



Economic Impacts of the Lake Superior Lithium Processing Facility

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RIAS Inc. is a boutique economics consulting firm based in Ottawa, Ontario, providing economic research, analysis and strategic advice to both industry and government clients. RIAS Inc. specializes in helping our private sector clients demonstrate the value and benefits of their activities, and we have conducted numerous socio-economic impact assessments for a broad range of industry sectors and companies in Canada and the United States, including: Mowi Canada West, BC Salmon Farmers Association, Atlantic Canada Fish Farmers Association, Canadian Aquaculture Industry Alliance, Window Covering Manufacturers of America, IAMGold Corporation, Fertilizer Canada, CropLife Canada, Association of Canadian Advertisers, McDonald's Canada, Terrapure Environmental, Shaftesbury Films Incorporated and Comcast NBCUniversal.

Contents

Executive Summary	1
Local Economic Impacts.....	2
Economic Impacts within Northwestern Ontario	2
Economic Impacts within Ontario	2
National Economic Impacts	3
Background.....	4
Proposed Lithium Processing Facility	4
World-Leading Technology.....	4
Filling a Critical Gap in the Lithium Supply Chain.....	5
Methodology	5
Addressing Uncertainty in the Estimates	5
Input-Output Analysis.....	6
Customized I-O Multipliers for Lithium Processing	8
Analytical Results	9
Key Parameters	9
Construction Phase Impacts	9
Ongoing Operations	11
Total Economic Impacts	12
Other Potential Economic Benefits.....	12
References.....	14
Appendix 1: Detailed Economic Impact Tables	15

List of Tables

Table 1: Number of Workers Required for Lithium Production in Northern Ontario.....	8
Table 2: Parameters and Assumptions.....	9
Table 3: Economic Impacts of LSL Facility Construction	10
Table 4: LSL Facility Operations - Total Direct, Indirect and Induced Economic Impacts.....	11
Table 5: Total LSL Project Economic Impacts.....	12
Table 6: LSL Facility Construction - Detailed Economic Impacts.....	15
Table 7: LSL Facility Ongoing Operations - Detailed Economic Impacts.....	16
Table 8: Total LSL Project - Detailed Economic Impacts (2027-2058).....	17

Economic Impacts of the LSL Facility

Executive Summary

Avalon Advanced Materials plans to establish Ontario's first lithium processing facility on a fully serviced 120-acre site in Thunder Bay, Ontario, located on 260 acres of water. The site for the proposed Lake Superior Lithium Processing Facility (LSL facility) has all major transportation infrastructure, including a ready-to-use deep-water port, the TransCanada Highway, the CN railway line, and a rail spur directly into the site, as well as proximity to municipal services for water, sewage, hydro, and natural gas.

The proposed LSL facility will deploy world-leading lithium processing technology that utilizes a direct alkaline pressure leach process, rather than conventional methods that use sulphuric acid roasting and caustic conversion processes, creating sulphur dioxide, acid mine drainage, and particulate matter. The technology represents a significant improvement in environmental and sustainability standards for lithium processing.

The facility will be able to process spodumene material from Ontario mines will be targeting battery grade lithium hydroxide as the product.

The location of the site and the advanced capabilities of the LSL facility to process lithium deposits of from mines across Northwestern Ontario and supply battery-grade lithium hydroxide (LiOH) to EV battery manufacturing plants in Southern Ontario will fill a critical gap in Ontario's lithium supply chain, as currently there is no production of lithium hydroxide in north America to service the EV industry and would have to be imported for the production of batteries in Canada. The proposed LSL facility will enable Ontario to capture the full economic benefits from an uninterrupted, integrated lithium supply chain, from mines in Northern Ontario to EV battery manufacturing in Southern Ontario.

The proposed Lake Superior Lithium Processing Facility (LSL facility) will also generate significant economic benefits for Thunder Bay, the region of Northwestern Ontario, the province of Ontario, and the national economy. The economic benefits take place over the lifecycle of the LSL project in two principal phases: a 3-year construction phase (2027-2029) and an operations phase beginning in 2028 for a 30-year period (2029-2058). The first phase includes significant construction employment while the operations phase will create high value direct fulltime employment, add indirect jobs within supplier industries, and induce an increase in consumer spending.

Quantitative estimates of the total economic impact from the construction and ongoing operations of the LSL facility are summarized below. It should be noted that financial estimates used as the basis for this economic impact assessment are expected to be further refined as the

LSL project proceeds, but they represent the best available information upon which to build the economic impact analysis at this time. Economic impacts are therefore expressed as estimated ranges given uncertainty in the factors such as manufacturing experience/certification, quality, pricing, delivery time and best value supplier, all of which can influence where equipment, supplies and services come from and at what cost, at both the construction and operations stages of the LSL project.

