

Lower Columbia Initiatives Corp.

# Regional Supply Chain & Investment Readiness

Research – Phase II

Jaspreet Kaur  
1-28-2022

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## About LCIC

The LCIC (Lower Columbia Initiatives Corporation) is an economic development corporation that works collaboratively in the Lower Columbia region with local agencies, organizations, and businesses to develop and implement strategies to strengthen the local economy.

Since its inception in 2010, the LCIC has worked on innovative projects such as Metal Tech Alley\* (focused on promoting the industrial circular economy) and assisted with the regional immigration pilot program. The LCIC undertakes Research & Development (R&D) related activities and projects with different stakeholders to inform economic development activities and programs in the region. These R&D projects may include anything from the preliminary study and feasibility analysis to data collection. These project outcomes help the LCIC improve business advocacy, economic development, and support programs.

*\*Metal Tech Alley (MTA), a project of the LCIC, supports the business ecosystem to lead the industrial circular economy (reduce, recycle, recover and reuse) in the Canadian landscape. The existing micro closed-loop systems in the regional economy include critical mineral extraction (Lithium, Lead), battery recycling, and renewable power generation (natural gas plants driven by waste wood from the forestry industry). The purpose is to expand these closed loops to include more companies and materials in the industrial circular economy. This supply chain study supports the MTA project as the by-product and waste quantitative data inputs, and high-level recommendations would lead to the circular economy-based initiatives.*

## Introduction

In 2021, the LCIC conducted a supply chain-focused, collaborative study with regional companies to identify common issues and guide the LCIC's business advocacy and support services to help make the supply chain more resilient in the future. Phase I of the supply chain study focused on issues where solutions would make a broad impact to stimulate business growth in the region. The high-level recommendations were as follows:

- a) Support supply chain infrastructure development
- b) Support transition-up in the value chain (value-added products) for core companies
- c) Create industry clusters in emerging markets (to enhance attractiveness for new businesses)
- d) Provide business resources through cross-industry collaboration (business & nonbusiness)

These initiatives align with the LCIC's vision for business attraction and expansion, relationship building and community development for the region's wellbeing.

As a next step LCIC undertook following actions on the study findings:

- a) *Conducted a business engagement session:* The session was held in October 2021 to engage with the participating organizations and share the study research findings. To help companies with business resources, five free mini-consulting projects were offered to companies through Blue Monarch Management contracted by the LCIC.
- b) *Expansion of Study (Phase II):* Collaboration among the organizations is the key to resolve supply issues across the sectors. As such, the supply chain study was expanded from the Trail region to include diverse businesses from across the West Kootenays.
- c) *Supply Chain Strengthening Initiatives:* The first initiative is to develop an information sharing platform which businesses and shipping companies can easily use to facilitate sharing loads intra- and extra-regionally. Economic developers, local businesses and shipping companies are working together to address the lack of coherent shipping options for small and medium businesses. When a fully-fledged logistics sharing platform is available and fully functional, it may be matched with additional 3PL services and local warehousing options. Discussions are still in early stages, but given business interest, this seems like a promising opportunity.

In the second initiative, lobbying efforts for the Provincial and Federal governments are being undertaken to make changes to the current border crossings in the Lower Columbia Currently. One of the two border crossings in the area is underutilized due to infrastructure inadequacies. This situation results in heavy usage of the other border crossing which is a high elevation crossing and uses routes that are problematic for environmental, safety and economic reasons. Initial activities will include undertaking a cost-benefit assessment of making upgrades to the underutilized border compared to the long-term benefits of making these changes. Ultimately, the results of the assessment will be used as part of advocacy efforts. The changes that are proposed will have a significant benefit for local companies making shipping less problematic and more economical. The reduction of traffic through residential and downtown areas will also benefit local residents.

The current report builds on the findings of Supply Chain Study Phase I and Phase II to develop detailed Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis of the West Kootenays region. The next section focused on analyzing the various industry sectors across the region. Additionally, the report introduces some of the best relevant industry examples and their key initiatives which could inspire the next steps for LCIC.

# SWOT Analysis







pass to cross the border at Paterson near Rossland. This adds shipping delays and high logistics costs for the trail-based companies dependent on road truck logistics. Further, the battery recycling materials movement must adhere to hazardous material handling regulations which does not allow sharing the truck load or rail cart load with other non-hazardous loads like wood, steel etc. It increased the in-bound and out-bound shipping cost for the battery recycling companies.

**Opportunity:**

*Favourable emerging markets:* The rising trend of Electric Vehicles (EVs) increases the demand for battery recycling, various high purity metals and minerals. The region could capitalize on the opportunity by supporting infrastructure and business support programs focused on these emerging market sectors.

*Call for climate action:* Canada has an ambitious target to achieve net zero emissions by 2050. By creating a first of its kind, circular economy model based on industry, the region could lead a path for the country.

*Demand to reduce supply chain dependence on international market:* Disruptions in the supply chain, caused by Covid-19, made businesses across North America reduce their dependence for material sourcing on international markets and instead develop capability within the continent. A very relevant case would be the dependence of EV battery manufacturing supply chain on the international market. Suppliers of battery pre-cursor material and various metals like Lithium, Cadmium, and graphite are located in China, Europe etc. Companies interested in setting up their operations in the US and Canada would need a resilient battery material supply chain within the continent. Canada can benefit from this supply chain gap as the country has various natural resources of battery relevant materials. The region has an established competitive advantage for battery recycling industry and could develop itself to meet the battery supply chain demand at midstream or downstream.

