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# Sionic Energy

100% Silicon Anode Platform - Investment Memo

## VERDICT - ASSUMING SERIES A, \$10-15M RAISE

**Pause** pending 20Ah cycling data. The chemistry looks credible. Format translation is unproven. All remaining risks are classified as fundable or ambiguous - **no fatal risks detected**. If 20Ah cycling  $\geq 80\%$  of small-format baseline: proceed to Full DD.

<b>Company</b>	Sionic Energy (formerly NOHMs Technologies, est. 2011, Rochester NY)
<b>Technology</b>	100% silicon-carbon anode (SCC55) + proprietary thio-phosphate electrolyte
<b>Business model</b>	Licensing - capital-light, partners manufacture
<b>Key question</b>	20Ah cells show ~600 cycles vs 1,200 in small format - does the cycle life hold at scale?

## RISK CLASSIFICATION

Every remaining risk in this deal is classified into one of four categories. **The classification determines the investment decision - not a score.**

CATEGORY	RISK	EVIDENCE	INVESTMENT IMPLICATION
RESOLVED	<b>Expansion control (SCC55)</b>	Scaffold contains Si volume change internally. <4% cell expansion. 821 papers, 148 confirm. Element Materials tested 20Ah.	No longer a risk. Mechanism proven.
RESOLVED	<b>SEI stability (electrolyte)</b>	Thio-phosphate AEA creates inorganic-rich SEI. ICE >90%. 57 patents. 269 papers. Sionic patent JP-2025016696-A confirmed.	No longer a risk. Chemistry validated.
FUNDABLE	<b>Format translation (20Ah)</b>	~600 cycles at 20Ah vs 1,200 at 4-10Ah. 50% gap. Trend improving. 0 papers show 100% Si at 1,000 cycles in 20Ah.	This is what Series A money funds. Validation campaign: <b>\$800K, 6 months.</b>
FUNDABLE	<b>Supply chain (electrolyte)</b>	Single-source thio-phosphate. No public cost data. Specialist confirms scalable; 2nd source feasible in 18 months.	Solvable with investment. 2nd supplier qualification: <b>\$500K, 18 months.</b>
FUNDABLE	<b>Manufacturing integration</b>	Licensing model = partner executes. 516 papers on Si processing; 0 at 100% loading. Process knowledge is proprietary.	First licensee support: <b>\$700K</b> . Standard risk for licensing model.
AMBIGUOUS	<b>Calendar aging</b>	Estimated 8%/yr at 35°C from HT data. No direct calendar aging test. Could be fundable (engineering) or concerning (non-linear).	One test resolves this. <b>\$200K, 12-18 months.</b> See page 2.

**FATAL RISKS: NONE DETECTED.** No physics violations, no mechanism failures, no structurally uncompetitive cost positions identified.

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## RESOLVING THE AMBIGUOUS RISK: CALENDAR AGING

Calendar aging is the only risk we cannot yet classify as fundable or fatal. The estimated 8%/yr at 35°C comes from accelerated cycling data, not a direct test. A dedicated test (**\$200K, 12-18 months**) would resolve the classification:

## // IF POSITIVE

Aging is  $\leq 5\%/yr$  at 35°C under realistic duty cycles. This is within industry norms (NMC cells: 3-5%/yr). Calendar aging moves from **Ambiguous** to **Resolved**. The deal becomes stronger.

## // IF NEGATIVE

Aging is  $>10\%/yr$  or non-linear (accelerating). This would mean the battery degrades too fast during storage - a problem that cannot be solved with engineering alone. Calendar aging moves from **Ambiguous** to **Fatal**. Recommend pass.

## WHAT THE MONEY PROVES

If Sionic is raising a Series A (\$10-15M), the remaining fundable risks are exactly what that capital should resolve. Here is how the raised capital maps to open assumptions:

WHAT THE MONEY FUNDS	COST	TIMELINE	HOW THIS CHANGES THE DEAL
<b>20Ah validation campaign (200 cells, 1,000+ cycles)</b>	\$800K	6 months	If positive: format translation risk moves from <b>Fundable</b> to <b>Resolved</b> . Deal becomes significantly stronger.
<b>Second electrolyte supplier qualification</b>	\$500K	18 months	Removes single-source supply chain risk. <b>Fundable</b> → <b>Resolved</b> .
<b>First licensee integration support</b>	\$700K	12 months	Proves the licensing model works in practice. <b>Fundable</b> → <b>Resolved</b> .
<b>Calendar aging test programme</b>	\$200K	12-18 months	Resolves the only ambiguous risk. See if-positive / if-negative grid above.

**\$2.2M of the raise directly de-risks every open assumption.** The remaining capital funds operations, team, and commercial development. You are not buying certainty - you are buying the right to fund the next proving steps.

