

# Frontier Lithium PEA Demonstrates Attractive 27% IRR Pre-Tax for Lithium Chemical Production in North America's Great Lakes Region

SUDBURY, ON, Feb. 16, 2021 /CNW/ - Frontier Lithium Inc. (TSXV: FL) (OTCQB: LITOF) (FSE: HL2) ("Frontier" or "the Company") is pleased to release the strong results of a Preliminary Economic Assessment ("PEA") for a proposed mine-to-lithium hydroxide chemical/hydromet plant facility ("Integrated Project") in the Great Lakes Region of North America. The fully Integrated Project PEA assumes a hydromet plant that would convert spodumene concentrate feedstock sourced from open-pit mining and a milling facility at the Company's PAK Lithium Project, located north of Red Lake, Ontario.



Frontier Lithium PEA Demonstrates Attractive 27% IRR Pre-Tax for Lithium Chemical Production in North America's Great Lakes Region (CNW Group/Frontier Lithium Inc.)

## Highlights (\$USD unless otherwise stated):

- Life of Project Revenue of \$8.52 billion over 26-year total project life;
- Total initial capital expenditure estimate of \$685 million with a contingency of 22.5% included.
- Sustaining Capital of \$117 million;
- Pre-tax Net Present Value at an 8% base case discount rate ("NPV<sub>8</sub>") of \$1.62 billion and Internal Rate of Return ("IRR") of 27%;
- Post-tax net "undiscounted" Cash Flow (before initial capital expenditures) of \$3.75 billion;
- Post-tax NPV<sub>8</sub> of \$974.6 million and IRR of 21%;
- Annual Average EBITDA (steady-state) of \$225 million.
- Chemical plant producing 23,174 tonnes of battery-quality Lithium Hydroxide Monohydrate (LiOH·H<sub>2</sub>O) per year with an average selling price of \$13,500 per tonne. A total of 556,200 tonnes of LiOH has been contemplated being produced from open pit mining only at the PAK and Spark deposits; underground constrained mineral resources available at the PAK deposit for future consideration.
- PAK and Spark deposits are open in all directions and could provide potential resource expansion for a newly commenced Preliminary Feasibility Study ("PFS");
- All-in operating cash costs of \$4,083 per tonne of LiOH; and
- After-Tax Pay Back of Capital Expenditures is 4.5 years after the start of commercial operations.

"The fully Integrated Project PEA demonstrates the economic and strategic benefits of developing lithium chemical production of lithium hydroxide in the Great Lakes Region of North America, with skilled labour, exceptional infrastructure, low carbon sources of energy, prime intermodal transportation access and low operating costs." stated Trevor Walker, President & CEO of Frontier

Lithium. "With PEA completion, Frontier will advance the Integrated Project to a PFS level and continue to advance the high-grade PAK Lithium Project resource toward the goal of production of premium lithium chemicals. Underpinning the PFS will be the current drilling at the PAK Lithium Project and ongoing operations of the Company's mini-pilot plant testing our proprietary Lithium Hydroxide production process. As western automotive companies rapidly electrify their product lineups, we expect very strong demand for locally sourced premium lithium chemicals supply, and the Great Lakes region is the prime location as it is the largest auto manufacturing hub on the continent."

(All Tables are in \$USD unless otherwise stated)

**Table 1: Summary of PAK Project PEA Economics**

Project Economics	
<b>Pre-Tax</b>	
NPV <sub>8</sub>	\$1.62 Billion ("B")
IRR	27%
Cumulative Cash Flow	\$5.26 B
Annual Average EBITDA (steady-state)	\$225 Million ("M")
<b>Post-Tax</b>	
NPV <sub>8</sub>	\$974.6 M
IRR	21%
Cumulative Cash Flow	\$3.51 B

