

Albemarle Corporation

Lithium supply bottlenecks: from mine to market

Eric Norris
President, Lithium

Citi Basic Materials Conference, Battery Supply Chain
Wednesday, November 28th, 2018



Forward-Looking Statements

Some of the information presented in this presentation, the earnings conference call and discussions that follow, including, without limitation, information related to product development, production capacity, committed volumes, market trends, pricing, expected growth, earnings and demand for our products, input costs, surcharges, tax rates, stock repurchases, dividends, cash flow generation, costs and cost synergies, capital projects, economic trends, outlook and all other information relating to matters that are not historical facts may constitute forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Actual results could differ materially from the views expressed.

Factors that could cause actual results to differ materially from the outlook expressed or implied in any forward-looking statement include, without limitation: changes in economic and business conditions; changes in financial and operating performance of our major customers and industries and markets served by us; the timing of orders received from customers; the gain or loss of significant customers; competition from other manufacturers; changes in the demand for our products or the end-user markets in which our products are sold; limitations or prohibitions on the manufacture and sale of our products; availability of raw materials; increases in the cost of raw materials and energy, and our ability to pass through such increases to our customers; changes in our markets in general; fluctuations in foreign currencies; changes in laws and government regulation impacting our operations or our products; the occurrence of regulatory actions, proceedings, claims or litigation; the occurrence of cyber-security breaches, terrorist attacks, industrial accidents, natural disasters or climate change; the inability to maintain current levels of product or premises liability insurance or the denial of such coverage; political unrest affecting the global economy, including adverse effects from terrorism or hostilities; political instability affecting our manufacturing operations or joint ventures; changes in accounting standards; the inability to achieve results from our global manufacturing cost reduction initiatives as well as our ongoing continuous improvement and rationalization programs; changes in the jurisdictional mix of our earnings and changes in tax laws and rates; changes in monetary policies, inflation or interest rates that may impact our ability to raise capital or increase our cost of funds, impact the performance of our pension fund investments and increase our pension expense and funding obligations; volatility and uncertainties in the debt and equity markets; technology or intellectual property infringement, including cyber-security breaches, and other innovation risks; decisions we may make in the future; the ability to successfully execute, operate and integrate acquisitions and divestitures; and the other factors detailed from time to time in the reports we file with the SEC, including those described under “Risk Factors” in our Annual Report on Form 10-K and our Quarterly Reports on Form 10-Q. These forward-looking statements speak only as of the date of this presentation. We assume no obligation to provide any revisions to any forward-looking statements should circumstances change, except as otherwise required by securities and other applicable laws.

Non-GAAP Financial Measures

It should be noted that Adjusted net income attributable to Albemarle Corporation (“Adjusted earnings”), Adjusted diluted earnings per share attributable to Albemarle Corporation, Adjusted effective income tax rates, segment operating profit, segment income, pro-forma net sales, net sales excluding the impact of foreign exchange translation (“ex FX”), EBITDA, Adj. EBITDA, Adj. EBITDA by operating segment, EBITDA margin, Adj. EBITDA margin, pro-forma Adj. EBITDA, pro-forma Adj. EBITDA margin, Adj. EBITDA excluding the impact of foreign exchange translation (“ex FX”), Adj. EBITDA margin excluding the impact of foreign exchange translation (“ex FX”), net debt to Adj. EBITDA, gross debt to Adj. EBITDA, free cash flow, and Adjusted free cash flow are financial measures that are not required by, or presented in accordance with, accounting principles generally accepted in the United States, or GAAP. These measures are presented here to provide additional useful measurements to review our operations, provide transparency to investors and enable period-to-period comparability of financial performance. The Company’s chief operating decision maker uses these measures to assess the ongoing performance of the Company and its segments, as well as for business and enterprise planning purposes.

A description of these and other non-GAAP financial measures that we use to evaluate our operations and financial performance, and reconciliation of these non-GAAP financial measures to the most directly comparable financial measures calculated and reported in accordance with GAAP, can be found in the Appendix to this presentation. The Company does not provide a reconciliation of forward looking non-GAAP financial measures to the most directly comparable financial measures calculated and reported in accordance with GAAP, as the Company is unable to estimate significant non-recurring or unusual items without unreasonable effort. The amounts and timing of these items are uncertain and could be material to the Company’s results calculated in accordance with GAAP.

