

**Value Added Agriculture  
Investment Attraction Strategy  
for  
Eastern Alberta Trade Corridor**

Submitted to

**Eastern Alberta Trade Corridor  
(EATC)**

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## 2. DISCLAIMER

This work is intended solely for the Eastern Alberta Trade Corridor (EATC). Any use which a third party makes of the work, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Decisions made or actions taken as a result of our work shall be the responsibility of the parties directly involved in the decisions or actions.

The information in this report is based on IMC's industry knowledge and what has been gathered from public sources as of September 30, 2016. This information has not been independently verified and while IMC believes that the information is accurate, it cannot guarantee the accuracy of the information.

### **3. EXECUTIVE SUMMARY**

This report covers Phase 1 of EATC's 3 phase project to improve regional capacity in order to attract investment, including Foreign Direct Investment (FDI), related to the value added agriculture sector.

#### **3.1. SCOPE & METHOD**

This Phase 1 Report was conducted in four main stages:

1. The initial phase involves a review of client information and a literature review of the existing resources. After summarizing the existing opportunities, IMC established screening criteria to filter out opportunities that do not fit into the client's vision, or which lack financial viability. A secondary set of criteria was then developed to further filter out opportunities and allow for a more focused, high-level analysis in the end report.
2. An analysis of the available opportunities was undertaken. This included interviews with relevant industry experts and a high-level analysis. This analysis included an assessment of current market size, supply/demand dynamics, and value chain viability.
3. Business cases were developed for three of the identified opportunities. As well, some specific target investors were identified.
4. Develop strategy and action plans.

This Phase 1 report will serve as a baseline for EATC to develop marketing material and leads which comprise the remaining phases of the EATC overall project.

#### **3.2. STRATEGY DEVELOPMENT APPROACH**

The strategy proposed herein is based on four fundamental principles:

1. Think Big. There will only be measurable long term job creation if the industries we attract are of a sufficient scale, growth and product export potential.
2. Investment in Competitive Advantage is the Foundation. In order to both overcome EATC weaknesses and provide competitive advantage to companies, there is a need to invest in Green Diversification Infrastructure that enhances business cases and growth opportunities and pursue “clusters” as a means of improving and sustaining competitiveness.
3. Market Pull over Producer Push. Sustainable growth can only be based on what global markets want, not necessarily what we are currently producing. If the crop required as feedstock for the new cluster industry can compete with other registered crop alternatives on a profit per acre basis and fits into rotations, producers will meet market demand.
4. Understand the Pains, Gains and Objectives of your team and target investors. The strategy identifies key external parties who will need to be attracted and motivated to fund, promote and ultimately invest in the EATC. The best way to motivate these parties is not with generic investment attraction brochures, but custom tailored and personal messaging for each party that addresses their key motivators at different stages of the process.

### **3.3. TECHNOLOGY, MACRO TRENDS AND MARKET FACTORS**

The rate of technological change has accelerated to the point to where developments that once took years are taking only months. These will affect agriculture and related value added processing in significant ways and must be considered when selecting which industries’ to attract to the EATC. Synthetic biology is rapidly introducing new “high tech” crops that significantly outperform existing varieties. Energy technologies such as solar and battery technologies promise to reduce the cost of electricity and enable localization of green power generation. This will also encourage development of greenhouses on a larger scale and reduce the disadvantages of higher latitude agriculture. A growing global demand for protein bodes well for pulse and livestock producing areas such as Alberta.

### 3.4. OPPORTUNITY SELECTION

Over 40 business sectors were assessed as possible investment attraction targets. A two stage process was developed.

The first stage was an initial selection based on a series of “Yes / No” criteria, where a “No” in any category would eliminate the opportunity from further consideration. The following criteria were used in initial opportunity selection:

- Commercially Proven Technology – this criterion analyzes if the opportunity has a proven commercial track record to enable near-term capital investment. Opportunities that are not commercially viable in the near term are not considered for further assessment.
- Existing Market – the product or service must have an existing domestic and/or international market and ideally be in an emerging market segment.
- EATC Suitability – this criterion analyzes the opportunity against its suitability in the EATC areas. Feedstock, relevant infrastructure, labour, and proximity to market will all influence an investor's location decisions within Alberta. With the exception of not being adjacent to major population and major R&D centres, the EATC has a sufficiently diverse resource, labour, and infrastructure base to attract most value added agricultural businesses that are in the process of considering Alberta.
- Economic Impact – greater than \$5 million in revenue per annum – while there are many viable cottage and small scale opportunities in agriculture and related processing, those opportunities that are estimated to not be able to scale to at least \$5 million revenue per annum within 5 years were eliminated.

After these selection criteria were applied to the initial opportunity list, a second stage of screening was employed to rank the remaining opportunities using the following criteria and weighting:

CRITERIA	SCORING WEIGHT
Potentially Cost Competitive – the product or service must be internationally competitive, based in the EATC, and be able to withstand normal market price and currency fluctuations. Higher value goods that expand the sales radius will be favoured.	40%
Environmental Impact – while the opportunity would obviously need to be compliant with regulations, recognition of relative positive or negative impact was used.	10%
Technologically Robust – opportunities that will thrive, or at least survive, rapid technological change outlined in the previous technology trends section will score higher. A relatively high weighting was assigned because this factor underpins the entire long term economic benefit of the opportunity.	20%
Net Economic Impact – the relative benefit to GDP and net employment were considered and weighted accordingly.	30%

### 3.5. OPPORTUNITIES

Four primary and several secondary opportunities were identified using this process. The primary opportunities are:

- Pulse processing – Strong global demand trend in primary and processed products
- Hydroponic greenhouse products – Alberta has low per capita production density versus Ontario and BC and is beginning to export to the US
- Hemp based biocomposites – recent contracts for automotive interior panels at an Alberta company and a new emerging hempcrete product with large market potential; several companies considering projects
- Specialty pet food – potential local opportunity for relocation plus competitive exchange rate for exports

Preliminary business cases were developed for the four primary opportunities. These considered factors such as: feedstock, markets, value chain, processing, site selection criteria, competitiveness, capital and operating

costs, key risks and mitigants and preliminary investor targets. The business cases will help to better tailor the pitches to investor targets.

Secondary opportunities were:

- Medicinal Marijuana
- Halal meat
- Microbreweries
- Aquaponics
- Glycerol carbonate
- Elevated solar farm
- Specialty pasta
- Pre-made meals

Brief summaries were provided for the secondary opportunities which included: fit within the EATC, cost competitiveness, market growth, technology, economic impact and risks and issues.

### **3.6. REGIONAL ASSESSMENT**

A high level assessment was done on infrastructure and general agricultural capacity in each of the three regions. This culminated in a preliminary "Initial Location Review" for possible industry cluster locations based on location siting criteria from the business cases and the regional review

### **3.7. STRENGTHS AND WEAKNESSES / CONSTRAINTS INFLUENCING GROWTH AND INVESTMENT**

A key regional strength is strong agricultural production. Weaknesses include distance to market, a limited labour pool and lack of critical infrastructure in some areas. Exchange rate depreciation and a recent reduction in oilpatch labour demand may moderate costs and enhance competitiveness. Rising energy costs due to carbon taxes and electricity transmission charges will reduce competitiveness. These factors are key drivers in development of the investment attraction strategy.

### 3.8. GOVERNMENT POLICY/DIRECTION RECOMMENDATIONS

Alberta competitiveness is greatly influenced by provincial government policy and legislation. Suggestions to enhance competitiveness that may be used by the EATC in communication with provincial and federal governments are provided. These address the areas of taxation, rural development bonds, GHG penalties, labour, foreign investment attraction, export market support, immigration policy, cluster related incentives, value-added related incentives, insurance and risk management, US border crossing and inter-governmental cooperation.

### 3.9. STRATEGY

As the scope of this study includes assessment of clusters as a way to attract investment, a brief review of successful clusters from around the world was conducted. Success factors included full time staff, government support, shared infrastructure, supply chain development, market access and consumption of by-products or co-products within the cluster, among others.

Various investment attraction approaches were combined to ultimately formulate a cluster based strategy called the **EATC Value Added Agriculture Complex or “EVAAC”**. EVAACs are infrastructure clusters designed to address the siting criteria and enhance competitiveness of the primary opportunities identified earlier in order to attract them into the EATC. An EVAAC can be built in each of the three EATC regions.

The EVAAC strategy consists of primary elements:

- Governance
- Marketing
- Cluster Design
- Energy Infrastructure

Governance is foundational to the success of a cluster. Many effective clusters in other jurisdictions have government legislated mandates that create a cluster development authority with the power to undertake all planning and business development tasks required to develop and administer the cluster. Investment attraction for a cluster cannot be a part time job. It requires a separate agency or team. As the effort to set up a government mandated organization or development authority would be a long, time-consuming process it is

recommended that the EATC develop a preliminary cluster governance model in parallel with the marketing and business development activity.

Much of the marketing material needed to attract funders and investors can be altered and tailored and then used to convince legislators to formalize some sort of “Special Diversification Zone” authority.

Marketing strategy is critical to mobilize the various teams that will be needed to execute the EVAAC program and to attract investors. These include:

- Existing government programs to provide resources to develop and promote the EVAAC plan.
- Politicians to support larger scale EVAAC infrastructure funding.
- Government bureaucrats to enable EVAAC funding.
- Provincial and federal investment attraction teams.
- Local investor companies in the target industries identified herein.
- Foreign investor companies in the target industries identified herein.

The marketing program should demonstrate a deeper understanding of the key competitiveness drivers in the target sector using the content of the business cases herein and the investment attraction studies previously completed.

The EVAACs include key shared utility, transportation loading/unloading infrastructure and some shared crop processing equipment for the cluster. Energy cost control will be a key factor in attracting investor tenants to EVAAC and sustaining the competitiveness.

The EVAAC strategy requires government seed funding. This could be proposed to government as a Green Diversification Infrastructure Initiative. This fits well with current provincial government priorities:

- Green – Agriculture based businesses maximizing use of green energy sources in an efficient, shared facility.
- Diversification – Value added secondary and tertiary agriculture processing that maximizes export revenues from locally grown commodities.
- Infrastructure – Shared agricultural processing complexes with common energy and transportation facilities to enhance the cost competitiveness of a wide array of value added agriculture businesses.



In addition to this main report and its recommendations, three addendum reports were produced selecting a primary and secondary business opportunity for each of Palliser, BRAED and HUB regions. Additional key infrastructure maps for each region have been added to these reports and a list of regional advantages, where possible. These are listed in Appendix D and could be pursued prior to, or in parallel with, the EVAAC Green Diversification Infrastructure strategy.

### 3.10. ACTION PLAN

The action plan is designed to accomplish the following:

Short term:

- Build initial EVAAC team.
- Validate or exclude potential investors that were identified in our research as seeking to relocate or expand.
- Develop and execute EVAAC marketing plan tailored to the needs and motivations of the stakeholders listed above in order to create awareness, attract and mobilize them.
- Initiate program funding tasks
- Draft EVAAC governance structure

Medium Term:

- Attract investors.
- Pursue government funding for infrastructure.
- Construct and commission EVAAC.

A GANTT chart provides a list of proposed action items focused on the following key milestones that seek to have an operational tenant in an EVAAC in 37 months :

1. Secured EVAAC Program Funding
2. Secured Initial EVAAC Tenants
3. Secured EVAAC Capital Project Funding
4. Begin Construction of EVAAC
5. Commissioning of Tenant Operations in EVAAC

### **3.11. SYNCHRONIZATION WITH EXISTING EATC STRATEGY**

It is understood that this study is the result of one of the recommendations in a previous report.

Some of the previous strategy recommendations made several years ago, such as biofuels development, have been invalidated by commodity prices and technological advancements in other areas. Others are tactical promotional strategies that have already been successfully executed or recommend gathering of specific data to assist in economic development. Others related to recommendations for development of cottage industries such as regional tourism, which while valid, are inconsistent with the focus of this assignment, which is focused on the attraction and development of medium scale opportunities with strong growth, employment and export potential.

The strategy proposed herein aligns with and builds upon most of the EATC strategies defined by the documents above.

Based on methodical consideration, screening and ranking of many opportunities available, this study prioritizes additional business opportunities that could fit into the EATC and builds upon some that were previously recommended.

## 4. PROJECT BACKGROUND, SCOPE AND APPROACH

### 4.1. BACKGROUND

This report covers Phase 1 of EATC's 3 phase project to improve regional capacity in order to attract investment, including Foreign Direct Investment (FDI), related to the value added agriculture sector.

The phases are as follows:

**Phase 1** – Develop an investment attraction strategy focused on the value added agriculture sector.

**Phase 2** – Facilitate community investment readiness by developing tools to improve the ability to attract foreign direct investment.

**Phase 3** – Identify prospective investors and initiate interaction with them.

This report, Phase 1 will articulate a multi-year strategy that, when implemented by BRAED, HUB and PEP, has the potential to result in new investments in the value added agriculture sector. This will result in new jobs, additional tax base, and increased community viability.

### 4.2. SCOPE

Ian Murray & Company Ltd. (IMC) was contracted by Eastern Alberta Trade Corridor (EATC) to perform an assessment of the opportunities in the Eastern Corridor for agriculture value added products and services.

EATC provided input as to the nature of the existing and known opportunities within the three regions that are a part of the association—Alberta Hub, BRAED and Palliser Economic Partnership.

This Phase 1 Report is being conducted in four stages:

1. The initial phase involves a review of client information and a literature review of the existing resources. After summarizing the existing opportunities, IMC established screening criteria to filter out

opportunities that do not fit into the client's vision, or which lack financial viability. A secondary set of criteria was then developed to further filter out opportunities and allow for a more focused, high-level analysis in the end report.

2. An analysis of the available opportunities was undertaken. This included interviews with relevant industry experts and a high-level analysis. This analysis included an assessment of current market size, supply/demand dynamics, and value chain viability.
3. Business cases were developed for three of the identified opportunities. As well, some specific target investors were identified.
4. Develop investment attraction strategy and action plan.

This Phase 1 report will serve as a baseline for EATC to develop marketing material and leads which comprise the remaining phases of the EATC overall project.

### **4.3. STRATEGY DEVELOPMENT APPROACH**

Numerous studies have been undertaken by the Alberta Government and regional economic development organizations to identify opportunities to attract and develop value added processing. This has produced an inventory of production capacities, capabilities and infrastructure and has identified several opportunities for economic development.

This study was designed to build upon, rather than duplicate, that good work. It focuses on laying the groundwork for development of business cases that could be used to attract potential domestic and foreign investors.

Often, studies begin with a "what we grow" rather than "what the market wants" perspective. While obvious climatic and other constraints will be considered, including cost competitiveness, the focus will be on opportunities that have some market momentum and where Canada already has an existing or emerging global brand. As well, further criteria include:

- Opportunities must be based on field proven technologies that could be conceived, funded, and brought into operation within 3-5 years;
- Opportunities must have a material size and potential economic benefit; and
- Opportunities must have the potential to be viable for both economically and environmentally sustainable businesses.

Finally, this study seeks to “think big.” While one role for the EATC is to incubate small businesses, another is to attract major investments with continental or global scale production capacity. This will maximize economic impact and create jobs for the long term.

### 5.3. ARTIFICIAL INTELLIGENCE

While the direct use of AI in agriculture is a young science, AI applications that are developed in many other fields will also be employed in agriculture. Application of AI in agriculture will depend on sensor based inputs discussed above which will generate “big data” and require intelligence to extract useful information. This “machine learning” is providing many potential applications, including the following:

- Predicting disease outbreaks using crop conditions like water stress, nutrient condition, plant population, soil moisture content, average temperatures etc.;
- Acceleration of genomics and nutrition R&D by using algorithms that have been trained to identify patterns to rapidly filter large datasets;
- Automated irrigation systems that take the weather conditions into account;
- Drones capable of delivering customized fertilizers and pesticides based on the requirement of each plant;
- Autonomous GPS-guided harvesting systems;
- Autonomous transport trucks; and
- Optical recognition for livestock for health monitoring.

### 5.4. RENEWABLE ENERGY AND STORAGE TECHNOLOGIES

Aside from simple combustion of biomass based fuels, improvements in renewable energy technologies could have a significant impact on agriculture. Given that renewable energy sources such as solar and wind are intermittent, they are best considered together with energy storage technology.

Imagine a farm with low cost, high efficiency solar arrays, wind turbines and a low cost battery system that could power electric, autonomous farm equipment. Given the ongoing advances in these technologies, and the fact that large scale solar farms in tropical areas are already quoting costs of \$30/MWh, this may be feasible in Alberta within 5 years.

Further, the economics of greenhouses will be greatly enhanced with low cost energy. The implications for global food production are significant. In Japan, an office complex integrated a greenhouse into its fundamental design. Workers contribute labour which ultimately supplements their lunch in the company cafeteria. It is

conceivable that urban housing could include greenhouses as a standard design element. As well, vertical farming will become more viable and common.

