BlueSolutions

Member Update

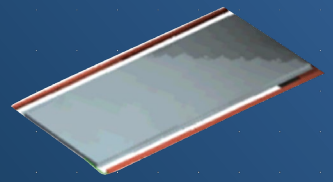
Gen4 SSB & Lithium Metal Anodes

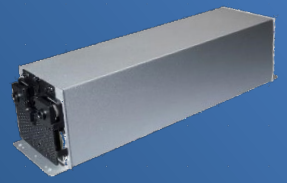
NAATBatt 2025 – Orlando, FL

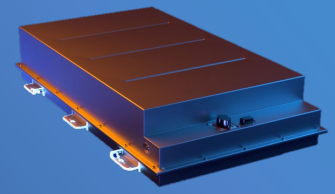
February 18, 2025

Blue Solutions in a Nutshell, our Competences

Products







Customers

DAIMLER

GAUSSIN MANUGISTIQUE

RATP

KEOLIS

transdev

bluebus

Manufacturing Experience

Serial Production: Since 2011

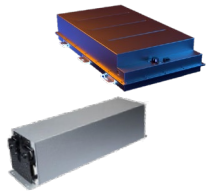
☑ > 1 GWh produced

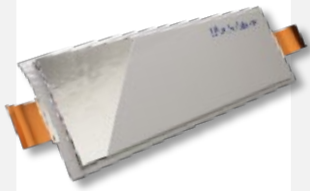
600 Million KM

Distance achieved

Pioneer in serial production of SSB & **Holistic** know-how in Packs & Integration

More than 3 million Solid -State Battery Cells produced in Canadian & French Pilot Plants since 2011.





~1980s	2001	2007	2011	2015	2018	2024	2029
French (**CEA/CNRS**) & Canadian (**Hydro-Québec/IREQ**)…	**In Canada**, creation of **Avestor**, a 50/50 JV between Hydro-Québec and Kerr-McGee						
	In France, a partnership between CEA, EDF & **Bolloré** leads to the creation of **Batscap**	**Bolloré Group** acquires Avestor and the merger with Batscap results in **Blue Solutions**	**1st electric car**, equipped with a 1*30 kWh pack providing a 250-km range	**1st electric bus**, equipped with 8*30 kWh packs providing a 180-km range	Contracts **with Daimler, Bluebus, RATP, Gaussin, ACTIA** to equip their electric buses	Gen4 A-Samples: **Li-Metal SSB to meet OEMs' specifications**	**Mass Production** of Gen4, starting by 5GWh
…developing a new polymeric electrolyte							

GEN 1 GEN 2 GEN 3 GEN 4

Blue Solutions' Gen4 SSB

World-first technological innovations:

- New Gen4 Electrolyte agnostic & HV cathodes compatible
- New ultra -thin Lithium metal anode of <20 µm