Albemarle Snapshot

Founded	1887
Global Employees	~5,400
Countries ¹	~100
Dividend Yield ²	1.3%
Market Cap ³	\$10.9B

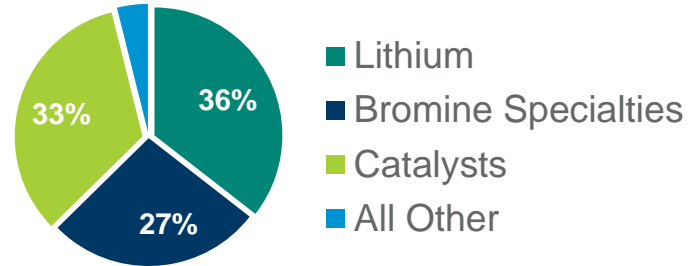
Financial Highlights⁴

Trailing Twelve Months Ended September 30, 2018

Net Sales	\$3.3B
Net Income ⁵	\$346M
Adj. EBITDA	\$988M
Adj. EBITDA Margin ⁶	30%

Net Sales by Segment⁴

Trailing Twelve Months Ended September 30, 2018



Providing innovative solutions to power the potential of energy efficiency

¹Based on destinations of FY2017 product sales.

²\$102.38 closing price as of November 9, 2018; annualized dividend of \$1.34 per share announced October 30, 2018.

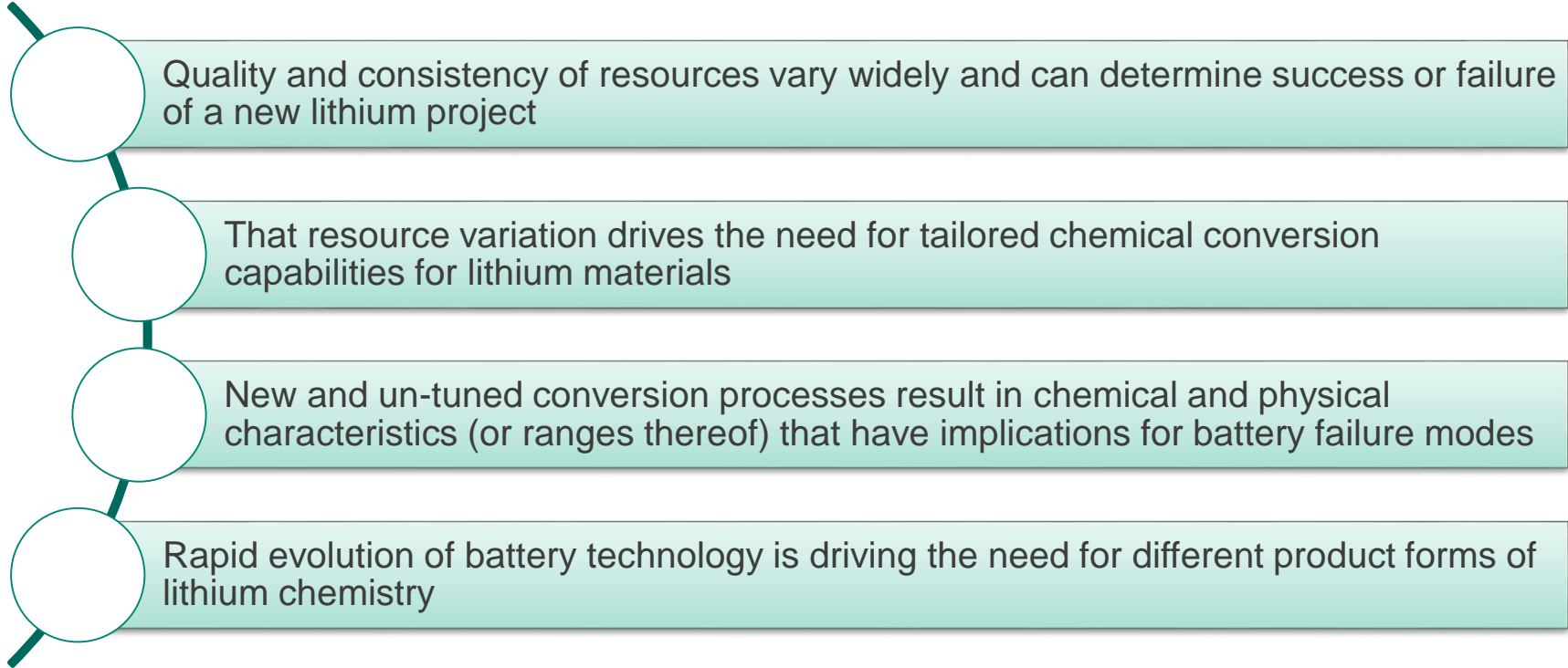
³\$102.38 closing price as of November 9, 2018; 106,187 million diluted shares outstanding as of September 30, 2018.

⁴Includes financial contribution from Polyolefin Catalysts & components business divested April 3, 2018.