*Reverse migration to small towns/rural areas due to Covid-19:* Work from home policies have accelerated the trend of young people migrating from big cities to rural areas. This may benefit the region in the long run to start building up knowledge-based economy for the future.

**Threat:**

*Impact of provincial regulations:* Forestry and battery recycling sectors reported the impact of regulations directly on their profit margins. Regulations on management of hazardous material require the shipping of end of life batteries in a way that it increased the shipping cost. For

forestry companies, the demand-supply equation is not balanced resulting into higher competition and prices for buying lumber. The BC based forestry companies are at price disadvantage with US based counterparts due to comparatively flexible regulations in US.

*Disruption in Supply Chain:* As is the case for most businesses, the forestry and metallurgy companies have been facing issues in sourcing raw material, repair and maintenance services, and inventory for their operations.

*Falling number of local secondary material vendor:* Manufacturing, metallurgy and forestry companies source more than 50% of their secondary raw material from local vendors. However, over the past few years some of the vendor companies have moved out of the region.

*Slow Business Growth:* Over the past decade few new businesses have established in the region and the existing businesses have rarely seen the scale of business growth prior to the last decade.

This SWOT analysis is a comprehensive snapshot deciphering the overall business health picture of the West Kootenay region. It is helpful in designing business advocacy and support programs that could have an impact across various types of businesses thus building on the idea of promoting collaboration among companies (Phase I study recommendations). However, it is important to understand each major industry sector from the region and the next section takes on a more individual industry sector approach.

# Industry Micro-clusters

Other recommendations from the first phase of the study was to develop an industry cluster to stimulate business growth in the trail region. It was a diverse set of companies in the previous phase from manufacturing, forestry and metallurgy sectors. The current extension of the study spread across the entire West Kootenay region and included a similar sector of companies. However, the companies in the same sector are very similar and have overlap in their operational, supply chain and overall business issues/problems. As such, for the purpose of study and analysis, similar companies are grouped together and treated as small cluster. For example, all the paper and pulp, timber companies and small vendors/contactors to these companies are grouped together as the forestry cluster. The companies in one cluster don't exist in silos rather it is small ecosystem that has been referred to as a micro-cluster that is pertinent to the economic growth in the region.

- A. Forestry Cluster:** The large companies in the cluster are the lumber production and pulp and paper manufacturing. Since the 20<sup>th</sup> century the presence of these companies has fostered the set of suppliers, contractors & service providers that thrive with the prosperity of these large companies. There are a few companies that exist at the end of value chain, for example, Mandala Homes deals in pre-fabricated homes with most of its client based in US. The diagram below highlights these cluster members:

The lumber and pulp & paper manufacturing companies serve customers in the US and Canada. The waste material from lumber companies like wood chips and bark is sent to pulp & paper manufacturing companies and natural gas renewable energy plants in Kettle Falls, US. The companies in the cluster are facing the following issues:

1. *Lack of financial resources:* Lumber companies sell logs of wood and have hardly undergone any business model transformation over past decade. The margins in value added wood products are significantly higher than a basic log of wood. Operational transformation to value added products requires capital and skilled labor. The capital resources are limited, and the accessible ones have a process that need specific

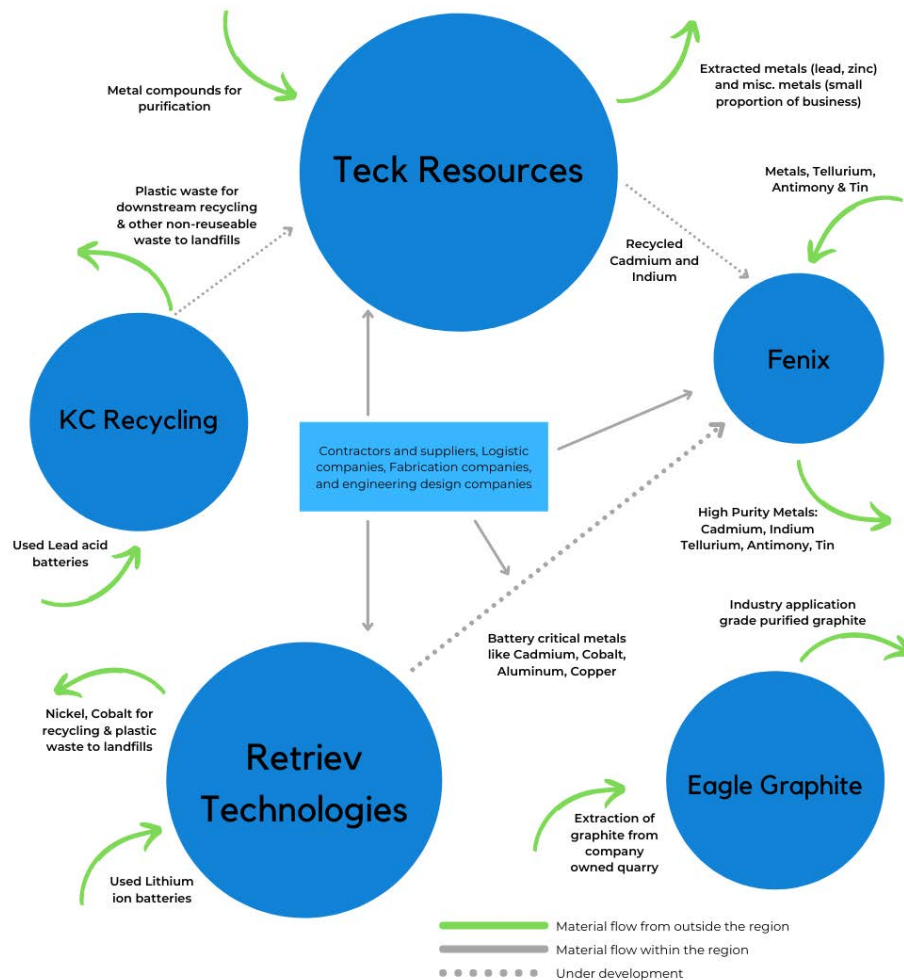
application and documentation. For example, one lumber company in the interview mentioned that they understand there are funding/grant opportunities that they can apply for. However, they don't have the dedicated in-house expertise to navigate the application process to reach that fund.