Local Economic Impacts

- Construction and preparation of the LSL facility is expected to generate \$698 to \$718 million in GDP for the economy within Thunder Bay, \$125 to \$137 million in labour income, and a total of 945 to 1,133 person-years of employment over the 3-year construction period (2027-2029)
- Once the facility is operational, it will generate a total of \$21.3 to \$21.4 billion in GDP for the city of Thunder Bay over its 30-year lifespan (2029-2058), \$851 to \$915 million in labour income, and 9,866 to 10,911 person-years of employment.
- Total economic gains for the city of Thunder Bay over the life of the LSL project (2027-2058) are expected to amount to over \$22 billion in GDP, \$975 to over \$1 billion in income for local workers, and between 10,811 and 12,044 person-years of employment.

Economic Impacts within Northwestern Ontario

- Construction of the LSL facility will generate \$721 to \$765 million in GDP for the regional economy of Northwestern Ontario, \$139 to \$165 million in labour income, and a total of 1,153 to 1,553 person-years of employment over the 3-year construction period (2027-2029). These regional economic impacts include the economic impacts for the City of Thunder Bay.
- Ongoing operations of the LSL facility are expected to generate a total of approximately \$25.4 billion in GDP within Northwestern Ontario, \$2.9 billion in labour income, and 42,724 to 43,426 person-years of employment over 30 years.
- Total economic gains for the region of Northwestern Ontario over the life of the project are estimated to amount to \$26 billion in GDP, \$3 billion in labour income and a total of 43,877 to 44,979 person-years of employment across the region.

Economic Impacts within Ontario

- For Ontario, construction of the LSL facility will create \$733 to \$836 million in GDP, \$152 to \$212 million in labour income, and 1,312 to 2,232 person years of employment over 3 years.
- Over 30 years of operations, the LSL facility will generate \$26.2 to \$26.5 billion in GDP

within Ontario, over \$3.4 billion in labour income, and between 49,767 and 52,176 person years of employment for or Ontario workers

- Total economic benefits within Ontario are estimated to amount between \$27 and \$27.4 billion in GDP, \$3.6 to \$3.7 billion in income for Ontario workers, and a total of 51,078 to 54,408 person-years of employment over the life of the LSL project.

National Economic Impacts

- At the national level, construction of the LSL facility will create between \$754 and \$878 million in GDP, \$164 to \$234 million in labour income and 1,490 to 2,589 person years of employment over the 2027–2029 period.
- Facility operations will deliver approximately \$31 billion in GDP, \$5.4 to \$5.6 billion in income and between 77,412 and 79,874 person-years of employment.
- Overall, construction and operations of the LSL facility will generate \$31.6 to \$32 billion in GDP, about \$5.6 to \$5.8 billion in income and 78,903 to 82,464 person-years of employment for Canadian workers.

A detailed study prepared recently by the Northern Policy Institute (NPI) for the Thunder Bay Community Economic Development Commission examines the potential labour requirements for a lithium- processing project in Thunder Bay, by specific role and position for facility maintenance and processing corresponding to National Occupational Classification (NOC) codes. The study also compares the labour requirements with the available labour force within the Northwestern Ontario region.

The NPI study is based on labour requirements estimated by Sayona (2019) for the Authier Lithium Project in Northwestern Quebec producing 110,000 MT of spodumene concentrate per year. Employment at the facility was estimated to be 61 workers per year (57 non-administrative and 4 administrative). As noted in the NPI study, production of spodumene concentrate is less labour intensive than production of lithium hydroxide. Estimates for the 30,000-tonne capacity LSL facility producing lithium hydroxide are 128 workers (100 non-administrative and 28 general & administrative).

Overall, based on their examination of 10 unique professions employed in lithium-processing facilities, NPI determined that at present, labour exists in Northwestern Ontario for all 10 of those professions. However, by 2026, the NPI that labour shortages could occur in two professions: (1) “Construction millwrights and industrial mechanics,” and (2) “General building maintenance workers and building superintendents.”

Background

Lithium is a highly reactive metal used to make energy-dense rechargeable batteries for electronics, electric vehicles, and grid storage. Lithium is also used in glass products such as glass-ceramic stovetops, glass containers, specialty glass, and fibreglass to increase the durability, corrosion resistance, and thermal resistance for use at extreme temperatures.

Lithium is a critical mineral for the energy transition, and net-zero emissions targets will require greater reliance on both new and recycled sources of lithium for batteries. By far the largest driver of current demand for lithium is EV battery production.

Proposed Lithium Processing Facility

Avalon Advanced Materials plans to establish Ontario's first lithium processing facility in Thunder Bay, Ontario, a key hub of the Northwestern Ontario economic region. Avalon has secured a valuable, high-quality site for its LSL facility on the port lands at 965 Strathcona Ave., Thunder Bay, which includes approximately 120 acres of land and 260 acres of water (380 combined). The site has all major transportation infrastructure, including ready-to-use access to a deep-water port, the TransCanada Highway, the CN railway line, and a rail spur directly into the site, as well as proximity to municipal services for water, sewage, hydro, and natural gas.