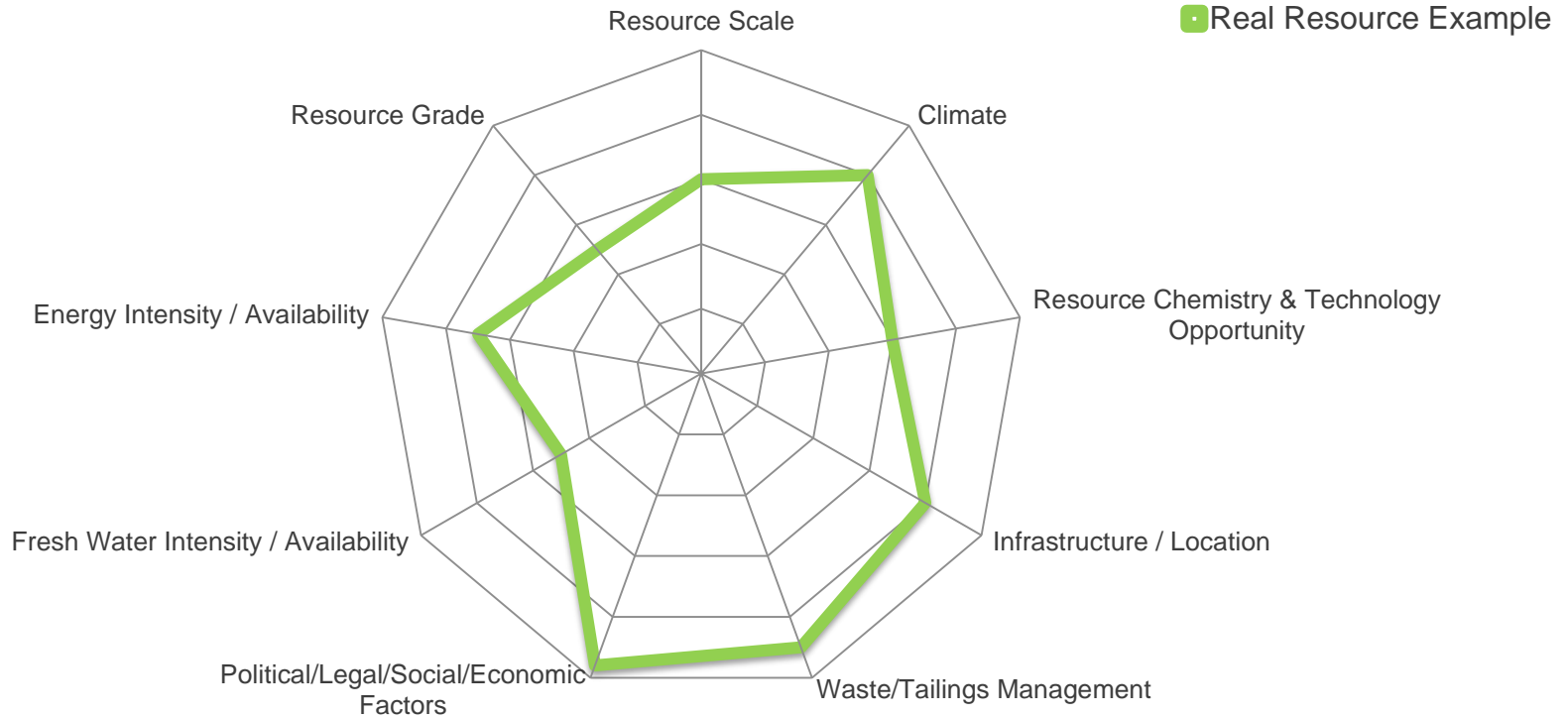
⁵Attributable to Albemarle Corporation.

⁶Non-GAAP measure. Adjusted EBITDA margin calculated by dividing net sales by Adjusted EBITDA.

Why is it challenging to get new lithium supply to market?