2. *Lack of skilled labor:* Lumber companies have a hard time hiring youth to work in their current production setup. The work shifts are 12 hours including nights, and the younger generation of the current workforce is not attracted to work in this kind of environment. Even if the lumber companies have plans to add new product lines or automate operations to reduce labor dependence, the capital required is the biggest hurdle.
3. *Regulations squeezing profit margins:* Most of the lumber companies sell in international markets and source the trees within BC. All the companies across the province compete for the same inventory of trees. As the regulations allow only a small percentage of trees to be cut, the boom in the housing market across the North America is creating imbalance in the demand supply equation resulting in a disproportionate price inflation of wood. Also, the stumpage fees on lumber is the highest in the province of BC. These factors create price disadvantage for the regional lumber companies in comparison to their US counterparts.
4. *Issues with supply chain:* Covid-19 has added uncertainty to the supply chain. For lumber, pulp & paper manufacturing companies, the Original Equipment Manufacturers (OMEs) are located across the globe – China, Europe etc. The routine maintenance inventories shipping time has gone up to six months to one year after Covid-19. The companies are slowing down operations, delaying customer orders and holding more inventory than required.

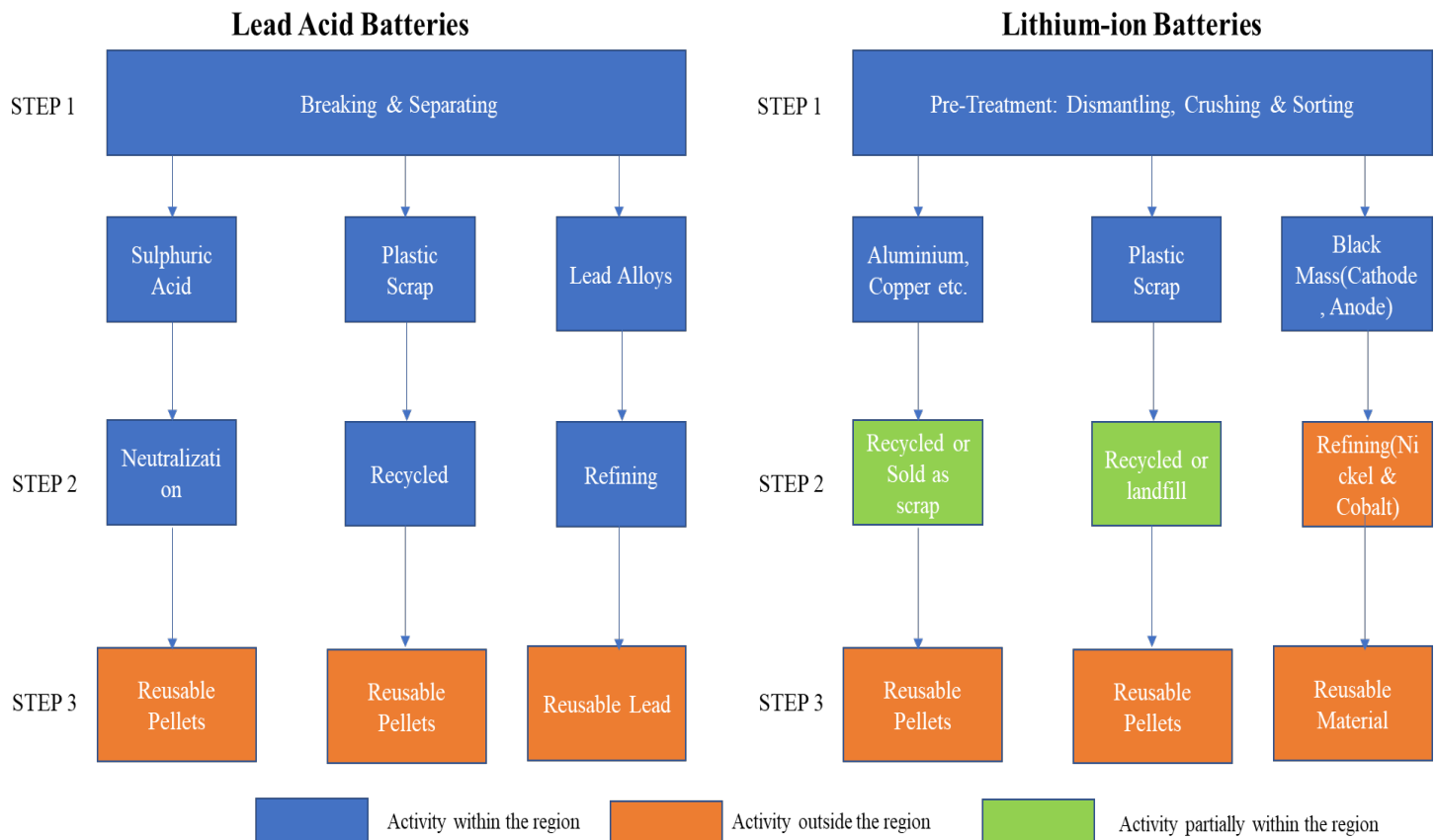
**Metallurgy Cluster:** The major companies under the metallurgy sector located in the Trail area are as below:

- a) Teck Resources – World's largest fully integrated Lead & Zinc smelting complex
- b) Retrieval Technologies – North America's leading Lithium-ion battery recycling
- c) KC Recycling - Lead Acid Battery Recycling
- d) Fenix Advanced Materials - Ultra High Purity Metal refining
- e) Eagle Graphite - High Purity Graphite Extraction & Refining

Teck Resources, the largest employer in the region, is Canada’s leading mining company with presence across the globe. Teck is also a key partner in the Metal Tech Alley initiative of LCIC. KC recycling sources used lead acid batteries from the US & Canada and the extracted lead metal is forwarded to Teck’s lead smelter for further refining. Fenix Advanced Materials sources cadmium and indium from Teck operations for making ultra-high purity grade metals.



Metallurgy offers the potential for creating circular economy based battery recycling cluster of higher capacity. The existing battery reverse logistics or battery recycling value chain is not completely within the region with an exception in lead acid batteries (wherein extracted lead compounds from used batteries are recycled at Teck smelter facility). For lithium-ion batteries, extracted nickle and cobalt compounds are being sent to a smelter in Sudbury, Ontario. The figure below describes about the complete battery reverse logistics value chain. A complete value chain for battery recycling starts with battery breaking and separating into components like anode, cathode, electrolyte and miscellaneous packing materials.



As shown above, most of the end value chain activities happened out of the region and for lithium-ion batteries the value chain is limited to only first step called manual/physical recycling. Due to standard technical specification and widespread use of lead acid batteries, recycling this type of battery is a straightforward process. It would be possible to pursue the production of end reusable materials within the region, but the hurdle of additional investment stands in the way.

On the contrary, the lithium-ion battery recycling process is complex due to a wide variety of chemistry and formats of batteries in the market. The existing battery recycling in the region is manual and labour intensive. North America’s end of life battery mass is going to be more than 100 Metric tons by 2025 and 300 Metric tons by 2030. If the operations have to scale up to meet the demand of the industry cluster, the recycling needs to be automated and more robust to be cost-effective. During discussions, it emerged that the EV battery market is evolving and companies are pursuing intensive R&D to make more efficient batteries and there are multiple types of car batteries coming in the market every year. Hence it is risky now to invest in a scale up recycling facility as the batteries being designed today could be obsolete in couple of years.

Further, a new nickel and cobalt refining facility if added for regional industry cluster could operate cost-effectively only with economies of scale. It would need a consistent supply of black mass (nickel & cobalt) which means constant high supply rate of end of life batteries at first step.