World-Leading Technology

In addition to its location advantages, the proposed LSL facility will deploy world-leading lithium processing technology that utilizes a direct alkaline pressure leach process, rather than conventional methods that use sulphuric acid roasting and caustic conversion processes, creating sulphur dioxide, acid mine drainage, and particulate matter. The alkaline pressure leach process will be acid and sulphate-free, without undesired crystallized salts or by-products. It also produces Analcime, an inert and neutral solid aluminium silicate, and calcium carbonate - both of which have uses in industrial building applications and industries. The technology represents a significant improvement in environmental and sustainability standards for lithium processing.

Another competitive advantage for the LSL facility will be the ability to process a greater diversity of intake materials from Ontario mines (Spodumene, Petalite, Lepidolite, Zinnwaldite). The LSL facility will also be a multi-circuit design able to adapt each circuit for specific intake of source/raw materials, thus providing the ability to process from multiple sources concurrently. The design of the process for the lithium conversion facility also allows for the feedstock to be mine grade lithium carbonate that can be converted to either battery grade lithium carbonate or battery grade lithium hydroxide.

Filling a Critical Gap in the Lithium Supply Chain

The location of the site and the advanced capabilities of the LSL facility to process lithium deposits from mines in northern Ontario and supply battery-grade lithium hydroxide (LiOH) and lithium carbonate to EV battery manufacturing plants in Southern Ontario will fill a critical gap in Ontario's lithium supply chain, as currently all lithium is shipped to China for processing into LiOH and lithium carbonate. The proposed LSL facility will enable Ontario to capture the full economic benefits from an uninterrupted, integrated lithium supply chain, from mines in Northern Ontario to EV battery manufacturing in Southern Ontario.

This report presents an assessment of the potential economic benefits over the lifecycle of the LSL project, which will involve two principal phases: a 3-year construction phase (2027-2029) with the operations phase beginning in 2028 for a 30-year period (2029-2058). Phase one includes significant construction employment while phase two will include the creation of high value direct fulltime employment, add indirect jobs within supplier industries, and induce an increase in consumer spending.

Methodology

To quantify the potential economic benefits of the LSL facility, RIAS Inc. examined economic impacts of the construction and operations phases of the LSL project based on the following sources of information:

- Statistics Canada input-output multipliers by sector at the provincial and national level
- Financial estimates of capital expenditures, revenues and expenses for the construction and ongoing operations of the LSL facility provided by Avalon.

These sources were used to derive quantitative estimates of the impacts of the LSL facility on output, GDP, incomes and employment within the local Thunder Bay economy, within the regional Northwestern Ontario economy, within the Ontario economy, and across the national economy.

Addressing Uncertainty in the Estimates

The financial estimates used as the basis for this economic impact assessment are expected to be further refined as the project proceeds, but they represent the best available information upon which to build the economic impact analysis at this time.

We have therefore presented economic impacts as estimated ranges given uncertainty in the factors such as manufacturing experience/certification, quality, pricing, delivery time and best value supplier, all of which can influence where equipment, supplies and services come from and

at what cost, at both the construction and operations stages of the LSL project.

Input-Output Analysis

The economic impacts of a change in output, prices or costs for a sector are dependent on the complexity of the economic system where such activities occur. An exogenous change, such as the construction and operation of a new lithium processing facility in Thunder Bay, triggers an interrelated set of changes throughout the local, regional, provincial and national economies that require some formal method of modeling to determine the magnitude of these changes. One of the methods used is an input-output (I-O) model-based analysis, which assesses the economic effects of an exogenous change in final demand for the output of a given industry. I-O models provide a measure of the interdependence between an industry and the rest of the economy by measuring:

- **Direct impacts:** Direct impacts measure the initial requirements for an extra dollar's worth of output of a given industry. The direct effect on the output of an industry is a one dollar change in output to meet the change of one dollar in final demand. Associated with this change, there will also be direct effects on GDP, jobs, and imports. For our analysis, the construction and ongoing operations of the LSL facility will increase economic output, and this direct impact becomes the starting point for a series of indirect and induced impacts within the local, provincial and national economies, which are often called secondary economic impacts.
- **Indirect impacts:** Indirect effects measure the changes due to inter-industry purchases as they respond to changes in output of the directly affected industries. This includes all the chain reaction of output up the production stream since each of the products purchased will require, in turn, the production of various inputs. In our analysis, these impacts are generated through the increase in purchases of various goods and services (non-human resources) by the LSL facility from suppliers across various industries. The increased purchases of these goods and services raises demand for the goods produced by other industries. In economic impact literature, these interdependencies are called 'backward linkages' of a sector.
- **Induced impacts:** Induced effects measure the changes in the production of goods and services in response to consumer expenditures induced by households' incomes (i.e., wages) generated by the production of the direct and indirect requirements. In our analysis, increased output from the construction and operation of the LSL facility will result in increased demand for inputs to production, leading to increased incomes for workers and higher consumer spending, which in turn affects output, GDP, incomes and jobs within the economy.