## **5.5. GREENHOUSES AND INDOOR CITIES**

A key potential implication of rapid technological advancement in materials and clean energy is the potential accelerated rise of the greenhouse. It is also possible that lighter, stronger, and cheaper materials, combined with electric vehicles, could make the capital and operating costs of the “indoor city” economically viable. The capital of Kazakhstan, Astana, is planning a 2km diameter indoor city to house 20,000 people.<sup>3</sup>

## **5.6. WATER**

Other emerging technologies, such as photocatalytic water splitting, could economically supply hydrogen fuel to provide heat or power in any remote location. This may ultimately use seawater as a feedstock to provide both desalinization and hydrogen extraction in a single facility (which would be a competitive disadvantage for inland Alberta). Improved water purification technologies and closed loop ecosystems such as those employed in aquaponics will make water management easier.

New water purification technologies based on nanomaterials and new designs will make cleaner water more accessible at a lower cost.

Thus, there will be no water shortages, just a cost to water which will encourage far better water management (it is unclear whether this will mitigate Alberta’s water disadvantage or create an incentive to locate new desalination plants).

## **5.7. MATERIALS SCIENCE AND 3D PRINTING**

Stronger, lighter, more flexible, even “intelligent” materials whose strength, flexibility or transparency change under different conditions, are rapidly emerging. New materials development is now being undertaken at the

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<sup>3</sup> [https://www.youtube.com/watch?v=YDOA\\_dHui6U](https://www.youtube.com/watch?v=YDOA_dHui6U)

atomic level. Custom compounds and nanotechnology are not only creating new structural materials, they are also creating new catalysts that will revolutionize chemistry and biochemistry.

Better materials, combined with 3D printing of mechanical components, will reduce the capital and operating costs of agricultural equipment. New materials will also improve the economics of large scale greenhouses in a variety of more extreme climates.

3D printed synthetic meat is an example of a “feedstock agnostic” food where the source of the molecules used to “build” the food must simply be of the right composition, of sufficient quality and in economic quantity. Whether the feedstock is a cow, or a greenhouse grown high nutrition GMO algae, combined with a pulse crop extract, a myriad of new possibilities will likely emerge.

## **5.8. POPULATION GROWTH IN DEVELOPING COUNTRIES – PROTEIN DEMAND**

Barring asteroid impact or pandemic scale calamities, it has been projected by the U.N. that there will be an additional 2.3 billion people to feed in 2050. Almost all this growth is in developing countries with relatively low protein consumption versus the developed world. Hence the demand for protein, already being accelerated by growing economic prosperity in Asia, will grow at a faster rate. This bodes well for livestock producers with low input costs and favours feed crops and higher protein crops such as pulses and industrial hemp leaves, which have high protein content. It also favours livestock with better feed to weight gain ratios, such as poultry and fish.

These factors could all combine to enable lower cost controlled-environment food production and urban development within the EATC.



## 6. VALUE ADDED AGRICULTURE SUCCESS STORIES

The prairies have numerous successful agricultural value added sectors and businesses that could be expanded on or duplicated in the EATC. Some examples are below.

### 6.1. PULSE PROCESSING

Canada is the world's largest exporter of pulses and Alberta ranks as Canada's second largest pulse producer, after Saskatchewan. Alberta's pulse acreage has grown by 186% between 2012 and 2016 and its share of total Canadian acreage increased from 14% to 23%. Pea production doubled between 2001 and 2012 in Alberta. There are now over 50 pea processing facilities in Alberta but these are mainly just cleaning and sorting and bagging or bulk loading operations. There are significant opportunities for secondary and tertiary processing of pulse into ingredients and higher value products.

### 6.2. BIO-MATERIALS

AITF's Vegreville decortication facility has made it possible for the Biocomposites Group Inc., based in Drayton Valley, to conduct successful pilot programs with automotive parts manufacturers for hemp reinforced automotive interior panels. Each panel within a single car model would generate approximately \$2 million in sales. The Biocomposites Group recently completed a contract for the supply of interior body panels for the GM Corvette from a parts supplier. While the size of this contract has not been confirmed, a single large order, requiring one work shift at the panel manufacturing plant, could consume Vegreville's entire processing capacity.

Given the large reduction in mass of fibre versus the entire hemp plant, it is advantageous to have decortication facilities close to the field. There may be an opportunity for up to 4 new decortication facilities in the EATC, should this market opportunity fully emerge.

While pre-commercial, Just Biofibre Structural Solutions Corp. of Calgary has patented a hempcrete building block which is lower cost on an installed basis, stronger and has better acoustic and insulating properties than cement blocks. Just Biofibre uses the hemp hurd (the woody core of the stalk surrounded by the bast fibre) so is an excellent complement to Biocomposites Group's demand for hemp fibre.

### 6.3. FUNCTIONAL FOODS AND NATURAL HEALTH PRODUCTS

Ceapro (TSX: CZO) is a successful exporter of high value personal care and cosmetic ingredients using proprietary technologies to extract ingredients from oats and other crops. The company is based in Edmonton with research facilities in Leduc and Charlottetown, PEI. Ceapro has built a global network of distribution partners that have recently contributed to their rapid sales growth.

BioNeutra North America Inc. (with a revenue of \$5 – 10M) is an Alberta-based biotechnology company doing R&D and producing bio-agriculture functional food, value added agrifood, and nutraceuticals. BioNeutra is managed by a team of functional food scientists, biochemists, microbiologists and business professionals. They produce: inulin (FOS), pro/prebiotics, weight management, fermented foods, food supplements, nutraceuticals, raw materials, and fibre.

CanBiocin is an Alberta-based company doing innovative food safety research. Founded as a spin-off company from University of Alberta-based research, CanBiocin's main product is a food safety ingredient that is derived from lactic-acid bacteria which already occurs in food. The company took the ingredient out, turned it into a concentrated "spray" or "additive" which slows the growth of Listeria in meat, achieved regulatory approval from Health Canada, and they now sell it to food processors as a food safety product. The company is also exploring lactic-acid, bacteria-based pro-biotics.

### 6.4. FOOD PROCESSING

There are numerous successful specialty food producers in Alberta. A few examples of successful companies are listed below.

- <http://babygourmet.com/our-food#squoosh>
- <http://www.chefbombay.com/>
- <http://www.siwinfoods.ca/contact/>
- <http://www.judygfoods.com/>
- <http://kitchenpartners.com/the-products/>
- <http://www.littlepotatoes.com/en/creamier-central/>
- <https://www.kinnikinnick.com/index.cfm>

- <http://www.peabutter.ca/page1.html>

When attracting such companies to the EATC, the following requirements must be considered: access to labour, transportation infrastructure, refrigeration and freezer space, and competitive electricity costs for the freezing process. It has observed that the clients of the Leduc Food Processing Development Centre tend to migrate to major centers such as Edmonton and Calgary for reasons including labour availability and rentable refrigeration. Further discussion with these companies is required to determine what would attract them to the EATC.

## 6.5. GREENHOUSES

In 2014 Alberta had 338 acres of greenhouses. Of these, 46% were producing vegetables, 41% were producing floriculture, and 13% were producing tree seedlings.

Red Hat Cooperative is a marketing cooperative representing over 1/3 of total greenhouse acreage in the province and distributes over 150,000 lbs per day of produce. Red Hat has started exports to the USA.

Thus, a strong foundation for further greenhouse development exists in the EATC. This segment may also be well suited to an industry cluster around heat and power to reduce input costs in the winter when demand exceeds supply and a significant volume of produce is imported from Mexico.

## 6.6. MICROBREWERIES

There are about 40 microbreweries in Alberta. For sales, marketing, and distribution purposes, these tend to be located near major population or tourist centres. It appears that most sales are within Alberta. Interprovincial trade barriers are a significant <sup>4</sup> factor in limiting exports. In some cases, it may be easier to sell to the US market. Recent beer tax increases on all beer sold in Alberta, combined with a subsidy to micro-breweries, may exacerbate the interprovincial trade issue, while providing some advantage to local players.

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<sup>4</sup> <http://www.cbc.ca/radio/thecurrent/the-current-for-june-17-2016-1.3639977/interprovincial-trade-barriers-costing-us-billions-says-new-senate-report-1.3639982>

## 6.7. NEXT GENERATION CO-OPS

Diverse logistics and marketing coops operate in Alberta which help operators share costs and improve efficiency. A few examples follow:

- Grain Logistics <http://westlock.aghost.net>
- Elk Meat Exports <http://www.wapitiriver.com>
- Rail Line <http://www.battleriverrailway.ca/brrngchome>
- Greenhouse Vegetables <http://50yearsfresh.redhatco-op.com/>
- Rhodiola Co-op <http://arrgo.ca/>

## 7. SUCCESSFUL CLUSTER EXAMPLES

A key element to developing an economically significant value added agricultural industry in the EATC may be in exploiting synergies offered by industrial clusters.

A successful cluster is characterized by:

- Generally close geographic proximity;
- By-products consumed within cluster;
- Utility and infrastructure synergies;
- Heat and power savings;
- Labour availability;
- Coordinated development community, with political clout; and
- Streamlined regulatory approval processes.

Following are brief profiles of some successful clusters.

### 7.1. MINOT, NORTH DAKOTA VALUE ADDED AGRICULTURAL COMPLEX

Following is an example of where an agricultural processing transportation and utility cluster has been successful.

Alliance Grain Traders (AGT), which is based in Saskatchewan, is a major global pulse consolidator, processor, and exporter with operations worldwide. In 2013 an AGT subsidiary acquired an unused pulse processing facility in Minot, North Dakota's value added agricultural complex which encompasses approximately 800 acres and includes accessible rail, water, and sewer. The adjacent Port of North Dakota, Minot's intermodal transportation hub, transports westbound agricultural commodities on Burlington Northern Santa Fe's (BNSF) dedicated rail line.

North Dakota has some advantages over the central and northern regions of the EATC in that many types of pulses can be grown there, mitigating market risk of a price collapse in a single pulse commodity for the processor.

## 7.2. NETHERLAND FOOD VALLEY

The food valley is an example of regional-cluster development. Originating from an initiative on the part of three local city councils, it has developed into a leading regional economic force as a result of collaborations with a clear thematic focus. The food valley consists of:

- Private companies
- Research institutes
- Experimental facilities
- Innovation cluster
- Incubators
- Network
- Universities

The most important contributing factors to the success of the food valley was its focus on small technology SME's. Through government funding, supporting policies, and major research infrastructure the Netherland's food valley has been established as a place for the complete value chain in the agriculture sector. The lure of knowledge and a supporting environment helped attract investment in the area. Currently, there are over 135 companies within the food valley. It should also be noted that the food valley's clustering concept helped create competitiveness, which leads to further innovation.

The contributing factors to the success of the Food Valley:

- Geography – Holland's mild climate, flat and fertile soil, and favorable geographical location at the heart of Europe has contributed immensely to the success of the food valley.
- Continually reinvesting in the agricultural supply chains – For decades, Dutch agriculture has succeeded in maintaining its lead over international competitors by continually investing in the renewal of agricultural production and supply chains. Farmers and growers are full partners in the agricultural supply chain. Their primary task is to produce food, flowers and plants with an optimum price/quality ratio using innovative, socially responsible, and sustainable methods.
- Strong and long term government focus and support in funding and infrastructure

### 7.3. DANISH FOOD CLUSTER

The Danish food and agriculture sector is the third biggest food cluster in the western world. Today, it employs more than 180,000 people and accounts for more than 20% of the country's total product exports.

Many large international companies have their base there, along with a dense underlay of research intensive universities, specialist knowledge organizations, and smaller-growth businesses. Over the decades, mutually beneficial partnerships have become increasingly commonplace.

The success of the Danish food cluster can be attributed to:

- Cutting edge innovation and technology available because of industry-university partnerships;
- Denmark's cluster brand focus on being the leaders in ingredients, product, and knowledge areas; and
- Their moderate temperature and soil fertility.

### 7.4. FARMER GROUPS IN POLAND

Rural clusters have been developed in Poland for two main reasons: to improve the socio-economic status of farmers and to combat unemployment in rural areas. Farming groups are legally operated organizations whose main aim is to market their products and services. There are about 110 groups in the Lublin, Poland region. There are the typical associations of fruit and vegetable producers whose best clients are, predominantly, domestic and international supermarkets and wholesalers. One key to their success is that they can provide large volumes at standardized quality. It is impossible for a single farmer to achieve such a success and level of profit. Conversely, it requires the dynamics of a group. As a joint body, farmers can establish modern storage facilities and refrigeration warehouses, as well as quality assessment procedures. These clusters add value to the fruit and vegetable production by developing more processed food beyond the basic line. Examples are preserves, sliced or peeled products, and frozen products.

## **7.5. FOOD PROCESSING CLUSTER, SOUTHERN OHIO**

The food processing cluster in southeastern Ohio is comprised of an eight-county region in Appalachia. It was part of an initiative to add value to the area's agricultural assets, promote a sense of "place," and support local entrepreneurs.

This cluster, which had an initial membership of 12 specialty food business, currently has over 100 members with several entrepreneurs have spun off several businesses. The success of this cluster can be attributed to:

- Associational infrastructure – although many spin-off associations (farmers' association, etc.) have formed from the original cluster, they have all operated in unison and never as a separate entity; and
- Community engagement – promoting entrepreneurship is paramount to success of a cluster.



## 8. OPPORTUNITY SELECTION

The initial opportunity list shown below in Table 8.1 was developed based on desk research, IMC experience, and conversations with government, research institutions, industry leaders and associations in various sectors including agriculture, food, bio-chemicals, bio-materials, technology and manufacturing.

The initial selection was based on a series of “Yes / No” criteria, where a “No” in any category would eliminate the opportunity from further consideration. The following criteria were used in initial opportunity selection:

- **Commercially Proven Technology** – this criterion analyzes if the opportunity has a proven commercial track record to enable near-term capital investment. Opportunities that are not commercially viable in the near term are not considered for further assessment.
- **Existing Market** – the product or service must have an existing domestic and/or international market and ideally be in an emerging market segment.
- **EATC Suitability** – this criterion analyzes the opportunity against its suitability in the EATC areas. Feedstock, relevant infrastructure, labour, and proximity to market will all influence an investor’s location decisions within Alberta. With the exception of not being adjacent to major population and R&D centres, the EATC has a sufficiently diverse resource, labour, and infrastructure base to attract most value added agricultural businesses that are in the process of considering Alberta.
- **Economic Impact > \$5 million p.a.** – while there are many viable cottage and small scale opportunities in agriculture and related processing, those opportunities that are estimated to not be able to scale to at least \$5 million revenue within 5 years were eliminated.

Score	Opportunity Description	a) Why does this fit with EATC?	b) Why is it cost competitive?	c) What's the market growth opportunity?	d) How is it technologically robust?	e) Why could it have significant economic impact?	Notes
6.2	Specialty Pet food (Cat & Dog Food)  Processing plant for pet food products, primarily for dogs and cats.	The by-product of meat processing plant in Brooks provides feedstock for pet food manufacturing and this provides an advantage for regions within the EATC.	Medium to high level capital intensity. Availability of feedstock. Pet food is a high-end value added product.	Approximately 72% of Canadian households own a cat or a dog. In 2009 the Canadian Government imposed a pet food import permitting process. This restriction coupled with rising demand and the high USD has created an incentive for local pet food manufacturing.	Automation of industry, especially food processing, has resulted in lower operating cost.	Growth trend in per capita pet care spending in North America.	

Score	Opportunity Description	a) Why does this fit with EATC?	b) Why is it cost competitive?	c) What's the market growth opportunity?	d) How is it technologically robust?	e) Why could it have significant economic impact?	Notes
6.1	Opportunities for Halal in both Canadian poultry and beef for export and local consumption.	Export markets are willing to pay a premium for Canadian beef and veal products.	Availability of cattle farms and the premium price on product is a major factor in cost competitiveness.	Muslim Canadians are the fastest growing religion in Canada. Halal food certification is increasingly sought for western-influenced meat products.	Technologically immune slaughterer ritual.	Has both import displacement and significant export potential.	The ritual slaughter is based on Koran/Quran and there is no established procedure. However, Il Rashid Mosque is working on standardizing the certification process for western Canada.

Score	Opportunity Description	a) Why does this fit with EATC?	b) Why is it cost competitive?	c) What's the market growth opportunity?	d) How is it technologically robust?	e) Why could it have significant economic impact?	Notes		
<b>Pre-made Meals</b>	5.7	Pre-made meals with a variety of meat and specialty selection. There are major players in this area, however, focus on healthier, ethnic and specialty products and niches provides less barrier to entry.	The pre-made meal processing facility would provide a cluster opportunity based on transport, refrigeration and access to labour pools.	Local feedstock and easy adoption of high tech equipment for higher value specialty products.	Increasing trend towards healthier and busier lifestyles has resulted in gluten free and organic pre-made meals.	Microbrewing is highly scalable, with the weak CAD, opportunities may exist in the US. Increasing interest in specialty beer results in a good market opportunity.	Alberta is an early adopter of High Pressure Processing (HPP) and other technologies to better retain nutrients.	Numerous examples of successful start-ups in Alberta.	Plant siting requires labour pool, good refrigeration, and transportation infrastructure.
<b>Microbrewery</b>	5.5	Small scale naturally brewed beer.	There are already 5 microbreweries in the EATC area.	Close to feedstock, new provincial program provides tax rebate grants to microbreweries.	The brewing techniques are well established, and new innovations in terms of flavor and quality has come into play.	The Alberta Small Brewer's Association estimates the potential near doubling of number of current breweries based on local population alone.	There are 52 licensees in Alberta that manufacturer beer. Highly competitive environment. Needs to be near population centres.		