Fast Charging Up To 3C

Leaner Industrial Process

Sustainability

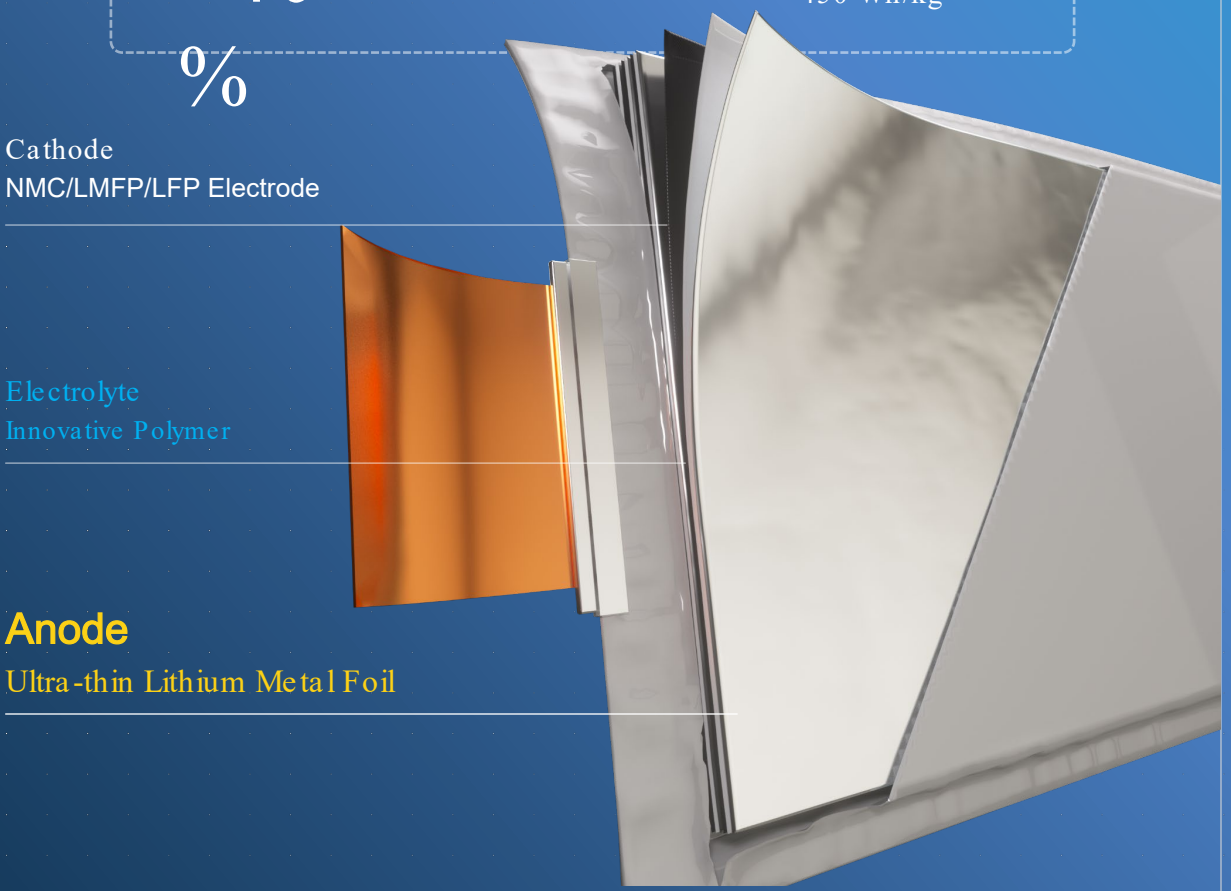
High Recyclability

Gen4 Benefits For OEMs

>40 %

Higher Energy Density vs. 2030 Li-ion

- 900 Wh/L
- 450 Wh/kg

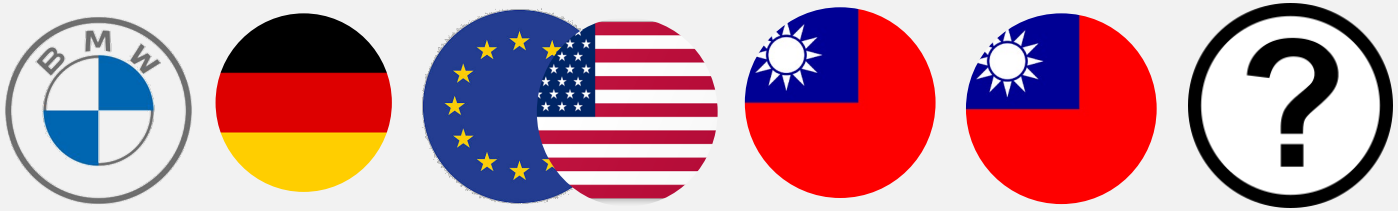


5 JDAs covering EVs and other applications

BlueSolutions

Signed :

- Passenger cars across all market segments
- Two-wheelers
- Commercial EVs
- IT applications



