery-led mix — are the company-level proof that specialization and integration depth, not scale leadership, is the model the market rewards here.

6 Three Market-Environment Scenarios

THE MARKET, NOT A PRICE

These three scenarios describe the **market environment** over the next five years — not a price target, not a company forecast. Each is anchored to the published house bands and to the dominant variable: how durably AI / data-center demand holds, and whether Korean grid permitting lets committed KEPCO spend convert to orders.

<p>Bull · demand holds</p> <p>Switchgear 7.7% — AI / data-center pull persists. Li-SOCl₂ broad 15.7% — AMI rollout accelerates, specialists keep share. Fusion device 18.4%. KEPCO's ~KRW 113tn T&D executes on schedule; permitting bottleneck clears.</p> <p>The market environment in which a well-placed component specialist converts the supercycle fastest.</p>	<p>Base · supported, slower</p> <p>Switchgear ~6.5% — mid of five houses. Li-SOCl₂ ~7% narrow. Plasma ~6%. KEPCO's KRW 72.8tn core plan executes with some slippage; capacity stays flat so upside remains ASP-led.</p> <p>Committed demand meets constrained delivery — price-led, not a volume boom.</p>	<p>Bear · timing slips</p> <p>Switchgear 5.7% — AI capex normalizes. Li-SOCl₂ 6.7% narrow. Plasma 5.9%. Korean permitting bottleneck stalls transmission (SEDaily 2026-04/05); order conversion pushes right.</p> <p>Demand exists but delivery timing slips — the market's real downside is timing, not demand.</p>
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Exhibit 16 · Three market-environment scenarios — the market bands, by driver (not a price target)

Scenario	Switchgear	Li-SOCl ₂	Plasma/fusion	Korea-grid factor
Bull	7.7%	15.7% broad	18.4% fusion	~KRW 113tn T&D executes on schedule
Base	~6.5%	~7% narrow	~6% plasma	KRW 72.8tn core plan, some slippage
Bear	5.7%	6.7% narrow	5.9% plasma	permitting bottleneck stalls transmission

Source: research \$03 scenario table (published house CAGR bands + the Korean grid-permitting variable). A description of the market environment, not a forecast of record and not a valuation.

READ THE SCENARIOS AS THE MARKET, NOT THE STOCK

Every path keeps the market structurally supported — the scenarios differ on *speed*, and the swing variable is grid-permitting timing more than demand existence. This is a description of the environment a participant operates in; it carries **no price target and no investment recommendation**.

7 What the Market Teaches

THE GENERALIZABLE LESSON

Step back from the single company, and the power-equipment market teaches a lesson that generalizes well beyond it.

1 A supply-constrained market prices before it expands. When transformer lead times triple and capacity is flat, the supercycle shows up first in price, not volume. The cleanest evidence in this study is a +40% breaker ASP against flat revenue — demand met by price because capacity could not move. Near-term upside is ASP-led, and the binding question is who has the capacity discipline and integration depth to capture it.

2 Where you sit in the value chain decides whether you capture price or pass it through. The Korean T&D giants own scale; the specialist owns the vacuum interrupter. In a supply-constrained market, the component most assemblers must buy in is the defensible slice — integration depth, not size, is the moat. A 12.9% margin on ~1/40th the revenue of the scale leader is the proof.

3 Honest market sizing is a range, and the range is the information. Switchgear spans USD 93–141bn across five houses; Li-SOCl₂ spans an order of magnitude on definition alone. Collapsing those to a point would destroy the most useful output — how much of the AI demand the market has already underwritten, and where the market's own boundary is contested. We kept every band.

4 The dominant risk in a committed-demand market is timing, not demand. KEPCO's KRW 72.8tn is committed; the question is whether permitting lets it convert. The honest counterweight to every supercycle narrative is the conversion bottleneck — a market-timing risk, not a demand-existence risk.

THE LESSON, GENERALIZED

A **portfolio of defensible specialist positions across markets that share one demand root** can out-earn scale leadership — provided each position sits deep enough in its value chain to capture price rather than pass it through. The power-equipment supercycle is the clearest current example: committed demand, constrained delivery, and a margin that accrues to integration depth. Read any participant in this market by where it sits in the chain, not by how big it is.