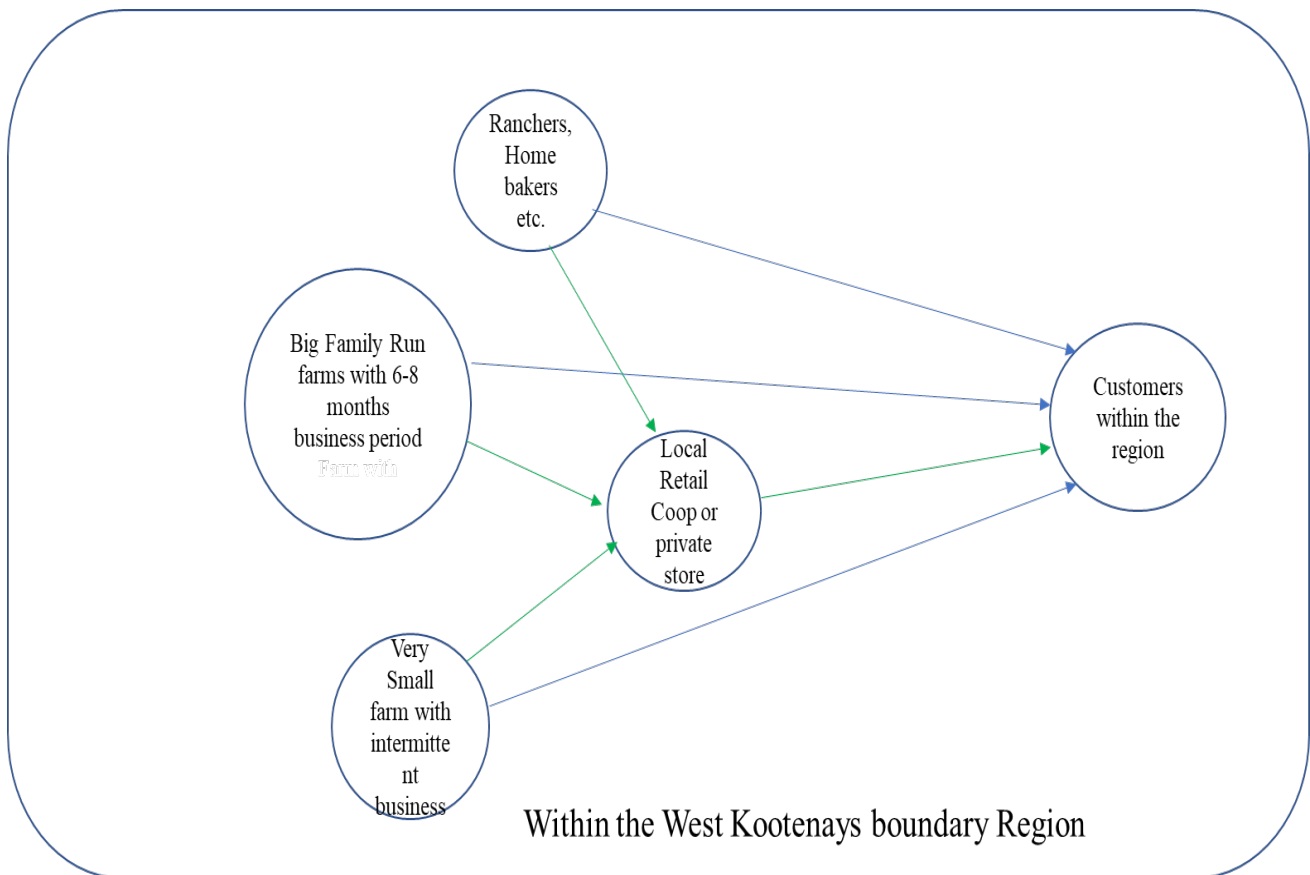
These two factors, capital intensive metal refining facility and variation in battery design, are the main hurdles to create a large battery recycling industry cluster within the region.

The main issues the companies in metallurgy sector are as follows:

1. *Lack of cost-effective logistic service:* With the exception of Teck Resources, the companies in the cluster depend on road trucking mode of transportation for inbound and outbound logistics. Although the Waneta border is 10 km to Trail, the shipping on road crosses the US border at Grand Forks after crossing mountain terrain across the Bonanza Pass. Shifting this on-road trucking commercial traffic to US on rail mode (using the existing short rail line) could increase profit margins and cash reserves to invest in business expansion.
2. *Impact of Covid-19 on supply chain:* The maintenance inventory sources from global market is delayed by months which impacts operations considerably. The cost of logistics has increased significantly post Covid-19.
3. *Limited economies of scale:* Although established battery recycling is a competitive advantage for the region, there is a necessary economy of scale threshold to be met to grow the sector into a larger cluster. Achieving this is possible with additional infrastructure investment in the supply chain, focused business advocacy and collaboration among the relevant stakeholder companies.

**C. Agriculture Cluster:** Although it is not the dominant cluster when it comes to bringing business from outside of the region. The agriculture sector covers all the following:

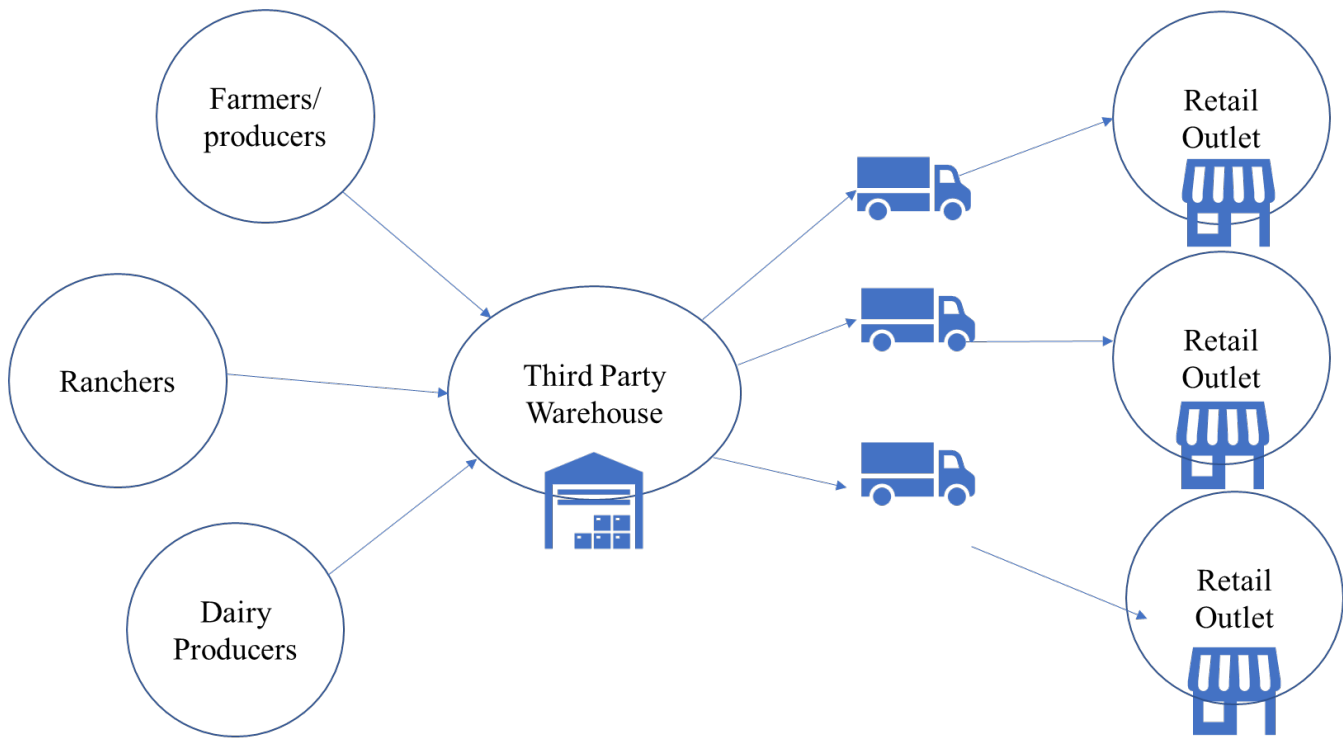




It is important to note that very little farm produce finds its way outside the region to customers. We asked the entrepreneur farmers how they consider selling their produce to customers/shops to areas far from the region. The following reasons were uncovered:

- a) *Who manages the logistics:* Some of the farms only have store outlets at their farm premises and customers visit the store and shop. There is one Kettle Valley Food Co-op store that opens once a week and provides an online marketplace to local customers. Producers list their produce by Saturday and customers have time to place an order by the next Monday. Producers by Tuesday would drop the order received at the Kettle Valley Food Co-op store. On Thursdays customers could come to pick up the order or pay a few extra dollars for delivery. Kettle Valley Food Co-op is a group of volunteers with only one full time employee at 5 hours per week. They have started making a profit after Covid-19 as their sales increased after a shortage of fresh produce at the big grocery stores due to supply chain issues. The producers selling at Kettle Valley Food Co-op would arrange shipping and try to pool the drop off trip among each other. The same is true for any producers selling on the shelves of another local grocery store. They end up producing what they can manage to ship considering the perishable nature of goods.