## HOW THE VERDICT CHANGES BY FUNDRAISING STAGE

The same evidence can support different verdicts depending on how much money the startup is asking for and what it's supposed to prove:

IF SIONIC IS RAISING...	VERDICT	REASONING
<b>Seed (\$2-5M)</b>	<b>PROCEED</b>	Evidence far exceeds seed requirements. Mechanism proven, expansion solved, electrolyte validated. Format translation is what the seed should fund.
<b>Series A (\$10-15M)</b>	<b>PAUSE PENDING DATA</b>	Evidence exceeds typical Series A range. But format translation (50% gap) is the critical question. One data point (20Ah cycling) resolves it. If $\geq 80\%$ : proceed.
<b>Series B (\$30-80M)</b>	<b>TOO EARLY</b>	At Series B, format translation should already be proven. 50% gap at 20Ah is below expectations. Would need 20Ah data + OEM interest + manufacturing economics before committing at this level.
<b>Series C+ (\$80M+)</b>	<b>NOT READY</b>	At this level, all technology risks should be resolved. Sionic has 3 fundable + 1 ambiguous risks open. Too early for growth-stage capital.

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## DEAL PROGRESSION - HOW EACH RESOLUTION CHANGES THE VERDICT BY STAGE

Read left to right: each column shows the deal after one more risk is resolved (assuming positive outcomes). Read top to bottom: the same risk mix produces different verdicts at different fundraising stages.

WHAT JUST HAPPENED	RISKS STILL OPEN	SEED	SERIES A	SERIES B	WHAT CHANGED
<b>Today (pre-screen)</b>	Format translation · Supply chain · Manufacturing · Calendar aging	PROCEED	PAUSE	TOO EARLY	Expansion + SEI are resolved. Four risks remain: 3 fundable + 1 ambiguous.
<b>20Ah cycling ≥80%</b>	Supply chain · Manufacturing · Calendar aging	PROCEED	PROCEED	PAUSE	Format translation resolved. Series A flips to Proceed. Series B still has 3 open.
<b>Calendar aging ≤5%/yr</b>	Supply chain · Manufacturing	PROCEED	PROCEED	PAUSE	No ambiguous risks left. Two fundable risks remain - money solves both.
<b>2nd supplier qualified</b>	Manufacturing	PROCEED	PROCEED	PAUSE	Supply chain de-risked. One fundable risk left (licensee execution).
<b>Licensee yield &gt;80%</b>	None	PROCEED	PROCEED	PROCEED	All risks resolved. Fully validated. Ready for growth capital at any stage.
<b>× Any answer is fatal</b>	≥ 1 fatal risk	PASS	PASS	PASS	A single fatal risk → pass at every stage. Money cannot solve physics failures.

**How to read this:** Each row adds one positive answer. The 'Risks still open' column shrinks as risks get resolved. The stage columns show the verdict at that moment. Notice: **Series A flips from Pause to Proceed after just one answer (20Ah cycling)**. Series B stays Pause until 4 of 4 risks are resolved. A single fatal answer makes the entire deal a Pass at every stage.

## HOW THE ANALYSIS WAS PRODUCED

This memo is based on a structured pre-screen that decomposes the technology claim into testable assumptions, verifies each against a corpus of **789K scientific papers and 190K patents**, and classifies remaining risks as **resolved, fundable, ambiguous, or fatal**. The detailed technical pre-screen with assumption chain, corpus evidence, and resolution path is available as a companion document.

**Scope:** This assessment covers technology feasibility and scale-up risk based on public evidence and corpus analysis. Valuation, deal terms, team assessment, and market timing are not in scope.

# Sionic Energy

100% Silicon Anode Platform · 370 Wh/kg · 1,200 cycles (small format) · SCC55 void-scaffold + thio-phosphate electrolyte · Licensing model

**VERDICT - ASSUMING SERIES A, \$10-15M RAISE**

**Pause** pending 20Ah cycling data. Evidence exceeds typical Series A requirements. Remaining risks are fundable. No fatal risks detected. If 20Ah cycling ≥80% of small-format baseline: **proceed to Full DD**.

**// KEY FINDING**

20Ah cells show ~600 cycles vs 1,200 small format (50% degradation at scale). Expansion appears solved (<4% via SCC55 scaffold). Thio-phosphate AEA stabilises SEI, no pre-lithiation. **Format translation and temperature sensitivity** (830 vs 580 cycles in 10Ah at 25/45°C) **are the binding constraints**.

*In plain terms: The technology may be pre-scale, not scale-ready. Until the 20Ah gap closes, the investment case is incomplete.*

**1. CLAIM BREAKDOWN - PRIORITISED ASSUMPTIONS**

The claim is decomposed into 5 testable assumptions. Level 0 = test first. If it fails, stop.