**Table 2: Summary of PAK Project PEA Economic Assumptions**

Economic Assumptions and Parameters	
Exchange Rate (\$USD/\$CAD)	\$0.78
Discount Rate (base case)	8%
Technical Grade Concentrate (7.2% Li <sub>2</sub> O)	\$1,600/tonne
Chemical Grade Concentrate (6.0% Li <sub>2</sub> O)	\$750/tonne
Lithium Hydroxide Monohydrate Battery Grade	\$13,500/tonne

**Table 3: Summary of PAK Project PEA Production Profile**

Production Profile	
<b>Total Project Life (LOM)</b>	26 Years
<b>Mine and Concentrator</b>	
Total Tonnes Milled	22,914,500
Diluted Head Grade	1.46% Li <sub>2</sub> O
Average Stripping Ratio (W:O)	3.6
Daily mill commercial throughput	2,900 t/d
Average Lithium Recovery (mill)	83.9%
Total CG Production (6.0% Li <sub>2</sub> O)	4,076,600 tonnes
Total TG Production (7.2% Li <sub>2</sub> O)	525,700 tonnes
<b>Hydromet Plant</b>	
Yearly chemical plant throughput	160,000 tonnes
Lithium Recovery	85%
Total battery grade Lithium Hydroxide (LiOH)	556,200 tonnes

**Table 4: Summary of PAK Project PEA Operating Costs**

Operating Costs	\$/t processed
<b>Mine and Concentrator</b>	
Direct Open Pit Mining Cost	3.48
Direct Processing Cost	17.82
Avg. Spodumene Conc. Production Cost (EXW hydromet plant)	313
<b>Hydromet Plant</b>	
Average Processing Cost	1,785
Lithium Recovery	85%
Total Lithium Hydroxide Production Cash Cost (EXW plant)	4,083

**Table 5: Summary of PAK Project PEA Capital**

Capital Requirements	\$ Million
<b>EPCM</b>	41.3
<b>Contingency</b>	111.4
<b>Mine and Mill</b>	
Site Preparation/Infrastructure	41.4
Mill Processing and Storage	100.3

Power Distribution	6.2
Open Pit Equipment	16.6
Water treatment and waste management	4.2
<b>Chemical Plant</b>	
Civil/Structural	103.9
Hydromet Processing	168.8
Utilities/Aux. & Services	90.9
<b>Total Pre-Production Capital Cost</b>	<b>684.9</b>
<b>Total Sustaining Capital Cost</b>	<b>117.1</b>

## Cautionary Statements

The fully Integrated Project PEA referred to in this announcement has been undertaken to determine the potential viability of the integrated project comprising a mine/concentrator and chemical plant in northern Ontario and to reach a decision to proceed with more definitive studies. This PEA is preliminary in nature, includes inferred mineral resources that are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty the PAK Lithium Project outlined by the PEA will be realized. The Company has concluded it has a reasonable basis for providing the forward-looking statements included in this announcement and believes that it has a reasonable basis to expect it will be able to fund the development of the Integrated Project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the PEA.

## Mining and Milling

A preliminary integrated site plan including mining operations, waste disposal, and concentrator was considered and developed for the purpose of the PEA. The PEA study outlines two open pits at the mine, one at the PAK deposit and one at the Spark deposit. The PAK deposit contains a pit constrained mineral resource in the measured and indicated categories of 5.4 million tonnes averaging 1.99% Li<sub>2</sub>O and a pit constrained inferred mineral resource of 0.60 million tonnes averaging 1.97% Li<sub>2</sub>O that hosts a rare technical/ceramic grade spodumene with low inherent iron (below 0.1% Fe<sub>2</sub>O<sub>3</sub>). The Spark deposit is located only 2km northwest of the PAK deposit and contains a pit constrained mineral resource estimate of 3.3 million tonnes averaging 1.59% Li<sub>2</sub>O in the indicated category and a pit constrained mineral resource of 15.7 million tonnes averaging 1.31% Li<sub>2</sub>O in the inferred category. Under the PEA, the open pits targeted production results in an anticipated stripping ratio of 3.6 to 1. The open pits will be mined using a standard fleet of off-road mining trucks and hydraulic excavators at a rate of approximately 2,900 tonnes of ore per day. The concentrator will process all of the ore generated from mining operations. Frontier Lithium has filed with appropriate authorities for a mining lease which comprises the mining and surface rights necessary to mine the PAK and Spark deposits and encompass the appropriate area for a mining operation as outlined in the PEA. Frontier Lithium does not have the necessary permits in place at the time of this release to build the project as described in the PEA.