The most commonly used metrics for I-O analysis are output, GDP, labour income and employment:

- Output is the total gross value of goods and services produced by a given organization, industry or project, measured by the price paid to the producer. This is the broadest measure of economic activity.
- Gross Domestic Product (“GDP”), or value added, refers to the additional value of a good or service over the cost of inputs used to produce it from the previous stage of production. Thus, GDP is equivalent to the unduplicated value of goods and services produced.
- Labour income includes wages and salaries paid to employees and employers' social contributions (i.e. pension and health insurance).
- Employment is the number of additional jobs created measured in terms of jobs (number of people employed).

A recent study by prepared by the Northern Policy Institute (NPI) for the Thunder Bay Community Economic Development Commission examined the potential labour requirements for a lithium-processing project in Thunder Bay, by specific role and position for facility maintenance and processing corresponding to National Occupational Classification (NOC) codes. The NPI study is based on labour requirements estimated by Sayona (2019) for the Authier Lithium Project in Northwestern Quebec producing 110,000 MT of spodumene concentrate per year. Spodumene concentrate is an intermediate product that can be transformed into lithium hydroxide or lithium carbonate which, according to the NPI Institute, generally requires one worker for approximately every 1,800 metric tonnes produced annually. NPI notes that facilities producing lithium hydroxide or lithium carbonate generally require one worker for every 100 metric tonnes to 250 metric tonnes produced annually.

Sayona (2019) estimated annual employment at the Authier Lithium facility to be 61 workers (57 non-administrative and 4 administrative). Given the higher level of labour intensity for lithium hydroxide, it is estimated that the 30,000-tonne capacity LSL facility would employ 128 workers (100 non-administrative and 28 administrative).

Table 1 below lists the potential facility maintenance and processing jobs for ten NOC codes from the NPI study based on a 110,000-tonne capacity spodumene concentrate facility, and RIAS Inc’s estimates for the 30,000-tonne capacity LSL facility producing lithium hydroxide.

Table 1: Number of Workers Required for Lithium Production in Northern Ontario, by NOC code

Role / position	NOC	Number of workers based on a 110,000 tonnes/year spodumene concentrate facility*	Number of workers for the proposed 30,000 tonnes/year LSL facility**
General building maintenance workers and building superintendents	73201	1	2
Electricians (except industrial and power system)	72200	1	2
Construction millwrights and industrial mechanics	72400	2	4
Steamfitters, pipefitters and sprinkler system installers	72301	2	4
Welders and related machine operators	72106	7	14
Metallurgical and materials engineers	21322	1	8
Industrial instrument technicians and mechanics	22312	14	26
Central control and process operators, mineral and metal processing	93100	8	16
Machine operators, mineral and metal processing	94100	8	16
Supervisors, mineral and metal processing	92010	5	8

* NPI (2024) estimates

** Estimates of the number of non-administrative employees at the proposed LSL facility.

The study also compared the labour requirements with the available labour force within the Northwestern Ontario region. Overall, based on their examination of employment within ten NOC codes in lithium-processing facilities, NPI determined that at present, labour exists in Northwestern Ontario for all 10 of those professions. However, by 2026, the NPI that labour shortages could occur in two professions: (1) “Construction millwrights and industrial mechanics,” and (2) “General building maintenance workers and building superintendents.”

Customized I-O Multipliers for Lithium Processing

Input-Output multipliers from Statistics Canada for 2019 were used as the basis for our analysis. StatsCan multipliers normally lag 3+ years behind the current year. While 2020 multipliers are available, we use the pre-COVID era multipliers for 2019.

For direct impacts during the construction and operations phases we relied on financial estimates specific to the LSL facility developed by DRA Americas Inc. (2024). For indirect and induced impacts, we applied Statistics Canada’s I-O multipliers for Non-residential building construction for the construction phase and Statistics Canada’s I-O multipliers for the Basic chemical manufacturing sector for the ongoing operations phase of the LSL facility, adjusted as needed based on DRA’s financial modeling.

These adjustments resulted in a customized set of multipliers that provide a more accurate reflection of the economic impacts of the direct alkaline pressure leach process technology and capital intensity of the LSL facility than the multipliers for the basic chemical manufacturing sector as a whole.

Analytical Results

Key Parameters

Table 2 summarizes the key parameters and assumptions used in our analysis.