Working With Nathan Research

COMPLIANT EXPERT NETWORK

Market reports and filings establish the *shape* of the power-equipment market; they do not capture the operating detail that decides a strategy — the real state of KEPCO order allocation, how data-center developers are sequencing switchgear procurement, the texture of vacuum-interrupter qualification, or where Vitzrocell actually stands in Indian AMI. That detail lives with the people who built, sold, specified, sourced and competed with these products — and reaching them, compliantly, is what Nathan Research does.

Nathan Research Group operates **Korea's first dedicated expert-network service, established in 2013**. We were built for the global private-equity, hedge-fund or corporate-strategy team that has a thesis on a Korean or Asian asset and needs primary, on-the-ground diligence that public disclosure cannot supply. The power-equipment, grid, primary-battery and industrial-plasma complex is one of our deepest benches.

Who we put in the room

For a Vitzrotech or power-equipment / grid engagement, we source, vet and convene primary experts across the value chain:

- ▶ **Former executives & engineers** — from Vitzrotech, Hyosung Heavy, HD Hyundai Electric, LS Electric and the MV-switchgear / VI supply base
- ▶ **Switchgear & vacuum-interrupter specialists** — MV/HV breaker design, eco/vacuum insulation, KEPCO qualification
- ▶ **Utility & data-center procurement** — KEPCO grid-build sequencing, data-center electrical-gear sourcing and lead-time dynamics
- ▶ **Li-SOCl₂ & AMI battery experts** — smart-meter cell qualification, Indian AMI channel, the Saft / Tadiran / EaglePicher oligopoly
- ▶ **Plasma / fusion / aerospace contacts** — KSTAR / ITER device supply, Nuri / KSLV combustor programs, accelerator work
- ▶ **Korea grid-policy specialists** — the 11th Basic Plan, transmission-permitting bottleneck and the "People Fund" financing debate

How an engagement works

1 • Scope

We translate your thesis into a precise expert profile and question set, mapped to the decisions you need to make.

2 • Source & vet

We identify, screen and compliance-clear each expert — confirming relevance, recency and the absence of conflicts before any call.

3 • Convene & synthesize

We arrange interviews on your timeline and, where useful, deliver written synthesis tied back to the questions in this study.

THE QUESTIONS THIS STUDY LEAVES OPEN

How fast can flat power-segment capacity be expanded without eroding the integration moat? Will Korean transmission permitting let committed KEPCO spend convert on schedule — or push order timing right? Is Vitzrocell's Indian-AMI #1 claim durable against the Saft / Tadiran oligopoly? And how much of the switchgear band's high end is real, durable data-center demand versus already-underwritten optimism? These are precisely the questions a compliant expert panel is built to answer.

Partner With Nathan Research

START THE CONVERSATION

If your team is evaluating the **electric-power T&D equipment market**, the **smart-grid battery or industrial-plasma adjacencies**, or **Vitzrotech** and the broader Korean grid-and-electrification supply chain, we would welcome the conversation. Tell us the decision you are trying to make — we will tell you, candidly, whether and how our network can help you make it.

What to expect when you reach out: A direct reply from a partner, not an intake form — and a scoping conversation rather than a sales call. From there: a compliant, conflict-cleared expert panel assembled to your timeline, and, where useful, written synthesis that builds directly on the analysis in this monograph.

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A Appendix

SOURCES · METHODOLOGY · GLOSSARY

Evidence base & methodology

This monograph synthesizes secondary market-research and primary disclosure, cross-checked on 2026-06-18. Figures are cited inline; where research houses disagreed — notably switchgear sizing (~50% spread across five houses) and the Li-SOCl₂ market boundary (~20× on the cell-vs-system definition) — **ranges are presented with attribution, never blended into a false midpoint.** Forward fans and scenarios are illustrative constructs compounding published house CAGR bands; "NRG estimate / projection" items are analyst derivations from sourced figures plus Vitzrotech's disclosed mix.

Web market research (range-preserved): switchgear sizing — MarketsandMarkets, Mordor Intelligence, Fortune Business Insights, Precedence Research, The Insight Partners; T&D-equipment umbrella — Grand View Research; vacuum interrupter — ResearchAndMarkets, IndustryARC, DataM Intelligence; smart grid / AMI — Precedence, MarketsandMarkets, Expert Market Research, Mordor, Allied / Strategic MR; Li-SOCl₂ — Grand View, Market Report Analytics (narrow), Research Nester, Valuates (broad); plasma / fusion — Grand View, Verified MR, GM Insights, Coherent MI.