## Chemical/Hydromet Plant

The hydromet plant PEA considers a lithium processing plant to be located on a Great Lakes port and includes spodumene concentrate receiving and storage facilities, reagent receiving and storage facilities, process facilities and site infrastructure. For the purpose of the PEA the chemical plant flowsheet incorporates as far as practical 'conventional' or proven-in-operation, equipment, and process stages, in order to minimize process, technology and equipment risk. The hydromet plant is designed to produce 23,174 tonnes per year of battery grade lithium hydroxide monohydrate (approx. 20,400 t/year of lithium carbonate equivalent "LCE").

## Mineral Resource Estimate

A summary of the Mineral Resource Estimate for Spark is set out in Table 6. The Mineral Resource Estimate for PAK is summarized in Tables 7 and 8.

**Table 6: Spark Mineral Resource Calculation (Updated 2021)**

Cut-Off	Resource Classification	Tonnes (t)	Li <sub>2</sub> O (%)	Ta <sub>2</sub> O <sub>5</sub> (ppm)	Contained Li <sub>2</sub> O (t)
0.60% Li <sub>2</sub> O	Indicated	3,261,000	1.59	123	52,000
	Inferred	15,718,000	1.31	108	206,000

**Table 7: PAK Open Pit Mineral Resource Calculation (Updated 2021)**

Cut-off	Resource Category	Commodity	Geologic Zone	Tonnes (t)	Li <sub>2</sub> O (%)	Ta <sub>2</sub> O <sub>5</sub> (ppm)	Contained Li <sub>2</sub> O (t)
0.6% Li <sub>2</sub> O	Measured	Lithium	UZ <sup>(1)</sup>	325,200	3.43	59	11,154
		Lithium	LIZ <sup>(2)</sup>	1,019,400	1.73	105	17,636
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>1,344,600</b>	<b>2.14</b>	<b>94</b>	<b>28,790</b>
		<b>Lithium / Tantalum</b>	<b>Bulk Pegmatite</b>	<b>1,344,600</b>	<b>2.14</b>	<b>94</b>	<b>28,790</b>
0.6% Li <sub>2</sub> O	Indicated	Lithium	UZ	255,400	2.91	75	7,432
		Lithium	LIZ	3,819,900	1.88	99	71,814
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>4,075,300</b>	<b>1.94</b>	<b>97</b>	<b>79,246</b>
		Tantalum	OZ <sup>(3)</sup>	544,100	1.11	113	n/a
		<b>Lithium / Tantalum</b>	<b>Bulk Pegmatite</b>	<b>4,619,400</b>	<b>1.72</b>	<b>99</b>	<b>79,246</b>
0.6% Li <sub>2</sub> O	Measured + Indicated	Lithium	UZ	580,600	3.20	65	18,587
		Lithium	LIZ	4,839,300	1.85	100	89,450
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>5,419,900</b>	<b>1.99</b>	<b>96</b>	<b>108,036</b>
		Tantalum	(OZ)	544,100	1.11	113	n/a
		<b>Lithium / Tantalum</b>	<b>Bulk Pegmatite</b>	<b>5,964,000</b>	<b>1.81</b>	<b>98</b>	<b>108,036</b>
0.6% Li <sub>2</sub> O	Inferred	Lithium	(UZ)	74,200	2.77	96	2,055
		Lithium	(LIZ)	528,900	1.86	79	9,838
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>603,100</b>	<b>1.97</b>	<b>81</b>	<b>11,893</b>
		Tantalum	(OZ)	77,400	1.21	153	n/a
		<b>Lithium / Tantalum</b>	<b>Bulk Pegmatite</b>	<b>680,500</b>	<b>1.75</b>	<b>89</b>	<b>11,893</b>