Score	Opportunity Description	a) Why does this fit with EATC?	b) Why is it cost competitive?	c) What's the market growth opportunity?	d) How is it technologically robust?	e) Why could it have significant economic impact?	Notes
5.4	Fish and food production in a closed loop environmentally controlled greenhouse/fish tank facility.	The high value product could be a part of the greenhouse opportunity.	Successfully operated in other countries – specialty products like herbs and micro-greens command premium prices. Lower OPEX in a cluster.	Displacement of imports. Aquaponics can be used to produce most major vegetables and crops. Can also be used for fruit and root vegetables in other countries.	The Alberta technology is in its 4th generation in the Brooks facility and has been commercial for a few years.	High growth potential as source of organically grown protein. Employs 10-15 people per small size facility.	Research to be completed.

Table 9.2 - Opportunity Screening Criteria Rating

Based on the selection, screening and scoring processes employed to this point, the following have been ranked as the top 4 “primary” opportunities for which business cases will be developed:

- Pulse-based processing for food, functional foods, and health products;
- Greenhouse hydroponic crops;
- Hemp based biocomposites
- Specialty pet food.

The primary business cases will be presented in the next section, followed by brief summaries of leading secondary opportunities in the following section.

The primary business cases and secondary opportunity summaries will be followed by strategies and action plans for the primary opportunities.

## **10. BUSINESS CASES FOR FINALIST OPPORTUNITIES**

Of the business opportunities ranked in the previous sections, three have been chosen for further analysis with a mindset to developing an EATC investment attraction strategy for each. The ultimate investment attraction strategy and action steps presented later in this document will be driven by the business needs and the amount of groundwork done in previous studies to identify opportunities and investment attraction potential of that industry segment.

Another key objective of this section is to provide the EATC personnel who will be involved in business development tasks, recommended in later sections, with the information to gain an introductory level of background in these businesses. This will help them to tailor the investment attraction pitches to the specific needs of potential investors in each sector.

The business cases below will differ in format, depending on the suite of potential investment attraction strategies that fit that industry given its value chain, location criteria, competitiveness drivers, and current level of maturity in the EATC. For example, the greenhouse sector has a short value chain, needs plentiful access to nearby labour, and would benefit from operating cost optimization. In contrast, pulse processing has a larger and more complex value chain with different investment and location criteria in each link.

### **10.1. PULSE PRODUCTS**

#### **10.1.1. Opportunity Overview**

Several trends indicate the likeliness of the growth in demand for pulse crops globally. Pulses are an important part of the diets in regions with the fastest population growth, namely India, Africa, the Middle East, and Central and Latin America. The global health food market is expected to reach \$1 trillion in 2017 and is growing as developing countries become more affluent. The recent recognition of the health risks of sugar consumption also favours adoption of low glycemic index foods such as pulses. Major food product research initiatives by pulse industry associations and food processors

are expanding the uses of pulses as healthy ingredients. Between 2003 and 2013, over 2000 new food products containing pulses were developed.

Canada is the world's largest exporter of pulses and provincially, Alberta ranks second in production to Saskatchewan. Pulse crops are an ideal rotational crop. Their production increase has proven to be valuable in crop rotations which help to control weeds, diseases and insects, as well as improving soil texture and fertility which enhance yields for other crops in rotation.

### 10.1.2. Feedstock

In Alberta, production of pulses is primarily field peas as shown in Table 10.1 below. They are grown from dryland fields in southern Alberta and through Central Alberta.

The next specialty crop production report by census division (2016) is being conducted at the time of writing of this report. Thus, the most recent data is from 2011. The Census Divisions referred to in Table 10.1 below are mapped in Figure 1.

<b>EATC REGIONS 2011 Production (tonnes)</b>					
<b>Census Divis.</b>	<b>Dry Peas</b>	<b>Lentils</b>	<b>Dry Beans</b>	<b>Chick Peas</b>	<b>Notes</b>
1	70,533	27,746	14,678	901	
2*	66,530	20,054	22,116	4,614	* Newell County only production
4	30,963	12,006			
7	58,347				
10	94,084				
<b>Total (EATC)</b>	<b>320,457</b>	<b>59,806</b>	<b>36,794</b>	<b>5,515</b>	
<b>Total (AB)</b>	<b>805,600</b>	<b>68,300</b>	<b>44,000</b>	<b>10,400</b>	

*Table 10.1 - Specialty Crop Production Report by Census Division*



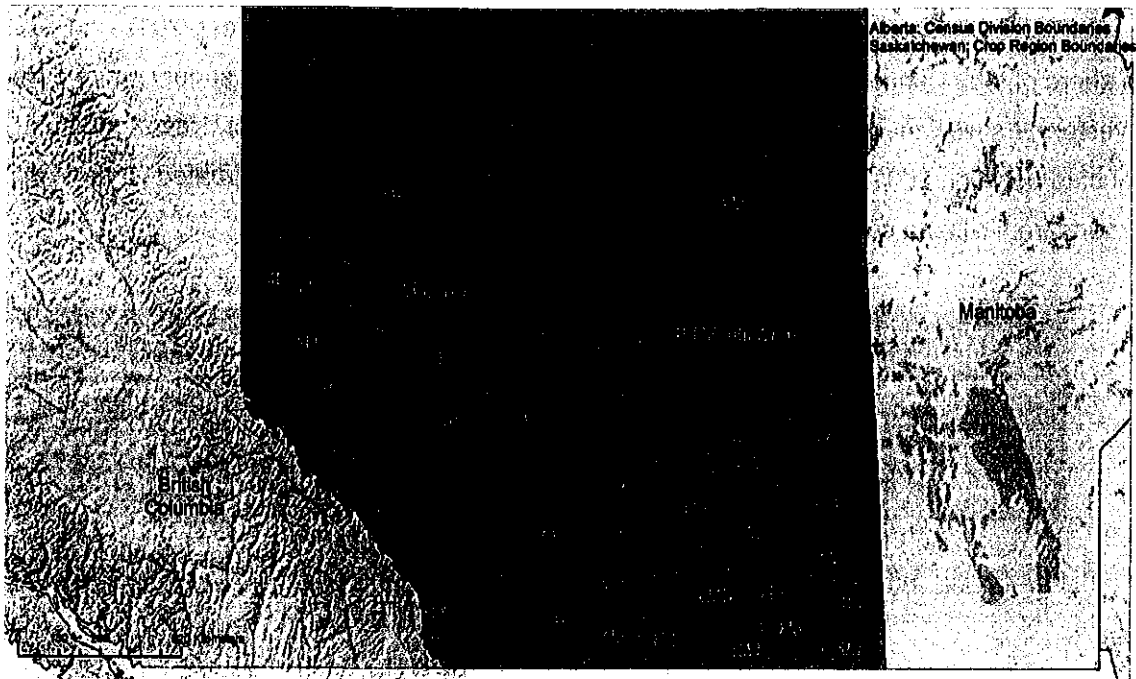


Figure 1 – Census Division Map

Source: "Opportunities in Pulse Processing Report" Field Guide Consulting 2013

Dry beans are grown primarily in the irrigated fields of southern Alberta, surrounding Bow Island, Taber, and Vauxhall. Chickpeas are grown mainly in southern Alberta, where the growing season is longest, and dry conditions are beneficial. Lentil production also occurs predominantly in southern Alberta, along with a small strip along the eastern border.

Faba beans are produced in the moister regions of the province, including central and north-central Alberta and irrigated areas of southern Alberta. Faba bean production also occurs in the Peace River region, though its shorter growing season can make this a challenge during less than ideal growing years.

While the Palliser region of EATC is suited to most major pulse varieties, dry peas are the predominant crop and best suited to most counties in the EATC. Therefore, dry peas will be the focus of our investment attraction strategy for this industry segment.

As per Table 10.2 below, Alberta's pulse acreage has grown by 186% between 2012 and 2016 and its share of total Canadian acreage increased from 14% to 23%. This trend should prove attractive to investors. As well, there has been significant production growth in the sector. Pea production doubled between 2001 and 2012 in Alberta. Based on this forecast, the estimated value of dry pea exports from Alberta could exceed \$0.3 billion in 2016-17.

<b>SEEDED ACRES 2016</b>					
<b>Column1</b>	<b>Alberta</b>	<b>Manitoba</b>	<b>Saskatchewan</b>	<b>Canada</b>	<b>% Alberta</b>
Beans, all dry	45,000	117,000	-	287,000	16%
Chick peas	-	-	160,000	160,000	0%
Lentils	565,000	-	5,275,000	5,840,000	10%
Peas, dry	1,860,000	165,000	2,200,000	4,274,000	44%
<b>TOTAL 2016</b>	<b>2,470,000</b>	<b>282,000</b>	<b>7,635,000</b>	<b>10,561,000</b>	<b>23%</b>
TOTAL 2012	862,312	190,000	4,935,000	6,355,000	14%
Increase	186%	48%	55%	66%	72%

Table 10.2 - Growth in Seeded Acres

Source: Statistics Canada

DRY PEAS – CANADA			
	2015	2016 (F)	2017 (F)
Area seeded (kha)	1,613	1,489	1,729
Area harvested (kha)	1,588	1,470	1,697
Yield (t/ha)	2.4	2.18	2.72
Production (kt)	3,810	3,201	4,611
Imports (kt) [b]	31	17	29
Total supply (kt)	4,170	3,902	4,840
Exports (kt)	3,091	2,800	3,200
Total Domestic Use (c)	395	902	740
Carry-out Stocks (kt)	684	200	900
Stocks-to-Use Ratio	20	5	23
Average Price (d)	\$ 260	\$ 365	\$300-\$330
[a] Crop year is August-July.			
[b] Imports and exports exclude products.			
[c] Total domestic use = Food and industrial use + Feed waste and dockage + Seed use + Loss in handling. Total domestic use is calculated residually.			
[d] Producer price, Free-on-board (FOB) plant, average over all types, grades and markets.			
kha: kilohectares ; t/ha: tonnes per hectare; kt: kilotonnes; (F): forecast, by Agriculture and Agri-Food Canada except area, yield and production for 2015-16 which is Statistics Canada and area seeded for 2016-17 which is Statistics Canada.			
Source: Statistics Canada			

Table 10.3 - Crop Growth: Dry Peas in Canada

Table 10.3 above suggests that substantial production increases are expected in 2017. It also forecasts reasonably strong prices. According to estimates by the Manitoba Department of Agriculture, producer returns on peas may exceed canola in 2016.<sup>5</sup> Some Alberta counties are developing legislation limiting the number of years that canola can be grown in a field so as to control disease.

<sup>5</sup> [https://www.gov.mb.ca/agriculture/business-and-economics/financial-management/pubs/cop\\_crop\\_production.pdf](https://www.gov.mb.ca/agriculture/business-and-economics/financial-management/pubs/cop_crop_production.pdf)

### 10.1.3. Markets

Global dry pea trade increased from 0.5 million tonnes in 1980 to 4.1 million tonnes in 2013, the most recent data available.<sup>6</sup> In 2015, Canada exported 6 million tonnes of pulses worth more than \$4.2 billion, representing 41% of global trade in pulses and serving over 150 countries. About 80% the dry pea exports were sold to India, Bangladesh, and China. Dry pea exports to Europe and North and South America are also important destinations.

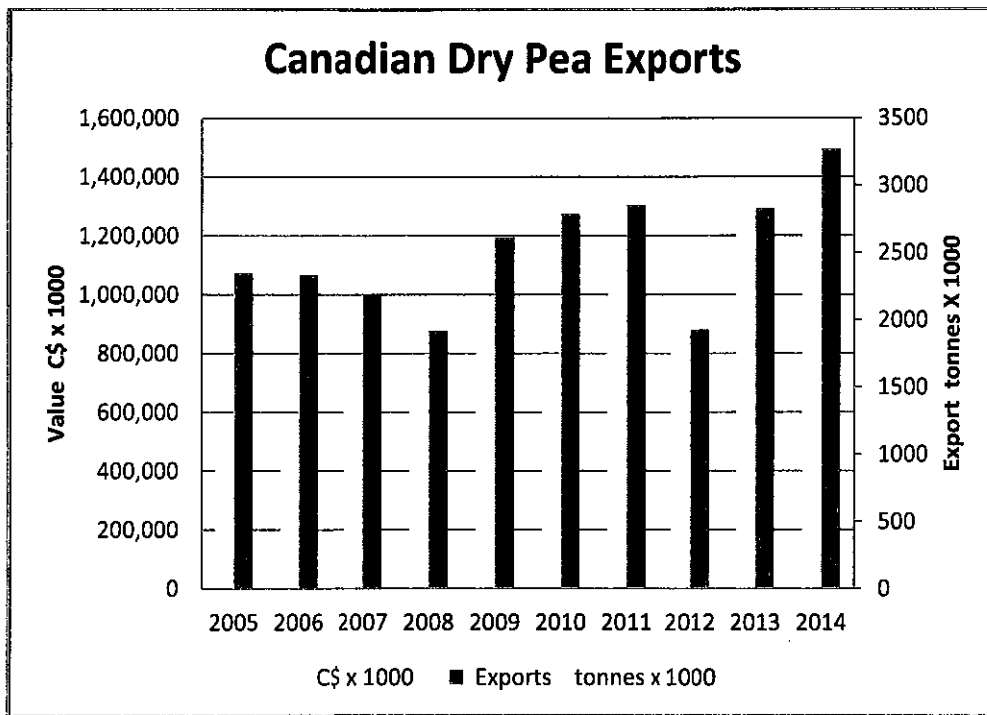


Figure 2 - Canadian Dry Pea Exports

Source: Statistics Canada,<sup>7</sup> January 2016

While Canadian pea exports were up only 30% over the 10 year period as shown in Figure 2 above, the value of exports almost tripled, indicating a significant strengthening in global pricing.

<sup>6</sup> <http://faostat3.fao.org/download/T/TP/E>

<sup>7</sup> <http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/by-product-sector/crops/pulses-and-special-crops-canadian-industry/dry-pea/dry-pea-statistics/?id=1174498108814>

#### 10.1.4. Value Chain

Figure 3 below illustrates the pulse processing value chain. There are several elements that represent potential investment attraction opportunities which will be explored.

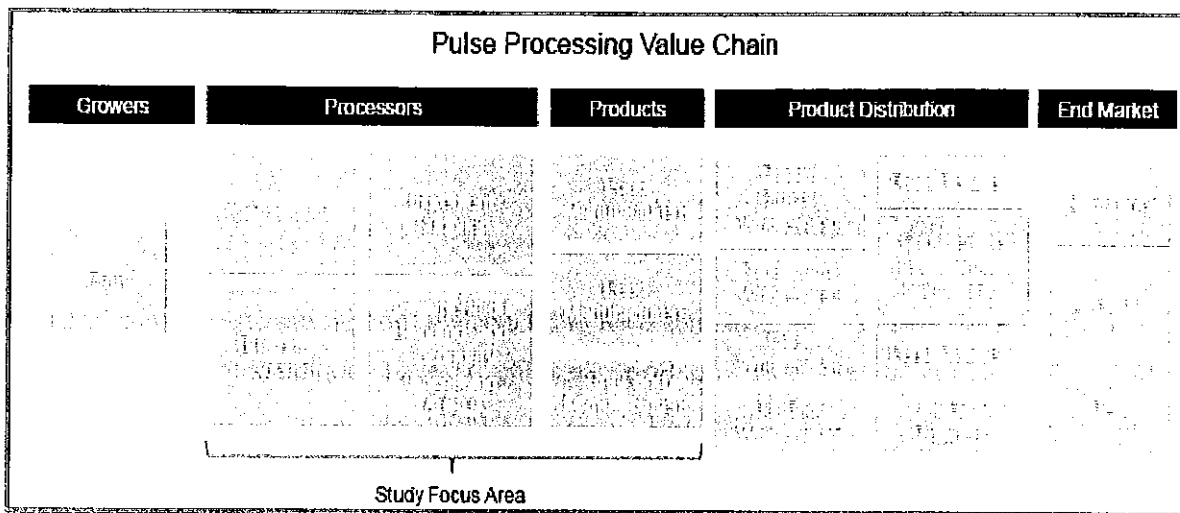


Figure 3 - Pulse Processing Value Chain

Source: "Opportunities in Pulse Processing Report" Field Guide Consulting 2013

A comprehensive study conducted in 2013 for the Economic Development Alliance for Southeast Alberta<sup>8</sup> identified 3 elements of the value chain with investment attraction potential as per the diagram above. These are:

- Pulse Consolidators – consolidators buy from growers and perform primary processing and may sell to secondary processors or export directly;
- Pulse Ingredient Manufacturers – milling to produce flours and further fractionation to extract proteins, starches, and fibre; and

<sup>8</sup> Pulse Processing Opportunities in Southeast Alberta – Field Guide Consulting 2013 - prepared for The Economic Development Alliance of Southeast Alberta

- Food Manufacturers – consumer food products such as spreads, baked goods, prepared meals, etc. The Leduc Food Processing Development Centre provides R&D and incubator facilities. However, the EATC could attract commercial scale manufacturers.