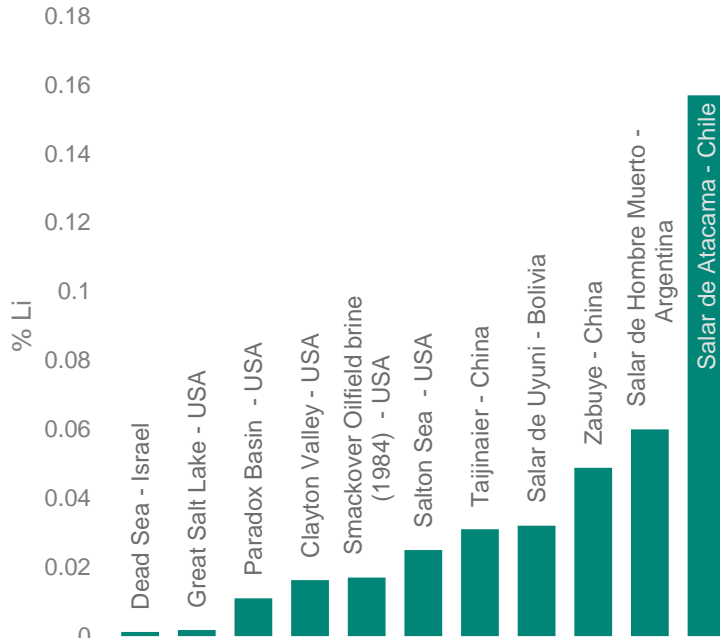


Each resource is unique – in many different respects



Complex considerations make it hard to evaluate ultimate success of a project

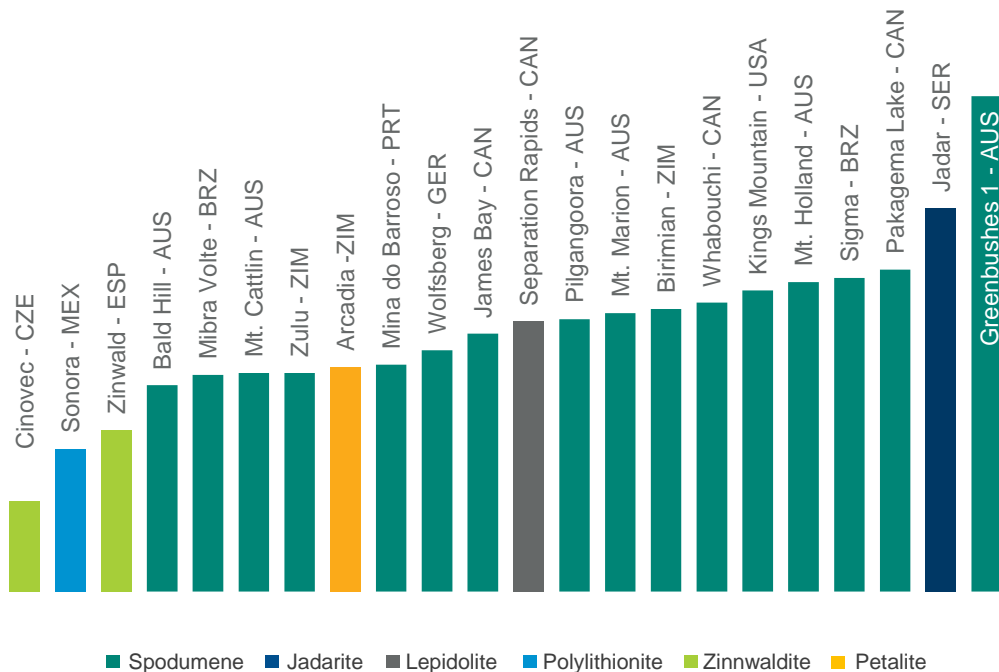
Brine resources have significant differences



Resource	Salt Content (Weight %) ¹						
	Na	K	Li	Mg	Ca	Cl	SO ₄
Clayton Valley - USA	4.69	0.4	0.0163	0.019	0.045	7.26	0.34
Salar de Atacama - Chile	9.1	2.36	0.157	0.965	0.045	18.95	1.59
Salar de Hombre Muerto - Argentina	9.90-10.30	0.24-0.97	0.058-0.121	0.018-0.141	.019-.09	15.80-16.80	0.53-1.14
Salar de Uyuni - Bolivia	7.06	1.17	0.0321	0.65	0.0306	5	-
Great Salt Lake - USA	3.70-8.70	0.26-0.72	0.0018	.5-.97	.026-.036	7.00-15.60	0.94-2.00
Dead Sea - Israel	3.01	0.56	0.0012	3.09	1.29	16.1	0.061
Zabuye - China	7.29	1.66	0.0489	0.0026	0.0106	9.53	-
Taijinaier - China	5.63	0.44	0.031	2.02	0.02	13.42	3.41
Salton Sea - USA	5.00-7.00	1.30-2.40	.01-.04	0.07-0.57	22.6-39	14.20-20.9	42-50
Paradox Basin - USA	2.52	2.67	0.011	3.09	4.35	20.1	0.022
Smackover Oilfield brine (1984) - USA	6.7	0.28	0.017	0.35	3.45	17.17	0.04

Variations in concentrations and chemical profile drive need for customized extraction