**Table 8: PAK Underground Mineral Resource Calculation (Updated 2021)**

Cut-off	Resource Category	Commodity	Geologic Zone	Tonnes (t)	Li <sub>2</sub> O (%)	Ta <sub>2</sub> O <sub>5</sub> (ppm)	Contained Li <sub>2</sub> O (t)
0.8% Li <sub>2</sub> O	Measured	Lithium	UZ	0	-	-	0
		Lithium	LIZ	0	-	-	0
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>0</b>
		<b>Lithium / Tantalum / Rubidium</b>	<b>Bulk Pegmatite</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>0</b>
0.8% Li <sub>2</sub> O	Indicated	Lithium	UZ	0	-	-	0
		Lithium	LIZ	1,261,700	2.15	91	27,127
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>1,261,700</b>	<b>2.15</b>	<b>91</b>	<b>27,127</b>
		Tantalum/ Rubidium	OZ	3,830	1.16	14	n/a
		<b>Lithium / Tantalum / Rubidium</b>	<b>Bulk Pegmatite</b>	<b>1,265,530</b>	<b>2.14</b>	<b>91</b>	<b>27,127</b>
0.8% Li <sub>2</sub> O	Measured + Indicated	Lithium	UZ	0	-	-	0
		Lithium	LIZ	1,261,700	2.15	91	27,127
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>1,261,700</b>	<b>2.15</b>	<b>91</b>	<b>27,127</b>
		Tantalum/ Rubidium	OZ	3,830	1.16	143	n/a
		<b>Lithium / Tantalum / Rubidium</b>	<b>Bulk Pegmatite</b>	<b>1,265,530</b>	<b>2.14</b>	<b>91</b>	<b>27,127</b>
0.8% Li <sub>2</sub> O	Inferred	Lithium	UZ	27,450	4.35	31	1,194
		Lithium	LIZ	2,043,400	2.35	73	48,020
		<b>Lithium</b>	<b>Total Lithium Zone</b>	<b>2,070,850</b>	<b>2.38</b>	<b>72</b>	<b>49,214</b>
		Tantalum/Rubidium	OZ	6,900	2.03	146	n/a
		<b>Lithium / Tantalum / Rubidium</b>	<b>Bulk Pegmatite</b>	<b>2,077,750</b>	<b>2.37</b>	<b>73</b>	<b>49,214</b>

- (1) Upper Intermediate Zone  
(2) Lower Intermediate Zone  
(3) Central Intermediate Zone

## Mineral Resource Estimate Notes

- Mineral Resources were prepared in accordance with NI 43-101 and CIM Definition Standards (2014). Minerals Resources that are not Mineral Reserves do not have demonstrated economic viability. This estimate of Minerals Resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing and other issues.
- Open Pit Mineral Resources are reported at a cut-off of 0.60% Li<sub>2</sub>O. Underground Mineral Resources are reported at a cut-off of 0.80% Li<sub>2</sub>O.
- Appropriate mining costs, processing costs, metals recoveries and inter ramp pit slope angles were used to generate pit shells.
- Appropriate mining costs, processing costs, metals recoveries and mining shapes were used to generate underground mineral resources
- Rounding may result in apparent summation differences between tonnes, grades and contained metals content
- Tonnage and grades measurements are in metric units
- Contributing assay composites at Spark were capped at 3.55% Li<sub>2</sub>O. At PAK, composite assays were capped at 4.40 % Li<sub>2</sub>O in the CIZ, 4.18% Li<sub>2</sub>O in the LIZ and 4.95% Li<sub>2</sub>O in the UZ.
- A specific gravity of 2.718 was applied to the pegmatite at Spark based on 241 measurements. The specific gravity at PAK vary from 2.66 to 2.86 depending on the pegmatite domain.
- Modeling at Spark was performed using GEOVIA Surpac 2019 software with grades estimated using ordinary kriging (OK) interpolation methodology. Samples were composited at 1.0 meter down hole. Block grades were estimated on a multi pass basis with a minimum and maximum number of composites required for each estimation pass. Block size is 2 metre \* by 2 metre (y) by 2 metre (z).
- Modeling at PAK was performed using GEOVIA Surpac 2019 software with grades estimated using ordinary kriging (OK) interpolation methodology. Samples were composited at 1.0 meter down hole. Block grades were estimated on a multi pass basis with a minimum and maximum number of composites required for each estimation pass. Block size is 2.5 metre \* by 2.5 metre (y) by 2.5 metre (z).