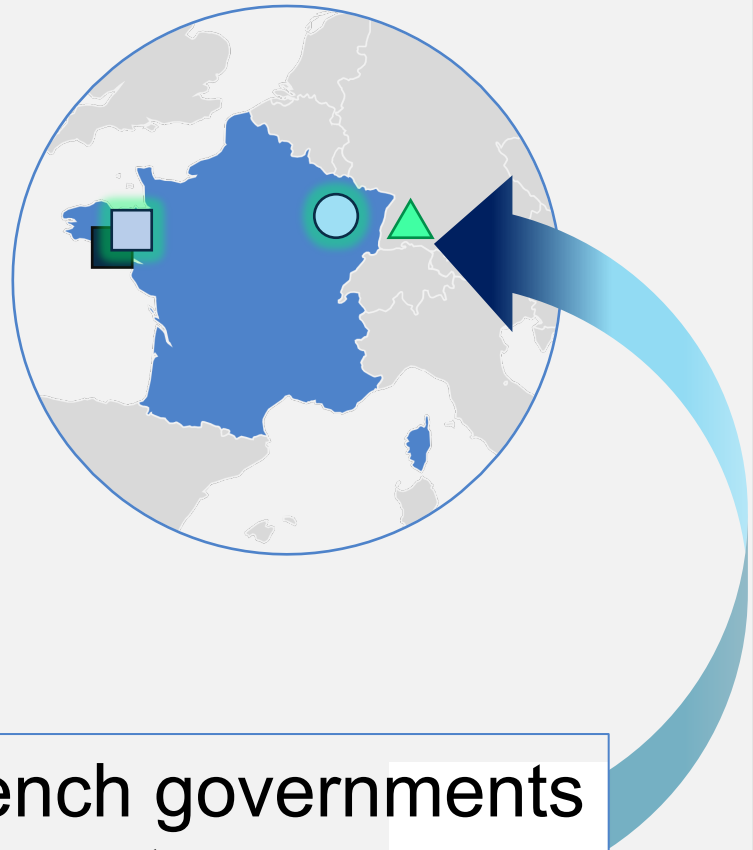
Soon !

Soon :

- In Asia under final negotiation

New R&D Partnerships & Funding (2024)

- Paris - College de France
- Grenoble - Laboratory of Electrochemistry and Physical Chemistry of Materials and Interfaces (LEPMI)
- Nantes – Institut Des Materiaux (IMN)
- 3rd party testing report



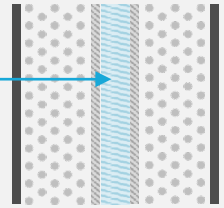
> € 1B commitments from French governments for 1st Giga-factory

Breakthrough: New ultra-thin Li-metal anode: reduced from ~60µm to <20µm thickness for higher density and lower cost