Hard rock also varies in quality, grade and chemical profile

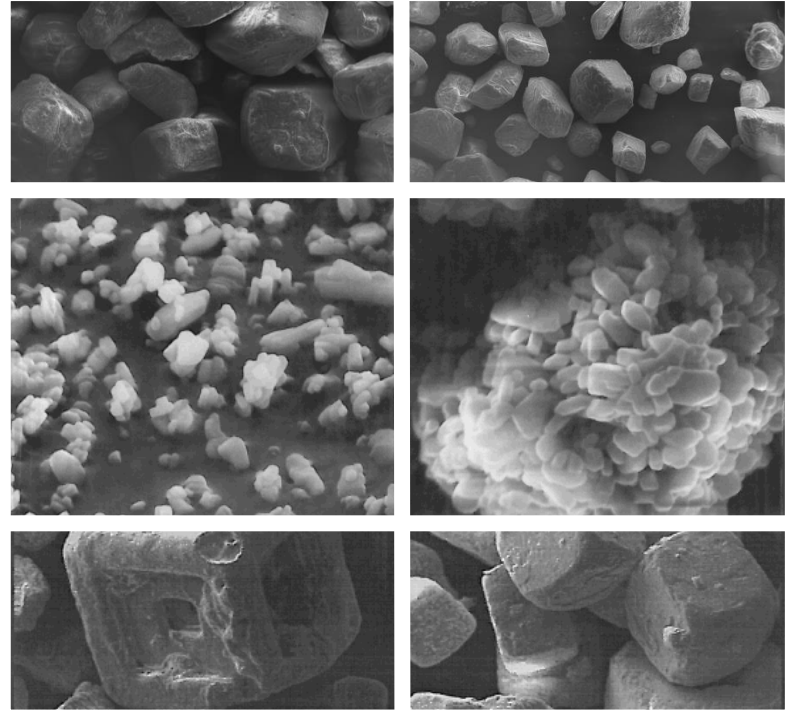


Mineral ¹	Formula	Average Li ₂ O%
Spodumene	LiAlSi ₂ O ₆	2.9-7.7
Petalite	LiAl(Si ₄ O ₁₀)	3.0-4.7
Lepidolite	K(Li,Al) ₃ (Si,Al) ₄ O ₁₀ (OH,F) ₂	3.0-4.1
Amblygonite	(Li,Na)Al(PO ₄)(F,OH)	
Montebrasite	LiAl(PO ₄)(OH,F)	7.5-9.5
Zinnwaldite	KLiFeAl(AlSi ₃)O ₁₀ (OH,F) ₂	0.4-0.8
Eucryptite	LiAlSiO ₄	4.5-6.5
Bikitaite	LiAlSi ₂ O ₆ H ₂ O	
Cookeite	LiAl ₄ (AlSi ₃ O ₁₀)(OH) ₈	
Virgilite	LiAlSi ₂ O ₆	
Jadarite	LiNaSiB ₃ O ₇ OH	1.75-2.0
Polyolithionite	KLi ₂ AlSi ₄ O ₁₀ (F,OH) ₂	

While extraction technologies are more standardized, hard rock cost and quality still vary widely

End-use quality standards demand well tuned conversion processes

- Morphology (form & structure) & Particle Size
 - Cathode structure
 - Processing Efficiency
- Impurities
 - Side reactions
 - Conductivity
 - SEI Layer Formation
 - Electrolyte integrity
 - Thermal Stability

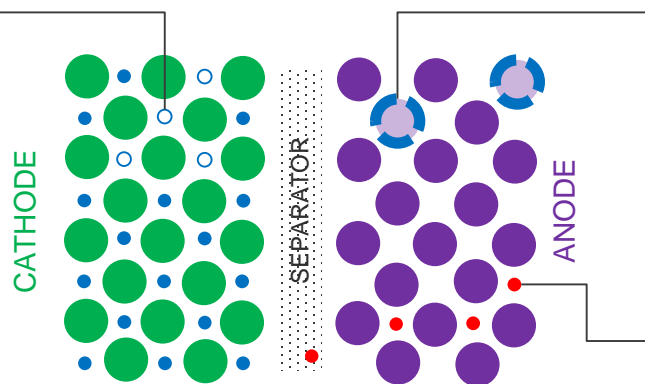


Resource variability and scarce process know-how can add years to process development timelines

Purity and consistency: a significant driver of battery performance

Impurities “deactivate” lattice positions in the metal oxide and
DEGRADE CAPACITY

All degradation pathways combined reduce battery
CYCLE LIFE



Material variation contributes to over/under charge and
COMPROMISES SAFETY

Impurities “clog” ion conduction channels, increase resistance &
LIMIT POWER

Only a few producers today have demonstrated the ability to produce Battery Grade Lithium that enable safe, high-performance, long-life batteries

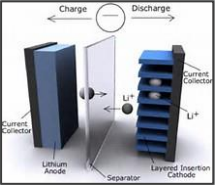
Bringing lithium products to xEV market is lengthy and complex

Raw Materials




Li Carbonate
Li Hydroxide

- Specification varies by customer
- New Supplier >= 1 year for each cathode formulation



Cathode, Anode,
Electrolyte

- Specifications vary by customer, application, and composition




Cylindrical,
Pouch, Prismatic

- Spec's vary by OEM vehicle and Performance Required.