Supercycle & policy: PowerMag, Build.inc, Energy News Beat, Hart Energy, Yahoo Finance (transformer lead times, US EOL transformers, AI capex / data-center delay risk); 11th Basic Plan for Power Supply & Demand (MOTIE, 2025-02-21), Korea Times, Seoul Economic Daily, IEA Korea 2025 (KEPCO KRW 72.8tn build, permitting bottleneck); pv magazine (distributed-grid program).

Competitors: KED Global, Businesskorea, THE ELEC, Transformer Magazine, Switchgear Magazine, Korea Herald (Korean T&D majors, ~KRW 33tn combined backlog); Tadiran / Saft market-share reports, PitchBook, EMIS (Li-SOCl₂ oligopoly).

Regulatory (DART, primary — company-as-evidence only): Vitzrotech FY2025 Annual Report, rcept **20260323000806** (2026-03-23) — segment-sales table, VCB / ATS / MCCB ASPs, capacity, backlog, ownership stakes (Vitzrocell 34.84%, Vitzro Nextech 69.02%, Vitzro Electric 100%), and the operating-holding-company structure, all verified in **document/20260323000806.xml**; 5-yr consolidated and parent financials cross-checked to **structured/fnlIttSinglAcnt. {2021-2025}.11011.{CFS, OFS}.json**. Quarterly updates available for the latest trajectory point: Q3-2025 **20251114001881**, Q1-2026 **20260515002487**, H1-2025 **20250814003682**. Subsidiary tickers: Vitzro Nextech KOSDAQ **488900**; Vitzrocell KOSDAQ-listed.

KRX: near-unused — consulted only to note that no listed-share-count change required cross-checking a capital event for this market-study lens. Not a valuation input and not an opening hook (per the market-research framing).

Data notes / gaps: (1) Li-SOCl₂ market split narrow (~USD 0.4–0.8bn) vs broad (~USD 8–9bn) — both carried, never blended. (2) Fusion sized as the device/R&D niche only; broad "fusion energy" figures excluded as a different scope. (3) No clean Korean domestic switchgear market in KRW was found — global figures used. (4) Segment operating profit is not disclosed; profitability cannot be split by market. (5) Vitzro Electric is unlisted — only consolidated financials are visible. (6) Special-segment backlog figure truncated in the XML extract. (7) Plasma / fusion shares are qualitative — the market is fragmented.

Glossary

T&D — transmission & distribution (of electric power). **Switchgear** — the assemblies of breakers, switches and protection that control/protect a circuit. **VCB / VI** — vacuum circuit breaker / vacuum interrupter (the breaker's proprietary component). **MCCB / ATS / ACB** — molded-case circuit breaker / automatic transfer switch / air circuit breaker. **GIS** — gas-insulated switchgear. **MV / LV / HV** — medium / low / high voltage. **SF₆** — sulfur hexafluoride, the insulating gas being phased down. **AMI** — advanced metering infrastructure (smart meters). **Li-SOCl₂** — lithium thionyl chloride primary (non-rechargeable) cell. **EDLC** — electric double-layer (super)capacitor. **ETO** — engineer-to-order. **ASP / OPM / SAM / TAM** — average selling price / operating margin / serviceable-addressable / total-addressable market. **KEPCO** — Korea Electric Power Corporation. **KSTAR / ITER** — Korean / international fusion-research tokamaks. **DART** — Korea's electronic disclosure system; **rcept_no** — filing receipt number. 사업주회사 (saeop-jiju-hoesa) — operating holding company. 사업보고서 (saeop-bogoseo) — Annual Report. 비츠로셀 (Vitzrocell), 비츠로일렉트릭 (Vitzro Electric), 비츠로넥스텍 (Vitzro Nextech) — the three operating subsidiaries.

SCOPE & DISCLAIMER

This is a **market-research and business-analysis document** for sector and competitive analysis; it is **not investment advice and contains no price target or valuation.** Company financials are cited **only as evidence of a market dynamic**, never as a value argument. Research-house figures are third-party market forecasts; forward fans and scenarios are illustrative constructs, not forecasts of record. Prepared by Nathan Research Group, Seoul, 2026-06-18.