An optimal configuration for a thinner lithium anode

Gen3 configuration

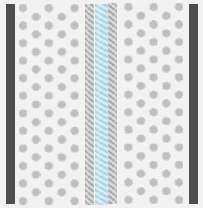
Lithium ~60µm thickness



Optimization

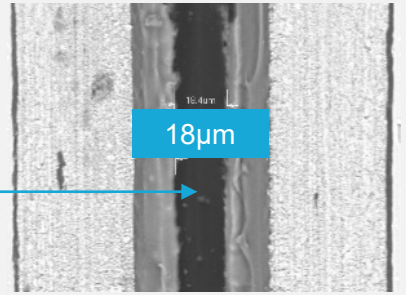
Gen4 configuration

Lithium <20µm thickness

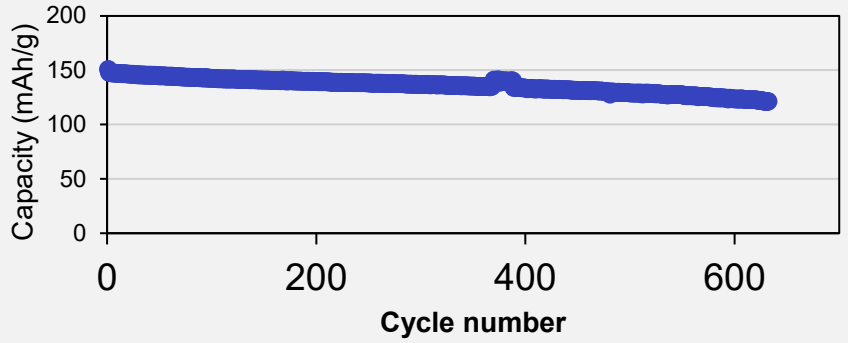


Proven manufacturability

Lithium



Proven Cyclability



Cycling conditions: LMFP, 40°C ; C/4 D/2 ; 2 bars

Note: diagrams not to scale, illustrative only

Gen4 targeted properties with differentiating characteristics across dimensions

Key differentiator Meeting auto OEM Key differentiator needs for EV mass adoption

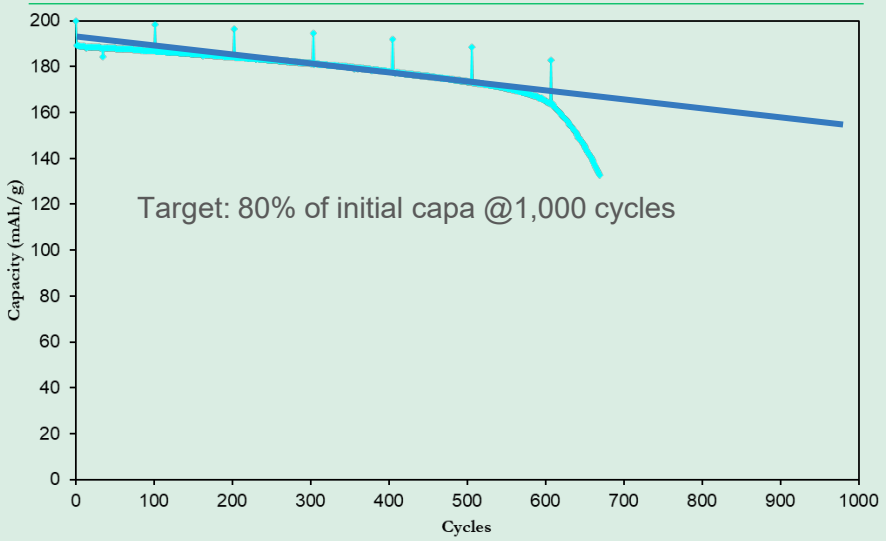
Gen4 targeted properties		NMC	LMFP
Performance	Operating temperature	from -20°C to 60°C	from -20°C to 60°C
	Fast charging rate	>3C *(fewer than 20 minutes)*	>3C *(fewer than 20 minutes)*
	Cycle life	>1,000	>1,000
	Volumetric density	>900 Wh/L	>600 Wh/L
	Gravimetric density	>450 Wh/kg	>350 Wh/kg
	Pressure	<2 bars	<2 bars
Safety	Fire hazard	Thermally stable electrolyte up to 250°C	Thermally stable electrolyte up to 250°C
Packaging			

Notes: (1) Assuming one charging cycle per week

Gen4 technology features a platform-based design compatible with three different cathodes and have very promising test results (1/2)