xEV, PEV,
ESS, CE

- Battery Cell and Pack Design vary by OEM and vehicle type



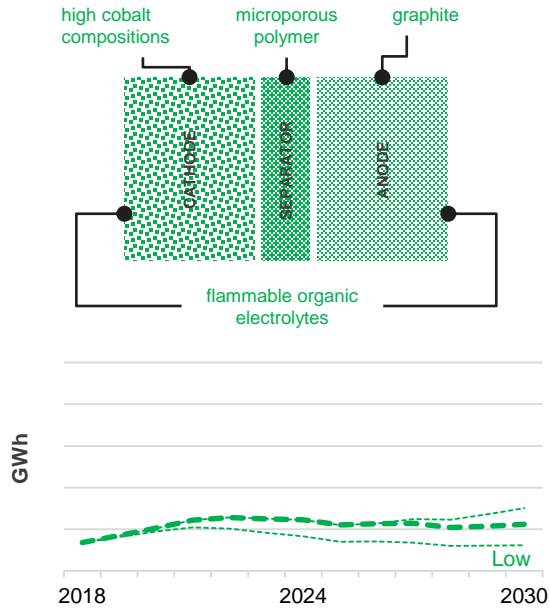
BEV, PHEV,
HEV

- Each OEM has a specific performance requirement and form factor they are designing

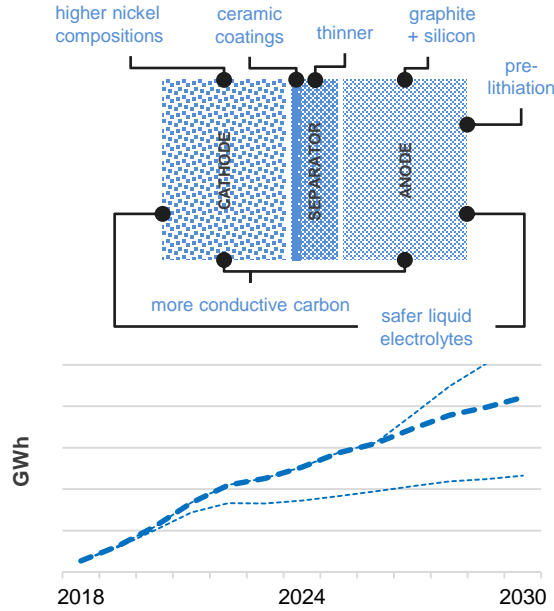
Qualification timing is 3-5 years for new cathode material to be qualified in a battery pack

