

Solid Power - How Much Cell Capability to Keep In-House?

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Decision scope: Pace and scope of internal cell/pilot capability within a partner-led commercialization strategy

Case convention: The advisor role and decision assignment are classroom constructions, not a documented board meeting or debate. Company statements and events are identified as such; no private deliberations are represented. [S1]

The decision

On 28 February 2024, Solid Power filed its 2023 annual report. It described a strategy built around selling sulfide solid electrolyte and licensing cell designs and manufacturing processes. The company said it did not intend to manufacture cells over the long term or build gigafactories; its pilot lines were expected to support development and research. [S1]

Yet internal cell work remained part of the route to commercialization. Solid Power had delivered A-sample EV cells to BMW for automotive qualification in November 2023, and a separate BMW announcement described a prototype line at BMW's own competence center under an R&D license. Neither announcement established successful qualification or commercial adoption. [S2] [S3]

In January 2024, Solid Power announced three new SK On agreements: a milestone-based R&D license, design and installation of a cell line at SK On's Korean facility, and validation-gated electrolyte supply. The company said it expected at least \$50 million across the agreements upon milestones and deliveries. The public summary did not disclose complete executed terms or the economics of each activity. [S4]

Assignment: Assume you are an outside strategy advisor preparing a classroom recommendation for a hypothetical Solid Power board discussion. Recommend the pace and scope of incremental internal cell/pilot capability as the company pursues partner-led commercialization. Specify what capability to preserve, what additional work (if any) to authorize, and the evidence-based gates for increasing, holding or reducing it. Address partner dependence, manufacturing learning, customer qualification and capital exposure. Use only information public by 28 February 2024. This assignment does not represent an actual board discussion.

An EV-scale owned manufacturing plant is a contingent stress test if partner capacity or timing proves persistently inadequate and project-level economics become supportable. No contemporaneous owned-scale project scope or quote is available here; do not treat such a plant as a supported immediate alternative. [S1]

What Solid Power was trying to commercialize

Solid Power's technology proposition centered on sulfide solid electrolyte and solid-state cell designs and processes. Management described electrolyte sales and licensing as its two strategic elements. It also described continued cell production in pilot lines to develop cells, provide samples and support partners. Those are management's stated strategy and claims, not independent proof of performance or a forecast of customer adoption. [S1]

The activities span distinct capabilities. Electrolyte formulation and production can support both cell development and a potential materials business. Cell design, process know-how and pilot manufacture generate information about whether laboratory designs can be built into repeatable cells. Customer qualification tests whether a cell meets a specific automaker's requirements. High-volume cell manufacturing adds scale, yield, quality-control, supply-chain and capital requirements. The public sources do not quantify the learning or cost advantage Solid Power would gain by expanding its own pilot capability.

Exhibit 1. Capability and control map

Activity	Solid Power position at cutoff	Partner role or dependency	What the public record establishes
Sulfide electrolyte formulation and production	Produced electrolyte; management reported 30 metric tonnes of annual capacity commissioned in 2023.	Partners and customers determine qualification and demand.	Capacity is not actual output, saleable yield or contracted demand. [S1]
Cell design and process development	Developed cells and licensed cell designs/manufacturing processes.	BMW, Ford and SK On were strategic partners; full agreement terms were not public.	Company said cells remained in development and needed further research before commercialization. [S1]
Pilot manufacture, testing and samples	Operated cell pilot lines for development and partner support.	BMW reported its own planned prototype line; SK On was to host a line design/procured/installed by Solid Power.	BMW A-sample delivery entered qualification; no successful qualification was reported in the cited sources. [S2] [S3] [S4]
Automotive qualification	Supplied cells for testing.	Automakers set program-specific qualification and vehicle-integration requirements.	Entry into qualification is not completion, adoption or volume demand. [S2]
EV-scale manufacturing	Not Solid Power's stated long-term plan.	The partner-led strategy relied on cell makers/automakers and their production assets.	No owned-scale project scope, capacity, capex or return estimate was disclosed. [S1]

Sources: Solid Power 2023 Form 10-K (S1); BMW release (S2); Solid Power A-sample release (S3); SK On agreements release (S4). Simplified map; contractual control rights and detailed division of work are not fully public.