Attraction of pulse consolidators and ingredient manufacturers are both actionable opportunities for the EATC and can serve as attractors to food manufacturers in the medium to long term.

While the EATC does not have facilities to conduct R&D in this sector, companies locating processing facilities in the EATC could use the Leduc Food Processing Development Centre.

#### **10.1.5. Processing Capacity**

Table 10.4 below contains a comprehensive list of 50 existing pea processing facilities in Alberta. One notable missing operator is St. Paul Seed Cleaning. This list supplements the map, displayed in Figure 4, to help isolate potential locations for additional processing capacity.

CD	Processor	Location
CD 1	Parrish & Heimbecker Ltd. Parrish & Heimbecker Ltd. Parrish & Heimbecker Ltd.	Bow Island Foremost Medicine Hat
CD 2	Cargill Columbia Seed Co. Ltd. Parrish & Heimbecker Ltd. Viterra	Lethbridge Vauxhall Milk River Grassy Lake
CD 3	Wilce Bros Ag Trading Feedrite (Div. of Ridley Inc.)	Raymond Fort MacLeod
CD 5	Cargill Cargill Feedrite (Div. of Ridley Inc.) Viterra	Carleton Place Trochu Linden Vulcan
CD 6	Acalina Resources Ltd Cargill Viterra Viterra - Feed Products Viterra - Feed Products	Calgary Blackie Crossfield Okotoks Oids
CD 7	Viterra Viterra Viterra	Kitim Provost Stettler
CD 8	Craigjevar Farm Ltd. Parkland (1309497Ab) Commodities Windy Acre Holdings Ltd.	Lacombe Innisfail Penhold
CD 10	Bashaw Processors Cargill Cargill Cargill Cargill Great Western Grain Co. Ltd. Viterra Viterra	Bashaw Camrose Vegreville Vermilion Viking Lloydminster Leroy Star
CD 11	SaskCan Pulse Trading Cargill Mountain Meadows Providence Grain Solutions Westmor Terminals Inc.	Gibbons Edmonton Lepal Fort Saskatchewan Morinville
CD 13	Champion Feed Services Westlock Terminals Ltd.	Barreac Westlock
CD 17	Bechari Farms Neufeld Petroleum Viterra	Manning La Crête High Level
CD 18	(Merlot Ag Services) (Wembley Seed Cleaning) Cargill Champion Feed Services Viterra Viterra	Girouville Wembley Bycroft Grande Prairie Fisher Grimshaw

Sources: Alberta Pulse Buyers List, Saskatchewan Pulse Growers Online Database

Table 10.4 - Pea Processing Facilities in Alberta

Source: "Opportunities in Pulse Processing Report" Field Guide Consulting 2013

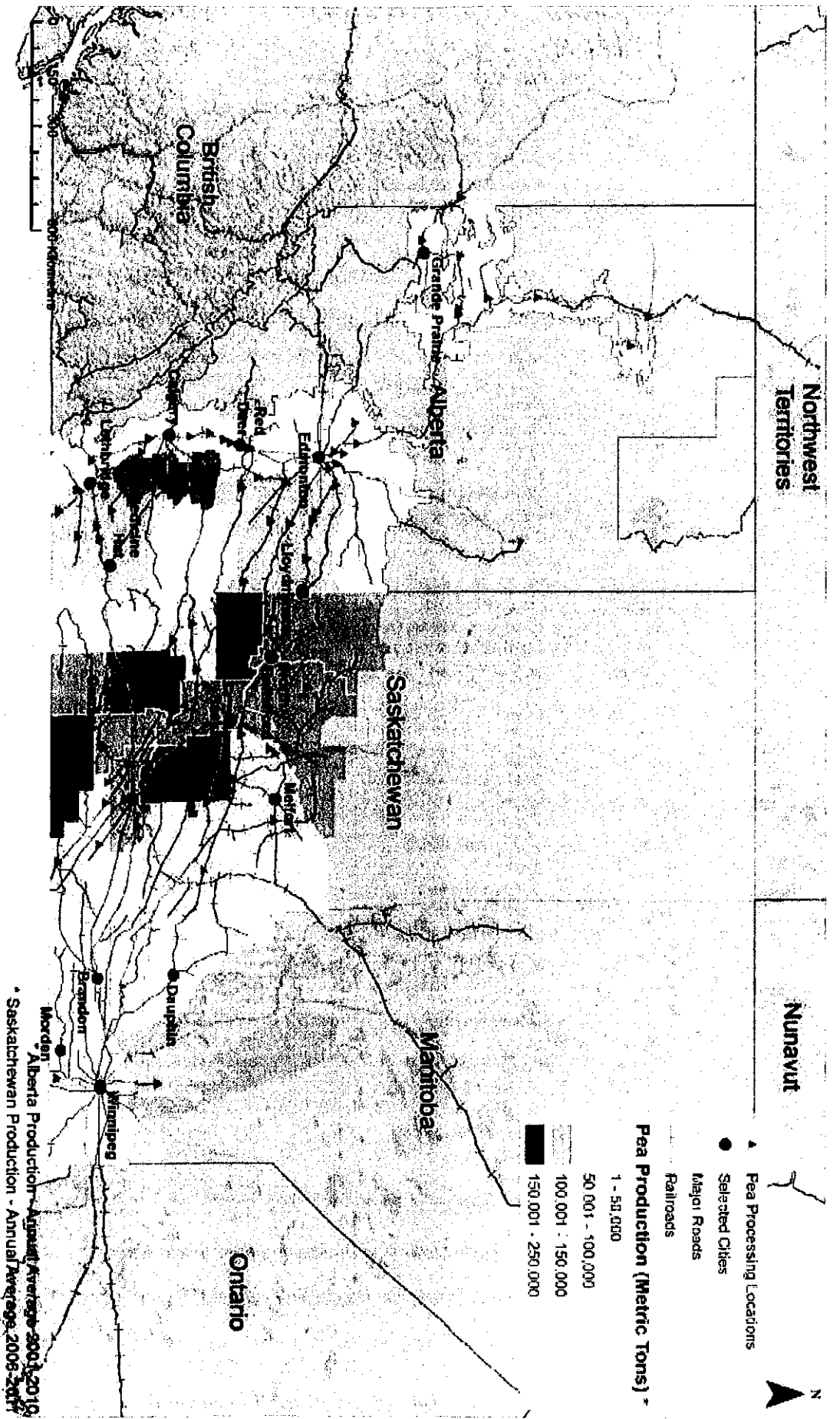


Figure 4 - Pea Processing Facilities in Alberta, Saskatchewan, Manitoba

Source: "Opportunities in Pulse Processing Report" Field Guide Consulting 2013



**10.1.6. Site Selection Criteria**

The criteria listed in Table 10.5 below narrows down the potential sites considerably, to those in or nearby rail corridors with a proximity to growers. It will be helpful to scan rail lines for existing sidings. Any unused sidings recently built to handle frac sand would be an opportunity.

<b>KEY LOCATION CRITERIA FOR PULSE FRACTIONATION</b>	
<b>Pulse Consolidators</b>	<b>Ingredient Manufacturers</b>
Rail service and container availability (min. 40 railcar siding).	Rail service and container availability (min. 40 railcar siding).
Proximity to growers, which in medium term may be impacted by water supply.	Market Access – Tariffs.
Local crop failure history.	Proximity to growers.
Labour availability and cost.	Water and sewer access (more important for wet fractionation).
Electricity and other operating costs.	Labour availability and cost.
Competition among crops.	Electricity and other operating costs.

*Table 10.5 - Key Location Criteria for Pulse Fractionation*

**10.1.7. Competitiveness Factors**

An independent Alberta regional seed cleaning operation exports cleaned and sorted bagged and bulk pulses to India. They reported facing competitive cost structure challenges related to electricity

and transportation costs. Electricity comprise 25% of operating costs and will erode profitability when the increase. . While generation prices have fallen, transmission costs could rise to \$40/MWh in Alberta. This facility is not on a railhead and is forced to use containers for both bulk and bagged export. The railroads have reduced allowable tonnage on 20' shipping containers from 26.5 tonnes to 21.5 tonnes, apparently due to issues with the container railcars, which increases their costs. A significant drop in ocean bulk shipping rates versus container rates is also problematic. Combining China's 20% import tariff on processed pulse products (vs 5% for raw goods), it is currently more profitable for Chinese companies to ship Canadian pulses to China for processing and sell them back into the North American market.

While a more thorough discussion of competitiveness will be done in the strategy section to follow, competitiveness issues include;

- Labour cost and availability;
- Electricity Costs;
- Trade barriers – China has a 20% import duty on pulse flour and 5% on raw pulses;
- Rail company reductions in per sea container weight allowance
- Sea container and rail transload infrastructure availability in producing regions; and
- Ocean bulk shipping rates being substantially lower than container shipping rates.

### **10.1.8. Capital Costs**

Capital costs for a basic 30,000 – 50,000 tonnes per year pea processing plant with storage, handling, cleaning, splitting, storage, weighing, rail siding and loading facilities were in the range of \$2 million – \$7 million in 2005,<sup>9</sup> depending on existing infrastructure. The US Bureau of Labour Statistics Producer Price Index for food processing for the period 2005 to 2016 denotes a 10.2% increase. Thus, the capital costs would fall approximately into the range of \$3.3 million to \$7.7 million.

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<sup>9</sup> Alberta HUB Regional Investment Strategy Report 2005 - MNP

### 10.1.9. Operating Costs

**10.1.10. Labour represents about 50% of a primary pulse processing plant, electricity 25% and the remainder is comprised of maintenance, consumables, and general expenses. Employment at such a plant will typically range from between 15 to 40 people, depending on the size and scope of the operations. Key Risks & Mitigants**

Table 10.6 below summarizes the key operating risks and mitigants for this segment that need to be understood to help formulate the investment attraction strategy. Several of these risks are inherent in a location in Alberta, Canada but some are manageable through actions of the investor and various levels of government.

KEY RISKS & MITIGANTS	
RISK	MITIGANT
Commodity price	Global demand for plant protein in sustained upward trend. Watch for emerging futures market.
Trade barriers	Select export markets with lowest tariffs. Work with Pulse Canada and government towards tariff reductions.
CAD vs USD exchange rate	Currency hedging.
Electricity cost and carbon taxes	Self-generation to avoid transmission costs. Maximize use of green energy subsidies.
Shipping container availability	Locate near container port or near inbound user of containers.
Shipping costs	Focus on highest value products in nearest markets.
Labour availability	Locate near population centre.

*Table 10.6 - Key Risks & Mitigants*

While there are risks in this sector, fundamental increasing in global demand and the need to improve soil and inputs management trends favour continued expansion. The primary processing

capacity can expand in the EATC region, but also serves as an attractor for potential investors in secondary processing.

### 10.1.11. Investor Targets

#### 10.1.11.1. Domestic Investors

Domestic investor targets in a multipurpose fractionation complex could potentially include all current processors based in Alberta, elsewhere in Canada, or US companies operating within Canada. Some may have existing North American or overseas buyers for whom they need product supply, while others may want to extend their local reach or establish a beachhead in a new region.

As stated previously, a multi-commodity fractionation complex would spread market pricing risk among several commodities.

The following lists of buyers and investors are maintained by the Alberta (over 50 companies) and Saskatchewan (over 80 companies) pulse grower associations:

- Alberta Pulse Growers:  
[http://pulse.ab.ca/images/uploads/page\\_files/Pulse\\_Buyers\\_List\\_2016-17\\_for\\_Website.pdf](http://pulse.ab.ca/images/uploads/page_files/Pulse_Buyers_List_2016-17_for_Website.pdf)
- Saskatchewan Pulse Growers: <http://saskpulse.com/markets/buyer-seller-listing/>

#### 10.1.11.2. Foreign Investors

The Global Pulse Confederation<sup>10</sup> has 600 corporate members from 55 countries producing products with a retail value exceeding \$100 billion. While there does not appear to be a membership list, a review of speakers and sponsors at the annual Global Pulse Convention,<sup>11</sup> organized by the GPC

<sup>10</sup> <http://iyp2016.org/about-us/global-pulse-confederation-cicils-iptic>

<sup>11</sup> <http://globalpulseconvention2016.com/speaker>

provided a good contact list of industry leaders. Foreign investor targets in pulse processing may include:

- China Cereals Oilseeds and Foodstuffs Corporation (COFCO) – is a state-owned enterprise <http://www.cofco.com/en/>
- Hongfa Food Company <http://www.made-in-china.com/showroom/hongfafood>
- Roquette, France <http://www.roquette.com/>
- Yantai Shuangta Food Company
- Wilmar <http://www.wilmar-international.com/>

Prior to approaching each target investor, research should be done to assess their history, resources, objectives, and growth pattern. In this manner, the targets can first be ranked and the pitch tailored to help address and mesh with the company's growth plans.

## **10.2. SPECIALTY HYDROPONIC CROPS - GREENHOUSE**

To attract new greenhouse investment into Alberta, the use of an industry cluster to improve cost competitiveness is proposed. To formulate a meaningful cluster strategy, a basic understanding of the risks, cost, and profitability drivers of this opportunity must first be understood.

The focus of this section will be on hydroponic produce and floriculture. Two complimentary opportunities are aquaponics and medicinal marijuana. As both opportunities require separate physical facilities from a conventional hydroponic greenhouse, either for licensing or operational reasons, they are considered as separate opportunities, although are compatible within an industry cluster.

### **10.2.1. Opportunity Overview**

The greenhouse industry in Alberta ranks fourth in the country after Ontario, British Columbia, and Quebec. In 2011, the Alberta greenhouse sector generated annual sales of \$162 million, employing 1,600 full time and 3,200 part-time workers with 127.5 hectares under glass or plastic. According to

the same government source, there were 230 greenhouse operators in the province but by 2014, the greenhouse area had increased to only 137 hectares<sup>12</sup>, an increase of only 7% over 3 years. This small expansion occurred in a time of strong economic growth. In a globally expanding industry with excellent export potential, Alberta does not seem to be fully capturing this growth opportunity.

Table 10.7 indicates that Alberta has approximately one sixth of the per capita greenhouse area dedicated to vegetables as compared to Ontario.<sup>13 14</sup> Using this measure, there is substantial opportunity for expansion in Alberta.

<b>2015 PER CAPITA GREENHOUSE AREA – VEGETABLES ONLY</b>			
<b>Column1</b>	<b>Greenhouse Area (Sq. m.)</b>	<b>Population</b>	<b>Sq. m. / person</b>
<b>Ontario</b>	9,973,043	13,792,000	<b>0.723</b>
<b>BC</b>	2,844,344	4,713,761	<b>0.603</b>
<b>Alberta</b>	506,884	4,201,458	<b>0.121</b>

*Table 10.7 - Per Capita Greenhouse Area, 2015 - Vegetables Only*

Approximately 50% of Alberta’s total greenhouse area is located within the EATC region. Of that, 80% is in the Medicine Hat region. There have been reports that two operators plan to add a total of 60 acres of new capacity in the coming months, although crop type and details are not yet available.

Figure 5 below illustrates the product breakdown.