Cathode and battery material requirements are dynamic

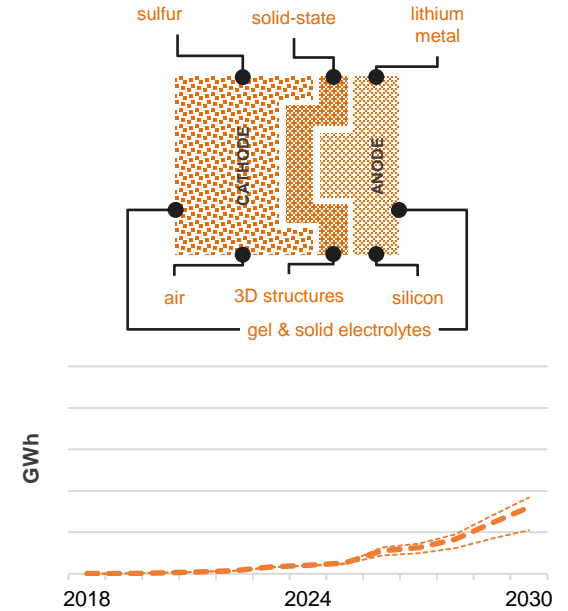
Current



Advanced

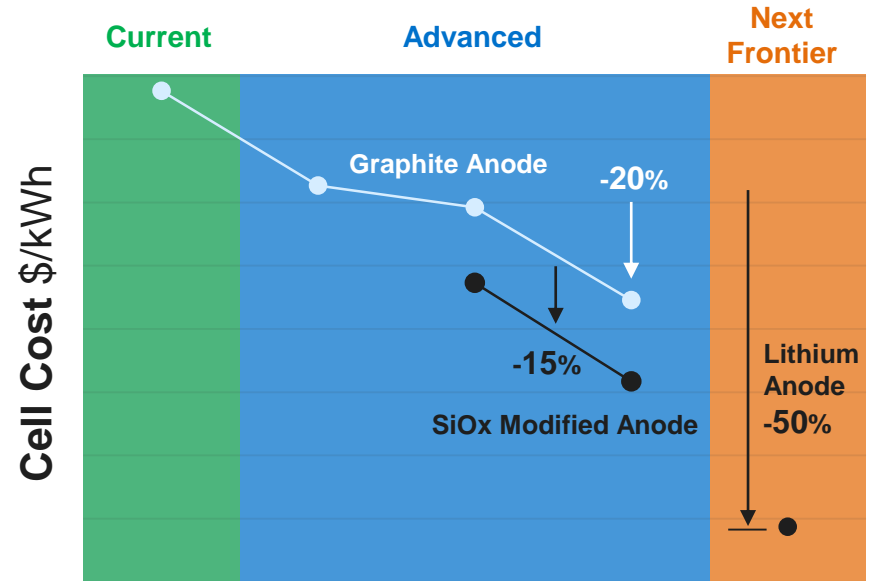
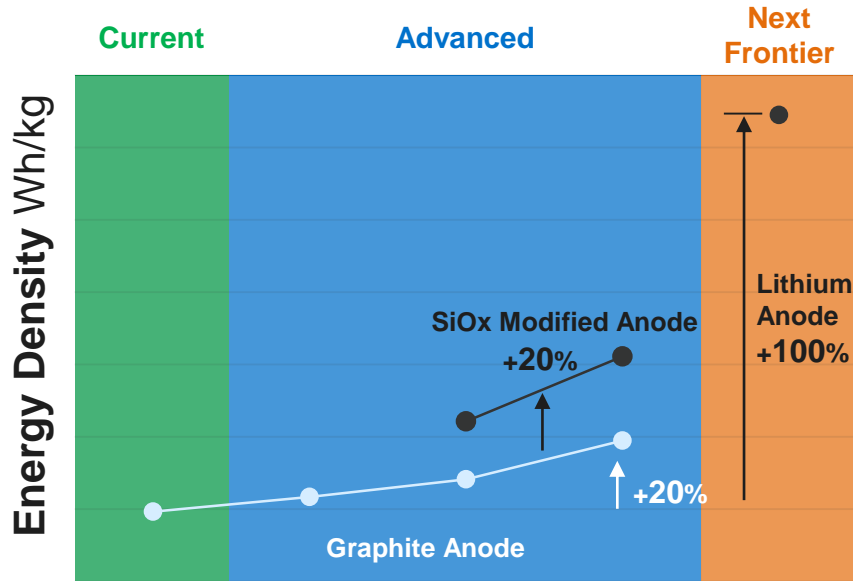


Next Frontier



Breadth of lithium products and capabilities needed for a supplier to remain relevant to battery firms

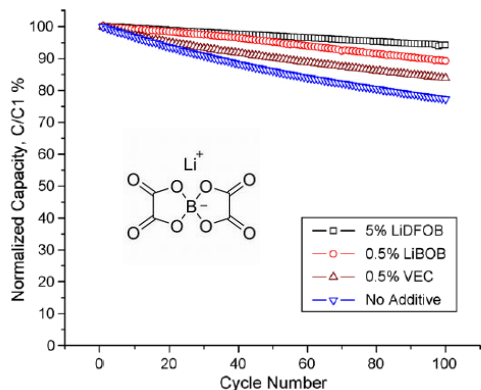
Lithium plays a key role in battery technology evolution



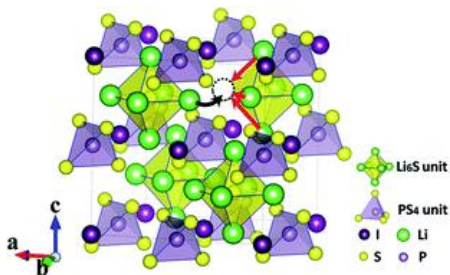
Material and cell advancements drive performance & cost improvements

Examples of advanced lithium materials from Albemarle

Patented lithium-based materials to enable long cycle life



Li₂S - key ingredient in next frontier solid separators



Lithium metal foils for next frontier anodes



Leading cathode and battery producers are seeking suppliers with ability to partner on next gen technology

In summary, multiple factors make lithium a specialized business



Only a few suppliers today (largely the “majors”) can meet the significant growth in demand

ALB
LISTED
NYSE

www.albemarle.com

Definitions of Non-GAAP Measures

Non-GAAP Measure	Description
Adjusted net income	Net income attributable to Albemarle Corporation before non-recurring, other unusual and non-operating pension and OPEB.
Pro-forma adjusted net income	Net income attributable to Albemarle Corporation before non-recurring, other unusual and non-operating pension and OPEB items, and the net impact of the divested business.
Adjusted diluted EPS	Diluted EPS before non-recurring, other unusual and non-operating pension and OPEB.
Pro-form adjusted diluted EPS	Diluted EPS before non-recurring, other unusual and non-operating pension and OPEB items, and the net impact of the divested business.
EBITDA	Net income attributable to Albemarle Corporation before interest and financing expenses, income taxes, and depreciation and amortization.
Adjusted EBITDA	EBITDA before non-recurring, other unusual and non-operating pension and OPEB.
Pro-forma adjusted EBITDA	Adjusted EBITDA before the net impact of EBITDA of the divested business.
Pro-forma Net Sales	Net Sales before the impact of Net Sales from the divested business.
Adjusted Effective Income Tax Rate	Reported effective income tax rate before the tax impact of non-recurring, other unusual and non-operating pension and OPEB items.