## Quality Assurance and Quality Control

Under Frontier's QA/QC procedures, all drilling was completed by Chenier Drilling Ltd. of Val Caron, ON using thin-walled BTW drill rods (4.2 cm core diameter) and a Reflex ACT III oriented core system. Using the Reflex system, the drill core was oriented and marked as it was retrieved at the drill. The core was boxed and delivered to the Frontier core shack where it was examined, geologically logged and marked for sampling. The core was photographed prior to sampling. Using a rock saw, the marked sample intervals were halved with one half bagged for analysis. Sample blanks along with lithium, rubidium and cesium certified reference material was routinely inserted into the sample stream in accordance with industry recommended practices. Field duplicate samples were also taken in accordance with industry recommended practices. The samples were placed in poly sample bags and transported to Red Lake by Frontier employees and then shipped to AGAT Laboratories Ltd. (AGAT) in Mississauga, ON for quantitative multi-element analysis. AGAT is an ISO accredited laboratory. All petrographic sample preparation and electron microprobe (EMP) analysis was completed at the Queen's Facility for Isotope Research (QFIR) at Queen's University in Kingston, Ontario under the direct supervision of Dr. Steve Beyer. The core is stored on site at the Pakeagama Lake exploration camp.

## Qualified Persons

The Mineral Resources for PAK Lithium Project disclosed in this news release have been estimated by Mr. Todd McCracken, P. Geo., an employee of **BBA Engineering Ltd.** and independent of Frontier. By virtue of his education and relevant experience, Mr. McCracken is "Qualified Person" for the purpose of National Instrument 43-101. The mineral resource has been classified in accordance with CIM Definition Standards for mineral resources and mineral reserves, (November 2014). Mr. McCracken, P. Geo., has read and approved the contents of this press release as it pertains to the disclosed Mineral Resource estimate and financial model. The National Instrument 43-101 PEA report will be filed on SEDAR ([www.sedar.com](http://www.sedar.com)) within 45 days.

BBA Engineering Ltd. is a Canadian consulting engineering firm specialized in power, mining and metals, biofuels, oil and gas.

Johnny Canosa P.Eng., Sr. Mining Engineer for JAC Mining Consultants is an independent Qualified Person as defined by NI 43-101 and has reviewed and approved the contents of this news release. Mr. Canosa is responsible for open pit mine planning, scheduling operating and capital costs related to mining and surface infrastructure.

Kurt Boyko, P.Eng., Consulting Specialist - Mechanical for Nordmin Engineering Ltd., is an independent Qualified Person as defined by NI 43-101 and has reviewed and approved the contents of this news release. Mr. Boyko is responsible for process plant design, chemical plant design and operating and capital cost estimates related to the processing facilities.

Steve Wilson, P.Eng., Process Engineer – Wil-Solve Consulting Services, is an independent Qualified Person as defined by NI 43-101 and has reviewed and approved the contents of this news release. Mr. Wilson is responsible for mineral processing and metallurgical testing.

## Review of Technical Information

Garth Drever, P. Geo, Vice President Exploration for **Frontier Lithium Inc.** is a Qualified Person as defined by NI 43-101 and has reviewed and approved the contents of this news release. Mr. Drever has been involved with all aspects of the PAK Lithium project since 2013.