<sup>12</sup> [http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/econ15525/\\$FILE/2014GHProfileFinalReport.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/econ15525/$FILE/2014GHProfileFinalReport.pdf)

<sup>13</sup> <http://economicdashboard.alberta.ca/Population#interProvGraphGrid>

<sup>14</sup> <http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/by-product-sector/horticulture-industry/horticulture-sector-reports/statistical-overview-of-the-canadian-greenhouse-vegetable-industry-2015/?id=1468861362193#a1.2>

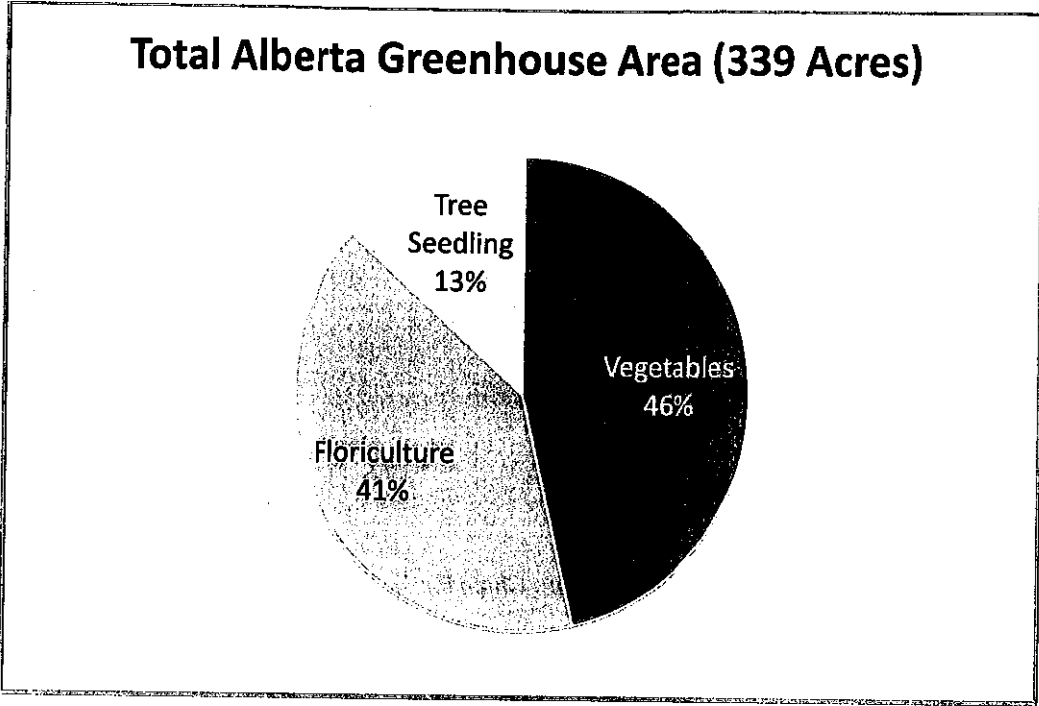
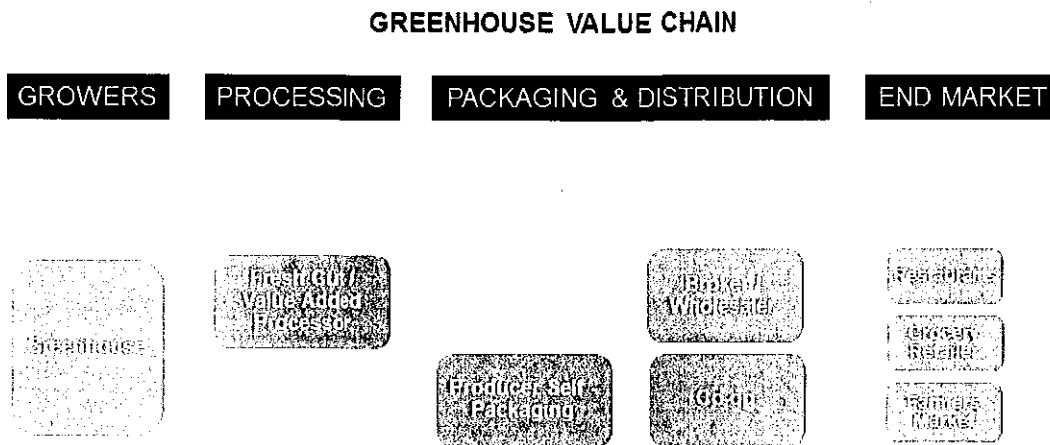


Figure 5 – Alberta Product Breakdown

**10.2.2. Value Chain**

The value chain for specialty fresh produce shown in Figure 6 below is fairly simple. Growers can package and ship directly to end markets such as retailers, restaurants or farmer's markets, or use a broker/wholesaler. If they are part of a co-op, the packaging, marketing, and distribution is performed for them. In some cases, such as floriculture, value added processing may occur.



*Figure 6 - Value Chain for Specialty Fresh Produce*

**10.2.3. Site Selection Criteria**

Greenhouse location requires a holistic consideration of operating inputs and infrastructure. Some of these are included in the following list of factors required to locate such a development.

**10.2.3.1. Heat**

Approximately 15%-20% of operating costs are for heat in a southern Alberta greenhouse. Approximately 80% of growers depend on natural gas for heating and 12% use coal. Natural gas has approximately one-half of the GHG impact as coal. However, unless exemptions can be negotiated with the provincial government for small commercial consumers, even those growers using natural gas will have their margins eroded by carbon taxes. The Alberta Greenhouse Growers Association



estimates of \$5 million in new carbon tax costs in 2017 will make Alberta growers less competitive than other provinces.<sup>15</sup>

There have been numerous studies of utilizing industrial waste heat for greenhouse operations in Alberta. These studies have been sufficiently positive to begin discussions with potential sources of waste heat, such as industrial plants.

However, there are challenges which have prevented execution of these initiatives:

- Industrial heat providers want to obtain both greenhouse gas credits and a fee for the heat provided. This fee may be reasonable to recover the capital and operating costs required to capture and deliver the waste heat, but the quoted costs made the venture economically unattractive for greenhouse growers. Thus, the returns are not large enough to satisfy both parties; and
- Growers and co-ops are not currently set up to run a district heating company.

#### 10.2.3.2. Electricity

Depending on whether a greenhouse is lighted, electricity costs typically range between about 5% and 15% of operating costs. Locating the cluster within an Industrial System Designation (ISD) is important to shield producers from the rapidly escalating cost of electricity transmission in Alberta, which could double to reach about \$40/MWh within the next few years. Note that it may be necessary to look at back-up generators to avoid the DTS (Demand Transmission Service) charges associated with back-up power.

The proposed \$35/MW subsidy for green energy warrants investigation of solar farms associated with the greenhouse cluster.

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<sup>15</sup> <http://www.greenhousecanada.com/news/carbon-levy-latest-hurdle-to-alberta-growers-31496?platform=hootsuite>

A solar or gas fired power project could be viable and necessary. The relative economics of each should be considered, having regard to back-up power charges (high for solar due to intermittent availability) and GHG penalties for gas fired power.

#### 10.2.3.3. Water Supply

While water currently comprises less than 2% of operating costs for those using a municipal supply, there is concern among growers relating to future access and rising costs. Where available, growers prefer irrigation water (in southern regions where available) as it provides less price escalation risk than municipal water sources and avoids the capital, operating cost, and permitting issues of water wells.

#### 10.2.3.4. Effluent

While not currently a large cost centre or operating constraint, those greenhouses connected to municipal or commercial grade water treatment systems will face less scrutiny in the future than rural operators.

#### 10.2.3.5. Land/Permitting

Aside from normal zoning and land use permitting and constraints, there are other important considerations in locating a greenhouse cluster:

- Rural locations are preferred due to lower property taxes;
- At least a quarter section of land of reasonable price must be available close to the heat/power source in order to attract a sufficient number of growers; and
- The county must issue a permit for use of night time illumination of the greenhouses in rural areas. This is a big issue with sodium lighting but less so for lower intensity,

purple LED lighting. However, LEDs are still too capital intensive and expensive for most growers to achieve the required payback on their investment.

- Water drainage and composting must be addressed

#### 10.2.3.6. Labour

Despite the energy sector downturn, it remains extremely difficult to staff greenhouses with Canadian workers. Retention rates of Canadian workers are between 10% and 20%, thus most greenhouses are staffed with temporary foreign workers (TFW). While agricultural TFW permits have been easier to obtain than in other sectors, there is vulnerability to changes in federal policy. It may be important to develop a stable permanent workforce, which could be comprised of foreign workers. Economical accommodation for these workers must be close by, which would be a key determining factor for site location.

#### 10.2.3.7. Transportation

While paved road access for large semi-trailers is important, the other factors listed here represent larger cost impacts for domestic markets. Rail is not generally used for transport of fresh produce outside of Alberta.

### 10.2.4. Key Location Criteria

The table below outlines key site location criteria, based on discussion with greenhouse operators.

SUMMARY OF KEY LOCATION CRITERIA FOR GREENHOUSES		
CRITERIA	RATING	COMMENT
Labour	Critical	Must be near economical housing for foreign workers.
Water	Critical	If not readily accessible, this could become an escalating cost.
Heat and Power	Very Important	Ready access to natural gas and electricity feeds. Also, as electrical generation market prices return to normal levels, avoidance of transmission charges will become important in minimizing costs.
Transportation	Very Important	Road access for tractor trailers. Rail access not used for fresh produce in this market.
Land Cost and Expansion Potential	Very Important	Land prices will affect the fundamental IRR of the investment. Expansion room must be considered.

Table 10.8 - Key Location Criteria for Greenhouses

**10.2.5. Capital Investment**

Again, using survey data from the Government of Alberta, the capital investment required to start up a minimum commercially sized greenhouse in Alberta ranges from approximately \$500,000 to \$1.2 million. The average breakdown of capital costs is shown below in Figure 7.

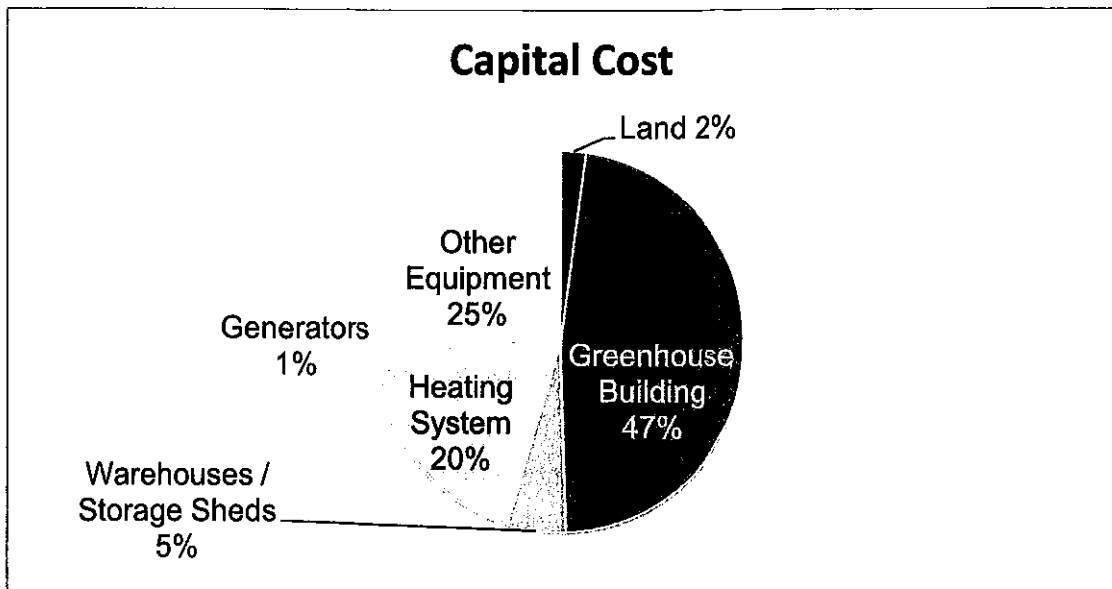


Figure 7 - Average Breakdown of Capital Costs in Alberta

Potentially shared capital expenditures in a cluster might include: part of the heating and generation systems, other equipment and warehousing, transportation and water infrastructure.

There are many highly qualified and successful greenhouse operators in Alberta. Thus, the investment attraction strategy for this segment may begin locally, encouraging expansion within an EATC regional cluster.

## 10.2.6. Cost Competitiveness

### 10.2.6.1. Background and assumptions

- Labour – Alberta Agriculture's most recent published study of greenhouse economics cites 2011 operating costs. Labour represents approximately 30% of typical greenhouse operating costs. In conversation with producers, rising minimum wage will force some of them to switch to less labour intensive crops to maintain their margins, thus reducing staff. Table 11.9 below

illustrates that there is a wide variance in margins among different types of greenhouse operations in Alberta.

- Heat & Power – after labour costs, heat and power compose the largest production costs in a typical Alberta greenhouse. The recent significant drop in electricity generation prices in Alberta have shielded this industry from the rapidly rising costs of transmission charges, caused by the large capital projects initiated by the Alberta Government several years ago. Transmission fees alone are set to double and are expected to reach \$40/MWh, about twice the current price of electricity itself. The generation costs themselves have been very low but this is expected to dramatically change in the medium term as the lower cost coal-fired power is phased out. In addition, the provincial carbon taxes currently being phased in on natural gas threaten to damage the competitiveness of this sector as it relies largely on natural gas for heating. This will be amplified in the colder, northern parts of the province.

#### 10.2.6.2. Margin Analysis

Table 10.9 indicates that margins can vary widely among different crops. However, given the relatively small sample size, wide variation in production area, and recently expanding export markets, it is difficult to conclusively rank these crops in terms of profitability today versus 2011.

**SUMMARY OF GREENHOUSE  
PRODUCTION COSTS & RETURNS BY CROPS, 2011<sup>16</sup>**

	Cucumbers	Tomatoes	Peppers	Bedding/ Ornamentals	Cut Flowers	Tree Seedlings
No. of Greenhouses	8	7	5	8	3	5
Avg Production Area (per m2)	11,374	8,637	3,682	2,076	2,994	10,569
..... dollars per square metre (m2).....						
<b>Gross Revenue</b>	<b>107.21</b>	<b>107.88</b>	<b>103.59</b>	<b>158.51</b>	<b>151.61</b>	<b>101.65</b>
<b>Variable Cost</b>						
Material Inputs	17.63	13.78	18.33	25.36	16.62	15.00
Natural Gas*	10.84	12.73	10.35	6.82	11.36	11.97
Electricity	11.96	3.83	14.12	2.90	11.30	4.66
Marketing Costs	13.32	15.79	9.81	0.83	0.23	7.77
Other Cash Costs	12.30	11.11	12.90	20.68	27.13	12.13
Labour	26.36	28.35	31.67	51.80	40.47	34.83
<b>Sub-total</b>	<b>92.41</b>	<b>85.59</b>	<b>97.18</b>	<b>108.39</b>	<b>107.11</b>	<b>86.36</b>
Capital Costs	9.03	8.95	10.16	17.44	16.18	10.06
<b>Total Prod'n.</b>						
<b>Costs</b>	<b>101.44</b>	<b>94.54</b>	<b>107.34</b>	<b>125.83</b>	<b>123.29</b>	<b>96.41</b>
Gross Margin \$/m2	11.12	20.39	3.82	48.92	46.75	18.66
Gross Margin	10.4%	18.9%	3.7%	30.9%	30.8%	18.4%

\* Average natural gas price in 2011 in Alberta was \$3.97/GJ

Table 10.9 - Production Costs & Returns by Crop, 2011

<sup>16</sup> [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex4369/\\$file/821-59.pdf?OpenElement](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex4369/$file/821-59.pdf?OpenElement)

The figure below illustrates the proportional cost of electricity and natural gas inputs, which together make up approximately 20% of operating costs (excluding depreciation and interest expense). Note that this was before the pending high increase in transmission costs, expected increase in generation costs, and GHG penalties. Thus, from an input cost perspective, heat and power are two areas where a cluster concept may improve competitiveness. This may be important to eliminate or reduce transmission costs, provide a more stable generation cost, and possibly reduce GHG costs.

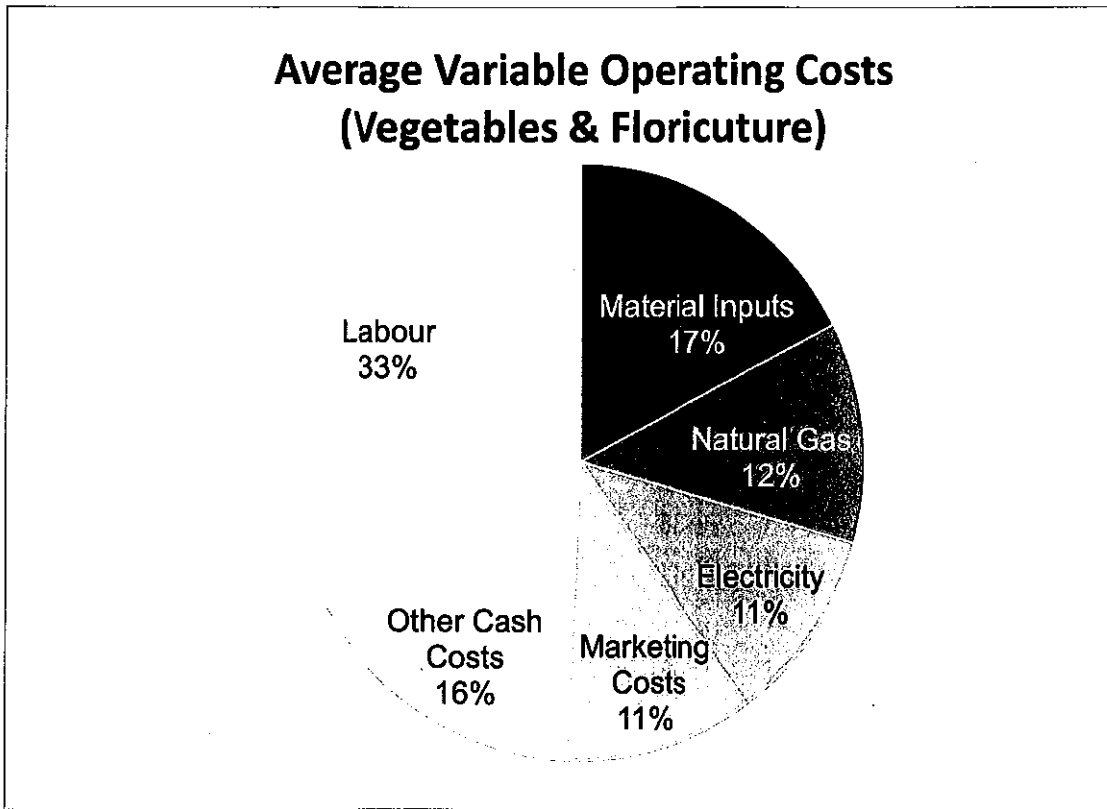


Figure 8 - Proportional Cost of Electricity & Natural Gas Inputs



### 10.2.7. Key Risks & Mitigants

Understanding the key operating risks and mitigants for this segment will help to formulate the investment attraction strategy.