Table 2: Parameters and Assumptions

Parameter	Assumed Value
Discount rate	5%
Exchange rate USD-CAD	1.35
LSL facility construction	3 years (2027-2029)
CAPEX (engineering, procurement, construction, owners' costs, contingency)	\$1.2 billion
LSL facility operational lifespan	30 years (2029-2058)
Lithium Hydroxide (LiOH) price	\$35,360/tonne LiOH
Production capacity	30,000 tonnes LiOH/annum
Revenue over 30 years	\$31.8 billion

Construction Phase Impacts

The construction phase includes EPC (design engineering, equipment procurement, construction) as well as commissioning and ramp up to name plate capacity. The total spend during the construction phase over the 3-year period is expected to be \$1.213 billion CAD, for an annual average of over \$400 million. Table 3 below shows the total direct, indirect and induced economic impacts of that expenditure for the local, regional, provincial and national economies. More details on the direct, indirect and induced impacts for the construction phase of the LSL facility can be found in Table 6, Appendix 1.

Table 3: Economic Impacts of LSL Facility Construction (2027-2029)

	Average Annual		Total		PV ^{5%}	
Local Impacts – City of Thunder Bay						
GDP (\$ millions)	\$231.7	- \$232.5	\$697.5	- \$718.3	\$623.9	- \$642.5
Labour Income (\$ millions)	\$41.1	- \$41.6	\$124.8	- \$137.2	\$111.6	- \$122.8
Jobs	308	- 315	945	- 1,133	845	- 1,013
Regional Impacts – Northwestern Ontario						
GDP (\$ millions)	\$240.2	- \$254.9	\$720.5	- \$764.7	\$644.4	- \$683.9
Labour Income (\$ millions)	\$46.2	- \$55.0	\$138.5	- \$165.0	\$123.9	- \$147.5
Jobs	384	- 518	1,153	- 1,553	1,031	- 1,389
Provincial Impacts – Ontario						
GDP (\$ millions)	\$244.3	- \$278.7	\$732.9	- \$836.2	\$655.5	- \$466.3
Labour Income (\$ millions)	\$50.7	- \$70.6	\$152.1	- \$211.8	\$136.0	- \$148.1
Jobs	437	- 744	1,312	- 2,232	1,173	- 1,821
National Impacts – Canada						
GDP (\$ millions)	\$251.3	- \$292.7	\$753.8	- \$878.0	\$674	- \$503.7
Labour Income (\$ millions)	\$54.5	- \$78.2	\$163.5	- \$234.7	\$146	- \$168.7
Jobs	497	- 863	1,490	- 2,589	1,333	- 2,141

It is important to note that throughout the presentation of economic impacts, each level of impact is a subset of the next level: local impacts are included in the regional impacts, regional impacts are included in the provincial impacts, and provincial impacts are included in the national impacts.

For Thunder Bay, the construction of the LSL facility is expected to generate an average of about \$232 million in GDP annually over the 3 years period, \$41.1 to \$41.6 million in labour income and 308 to 315 jobs each year over the 3-year period from 2027 to 2029.

For the region of Northwestern Ontario, it is estimated that the LSL facility construction will create \$240 to \$254 million in GDP, \$46 to \$55 million in labour income and a total of between 384 and 518 jobs within the region each year over the 3-years.

At the provincial level, construction will generate a total of \$244 to \$279 million in GDP annually, \$51 to \$71 million in annual income for Ontario workers, and a total of 2,036 to 3,054 jobs over the 3-year period.

Overall national impacts are expected to be: \$1.06 to \$1.59 billion in economic output, \$563 to \$845 million in GDP, \$189 to \$283 million in labour income and a total of 437 to 734 jobs each year over the 3-year period.

Ongoing Operations

Table 4: LSL Facility Operations - Total Direct, Indirect and Induced Economic Impacts (2029-2058)

	Average Annual	Total	Present Value ^{5%}
Local Impacts – City of Thunder			
GDP (\$ millions)	\$665.6 - \$669.6	\$21,297.6 - \$21,426.9	\$10,105.1 - \$10,166.8
Labour Income (\$ millions)	\$26.6 - \$28.6	\$850.6 - \$915.1	\$408.9 - \$439.7
Jobs	308 - 341	9,866 - 10,911	4,748 - 5,247
Regional Impacts – Northwestern			
GDP (\$ millions)	\$792.7 - \$795.4	\$25,365.9 - \$25,452.8	\$12,048.0 - \$12,089.5
Labour Income (\$ millions)	\$90.0 - \$91.3	\$2,879.6 - \$2,923.0	\$1,377.9 - \$1,398.6
Jobs	1,335 - 1,357	42,724 - 43,426	20,439 - 20,775
Provincial Impacts – All of Ontario			
GDP (\$ millions)	\$819.9 - \$829.3	\$26,238.0 - \$26,536.3	\$12,464.4 - \$12,606.8
Labour Income (\$ millions)	\$106.4 - \$108.2	\$3,404.8 - \$3,463.3	\$1,585.6 - \$1,656.6
Jobs	1,555 - 1,630	49,767 - 52,176	23,803 - 24,953
National Impacts – Canada			
GDP (\$ millions)	\$962.6 - \$972.1	\$30,801.9 - \$31,106.1	\$14,659.7 - \$14,805.0
Labour Income (\$ millions)	\$169.5 - \$174.2	\$5,422.9 - \$5,574.4	\$2,589.3 - \$2,661.7
Jobs	2,419 - 2,496	77,412 - 79,874	37,016 - 38,192

* 75% and 90%, respectively, of the total provincial economic impacts of the operations phase of the project were assumed to be generated be at the local and regional levels.