Current Pre-Sample A tests demonstrate and confirm cyclability

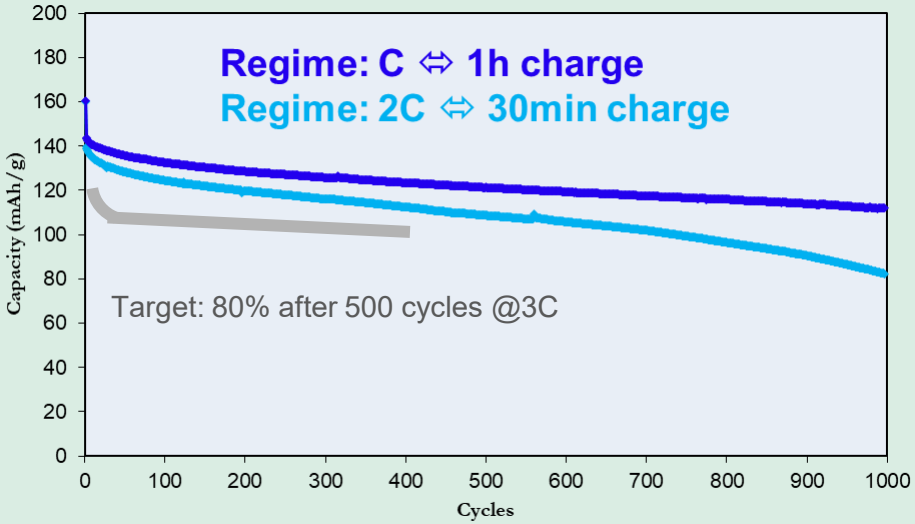
NMC



Achieving 600-700 cycles with NMC is already at par with other leading players (e.g., wit high silicon share) that achieve ~600 cycles

Cycling conditions: Tests performed in pouch cells, Electrolyte excess limited, 40°C (Temperature), C/4-D/2 (C-rate), 2 bars (Pressure applied)

LMFP



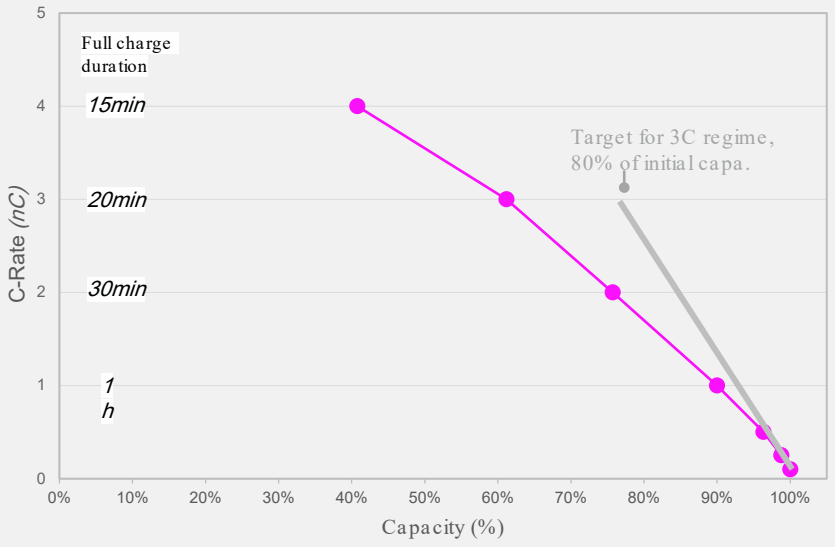
Blue Solutions did not face dendrite formation issues since launch of SSB Gens so far according to company information (evidenced by long lifetime of Gen2 and Gen3 product with >2500 cycles)

Cycling conditions: Tests performed in pouch cells, Electrolyte excess limited, 40°C (Temperature), nC-2nD (C-rate), 2 bars (Pressure applied)

Gen4 technology features a platform-based design compatible with three different cathodes and have very promising test results (2/2)