RISK	MITIGANT
Labour availability	Locate near to population centres that can house temporary foreign workers or provide a greater pool of permanent (possibly foreign) workers willing to work at lower wage rates. Growing Forward has funding for automation.
Increase in minimum wage	Reduce staff, automate when feasible.
Increase in natural gas prices	Alternative heat or heat and power co-gen sources.
Water price	Irrigation water offers the lowest cost with the least risk of price escalation. Where not available, locate facilities near larger water sources that are less likely to become scarce.
Increase in electricity prices	Obtain ISD designation for self-generation to avoid transmission charges and to provide greater price stability. Consider subsidized green power sources as part of the supply mix.
Increase in CAD vs USD	Hedging to address fluctuations. Improve scale and efficiency to maintain export profit margins.

Table 10.10 - Key Risks & Mitigants

There are many highly qualified and successful greenhouse operators in Alberta. Thus, the investment attraction strategy for this segment may be local and, in some cases, encouraging expansion within in the EATC region.

Integration of this cluster within the overall investment attraction strategy and rollout steps will be presented in the conclusion and next steps sections.

### 10.2.8. Investor Targets

#### 10.2.8.1. Produce and Floriculture

In addition to local greenhouse operators, other Canadian, US, and overseas greenhouse operators may be investment attraction targets. The industry in the Netherlands has downsized in recent years due to competitive pressures and rising costs, thus some of these operators may be amendable to overseas opportunities. The top US operators have more area under glass than all of Alberta. Below are lists of Ontario, BC, US, and Dutch producer associations and operators.

- The Ontario Fruit and Vegetable Growers Association: <http://www.ofvga.org/aboutofvga>
- The BC Greenhouse Growers Association: <http://bcgreenhouse.ca/>
- A list of the largest US operators can be found at:  
<http://www.greenhousegrower.com/business-management/top-100/2015-greenhouse-grower-top-100-grower-list/>
- Brief descriptions of the major Dutch producer associations are listed at:  
<http://www.freshplaza.com/article/129292/Dutch-growers-unions-and-producer-organizations>

It appears the term “association” in the Netherlands is more like a producer co-op in North America. Direct links to some of the largest Netherlands based greenhouse associations:

- Best of Four: <http://www.bestoffour.nl/>
- DOOR: <http://cooperatiedoor.nl/en/>

- The Greenery: <http://en.thegreenery.com/home>
- Harvest House: <http://www.harvesthouse.nl/en>
- Van Nature: <http://www.nature.nl/site>

#### 10.2.8.2. Medical Marijuana Investor Targets

Some of Canada's biggest producers include Canopy Growth Corp. (the parent group of Tweed Inc.), Bedrocan Canada Inc., and Mettrum Ltd. Ontario-based Tweed Farms is housed in a former Hershey Chocolate factory, where it is licensed to grow cannabis plants in its 32,516 square-metre greenhouse and sell 3,500 kilograms of dried cannabis. The first licensed grower in Alberta was Aurora Cannabis<sup>17</sup> of Cremona. Another Alberta producer, who began in the cucumber greenhouse business, is Sundial growers or Airdire.<sup>18</sup> The federal current licensing process appears to be arduous with long lead times. It is unclear whether legalization would shorten this process.

#### 10.2.8.3. Aquaponics Investor Targets

A 2014 study conducted by Johns Hopkins Centre for A Livable Future<sup>19</sup> found that 84% of the 809 qualified respondents were hobbyists. Commercial aquaponics operations in the US are still in their infancy.

Alternative Farming Solutions<sup>20</sup> is planning a 50,000 sq. ft. aquaponics operation which may be located in the Palliser region, but this location needs to be confirmed.

Stewart Farms of Oak Bay, NB is planning a 100,000 sq. ft. facility in New Brunswick to open in 2017. This is based on a media report and requires verification.

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<sup>17</sup> <https://auroramj.com/>

<sup>18</sup> <http://sundialgrowers.com/>

<sup>19</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4100909/>

<sup>20</sup> <http://www.alternativefarmingsolutions.ca/>

### 10.2.9. Conclusions

The greenhouse segment is profitable in Alberta and provides an investment attraction opportunity for the EATC. The recent drop in the Canadian dollar vs the US dollar has focused Canadian producers on US exports. This benefits Alberta in two ways: firstly, it distracts Ontario and BC competitors from the Alberta market, and secondly, it opens export opportunities for Alberta producers in the US.

The Alberta greenhouse sector is vulnerable to cost escalations absent in several competing jurisdictions. These include escalating labour, heating, and electricity.

To enhance the competitiveness of this sector and attract additional investment, a greenhouse cluster that enhances or at least complements existing clusters should be considered.

As well, packaging and marketing clusters already have been formed using the co-op model but there remains an opportunity to further enhance competitiveness through reduction and long term pricing stability of other key input costs mentioned above. These inputs are otherwise very likely to rise and become a major competitive disadvantage for Alberta producers.

Enhancing competitiveness of greenhouse operations to attract investment may be accomplished by the development of a cluster to reduce the largest controllable input costs of this sector, heat and power. In some sectors, informal clusters have already been formed around joint marketing and packaging, such as Red-Hat and Pik-N-Pak greenhouse cooperatives. Building on existing clusters must be considered.

### **10.3. HEMP BASED BIOCOMPOSITES**

Biocomposites are materials formed by blending natural fibres with other natural or synthetic materials. The following assessment is based on the use of hemp as a feedstock, which has good growth potential in the EATC. Hemp has been grown for industrial purposes for many decades. Global production of industrial hemp exceeded 350,000 tonnes in 1961 and, for a variety of reasons, declined to under 100,000 tonnes by 2000. Introduction of low THC hemp varieties and an interest in bio-based products is causing a resurgence.

#### **10.3.1. Feedstock**

Industrial hemp is grown primarily for its seeds and fibres, or in some cases both. Straw from the hemp crop, which was largely considered as a waste in the past, is currently used to produce hemp fibres, which is processed further and can be used in variety of industries such as textile, bioplastics, and pulp and paper. It should be noted that the hemp straw consists of 15%-30% fibre and 55%-60% hurd (the woody core of the stem), and 15-25% is dust, which can possibly be pelletized and used as biofuel. The leaves contain 23% protein among other valuable compounds.

There are several hemp varieties, some with a significant biomass proportion growing 2-3 metres in height. Shorter varieties are easier to harvest for producers who only want seed. Seed is harvested later than pure fibre crops as it needs to mature longer. Specially equipped combines can harvest the entire crop so it is conceivable that both food and fibre could be grown in the same field to enhance producer netbacks, given an appropriate hemp variety.

#### **10.3.2. Value Chain & Products**

Figure 9 below illustrates the numerous steps in the processing value chain and the resulting products. This value chain excludes leaves, which could also serve as feedstock for health, food, and animal feed products. Players in the value chain will vary by primary product type.

The industrial fibre value chain is comprised of producers, processors, primary manufacturers (e.g. door panels), secondary manufacturers (e.g. auto parts companies), and tertiary manufacturers (e.g. auto companies).

The food and health product value chain is comprised of producers, processors, food manufacturers, distributors, and retailers. The shortest version of this value chain would be a producer selling directly to the manufacturer, who then has a retail outlet or distributes to other retailers directly.

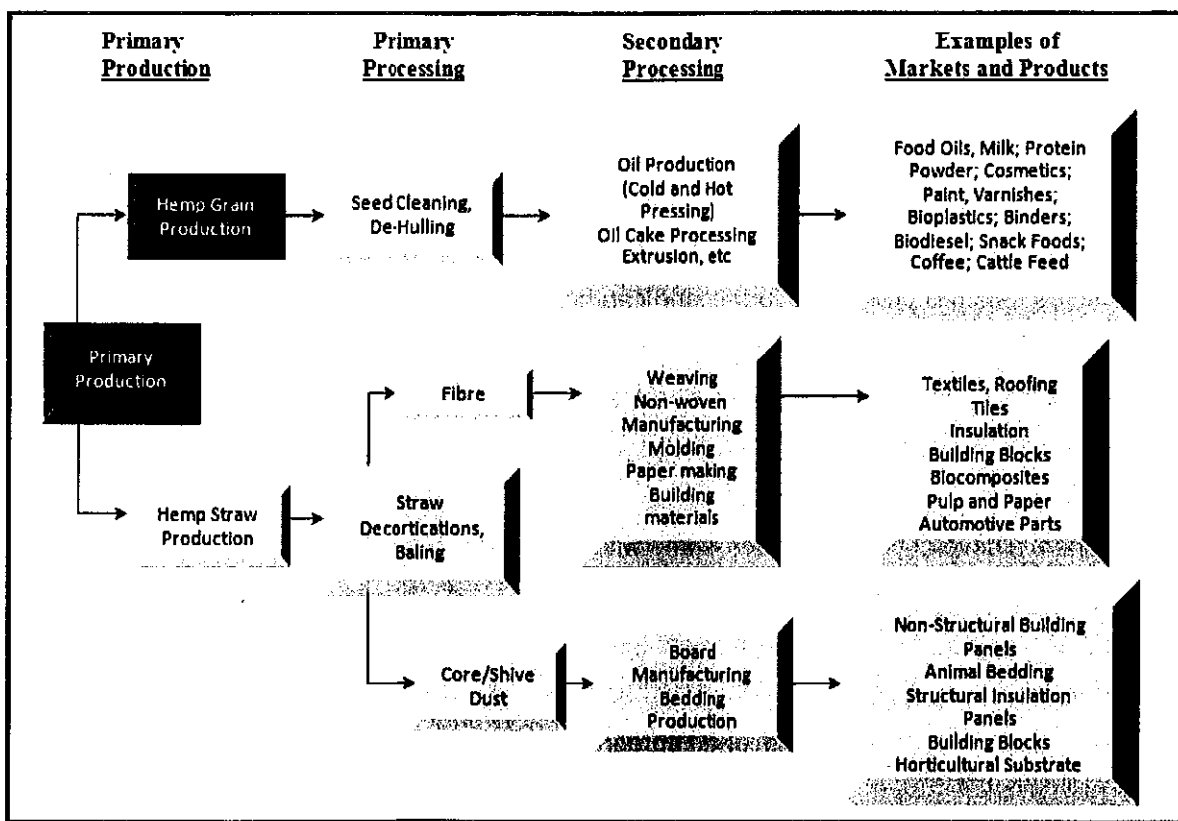


Figure 9 - Hemp Processing Value Chain & Product Examples

Source: Government of Alberta website

Active projects in Alberta include fibre mats for automotive interior panels and hemp-crete construction blocks.

Internationally, hemp is becoming a mainstream fibre in many domains. For example, Nike uses hemp fibres in its running shoes. There are several Canadian companies—including Hemp Oil Canada Inc., Hempola Valley Farms, Fresh Hemp Foods Ltd., Ruths Hemp Foods, Cool Hemp, and Natures Path, etc.—who are working to develop and market hemp seed products. These companies are all involved in the hemp seed market and are producing a wide range of products. These products are snack foods, hemp meal and flour, edible oil, shampoo and conditioners, moisturizers, commercial oil paints, beer, and aromatherapy and cosmetic products. As the Controlled Drugs & Substances Act regulations have until now prevented harvesting of the leaves, there has been no commercial activity in this domain.

### **10.3.3. Process**

For fibre and hurd production, decortication (shown in Figure 10 below) separates the fibre, hurd, and the dust, which are later processed and used in the various applications. If the final product is automotive paneling, then the hemp fibre is mixed with resin and wood fibre and pressed into the desired form. If the final product is hemp-crete blocks, the hurd is blended with specialized lime compounds.

Seeds are cleaned and, if necessary, de-hulled using standard equipment. They may be pressed for oil or de-hulled for food products. The meal resulting from de-hulling can be turned into flour or used as a base for other food products.

The 1 tonne per hour facility in Vegreville is currently supplying hemp fibre to the Biocomposites Group of Drayton Valley, Alberta to fulfill a contract for automotive panels for a supplier to General Motors.

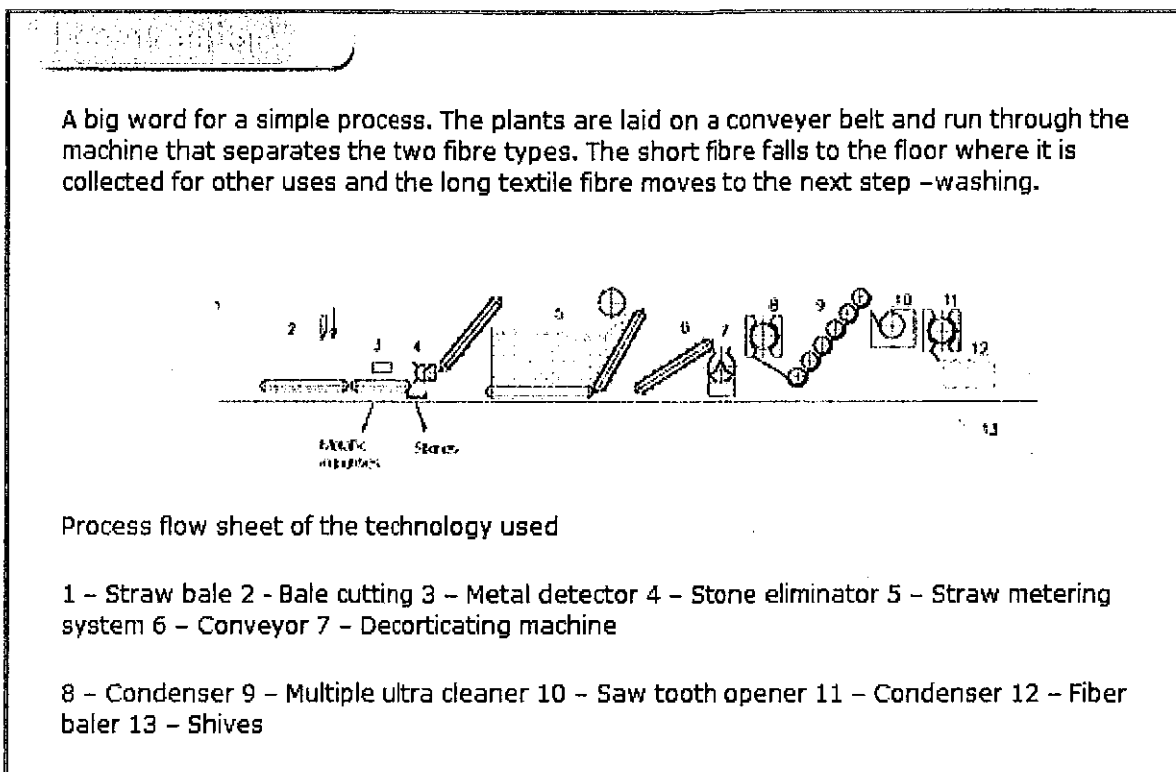


Figure 10 - An outline of the decortication process

#### 10.3.4. Fit With EATC Region

There was a total of 25,557<sup>21</sup> acres of hemp grown in Alberta in the year 2014, predominantly in the eastern and southern regions.

After speaking with the BioComposites Group (BCG) in Drayton Valley, it was discovered that there is some benefit in decortication close to the growers, as the fibre portion required for their automotive panel products is only 20%-30% of the total hemp biomass. As such there are transportation and logistics savings related to regional decortication.

<sup>21</sup> [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex126](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex126)



### 10.3.5. Capital and Operating Costs

With ready access to feedstock and a cluster to reduce capital and operating costs, this opportunity can likely be competitive in nature if supported by both fibre mat and hempcrete customers. To determine if a standalone decortication process is viable, the following economic indicators were considered:

- A standalone dry decortication unit with straw processing capacity of 4-7 MT/h, would approximately cost \$8M-\$10M.
- The outputs of this plant would be bast fibres, clean hurd, and dust in bulk.
- In a report developed for Alberta Agriculture in 2012<sup>22</sup>, the prices of processed fibre and hurd was determined approximately as \$1,000 per tonne and \$370 per tonne to the manufacturer ,
- One agriculture report stated that in a 3 MT/h plant , the operating costs were \$5.5M, of which one half was feedstock.
- Given yields of 30% fibre and 55% hurd, the maximum annual fibre production from a 3 tonnes/h decortication plant running 24 hours per day for 350 days per year would be about 6,300 tonnes of fibre and 13,800 tonnes of hurd.
- It is estimated that the demand for hemp fibre for automotive interior manufacturing in Alberta will be between 2000 and 6000 tonnes per annum.<sup>23</sup> At an average price of \$1,000/tonne for processed fibre, the total fibre revenue for a decorticator selling into an automotive panel manufacturer in Alberta would be \$2M to \$6M.
- A full scale hempcrete building block plant would consume 16,000 tonnes of hurd annually. Thus at a price of \$370/tonne, a decorticator could earn an additional \$5.9M

These figures were developed in discussion with industry experts and some of the costs were based on the Alberta Agriculture report.