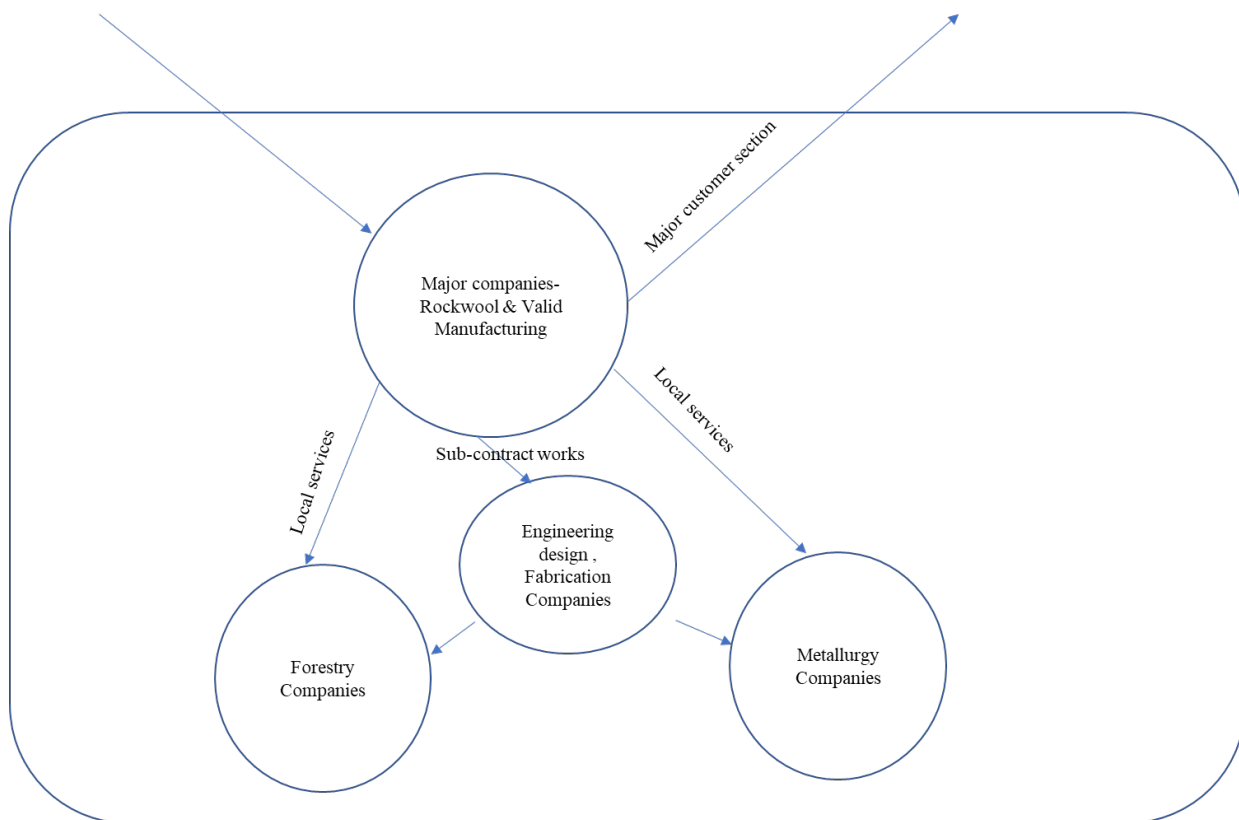
- b) *Regulation hurdles to retail shelves:* Chain retail stores need a consistent supply of fruit and vegetable produce on the shelves to meet the high customer traffic demand. Small scale producers cannot keep up with this scale and are best matched with either third party companies buying their produce to resell or small independent local stores with a lower demand rate. However, there are large to medium scale fresh produce farms from the region with capacity to be on the shelves of national retail chains or even sell to the global market. Producers need to get Canada GAP certification as a prerequisite to sell with the retail chains and international markets. Canada GAP is a certification program in place to ensure that safe food growing practices are being used to avoid contamination of produce. One of the farms did report the Canada GAP certification qualification process as a hurdle and some of the audit checklist requirements are not farming sensitive. It seems that those criteria are setup in the process without any feedback or consideration from a producer's perspective. For example, the audit would require the tractor to be washed 2 to 3 times per week to ensure safety of produce rather than washing it once a week which would suffice as per owners' perspective. This requires extra time and money to meet the checklist for getting Canada GAP certified. On top of that, there is the additional \$5000-6000 for the annual certification fee. For medium scale producers, the alternate option is to sell through their own farm store or local retail store rather than invest in Canada GAP certified.
- c) *Supply Chain Infrastructure:* We asked farmers if there is any way they could see their produce in hitting the shelves of large grocery stores in big cities or even national grocery store chains. They told us that having a third party manage the supply chain from inside the region to the areas outside the region even up to Vancouver would be a step forward to achieving this goal. The hypothetical model could mean farmers drop their produce at a strategically located central warehouse with cold storage facility to manage perishable produce. A third party would manage the sale and shipment to retail outlets anywhere across the province. They would charge a handling fee to the producers and sell to retail stores with some profit margin.



Having a third party supply chain company would remove the burden of shipping and dealing with retail stores, creating more opportunities to produce and sell more for these agriculture businesses. It is to note that these businesses do understand the relevance of social media platforms and most of them have a website or Facebook page to connect with the customers. There are concierge website(s) that provide listings to the producers/farmers on an online portal. It is surprising to the producers to see fresh produce on the shelves of big retail stores sourced from international countries while the same products are available locally through agriculture businesses like them. Retail grocery chains require a consistent supply source with large capacity to meet the large consumer demand at their store outlets. A third party wholesaler who manages the warehouse could be a point of contact with these chain outlets.

**D. Manufacturing Cluster:** This cluster follows the forestry and metallurgy clusters in terms of its size for the region. There were two major manufacturing companies interviewed for this study: Rockwool & Valid Manufacturing.

- a) Rockwool: this manufacturing facility produces stone wool insulation products for residential, commercial, and industrial applications, including pipe sections for ROCKWOOL Technical Insulation business. Established in 1999
- b) Valid Manufacturing: designs, engineers, and manufactures innovative and reliable solutions for a wide range of industries like recreational vehicle OEMs, agriculture, forestry, commercial electrical and other industrial applications.



There are other small-scale fabrication, engineering design companies developed to cater the metallurgy and forestry clusters in the region. Companies in this cluster reported the following issues:

- a) *Rising Business cost*: For small fabrication companies the cost of doing business has increased over time. The shipping cost is higher as the courier companies serving the region have lower demand from Kootenay based businesses since operations tend to be quite small. These small companies do not hold a lot of inventory to reduce costs and raw material is usually only ordered based on the customer demand. At times the cost of shipping inventory could be same as cost of the material itself.
- b) *Labour Shortage and Variable Demand*: Small fabrication companies operate with limited full-time employees and to cater to the intermittent work spike companies rely on temporary labour. This arrangement is accompanied by uncertainty, and they have to turn down the customer orders call if ad hoc labor is not available.