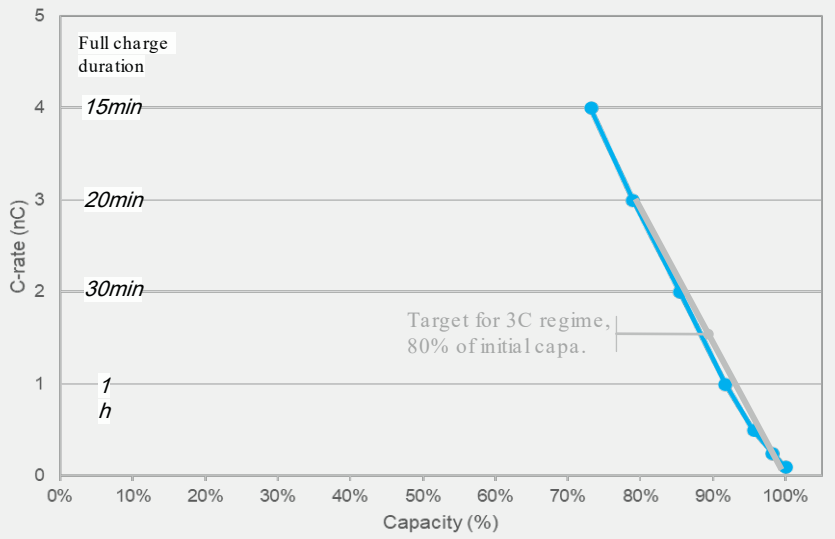
Current Pre-Sample A tests and confirm fast charging performance

NMC



- **NMC Gen4** has not yet fully reached fast charging target: **60% of capacity recovered at 3C,** vs. performance BEV OEM **target to guarantee >3C charging from 5% to 80% SoC**
- **Promising results** with **75% of capacity recovered at 2C** , i.e., in 22 minutes

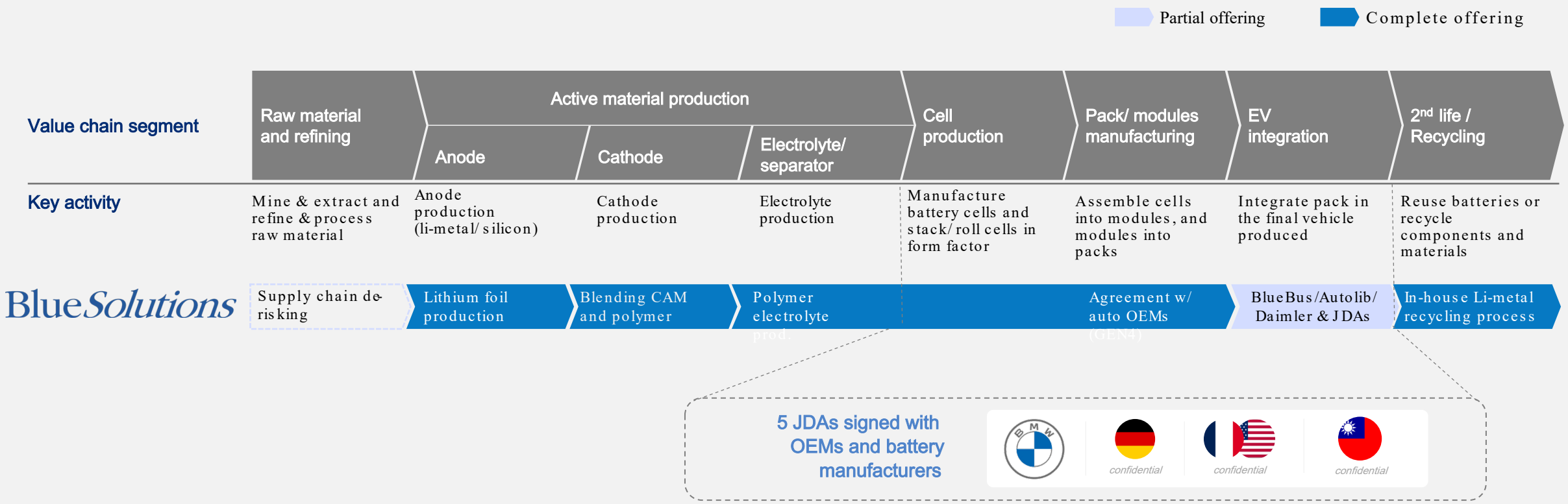
LMFP



- **LMFP Gen4 has successfully demonstrated fast charging ability**
- Pre-A sample **results have met 3C target**