Over 30 years of operation, the LSL facility is expected to generate a total of \$615 to \$632 million in annual GDP, \$80 to \$83 million in annual labour income, and 1,166 to 1,223 jobs each year within the city of Thunder Bay.

For the region of Northwestern Ontario, it is estimated that ongoing operations of the LSL facility will create a total of \$738 to \$746 million in GDP, \$96 to \$100 million in labour income and 1,400 to 1,467 jobs each year over the period 2029-2058.

For Ontario, the LSL facility will generate an estimated \$820 to \$829 million in annual GDP, \$106 to \$111 million in annual income for Ontario workers, and 1,555 to 1,630 jobs each year over the 30-year operations phase.

Overall national impacts are expected to be: \$966 to 962 million in GDP, \$170-174 million in labour income and 2,416 to 2,493 jobs each year over the 30-year period.

Total Economic Impacts

Table 5: Total LSL Project Economic Impacts (2027-2058)

	Total		Present Value ^{5%}	
Local Impacts – City of Thunder Bay				
GDP (\$ millions)	\$21,995.1	- \$22,145.2	\$10,728.9	- \$10,809.3
Labour Income (\$ millions)	\$975.4	- \$1,052.3	\$520.5	- \$562.4
Jobs	10,811	- 12,044	5,593	- 6,260
Regional Impacts – Northwestern				
GDP (\$ millions)	\$26,086.4	- \$26,217.5	\$12,692.4	- \$12,773.4
Labour Income (\$ millions)	\$3,018.2	- \$3,087.9	\$1,501.8	- \$1,546.1
Jobs	43,877	- 44,979	21,470	- 22,164
Provincial Impacts – All of Ontario				
GDP (\$ millions)	\$26,970.9	- \$27,372.5	\$13,119.9	- \$13,354.7
Labour Income (\$ millions)	\$3,556.8	- \$3,675.1	\$1,721.6	- \$1,846.0
Jobs	51,078	- 54,408	24,975	- 26,949
National Impacts – Canada				
GDP (\$ millions)	\$31,555.7	- \$31,984.1	\$15,333.9	- \$15,590.2
Labour Income (\$ millions)	\$5,586.5	- \$5,809.1	\$2,735.6	- \$2,871.6
Jobs	78,903	- 82,464	38,349	- 40,508

Table 5 shows the total economic benefits from the construction phase (from Table 3) and the ongoing operations phase (Table 4) for the proposed LSL facility. Over the entire period of the LSL project (2027-2058), the following total economic impacts are expected:

- Within Thunder Bay: \$22 to \$22.1 billion in GDP, \$975 million to \$1.05 billion in income for workers, and a total of 10,811 to 12,044 person-years of employment.
- For the region of Northwestern Ontario: a total of more than \$26 billion in GDP, \$3 billion in labour income and a total of 43,877 to 44,979 person-years of employment across the region.
- For Ontario: \$27 to \$27.4 billion in GDP, \$3.6 to \$3.7 billion in income for Ontario workers, and a total of 51,078 to 54,408 person-years of employment.
- National impacts: \$31.6 to \$32 billion in GDP, \$5.6 to \$5.8 billion in labour income and 78,903 to 82,464 person-years of employment for Canadians.

Other Potential Economic Benefits

There are a number of potentially significant additional economic benefits that have not been quantified in this Report, including:

- broader development of northwestern Ontario's lithium assets by producers seeking to

- utilize the proximity of Avalon's processing capacity;
- potential to incentivize a regional critical-minerals innovation and R&D hub in partnership with local university and college stakeholders;
- potential to unlock new economic development opportunities for local and regional First Nations communities;
- enhanced environmental and sustainability process innovation and novel Canadian IP;
- supply chain efficiencies potentially created by connecting lithium assets in the north with regional processing capacity, reducing life-cycle carbon footprint compared to producers who ship raw materials to processing facilities overseas;
- potential future expansion of the LSL facility to include an additional 120,000 tonnes of nameplate capacity, and development of cell/cathode production and battery recycling facilities on the site (complete Rockefeller Industrial Park).