## About Frontier Lithium Inc.

Frontier Lithium ([TSX.V: FL](http://TSX.V:FL)) ([OTCQB: LITOF](http://OTCQB:LITOF)) ([FSE: HL2](http://FSE:HL2)) is a Sudbury Ontario based, publicly listed, junior mining company with the largest land position in an emerging premium lithium mineral district located in the Great Lakes region of northern Ontario. The company maintains 100% interest in the PAK Lithium Project which contains one of North America's highest-grade, large tonnage hard-

rock lithium resources in the form of a rare low-iron spodumene. The Project has significant upside exploration potential. Frontier is a pre-production business that is targeting the manufacturing of battery quality lithium hydroxide in the Great Lakes Region to support electric vehicle and battery supply chains in North America. Frontier maintains a tight share structure with management ownership approximately 30% of the Company.

### **About the PAK Lithium Project**


The PAK Lithium Project encompasses 26,774 hectares at the south end of Ontario's Electric Avenue, the largest land package hosting lithium bearing pegmatites in Ontario. The Project covers 65 km of the Avenue length and remains largely unexplored; however, since 2013 the company has delineated two premium spodumene bearing lithium deposits located 2.3 km from each other at the southwestern end of the project. Recently, Frontier confirmed the presence of spodumene with the Bolt pegmatite, between PAK and Spark deposits and the Pennock Lake pegmatite occurrence a further 30 km along the Project. Frontier's premier Great Lakes location is advantaged by favorable geology, proven metallurgy with access to intermodal hubs, infrastructure, power, and mining along with downstream lithium processing expertise and auto OEM's.

The PAK deposit hosts a rare "technical grade" spodumene maintaining low inherent iron levels (below 0.1%  $\text{Fe}_2\text{O}_3$ ) and contains a pit constrained mineral resource in the measured and indicated categories of 5.4 million tonnes averaging 1.99%  $\text{Li}_2\text{O}$  and a pit constrained inferred mineral resource of 0.60 million tonnes averaging 1.97%  $\text{Li}_2\text{O}$ . The PAK deposit also contains an underground constrained mineral resource in the measured and indicated categories of 1.3 million tonnes averaging 2.15%  $\text{Li}_2\text{O}$  and an underground constrained mineral resource in the inferred category of 2.1 million tonnes averaging 2.38%  $\text{Li}_2\text{O}$ . The Spark deposit is located only 2km northwest of the PAK deposit and contains a pit constrained mineral resource estimate of 3.3 million tonnes averaging 1.59%  $\text{Li}_2\text{O}$  in the indicated category and a pit constrained mineral resource of 15.7 million tonnes averaging 1.31%  $\text{Li}_2\text{O}$  in the inferred category., as per the initial results supporting an upcoming NI 43-101 Technical Report, "2020 Preliminary Economic Assessment, Fully Integrated PAK Lithium Project" by BBA Engineering Ltd.

### **Forward-looking Statements**

Neither the TSX Venture Exchange nor its Regulation Services Provider (as that term is defined in the policies of the TSX Venture Exchange) accepts responsibility for the adequacy or accuracy of this release. This release includes certain statements that may be deemed "forward-looking statements". All statements in this release, other than statements of historical facts, that address future production, reserve potential, exploration drilling, exploitation activities and events or developments that the Company expects are forward-looking statements. Although the Company believes the expectations expressed in such forward-looking statements are based on reasonable assumptions, such statements are not guarantees of future performance and actual results or developments may differ materially from those in the forward-looking statements. Factors that could cause actual results to differ materially from those in forward looking statements include market prices, exploitation and exploration successes, continued availability of capital and financing, and general economic, market or business conditions. Investors are cautioned that any such statements are not guarantees of future performance and those actual results or developments may differ materially from those projected in the forward-looking statements. For more information on the Company, Investors should review the Company's registered filings what are available at <https://www.sedar.com>

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