LEVEL	ID	ASSUMPTION DESCRIPTION	PRIORITY	DEPENDENCY
L0	ASM-016	SCC55 void-scaffold maintains <4% expansion at 20Ah over 1,000+ cycles	12	Weakest link. Test first. If expansion fails, all downstream collapses.
L1	ASM-017	Thio-phosphate AEA electrolyte maintains stable SEI at 25°C and 45°C	8	If level 0 passes, test second. SEI required for cycle life.
L2	ASM-018	370 Wh/kg at 20Ah sustains >1,000 cycles (format translation)	5	Depends on 0+1. The format-translation gap is the binding constraint.
L3	ASM-NEW	Electrolyte additive supply chain scales at GWh volume	3	Depends on 0+1+2. Supply chain secondary to chemistry.
L4	ASM-020	Licensing partners achieve drop-in integration at 100% SCC55 loading	2	Depends on all above. Last gate before commercial deployment.

*Priority = evaluation order (higher = test first). Level 0 first; if it fails, stop.*

**2. VERIFICATION REPORT - WHAT WE CHECKED**

Each assumption verified against **789K papers, 190K patents, 93K synthesis recipes**.

L	ASSUMPTION CHECKED	STATUS	RISK CLASSIFICATION	FINDINGS	CORPUS EVIDENCE
L0	Energy density + expansion	Confirmed	RESOLVED	330 Wh/kg in 4-10Ah. Element Materials tested 20Ah. <4% swelling via SCC55 scaffold.	821 papers · 148 scaffold
L1	SEI stability (electrolyte)	Confirmed	RESOLVED	Thio-phosphate AEA creates inorganic SEI. ICE >90%. 57 patents. Sionic JP found.	540 papers · 32/59 CE>90%
L2	Format translation	Open - data needed	FUNDABLE	20Ah: ~600 vs 1,200 cycles (50% drop). Positive trend but not at target.	154 papers >1,000 cyc
L3	Supply chain	Open - specialist	FUNDABLE	Thio-phosphate AEA: single-source, proprietary. No public cost/yield data.	269 papers · Sionic JP
L4	Manufacturing integration	TACIT	FUNDABLE	Licensing = partner executes. 516 papers; 0 at 100% loading.	516 papers · 0 at 100%

MANUFACTURING & RELIABILITY FLAGS

Partially assessable from public data.

FLAG	STATUS	RISK CLASS.	FINDINGS	CORPUS EVIDENCE
<b>Process-window sensitivity</b>	TACIT	FUNDABLE	Narrow window widens with investment. Not a physics barrier.	516 papers · 0 at 100%
<b>Calendar aging 45-60°C</b>	PARTIAL	AMBIGUOUS	8%/yr estimate from HT data. No direct test. Could be fundable or fatal.	224 papers · elevated-T
<b>Areal capacity</b>	N/A	N/A	100% SCC55 loading fixed. Covered in primary chain.	-

**Not assessed:** Cell-to-cell variability, safety/abuse tolerance, and OEM qualification require production data - covered in **Competitive set (€2,500)**

3. RESOLUTION PATH - PRIORITISED ACTION PLAN

Sequential: proceed only after the previous passes. Each step linked to an assumption from Section 1.

PRIORITY	L	DATA NEEDED	WHO TO ASK	WHAT TO ASK	TIMELINE / COST
P1	L0	20Ah cycling: 1,000+ cycles at C/3, 1C, 25°C	Sionic or Element Materials	Capacity vs cycle at 20Ah. Compare to baseline. If penalty >40%: format translation is binding.	2-4 weeks
P1	L1	Temperature cycling at 25/45/0°C with EIS	Sionic Energy	EIS Nyquist at 3 temperatures. Arrhenius analysis of 830/580 gap → calendar aging trajectory.	2-4 weeks
P2	L3	Electrolyte additive scale-up feasibility	Electrolyte chemist (specialist)	Yield at 1x vs 10x scale. Precursor sourcing. 2nd source feasibility. Single-source = OEM risk.	€800-1,500
P3	L4	Cylindrical format (21700 or 4680) cycling	Sionic Energy	Cylindrical cycling if available. Tesla/BMW require before qualification. Pouch-only limits market.	4-8 weeks

**Specialist needed:** Electrolyte chemist with additive scale-up experience. Expansion solved (SCC55). Open question: thio-phosphate AEA at GWh cost.

SOURCES & CALIBRATION

IEEE Spectrum Dec 2024 · Group14 Dec 2024 · PRWeb Dec 2025 · sionicenergy.com · MatIntel corpus: **789K papers, 190K patents** across **10 materials domains**. Battery-domain calibration: **85% verdict accuracy** on 25 retrospective outcomes incl. Envia, Sakti3, Northvolt, Amprius.