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Appendix 1: Detailed Economic Impact Tables

Table 6: LSL Facility Construction - Detailed Economic Impacts (2027-2029)

	Average Annual	Total	PV ^{5%}
Direct Impacts			
Output (\$ millions)	\$404.4	\$1,213.3	\$1,085.1
GDP (\$ millions)	\$209.9	\$629.7	\$563.2
Labour Income (\$ millions)	\$30.8	\$92.3	\$82.6
Jobs	130	391	350
Local Impacts – City of Thunder Bay			
GDP (\$ millions)	\$231.7 - \$232.5	\$697.5 - \$718.3	\$623.9 - \$642.5
Labour Income (\$ millions)	\$41.1 - \$41.6	\$124.8 - \$137.2	\$111.6 - \$122.8
Jobs	308 - 315	945 - 1,133	845 - 1,013
Regional Impacts – Northwestern Ontario			
GDP (\$ millions)	\$240.2 - \$254.9	\$720.5 - \$764.7	\$644.4 - \$683.9
Labour Income (\$ millions)	\$46.2 - \$55.0	\$138.5 - \$165.0	\$123.9 - \$147.5
Jobs	384 - 518	1,153 - 1,553	1,031 - 1,389
Provincial Impacts – All of Ontario			
Indirect			
GDP (\$ millions)	\$23.8 - \$47.5	\$71.3 - \$142.6	\$63.8 - \$127.5
Labour Income (\$ millions)	\$15.6 - \$31.1	\$46.7 - \$93.4	\$41.8 - \$83.6
Jobs	226 - 451	677 - 1,353	605 - 1,210
Induced			
GDP (\$ millions)	\$10.7 - \$21.3	\$32.0 - \$64.0	\$28.6 - \$57.2
Labour Income (\$ millions)	\$4.3 - \$8.7	\$13.0 - \$26.0	\$11.6 - \$23.3
Jobs	81 - 162	244 - 487	218 - 436
Total			
GDP (\$ millions)	\$244.3 - \$278.7	\$732.9 - \$836.2	\$655.5 - \$747.9
Labour Income (\$ millions)	\$50.7 - \$70.6	\$152.1 - \$211.8	\$136.0 - \$189.4
Jobs	437 - 744	1,312 - 2,232	1,173 - 1,996
National Impacts – Canada			
Indirect			
GDP (\$ millions)	\$28.1 - \$56.2	\$84.3 - \$168.6	\$75.4 - \$150.8
Labour Income (\$ millions)	\$18.2 - \$36.4	\$54.6 - \$109.2	\$48.8 - \$97.7
Jobs	263 - 526	789 - 1,578	706 - 1,412
Induced			
GDP (\$ millions)	\$13.3 - \$26.6	\$39.8 - \$79.7	\$35.6 - \$71.2
Labour Income (\$ millions)	\$5.5 - \$11.1	\$16.6 - \$33.2	\$14.9 - \$29.7
Jobs	103 - 207	310 - 620	277 - 554
Total			
GDP (\$ millions)	\$251.3 - \$292.7	\$753.8 - \$878.0	\$674 - \$785.3
Labour Income (\$ millions)	\$54.5 - \$78.2	\$163.5 - \$234.7	\$146 - \$210.0
Jobs	497 - 863	1,490 - 2,589	1,333 - 2,316

Table 7: LSL Facility Ongoing Operations - Detailed Economic Impacts (2029-2058)