A partner-led commercial test

The 16 January 2024 SK On announcement described three separate commercial pathways. First, SK On would make \$20 million in R&D license payments during 2024-2027, subject to milestones; the license was for research and development, not commercial cell production. Second, Solid Power estimated \$22 million for cell-line design, procurement and installation at SK On's Korean facility, with construction expected in 2024 and completion in 2025; payments were milestone-based. Third, after validation, SK On was required to purchase at least eight metric tonnes of electrolyte through 2030, while Solid Power said it expected at least \$10 million depending on volumes. The company's at-least-\$50-million headline was an expectation conditional on milestones and electrolyte deliveries. [S4]

These components should not be read as equivalent. R&D license payments depend on milestones; line installation is gross project value with costs, accounting and cash timing undisclosed; electrolyte purchases are gated by validation and volume. The public release is a summary, not the executed agreements. It does not establish installation margin or pass-through costs, acceptance and remedies, invoicing and collections, or the full IP and termination terms. [S4]

Exhibit 2. SK On agreements as announced on 16 January 2024

Component	Publicly announced terms	Condition / unknowns
R&D license	\$20m payments during 2024-2027	Milestones; research/development rights, not commercial cell production. Detailed schedule and agreement terms not public.
Cell-line design and installation	Estimated \$22m for design, procurement and installation; construction expected in 2024, completion in 2025	Milestone payments. Project costs, pass-through items, margin, acceptance, recognition and collection timing unknown.
Electrolyte supply	Validation purchases, then at least 8 metric tonnes through 2030; Solid Power expected at least \$10m depending on volumes	Validation, actual volume, price and unit economics not fully disclosed.
Combined company expectation	At least \$50m across agreements	Company expectation upon milestones and deliveries; not backlog, guaranteed revenue, profit or cash collected.

Source: S4, "The Agreements." Dollar values as announced; no reconstruction of undisclosed contract economics.

The contracts made the partner-led model more testable, but they did not remove execution risk. Solid Power's annual report disclosed dependence on a limited set of partners and stated that the company often could not control their pace or scope. It also listed partner failure and the possibility of creating its own capacity among risks. These are risk disclosures, not evidence that a partner had failed or delayed. [S1]

Capital and operating context

Solid Power reported 2023 revenue of \$17.410 million, compared with \$11.789 million in 2022. Revenue came mainly from joint-development agreements, government contracts and research and development activity; it was not evidence of scaled electrolyte sales or commercial cell licensing. For 2023, operating loss was \$90.620 million, operating cash use was \$58.261 million and cash purchases of property and equipment were \$34.512 million. [S1]

At year-end, the company reported \$34.537 million cash, \$141.505 million marketable securities and \$239.566 million long-term investments. Management's reported total liquidity was \$415.608 million. The long-term investments should not be treated as unrestricted cash. Management expected 2024 capital spending to focus mainly on finishing its electrolyte R&D facility and enhancing electrolyte production capability. [S1]

Exhibit 3. Selected financial and investment context

USD millions; fiscal years ended 31 December. Company-reported unless stated otherwise.

Measure	2022	2023
Revenue	11.789	17.410
Cash PP&E purchases	58.296	34.512
Operating loss	-	90.620
Operating cash use	-	58.261

Balance-sheet measure at 31 Dec 2023	USD millions
Cash	34.537
Marketable securities	141.505
Long-term investments	239.566
Management-reported total liquidity	415.608

Source: S1, Item 7 and financial statements, pp. 35-50. Amounts converted from reported thousands; dashes indicate not shown. "Operating cash use" and "cash PP&E purchases" are outflows. Revenue reflects development and government work as well as other activity; it is not a proxy for recurring commercial sales. Accounting construction-in-progress at year-end included \$11.352m for SP2, \$0.773m for a second SP1 cell pilot line and \$1.525m for other SP1 projects; these are balances, not total project costs or returns. [S1]

The financial picture frames the cost of continued development, but does not supply an investment budget for a new pilot line. The company also had continuing R&D, facility and commercialization needs. No public source reviewed supplies a quoted cost, capacity, staffing plan, commissioning schedule or expected yield for a hypothetical owned-scale cell project. [S1]

Other commercialization architectures

Solid Power was not choosing between “all internal” and “all external.” Its announced model already combined internal pilot work with partner licenses, partner facilities and electrolyte production. Other solid-state battery announcements also mixed internal and partner capabilities, although they are not directly comparable.