Adjusted EBITDA - Continuing Operations *(twelve months ended)*

(\$ in thousands)	Twelve Months Ended				
	Sep 30, 2017	Dec 31, 2017	Mar 31, 2018	Jun 30, 2018	Sep 30, 2018
Continuing Operations					
Net income attributable to Albemarle Corporation	\$ 875,306	\$ 54,850	\$ 135,397	\$ 334,525	\$ 345,600
Depreciation and amortization	193,774	196,928	202,188	203,540	203,352
Non-recurring and other unusual items (excluding items associated with interest expense)	89,214	102,660	101,914	(113,484)	(109,373)
Interest and financing expenses	117,216	115,350	60,375	59,093	56,289
Income tax expense	88,324	431,817	440,207	497,179	511,851
Income from discontinued operations (net of tax)	(559,974)	—	—	—	—
Non-operating pension and OPEB items	23,224	(16,125)	(17,259)	(18,410)	(19,577)
Adjusted EBITDA	\$ 827,084	\$ 885,480	\$ 922,822	\$ 962,443	\$ 988,142
Pro-forma: Net impact of adjusted EBITDA from divested businesses	(32,798)	(37,123)	(41,287)	(31,521)	(21,028)
Pro-forma Adjusted EBITDA	\$ 794,286	\$ 848,357	\$ 881,535	\$ 930,922	\$ 967,114
Net Sales	\$ 2,910,842	\$ 3,071,976	\$ 3,171,542	\$ 3,288,158	\$ 3,311,040
Pro-forma: Net impact of Net Sales from divested business	(97,595)	(99,491)	(106,013)	(80,282)	(53,306)
Pro-forma Net Sales	\$ 2,813,247	\$ 2,972,485	\$ 3,065,529	\$ 3,207,876	\$ 3,257,734
Pro-forma Adjusted EBITDA Margin	28%	29%	29%	29%	30%

See above for a reconciliation of adjusted EBITDA and pro-forma adjusted EBITDA, the non-GAAP financial measures, to Net income attributable to Albemarle Corporation, the most directly comparable financial measure calculated and reported in accordance with GAAP.

See above for a reconciliation of pro-forma net sales, the non-GAAP financial measure, to net sales, the most directly comparable financial measure calculated and reported in accordance with GAAP.

Adjusted EBITDA - by Segment *(twelve months ended)*

(\$ in thousands)	Twelve Months Ended				
	Sep 30, 2017	Dec 31, 2017	Mar 31, 2018	Jun 30, 2018	Sep 30, 2018
Lithium					
Net income attributable to Albemarle Corporation	\$ 314,707	\$ 342,992	\$ 373,712	\$ 409,185	\$ 409,753
Depreciation and amortization	86,409	87,879	92,879	95,744	96,798
Non-recurring and other unusual items	15,977	15,781	11,223	(698)	(1,635)
Adjusted EBITDA	417,093	446,652	477,814	504,231	504,916
Net Sales	937,461	1,018,885	1,100,688	1,174,430	1,176,120
Adjusted EBITDA Margin	44%	44%	43%	43%	43%
Bromine Specialties					
Net income attributable to Albemarle Corporation	\$ 201,336	\$ 218,839	\$ 219,681	\$ 227,615	\$ 241,822
Depreciation and amortization	40,112	40,062	40,701	40,059	40,501
Adjusted EBITDA	241,448	258,901	260,382	267,674	282,323
Net Sales	830,572	855,143	861,591	878,160	897,853
Adjusted EBITDA Margin	29%	30%	30%	30%	31%
Catalysts					
Net income attributable to Albemarle Corporation	\$ 216,405	\$ 230,665	\$ 229,359	\$ 456,252	\$ 458,897
Depreciation and amortization	53,160	54,468	53,855	53,342	51,655
Non-recurring and other unusual items	(1,250)	(1,250)	(1,250)	(219,955)	(218,705)
Adjusted EBITDA	268,315	283,883	281,964	289,639	291,847
Pro-forma: Net impact of adjusted EBITDA from divested business	(33,323)	(37,123)	(41,287)	(31,521)	(21,028)
Pro-forma Adjusted EBITDA	234,992	246,760	240,677	258,118	270,819
Net Sales	1,019,593	1,067,572	1,074,731	1,101,442	1,107,987
Pro-forma: Net impact of net sales from divested business	(97,595)	(99,491)	(106,013)	(80,282)	(53,306)
Pro-forma Net Sales	921,998	968,081	968,718	1,021,160	1,054,681
Pro-forma Adjusted EBITDA Margin	25%	25%	25%	25%	26%

See above for a reconciliation of adjusted EBITDA and pro-forma adjusted EBITDA on a segment basis, the non-GAAP financial measures, to Net income attributable to Albemarle Corporation ("earnings"), the most directly comparable financial measure calculated and reporting in accordance with GAAP.

See above for a reconciliation of pro-forma net sales on a segment basis, the non-GAAP financial measure, to net sales, the most directly comparable financial measure calculated and reported in accordance with GAAP.