	Average Annual		Total		PV ^{5%}	
Direct Impacts						
Output (\$ millions)	\$995.4		\$31,853.6		\$15,212.0	
GDP (\$ millions)	\$642.5		\$20,559.8		\$9,752.7	
Labour Income (\$ millions)	\$15.9		\$507.6		\$245.1	
Jobs	126		4,032		1,962	
Local Impacts – City of Thunder Bay						
GDP (\$ millions)	\$665.6	- \$669.6	\$21,297.6	- \$21,426.9	\$10,105.1	- \$10,166.8
Labour Income (\$ millions)	\$26.6	- \$28.6	\$850.6	- \$915.1	\$408.9	- \$439.7
Jobs	308	- 341	9,866	- 10,911	4,748	- 5,247
Regional Impacts – Northwestern Ontario						
GDP (\$ millions)	\$792.7	- \$795.4	\$25,365.9	- \$25,452.8	\$12,048.0	- \$12,089.5
Labour Income (\$ millions)	\$90.0	- \$91.3	\$2,879.6	- \$2,923.0	\$1,377.9	- \$1,398.6
Jobs	1,335	- 1,357	42,724	- 43,426	20,439	- 20,775
Provincial Impacts – All of Ontario						
Indirect						
GDP (\$ millions)	\$136.5	- \$144.1	\$4,369.5	- \$4,610.6	\$2,086.7	- \$2,201.9
Labour Income (\$ millions)	\$71.1	- \$75.0	\$2,274.5	- \$2,400.1	\$1,086.2	- \$1,146.2
Jobs	1,118	- 1,179	35,764	- 37,738	17,080	- 18,022
Induced						
GDP (\$ millions)	\$40.9	- \$42.7	\$1,308.7	- \$1,365.9	\$625.0	- \$652.3
Labour Income (\$ millions)	\$16.6	- \$17.4	\$532.3	- \$555.6	\$254.2	- \$265.3
Jobs	312	- 325	9,970	- 10,406	4,761	- 4,969
Total						
GDP (\$ millions)	\$819.9	- \$829.3	\$26,238.0	- \$26,536.3	\$12,464.4	- \$12,606.8
Labour Income (\$ millions)	\$106.4	- \$108.2	\$3,404.8	- \$3,463.3	\$1,585.6	- \$1,656.6
Jobs	1,555	- 1,630	49,767	- 52,176	23,803	- 24,953
National Impacts – Canada						
Indirect						
GDP (\$ millions)	\$253.0	- \$260.5	\$8,096.4	- \$8,337.5	\$3,866.5	- \$3,981.7
Labour Income (\$ millions)	\$121.8	- \$125.8	\$3,899.1	- \$4,024.6	\$1,862.0	- \$1,922.0
Jobs	1,743	- 1,804	55,768	- 57,742	26,633	- 27,575
Induced						
GDP (\$ millions)	\$70.7	- \$72.7	\$2,263.0	- \$2,326.1	\$1,080.7	- \$1,110.9
Labour Income (\$ millions)	\$29.0	- \$29.8	\$928.4	- \$954.3	\$443.4	- \$455.7
Jobs	547	- 562	17,509	- 17,998	8,362	- 8,595
Total						
GDP (\$ millions)	\$962.6	- \$972.1	\$30,801.9	- \$31,106.1	\$14,659.7	- \$14,805.0
Labour Income (\$ millions)	\$169.5	- \$174.2	\$5,422.9	- \$5,574.4	\$2,589.3	- \$2,661.7
Jobs	2,419	- 2,496	77,412	- 79,874	37,016	- 38,192

Table 8: Total LSL Project - Detailed Economic Impacts (2027-2058)

	Total		PV ^{5%}	
Direct Impacts				
Output (\$ millions)	\$33,067		\$16,297	
GDP (\$ millions)	\$21,189		\$10,316	
Labour Income (\$ millions)	\$600		\$328	
Jobs	4,423		2,311	
Local Impacts – City of Thunder Bay				
GDP (\$ millions)	\$21,995.1	- \$22,145.2	\$10,728.9	- \$10,809.3
Labour Income (\$ millions)	\$975.4	- \$1,052.3	\$520.5	- \$562.4
Jobs	10,811	- 12,044	5,593	- 6,260
Regional Impacts – Northwestern Ontario				
GDP (\$ millions)	\$26,086.4	- \$26,217.5	\$12,692.4	- \$12,773.4
Labour Income (\$ millions)	\$3,018.2	- \$3,087.9	\$1,501.8	- \$1,546.1
Jobs	43,877	- 44,979	21,470	- 22,164
Provincial Impacts – All of Ontario				
Indirect				
GDP (\$ millions)	\$4,512.1	- \$4,681.9	\$2,214.2	- \$2,265.6
Labour Income (\$ millions)	\$2,368.0	- \$2,446.8	\$1,169.8	- \$1,188.0
Jobs	37,118	- 38,415	18,290	- 18,627
Induced				
GDP (\$ millions)	\$1,372.6	- \$1,397.8	\$682.2	- \$680.9
Labour Income (\$ millions)	\$558.3	- \$568.6	\$277.5	- \$277.0
Jobs	10,458	- 10,650	5,197	- 5,187
Total				
GDP (\$ millions)	\$26,970.9	- \$27,372.5	\$13,119.9	- \$13,354.7
Labour Income (\$ millions)	\$3,556.8	- \$3,675.1	\$1,721.6	- \$1,846.0
Jobs	51,078	- 54,408	24,975	- 26,949
National Impacts – Canada				
Indirect				
GDP (\$ millions)	\$8,265.04	- \$8,421.83	\$4,017.35	- \$4,057.08
Labour Income (\$ millions)	\$4,008.27	- \$4,079.19	\$1,959.71	- \$1,970.82
Jobs	57,347	- 58,531	28,044	- 28,281
Induced				
GDP (\$ millions)	\$2,342.6	- \$2,366.0	\$1,151.9	- \$1,146.5
Labour Income (\$ millions)	\$961.6	- \$970.9	\$473.1	- \$470.6
Jobs	18,129	- 18,308	8,916	- 8,872
Total				
GDP (\$ millions)	\$31,555.7	- \$31,984.1	\$15,333.9	- \$15,590.2
Labour Income (\$ millions)	\$5,586.5	- \$5,809.1	\$2,735.6	- \$2,871.6
Jobs	78,903	- 82,464	38,349	- 40,508