<sup>22</sup>

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/econ14086/\\$file/hemp\\_production\\_marketassessment\\_report.pdf?OpenElement](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/econ14086/$file/hemp_production_marketassessment_report.pdf?OpenElement)

<sup>23</sup> Biocomposites Group

### **10.3.6. Market**

The market size for global natural fibres composites reached \$US 2.1 billion in 2010 and is growing at a rate of 15% per year. With automotive manufacturers actively seeking alternatives to fiberglass, natural fibres can compete with carbon fibre in some applications.

The hemp-crete primary value proposition, promoted by Just Bio Fibre in Alberta, is that its blocks provide an insulating value of between R27 and R42 for the same price or lower as conventional concrete blocks.

Industrial hemp leaves also have significant feed value, with up to 23% protein. The Controlled Drugs & Substances Act regulation currently forces farmers to discard the leaves in the field, due to their low 0.3% THC content. This level is deemed to be above the limit wherein narcotic effects occur. The announcement updating this regulation to permit harvesting of leaves is expected by November 17, 2016 did not occur. As mentioned above, this would open a significant new co-product revenue source for higher value foods, medicinal products, nutraceuticals, and animal feed. Last year, the US Industrial Hemp Farming Act of 2015 was introduced into the Senate, which would change the material's designation as a controlled substance and permit farmers in the US to produce industrial hemp. Twenty-eight states, including Kentucky, currently have laws that involve industrial hemp production.

### **10.3.7. Economic Impact**

The body panel in each model of car has the potential to generate \$2M in export revenue. This, coupled with the global demand for hemp fibre, could create a demand for up to four processing facilities in the EATC region, according to estimates from the Biocomposites Group. A hemp decortication facility could employ up to 10 persons per shift. Hemp-crete blocks under development by Just Biofibre would employ 20-30 persons. Additional upside exists around processing hemp seed and leaves in Alberta

### 10.3.8. Location Siting Criteria

Proximity to producers and a labour pool are important to decortication operations and the hempcrete block manufacturer. In addition access to rail is mandatory for the hempcrete operator.

### 10.3.9. Risks and Issues

The blockage in this sector has been a lack of industry demand, largely due to regulatory restrictions. This has been overcome, initially in Europe, and now in North America. A major issue is contracting sufficient volumes of high quality hemp for fibre and hurd within a reasonable (100 km) radius of the plant.

### 10.3.10. Investor Targets

Discussions with the Biomaterials Group in Alberta Agriculture & Forestry revealed that four companies are currently considering investment in hemp processing facilities in Alberta.<sup>24</sup> Of these four companies, two are Canadian companies, one from the US (Kentucky), and one from Europe. While not directly considered in this study, hemp based food processing is a growing export industry in Manitoba and is worth investigating further. Therefore hemp food companies are included.

#### 10.3.10.1. Food Company Targets

- Hemp Oil Canada, Inc.
- Manitoba Harvest Hemp Foods
- Hempola Valley Farms
- Fresh Hemp Foods Ltd.
- Ruth's Hemp Foods
- Cool Hemp
- Natures Path

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<sup>24</sup> Lori-Jo Graham, Program Lead, Biomaterials, Alberta Agriculture and Forestry

### 10.3.10.2. Product Company Targets

- Gren Spring Technologies – Consumer products, 3D printing filament.
- Dr. Bronner's Magic Soaps – Produces organic and Fair Trade soaps and body care products. Shares profits and energy with our workers and worthwhile causes worldwide.
- Green Field Paper Company – Specialty papers
- Hemp Traders – Importer and wholesaler of hemp textiles.
- EnviroTextiles, LLC – wide range of hemp and hemp-blend fabrics for the apparel and home furnishing markets. Also offers tees and tote bags for private label programs.
- Hemp Technologies, LLC – Assortment of products.
- 

### 10.3.11. Conclusions

The growing demand for industrial hemp in many sectors provides a solid growth opportunity for the EATC. Fibre mat production using hemp for markets such as automotive interior panels is highly complementary with hempcrete block manufacturing that utilizes hemp hurd. In addition the growing demand for natural health products offers opportunities for seed processing. Legislative changes would also open up the market for processing of industrial hemp leaves, which have a very high protein content and contain other valuable compounds. While this has been accomplished in most hemp growing jurisdictions in the world, a fundamental issue is that industrial hemp is regulated by Health Canada rather than Agriculture Canada. Health Canada has taken no action to enable harvesting of industrial hemp leave which would enhance the value of hemp to producers.

## 10.4. PET FOOD MANUFACTURING

Pet food spending continues to grow in North America. In Alberta, the pet food market is primarily dominated by a few major players such as Champion Pet Foods and Nestlé Purina (manufactured in Montreal). There are small players within the market as well. This section will discuss some of the opportunities that we have discovered and the feasibility of building a greenfield-specialized dry pet food manufacturing plant within the EATC region.

### 10.4.1. Opportunity Overview

This section assesses the market opportunity available for a specialized pet food processing plant within the EATC region.

#### 10.4.1.1. Product Overview:

The recent market trend in pet food indicates that the whole world is moving toward the “no grain” vegetable and pulse base pet food with higher content of protein from peas and lentils. Traditionally, pet food consists of material that provides the nutrition shown below.

Guaranteed Analysis	
Crude protein (min)	38%
Crude fat (min)	18%
Crude fibre (max)	5%
Moisture (max)	10%
Calcium	1.60%
Phosphorous	1.30%
Omega 6	3%
Omega 3	1.10%

Table 10.11 - Guaranteed Analysis of Pet Food

The section below discusses crude protein which provides a competitive advantage for the EATC region.

- Crude Protein – the major ingredient that contributes towards the crude protein component of a dry dog food are meat and pulses. Typically, chicken and beef are used as the ingredient for meat while peas and lentils are used as pulses. There has been ongoing research at the University of Saskatchewan about developing exclusively pulse-based commercial dog food.<sup>25</sup>

Unlike the common understanding, most of the protein in pet food comes from the pulses rather than from a meat product. The EATC has a competitive advantage, as the pulse production is high within their area.

The EATC also has advantages in providing meat feedstock due to the presence of livestock and meat processing facilities in the region. The economics related to this advantage are discussed in later sections.

#### 10.4.1.2. Canada Wide Market

The customer trend report<sup>26</sup> developed by agriculture and agri-food Canada valued the overall pet food market size in 2011 at \$1.7 billion CAD, which includes \$531 CAD that was imported into Canada. The dog food sales reached \$969 million and the cat food sales reached \$655 million. Sales of other pet food such as that for birds, fish, etc. was \$72.5 million.

In the customer trend report, a compounded average growth rate of 2.2% was assumed. With the assumed CAGR, the Canadian dog food market size was estimated to approximately be \$1.08 billion CAD.

An alternative method was employed to identify market size:

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<sup>25</sup> <http://www.producer.com/2015/06/pulses-popular-in-pet-food/>

<sup>26</sup> <http://www.agr.gc.ca/resources/prod/Internet-Internet/MISB-DGSIM/ATS-SEA/PDF/6245-eng.pdf>

- As of 2011 the number of dogs in Canada was identified as just over 5 million.<sup>27</sup>
- Based on this number and the total revenue from dog food sales (\$969 Million CAD) we can estimate that the revenue per dog was \$193.
- On various other reports, the number of dogs in the year 2013 and 2014 were identified as 5.9 million and 6.4 million respectively.<sup>28 29</sup>
- Based on extrapolation, the current market size is identified as \$1.5 billion CAD (shown in the figure and table below).
- Please note that this would include wet, dry, and raw pet food.

	Number of Dogs (Millions)	Total Market Size (\$ Millions)	Revenue per dog
2011	5	969	193.8
2012	5.45	1056.21	193.8
2013	5.9	1143.42	193.8
2014	6.4	1240.32	193.8
2015	6.9	1337.22	193.8
2016	7.35	1424.43	193.8

*Table 10.12 - Market Size and Revenue per Dog in the Canadian Marketplace*

<sup>27</sup> <http://www.agr.gc.ca/resources/prod/Internet-Internet/MISB-DGSIM/ATS-SEA/PDF/6245-eng.pdf>

<sup>28</sup> [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/sis14914](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sis14914)

<sup>29</sup> <https://www.canadianveterinarians.net/documents/canadian-pet-population-figures-cahi-2014>

## Total Market Size (Millions)

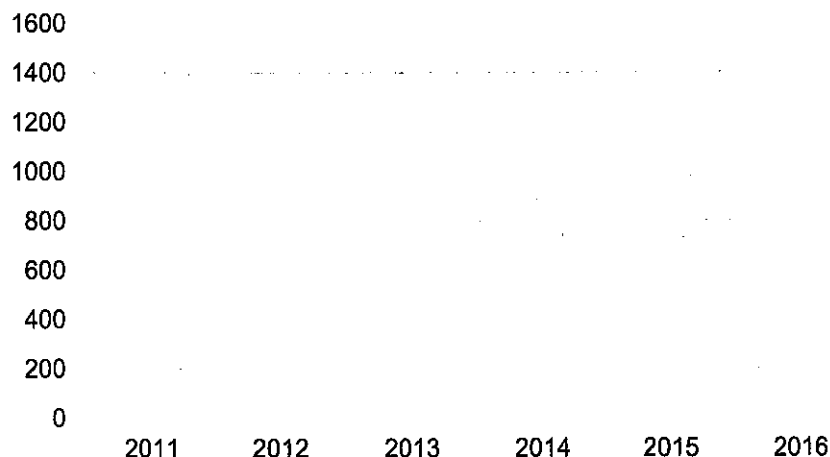


Figure 11 - Total Market Size (Canada) for Pet Food

Some of the major players in the pet food market in Canada, as per the customer trend report, were Mars, Nestlé, Hills Pet Nutrition Canada, and Champion Pet Food (primarily exported into US).

### 10.4.1.3. Export Market

The US is a top target for Canadian export as the market potential for dog food is substantial. In 2012, there were approximately 76 million dogs with the sale of pet food at approximately \$12.6 billion USD, out of which the dry dog food comprised of \$8.2 billion USD. In the US Pet Food Trend report, it was forecasted that the overall market size would be \$15 billion USD with dry pet food being \$9.8 billion.<sup>30</sup> It should be noted that the competition in the US pet food market is high.

The top four competitors in the pet food industry are: Mars Inc. (Brand Names: Cesar, Greenies, Pedigree, Whiskas, and Sheba), Nestlé SA (Purina ONE, Fancy Feast, Chef Michael's, Purina

<sup>30</sup> <http://www.agr.gc.ca/resources/prod/Internet-Internet/MISB-DGSIM/ATS-SEA/PDF/6477-eng.pdf>



Cat/Dog Chow, and Friskies), Big Heart Pet Brands (Meow Mix, Milk-Bone and Kibbles 'n Bits), and the Colgate-Palmolive Company (Hill's Science Diet, Hill's Prescription Diet, and Hill's Science Plan). As seen in Figure 12 below, Mars Inc.'s market share is 22.2%, Nestle SA has 9.8%, Big Heart Pet Brands is at 7.8%, and the Colgate-Palmolive Company has a 6.5% share. The remaining 53.7% is split between other, smaller companies.<sup>31</sup>

#### Major Players in the Pet Food Industry in US

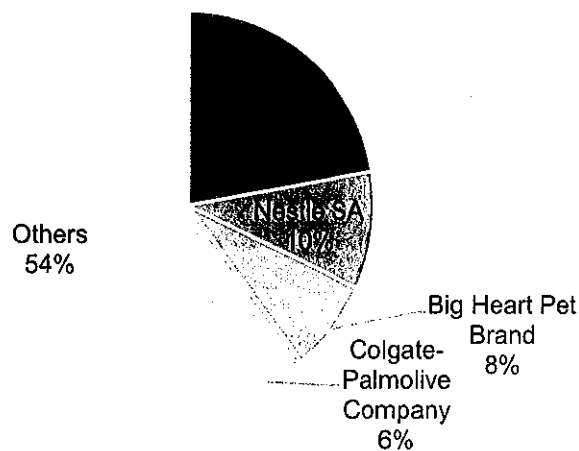


Figure 12 - Division of the US Pet Food Industry

#### 10.4.1.4. Regional Market

By locating a specialized pet food plant, the EATC would be able to primarily target the western border region in the US, namely Washington State and Montana. The main reason for choosing Washington State as an example is because there are no major pet food manufacturers in this region and the region's many pet food stores are supplied through distribution centres.

The market size calculation is as described below:

<sup>31</sup> [Link](#)

- As per the IBIS report in 2011, 3.1% of total revenues from pet food retail in US came from Washington State.
- With a total revenue from dog food retail being \$8.2 billion USD, the total market size can approximately be equal to (or greater than) \$254 million USD in Washington State.
- In another IBIS report related to pet food manufacturing in US,<sup>32</sup> it is noted that Canada supplies approximately 30% of the US imports for pet food. Combining these statistics, it can be estimated that market size would approximately be \$75 million USD a year.
- Assuming a \$1.25 exchange rate, we would arrive at a market size of approximately \$100 million CAD per year.

#### 10.4.1.5. EATC Market

To assess the EATC market, the following methodology was employed:

- The EATC region has a population and market base of 275,000.
- As per the 2011 census data, an average household contains 2.6 people.<sup>33</sup>
- Based on this information, we have approximately 105,769 (275,000/2.6) households in the EATC region.
- As per the Canadian pet market outlook report, approximately 32% of the households in Canada owns a dog.
- As per the 2014 Statistics Canada survey, the average spending on pet food in a household is \$275 per year.
- Combining the data presented above, we can approximate the total market size of \$10M (within the EATC region alone).

However, it should be noted that there are no pet food manufacturing plants within the region, as most are located near Calgary or Edmonton.

<sup>32</sup> <https://colgate-palmolive.wikispaces.com/file/view/31111+Animal+Food+Production+in+the+US+Industry+Report.pdf>

<sup>33</sup> <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/famil53c-eng.htm>

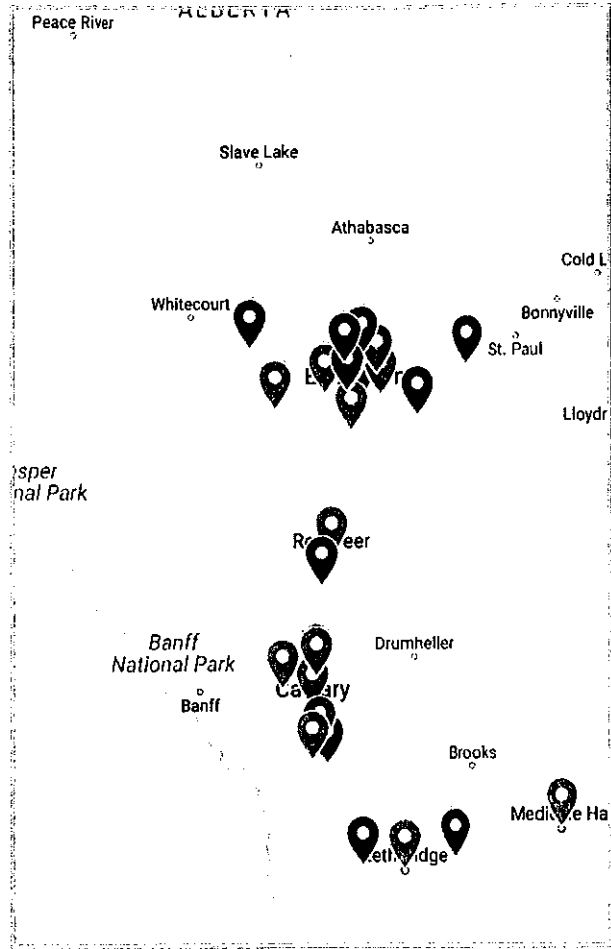


Figure 13 - Location of pet food plants (in red) and top twenty populated regions within Alberta (blue)

Combining the total market size available for the proposed specialized pet food manufacturing plant is approximately \$110 million a year. Note that only two markets were scrutinized as part of this research. There are possibilities within other markets, namely BC and Saskatchewan.

**10.4.2. Value Chain**

The value chain of a pet food industry is as shown below.

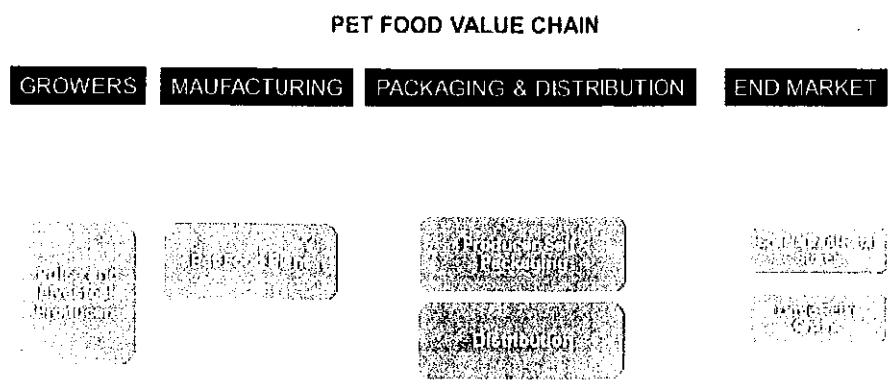


Figure 14 - Pet Food Industry Value Chain

#### 10.4.2.1. Growers

The major ingredients for the pet food plant, namely the pulses and the meat, provide a major competitive advantage for the EATC region because of the availability of feedstock. Locating the pet food plant near a flour mill would create a potential cluster opportunity and further reduce cost.