Exhibit 4. Selected announced architectures by the cutoff

Company / partnership	Announced arrangement by cutoff	Status and comparison limit
Solid Power / BMW	BMW said an R&D license enabled it to establish a prototype line at its competence center; Solid Power continued cell development and sample work.	Planned prototype capability and sample qualification activity; no commercial outcome established. [S2] [S3]
Solid Power / SK On	R&D license, cell-line installation at SK On, and validation-gated electrolyte supply.	Agreement summary with milestone and volume conditions; executed economics and subsequent outcomes unavailable at cutoff. [S4]
Toyota / Idemitsu	Toyota described combining battery mass-production capability with Idemitsu's solid-electrolyte production/development; it targeted commercialization in 2027-28.	Company target, not achieved production. [S5]
QuantumScape / Volkswagen	QuantumScape's FY2023 filing described its QS-0 pre-pilot line and a planned QS-1 pathway involving the Volkswagen joint venture QSV.	Filing was public 27 February 2024; architecture only. Technology, financing, scale and rights differ. [S6]

Sources: S2, S3, S4, S5 and S6. The examples establish variation in announced architectures, not comparative performance or superiority.

Options for the advisor's recommendation

The advisor may develop another option, but should make its scope and stage gates explicit.

- 1. Hold internal cell capability near the disclosed plan.** Continue cell development, samples and pilot-line work needed for current partner programs; keep the announced emphasis on electrolyte and licensing. Define evidence that would warrant incremental cell spending.
- 2. Authorize selective incremental pilot capability.** Expand targeted internal process-control, testing or pilot work where a specific learning or qualification gap is identified. Set staged release criteria and a stop/hold rule; preserve partners as the intended route to commercial manufacturing.
- 3. Shift more development and validation to partners.** Limit additional internal cell-line commitments and prioritize joint work at partner facilities, while retaining enough internal expertise to interpret results, protect know-how and support electrolyte and licensing activity. Identify what data, access and partner capacity would be needed.

An EV-scale owned plant can appear only as a contingent stress test: what future evidence would make a separately scoped project worth evaluating? The sources provide no project cost

or scale estimate for such a choice. [S1]

Submit a short advisor memo recommending a capability envelope and a staged decision rule. Identify (a) which work remains internal, (b) which evidence must come from partner lines or customer qualification, (c) the gates for adding or reducing internal pilot scope, (d) the milestones and information rights to seek in partner arrangements, and (e) what evidence would change your recommendation. Do not infer a plant budget or contract contribution from the aggregate figures above.

Discussion questions

1. What learning can Solid Power obtain from its own pilot capability that it may not obtain through partner facilities? Which learning is specific to its electrolyte, cell design or manufacturing process?
2. How should a company weigh complementary assets and customer access against dependence, bargaining risk and possible know-how leakage?
3. Which announced SK On components test the partner-led strategy, and what do they not establish about commercialization economics?
4. What observable gates should precede additional internal pilot investment? Which are technical, customer, partner-capacity or financial gates?
5. What would make partner-led commercialization cease to be credible? What evidence, rather than a general risk disclosure, should trigger reconsideration?
6. How should Solid Power retain strategic options without making an unsupported immediate commitment to EV-scale owned manufacturing?

Sources

- **[S1]** Solid Power, 2023 Form 10-K, filed 28 February 2024, accession 0001558370-24-001906. [SEC filing](#), especially Item 1, pp. 6-10; Item 1A, pp. 17-27; Item 7, pp. 35-42; financial statements, pp. 47-50; Notes 1 and 3, pp. 51, 55.
- **[S2]** BMW Group, “BMW Group and Solid Power deepen Joint Development Partnership,” 20 January 2023. [BMW release](#).
- **[S3]** Solid Power, “Solid Power Releases Third Quarter 2023 Results; Ships First A-Sample EV Cells to Enter Automotive Qualification,” 7 November 2023. [Company release](#).
- **[S4]** Solid Power, “Solid Power and SK On Deepen Partnership with New Agreements,” 16 January 2024. [Company release](#), “The Agreements.”
- **[S5]** Toyota Motor Corporation, “Idemitsu and Toyota Announce Beginning of Cooperation toward Mass Production of All-Solid-State Batteries for BEVs,” 12 October 2023. [Toyota release](#).
- **[S6]** QuantumScape, FY2023 Form 10-K, filed 27 February 2024, accession 0000950170-24-021100. [SEC filing](#).