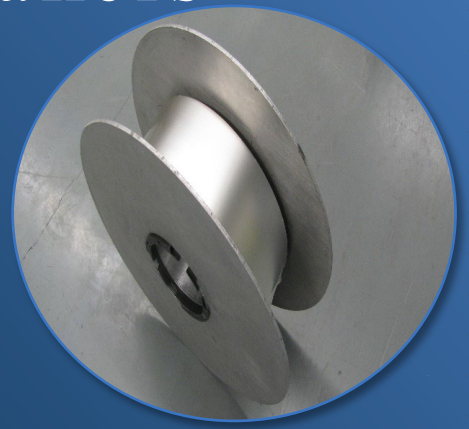
Cycling conditions: Tests performed in pouch cells, Electrolyte excess limited, 40°C (Temperature), 2 bars (Pressure applied)

Value chain coverage: Blue Solutions is the most integrated player from lithium extrusion to recycling

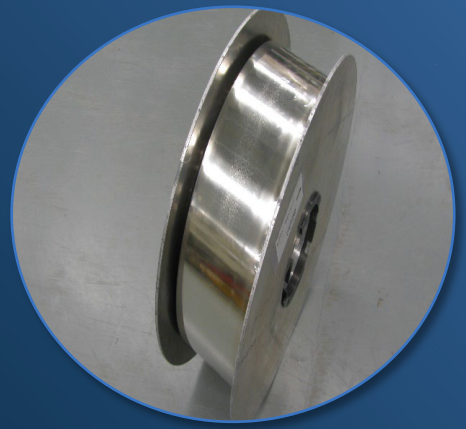


- Blue Solutions is the only full SSB player with **experience across the full value chain**. Upstream (e.g., li-foil production) and downstream (e.g., li-metal extraction & recycling) businesses as additions to cells production

Shipping Lithium Metal Anode Foil to battery makers



Extruded film
Width: 75 to 200 mm
Thickness: 0.12 to 0.3 mm
+/-0.01 mm
Up to 15 kg of lithium/roll



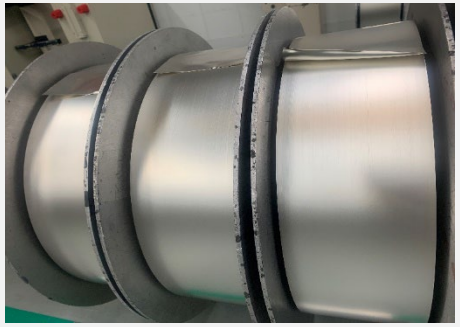
Rolling film
Width: 75 to 200 mm
Thickness: 30 to100 µm
+/- 1 µm
Up to 15 kg of lithium/roll

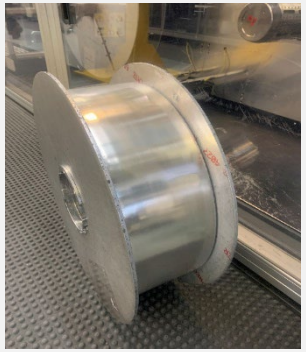
Future innovations
Width up to 250 mm
Ultra thin foil: 0.020 mm
Ultra thin foil laminate on current collector
Lithium alloy film

From **lithium metal ingots**
Battery grade 99.7 %

Li-metal anode foil - process innovation for over 25 years

- Over **110 000 km** of battery grade very thin lithium film produced in the past 20 years
- Over **600 metric tons** of lithium metal processed
- **High-speed extrusion** process with 15 kg of lithium per roll capacity
- Industrial lithium rolling process -**unmatched capability of width, length, thickness and speed.**
- Strong expertise in process and material development to **achieve new product requirements and challenges**.





OPEN FOR BUSINESS: REACH OUT WITH YOUR ORDER !

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NAATBATT 2025
EXTENDING RANGE
FEBRUARY 17-20, 2025
OMNI CHAMPIONSGATE
ORLANDO, FLORIDA

Thank You

Adrian Tylim
Head Business Development