SES VS. LI-METAL PEERS

By Mark Newman and Professor Billy Wu as Consultants to Ivanhoe (1)

		SES Beyond Li-ion™	QuantumScape	Solid Power
3rd party validated		✓	X	X
Room Temperature Energy Density	Cell type	***4Ah (25+ layer) at 25°C (***Wh/kg)	1 layer and 4 layer	2Ah (10 layer) and 2 layer ***at 29°C (***Wh/kg)
	Low power C/20	>375*	n/a	330
	Low power C/10	375	n/a	~264
	Medium power 1C	339	n/a	~33
	High power 5C	321	n/a	n/a
0 °C Low Temperature Energy Density	Low power C/10	324	n/a	n/a
	Medium power 1C	298	n/a	n/a
	High power 5C	282	n/a	n/a
Lifetime	1-2 layer	n/a	1,000 cycles (>80% retention)	>250 cycles (>80% retention)
	3-4 layer	779 cycles (70% retention)**	>450 cycles (>90% retention)	n/a
	10 layer	n/a	n/a	>32 cycles (>80% retention)
	25+ layer	550 cycles (90% retention)**	n/a	n/a
Fast Charging	1 layer	n/a	80% in <15min	n/a
	10 layer	n/a	n/a	n/a
	25+ layer	80% in <15min	n/a	n/a
Safety	Thermal	Electrolyte is stable with Li above Li melting point	Electrolyte is stable with Li above Li melting point	n/a
	Nail	PASS TEST	n/a	n/a
	Overcharge	PASS TEST	n/a	n/a
	External Short Circuit	PASS TEST	n/a	n/a
Manufacturability		✓ (highly similar process to Li-ion)	? (unproven and complex for proprietary separator)	? (significant process changes vs. Li-ion)
Commercialization Timeline		Li-Metal: 2025***	Li-Metal: 2026***	Silicon: 2026 Li-Metal: After 2026?
Source		3rd party test data (Exponent and Eclipse) and SES internal data	Investor presentations; SEC filings	Company update Dec 2020 and company press releases

* Estimated; ** internal test data; *** Represents at-scale post-pilot production (QS-1 Expansion for QuantumScape and Expansion 1 for SES)

Note:
1. For additional information on Mark Newman and Billy Wu please see page 7

SES Beyond Li-ion™