# Best Practice Examples

## **A. City of Prince George, BC:**

The West Kootenay has cluster similar to this city – forestry, manufacturing, agriculture. As mentioned on the city’s website (<https://princegeorge.ca/Pages/default.aspx>), the city has evolved over the last few decades from a mainly forest-based economy to one that has a strong natural resource base, but also supplies goods and services for a broad range of sectors throughout northern B.C., within Canada, and internationally. Compared to other mid-sized cities covered in the Conference Board of Canada’s Mid-Sized Cities Outlook 2016, Prince George was at the top for economic growth. With 36 percent of BC timber supply from Prince George, the industry created \$1.53 billion of BC’s total GDP. Prince George has superior transport connectivity over rail (CN terminal), road (highways) & air (airport). Since 2007, the city’s wood trade with China increased by 936% and reached \$1 billion in 2016. The competitive advantage lies in the city’s natural resources and agriculture workforce, its trades and transport workforce, as well as its sales and services workforce. As per the city’s economic strategy initiative report 2011-25, the following are the objectives:

- A) Take a cluster approach to become industry cluster experts and advocates. The region focused on manufacturing, forestry clusters by nurturing collaboration, attracting foreign direct investment, specific workforce training etc.
- B) Strategically market industry cluster to support investment: the region regularly releases cluster sector reports and markets its competitive advantages like established international market, access to complete supply chain etc.
- C) Create infrastructure to support the cluster development: a holistic approach to business development through funding program support, upskill & workforce development
- D) Aligning the workforce with economic development goals through upskill and training

The region's strategic objective is to align its competitive advantage to create economies of scale with industry cluster in manufacturing and forestry. Industry clusters expand knowledge base, fostering innovation and specialization to become sector expert location.

In the West Kootenay, fostering a manufacturing or forestry cluster would create demand for professional engineering and business services specific to those sectors. For example, if an investor or corporation is looking for a location to start a business related to that sector, the region with developed cluster and related services would have advantage to be selected. This approach is replicable in the West Kootenays region for creating a cluster in battery recycling, forestry, or agriculture sectors.

## **B. City of Port Colborne, Ontario**

The city falls into the Niagara Industrial Region and has a competitive advantage of intermodal transportation access (rail, road and water). The privately owned rail line connects to the transcontinental CP & CN rail network. Its manufacturing economy cluster focused around bio-medical manufacturing and fabricated metals. Located on the shores of Lake Erie the port is friendly to move oversized and heavy equipment machinery for customers in power, energy, oil & gas. It offers foreign trade zone benefits for the producers executing projects in the city. This includes access to special custom procedures for doing international business, and incentives to lessen tariff on imports.

Niagara Industrial Association (NIA) supports the business development in Port Colborne. As per NIA website (<https://niagaraindustry.com/>), NIA influences government policy, pursues business development opportunities, provides members with important industry information, builds strategic partnerships and leverages programs and services that support industrial development. NIA was formulated in 2007 to unite the manufacturing industries to promote the growth of the sector. Members of NIA get access to industry data, reports, business support services, reduced regional development charges to zero for two years. For the regional development charges program, the charges collected for any construction that needs a permit to complete are refunded or granted at 50-100% of the charges depending on the criteria met.

The sector specific industry association helps advocates for the needs of business to policy makers, provides access to the global network in the industry, provides relevant tools and resources on best practices across the industry. Businesses have significant influence in the regulations that impact the sector through their industry association.

The West Kootenay region should promote creating sector specific associations with major stakeholder companies located in the region. These industry associations can work on establishing relations with vendors to built resilient supply chains, access to grant/fundings through government bodies and various lobbying initiatives.

### **C. Battery Recycling Cluster, Harvita, Finland:**

Three companies BASF, Fortum & Nornickel have signed an intent letter to develop EV battery recycling facility. The project would make “closed loop” to extract critical minerals/metals from used batteries.

Nornickel owns a nickel refinery in Europe. BASF would use recycled materials from the to make a battery material precursor. Fortum, a clean energy company, acquired Crisolteq, an expert in low CO2 hydrometallurgical processing. Now it would be able to increase recovery rate of critical metals and minerals from 50% to 80%. This project is in its very early phase and only limited information is available.

Since the West Kootenay has a competitive advantage in battery recycling, a similar cluster based on circular economy for battery recycling could be explored.

# Recommendations & Conclusion

Based on SWOT analysis and industry specific review, the following recommendations are proposed:

- a) *Infrastructure Boost*: All the industry sectors i.e., metallurgy, forestry, manufacturing and agriculture have supply chain related issues like shipping delays and rising shipping costs. This impacts the decision of future business expansion, profit margin and make difficult to compete with competitors from other locations with comparative supply chain advantages. As discussed in best practice examples above, the City of Port Colborne and City of Prince George have access to complete supply chain which is competitive edge for existing businesses and to attract new business to establish. Improved accessibility to international markets over rail network would stimulate the metallurgy, manufacturing and forestry sectors. Further, the agriculture businesses have a first step supply chain gap to reach the market within BC but beyond the Kootenay and Okanagan areas. The investment to create a delivery channel from local producers to retail customers could start new era for the agriculture sector that has potential to serve even the international market in US.
  
- b) *Industry Associations/Collaboration*: As elaborated in the previous sections, different companies in the same cluster have overlap in their issues. The problems include funding resources, skill shortage, and regulations. The factors controlling these hurdles could be beyond the power of any individual company to resolve. However, in the best practice examples, NIA (Niagara Industrial Association) promotes the interests of the manufacturing industry cluster in the region which supports businesses in Port Colborne through lobbying for policies that impact the sector, marketing activities, networking opportunities building strategic partnerships, and developing vendor relationships. Collaboration through an industry association framework related for metallurgy, forestry and/or agriculture sectors would be helpful in pursuing solutions to the regulatory issues, as well as increasing business retention and attraction to the West Kootenay region.