#### 10.4.2.2. Logistics

Market access is primarily achieved through roadways with trucks or freight cars, which would transport finished products to the distribution centre. Locations such as Medicine Hat, Camrose, or Brooks have an advantage because of the availability of the intermodal terminal near these locations.

#### 10.4.2.3. Retail

There are many specialty pet food stores in the US and Canada. It is primarily dominated by Pet Co and PetSmart. Costco and some other big box stores also have premium house brands.

### 10.4.3. Site Selection Criteria

The pet food location within the EATC would need an understanding of the raw material and labour requirements for making dry food. In this section, proximity of the raw material and the market is considered to reduce transportation cost.

#### 10.4.3.1. Raw Material

The primary feed in a dry pet food plant consists of meat (beef or poultry), vegetables, lentils, oats, and pulses. As protein contents are usually considered to be the highest content in a pet food, the meat and pulse supply would be the largest cost factor for a pet food plant. A representative from Champion Pet Foods stated that their facility in Alberta uses approximately CAD \$100,000/day worth of raw ingredients.

#### 10.4.3.2. Water Supply

A pet food manufacturing plant is water intensive in nature, as indicated by a representative from an engineering firm specialized in designing food processing plants. This is very important to note as the availability of water could become a large factor in deciding the site location. Water is used for various purposes within the production processes, in particular the wash process consumes the most water. It should also be noted that if the plant is going to be set up near Calgary, it could face opposition from the city regarding the water supply.<sup>34</sup>

#### 10.4.3.3. Effluent

The representative from the Champion Pet Food plant indicated that availability of effluent treatment infrastructure would be very important, as the wastes from the pet food plant must be removed carefully.

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<sup>34</sup> <http://calgaryherald.com/business/local-business/city-of-calgary-balks-at-balzac-area-beef-plant>

#### 10.4.3.4. Land/Permitting

The pet food plant must comply with the minimum distance from the general population. A report developed by the Louisiana Economic Development indicates that to develop a plant that produces 44,000 to 63,000 tonnes per year would require a land size of 70,000 to 100,000 square feet. With the availability of land mass in the EATC, this is of a lower risk compared to other factors.

#### 10.4.3.5. Labour

It remains very hard to find labour to work in meat processing plants. The turnover in the industry seems to range from 60% to 100%.<sup>35</sup> A representative from the County of Newell informed that attracting labour to meat processing industry is hard. The Champion Pet Food representative mentioned that although many activities within the plant are automated, the requirement of manual labour is high. The facility in Alberta currently employs 249 employees full-time. It is imperative to maintain a healthy workforce pool as this would play a critical factor in attracting investment.

#### 10.4.3.6. Transportation

The two biggest costs, as mentioned by an engineering contractor for a pet food plant and a meat processing plant, are associated with water and transport. Remaining close to a largely populated urban centre such as Edmonton or Calgary is important as to be as close part of value chain as possible. However, as shown in Figure 14 above (which lays out the top 20 populated regions and pet food producers in Alberta), the number of producers in the EATC region is nil, as most of the producers are focused near the highly populated sections. As mentioned previously, locating near Calgary could lead to water issues as the City of Calgary has been strict in terms of providing water for meat and meat product processing plants.<sup>36</sup>

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<sup>35</sup> <https://migrationfiles.ucdavis.edu/uploads/cf/files/2009-may/kandel.pdf> Page 10

<sup>36</sup> <http://www.theglobeandmail.com/news/national/calgary-cuts-water-supply-to-meat-plant/article18245149/>

Municipality	2015 Population
MEDICINE HAT	63,018
CAMROSE	18,038
COLD LAKE	15,736
BROOKS	14,185
BONNYVILLE NO. 87, M.D. OF	13,233
LAC LA BICHE COUNTY	12,220
CYPRESS COUNTY	7,214
NEWELL, COUNTY OF	7,138
BONNYVILLE	6,921
WAINWRIGHT	6,289
ST. PAUL NO. 19, COUNTY OF	6,168
ST. PAUL	6,004
VEGREVILLE	5,758
BEAVER COUNTY	5,689
REDCLIFF	5,588
VERMILION	4,545
SPECIAL AREAS BOARD	4,499
WAINWRIGHT NO. 61, M.D. OF	4,138
LAMONT COUNTY	3,872
<b>Total</b>	<b>210,253</b>

*Table 10.13 - Top 20 populated regions in the EATC region*

Hence, in this case, the pet food plant could be located within the EATC region (whose top 20 populated MD's are listed in table above) and should cater to a regional market, which includes US markets such as Washington State (in this case, Washington State is chosen an example to demonstrate market size). This provides an advantage as there would not be any competition within the region and this also follows the model of Champion Pet Food, which exports most of its products to the US market.

#### 10.4.4. Summary of Key Location Criteria for Pet Food Manufacturing

CRITERIA	RATING	COMMENT
Labour	Critical	Must be near economical housing for temporary foreign workers and should have access to labour pools.
Water	Critical	If not readily accessible, then this could become an escalating cost.
Transportation	Very Important	The balance between finding a densely populated labour pool, target market, as well as feedstock can be achieved through identifying a site location which has access to road ways. This would be a major cost component if not chosen well.
Effluent Treatment	Important	Could be an important factor to attracting labour, alternative is to build a small effluent treatment plant within the facility. However, this could consume more capital.
Land/Permitting	Important	Land prices will affect the returns. However, this is only considered important because of the availability of land in the EATC region.

Table 10.14 - Summary of Key Location Criteria for Pet Food Manufacturing

#### 10.4.5. Capital Investment

A pet food plant can be capital intensive in nature. The whitepaper from Louisiana Economic Development indicates that the capital cost would be approximately between \$35 million USD and \$50 million for a plant that would require a site space of 100,000 sq. ft. and can produce up to 63,000 tonnes a year (hence it can be inferred that 1 sq. ft. of a pet food plant can produce 0.63



tonnes).<sup>37</sup> However, because of the economies of scale, it is assumed that 1 sq. ft. can produce only 0.3 tonnes of pet food. A representative from an engineering contracting firm that specializes in design work for the food processing industry stated that the equipment and land cost for such a plant would be approximately \$500 per sq. ft. Based on the above assumption a possible capital cost scenario is calculated.

Capital Cost		
Equipment & Land	\$500	Per Square feet
Production Capacity	0.3	tonnes/square foot
Production range	10000	tonnes
Total Size	33,330	Square foot
Capital Cost	\$16,666,000	
Daily Production*	33	Tonnes/day

\* assuming 256-day production

*Table 10.15 - Approximate Capital Cost Scenario*

A conservative number of 10,000 tonnes was considered as this would service the EATC region and can also be exported to the US. Based on this number, we could get a capital cost of \$15 to \$20 million CAD.

The highlights of the operating costs are as follows:

- 25 full time staff members are required to operate the plant.
- \$30 is assumed as per hour labour cost (including benefits etc.).
- Water usage cost is \$2,500 per month and waste water cost is \$1,500 per month, respectively.
- \$76 is assumed as electricity cost to produce 1 tonne of pet food.
- Direct material cost is \$1.52 per kg of pet food produced.

<sup>37</sup> <http://www.opportunitylouisiana.com/docs/default-source/key-industries-documents/the-opportunity-for-pet-food-manufacturing-in-louisiana.pdf?sfvrsn=2>

- Transportation cost of carrying 1 tonne to Seattle from the EATC region is approximately \$1,500.<sup>38</sup> In this scenario, it is assumed all the product is shipped to Seattle region.
- Natural gas requirement of the plant is 1.25 mbtu/h.

With these assumptions, we arrive at an operating cost of \$31 M with the biggest contributors being direct material and transportation. These numbers were estimated based on a discussion with an engineering company and desk research. Further detailed understanding of the cost a feasibility study should be conducted.

Shown below is a summary of the approximate operating cost assumptions.<sup>39 40</sup>

Operating Cost	
Labour	\$ 1,536,000.00
Water Usage	\$ 30,000.00
Waste Water Charges	\$ 18,000.00
Gas	\$ 7,920.00
Power	\$ 115,200.00
Direct Material Cost	\$ 15,201,033.33
Transportation Cost	\$ 15,000,000.00
<b>Total</b>	<b>\$ 31,908,153.33</b>

Table 10.16 - Approximate Operating Cost Assumptions

#### 10.4.6. Revenue

For a plant that produces 10,000 tonnes a year, at \$6.0 per kg for dry food,<sup>41</sup> a total revenue of \$60million CAD can be achieved. However, it should be noted that this number is only to provide guidance, and warrants further investigation.

<sup>38</sup> [https://ecprod.cn.ca/velocity/POWIntermodalFrontend/public/english/GetIntermodalPrice?s\\_icid=IntrmdlPrice-feature-right-getintrmdlprice](https://ecprod.cn.ca/velocity/POWIntermodalFrontend/public/english/GetIntermodalPrice?s_icid=IntrmdlPrice-feature-right-getintrmdlprice)

<sup>39</sup> Edward School of Business, "Horizon Pet Food Business Case", [Link](#)

<sup>40</sup> <http://www.statcan.gc.ca/pub/16-201-x/2009000/ct053-eng.htm>

<sup>41</sup> <https://www.homesalive.ca/brands/horizon/dog-food/horizon-legacy-all-life-stages-dog-food.html>

### 10.4.7. Key Risks & Mitigants

Understanding the key operating risks and mitigants for this segment will help to formulate the investment attraction strategy. These are outlined in table 10.17 below.

KEY RISKS & MITIGANTS	
Risk	Mitigant
Labour availability	Locate near major centres – use foreign workers when required
Increase in minimum wage	Reduce staff, automate when feasible.
Water price	Irrigation water is the lowest cost with least risk of price escalation. Where not available locate near larger water sources that least likely to become scarce.
Transportation Cost	The norm is to locate near populated centres (most plants located near Edmonton and Calgary), hence locating near densely populated regions such as Medicine Hat would help reduce costs.
Marketing Risk	The pet food industry faces stiff competition and hence a food grade production facility, with scientific product development and innovative marketing, is required to develop a brand.
Increase in CAD vs USD	Hedging to address fluctuations. Improve scale and efficiency to maintain export profit margins.

Table 10.17 - Key Risks & Mitigants

### 10.4.8. Opportunities

There are two specific opportunities that were discovered during the course of this study.

- Champion Pet Food – The representative from the Champion Pet Food plant in Morinville has been operating for 25 years and there have been talks about modernizing the plant. This could be an opportunity for the EATC, as it would be possible for the EATC to attract Champion Pet Food within its region.
- Horizon Pet Food – A company that was established in 2007, Horizon Pet Nutrition have grown tremendously in the past years. They have a pulse based pet food, which is mostly made up of peas, lentils, and fava beans. There is further ongoing research in this area. With the current trends in pulses, Horizon could also be approached for expansion into Alberta.

#### **10.4.9. Conclusions**

A specialized greenfield pet food plant would be a good opportunity for the EATC region as:

- The availability of feedstock (pulse and meat) as the current trend is moving towards pulse based pet food.
- There is no competition within the EATC region, which avoids resource sharing.
- The export potential to neighboring US States market could provide access to the huge market in US.
- Short term opportunities may exist with Champion Pet Food and Horizon Pet Food.

## **11. SECONDARY OPPORTUNITY SUMMARIES**

### **11.1. FUNCTIONAL FOODS AND HEALTH PRODUCTS BASED ON WHEAT, OATS, AND BARLEY**

The grain based functional food and ingredients segment has received substantial investment and R&D in Alberta, which is beginning to yield commercial success stories such as CeaPro and others. Rather than duplicate such a development plan for these industry segments in this study, we have limited our treatment to a possible integration of grain based fractionation and value added products in a fractionation cluster initially focused on pulses.

### **11.2. GLYCEROL CARBONATE**

Glycerol carbonate is a high value added derivative that demonstrates low toxicity, good biodegradability, and a high boiling point. With these properties, it finds use in several applications in different industrial sectors, such as: a polar high-boiling solvent/degreaser or intermediate in organic syntheses (i.e., synthesis of polycarbonates and other polymeric materials; intermediate for making glycerol, which is employed in textile, plastic, pharmaceutical, and cosmetics industries); as a precursor in biomedical applications; and as a protection group in carbohydrate chemistry.

- Feed – Glycerol (a byproduct of biodiesel plants).
- Process – There are many technologies in various stages of commercialization.
- Products – Glycerol Carbonate.

## 11.2.1. Evaluation

### 11.2.1.1. Fit with EATC Region

The Lloydminster Archer Daniel biodiesel plant produces glycerol. We interviewed personnel from ADM sales in Chicago. They stated that ADM is not interested in developing a production capacity and market in Alberta.

### 11.2.1.2. Cost Competitive

Technology identification and licensing would be the biggest cost component in this opportunity.

### 11.2.1.3. Market Growth

The market for glycerol carbonate is relatively new and product is high-end value added. This offers both nationwide sales as well as export opportunities. Glycerol carbonate (or a form of it) will replace iso-cyanide, which is highly harmful in the production of polyurethane.

### 11.2.1.4. Technology

At this point in time, there is various technology available in the market with varying level of effectiveness. However, the biggest cost would be to identify the optimal technology and tying a licensing deal. This risk could be mitigated by partnering with a technology provider.

### 11.2.1.5. Economic Impact

If produced in mass scale, glycerol carbonate could become mainstream in the production of polyurethane, which has many applications.

#### 11.2.1.6. Risks and Issues

Finding a biodiesel plant with the scale and interest to invest is a major risk. In addition, biodiesel manufacturing economics are marginal and given the rise of electric vehicles, transportation biofuels may be considered a sunset industry.

#### 11.2.2. Conclusion

As ADM is not interested in development of a glycerol carbonate facility in Alberta at this time and it is the only feedstock source in the province, this is not a currently viable opportunity.

### 11.3. MEDICINAL MARIJUANA - GREENHOUSE

The opportunity in this case would be to grow medicinal marijuana in a greenhouse.

- Feed – Cannabis seeds.
- Process – Hydroponic greenhouse.
- End product – Medicinal marijuana.

#### 11.3.1. Evaluation

##### 11.3.1.1. Fit with EATC Region

This high value product could be a part of the greenhouse opportunity.

##### 11.3.1.2. Cost Competitive

Growing medicinal marijuana as part of a greenhouse is much more cost competitive than indoor growth (greenhouse lighting costs are approximately half of what is required for an indoor platform). An Ontario operator quoted production costs of \$2.20 a gram, or \$2.40 after bottling and labeling

with a market price of about \$7.00.<sup>42</sup> Within a heat and power cluster, an EATC based operation is likely to have a competitive cost structure.

### 11.3.1.3. Market Growth

The medical marijuana market appears to be growing. A total of 29 producers are licensed by the Federal Government: sixteen in Ontario, seven in British Columbia, two in Saskatchewan, and one each in New Brunswick, Quebec, Manitoba and Alberta. Using a \$7 per gram market price of medicinal marijuana, the total sales in the year 2015 to 2016 exceeds \$61 million in Canada. Some estimates are based on a \$80 million to \$100 million current market size. In Canada, the sale of medicinal marijuana has increased drastically from year 2015 to 2016 as per Table 11.1 below. This trend is expected to continue.

#### MEDICINAL MARIJUANA SALES

	Q1 (Kg)	Q2 (Kg)	Q3 (Kg)	Q4(Kg)	Total (Kg)
2015 - 2016	1,371	1,873	2,481	3,082	8,807
2014 - 2015	408	596	789	979	2772

*Table 11.3.1.3.1 - Medicinal Marijuana Sales*

If marijuana is legalized for general consumption in Canada, those producers already established will have a significant first-mover advantage, assuming the lengthy federal licensing process is the same as for medicinal marijuana. Should this occur, it is expected to create substantial market growth.

### 11.3.1.4. Technology

Growing medicinal plants requires the highest technology-optimized hydroponic greenhouse operations. However, this is well proven with no technological risk.

<sup>42</sup> <http://business.financialpost.com/news/agriculture/canadas-cheapest-pot-producer-sees-sunshine-as-the-secret-to-dominating-legalization-era>



#### 11.3.1.5. Economic Impact

As an example, a 55,000 sq. ft. facility can produce a revenue of \$1.0 MM per harvest with 4-6 harvests per year. Several dozen people are said to be employed at Alberta's first facility but exact employment statistics were not confirmed.

#### 11.3.1.6. Risks and Issues

Local communities may object and the business case would need to be based on the medicinal market only, as it is currently uncertain whether this substance will be legalized for general consumption. It is also uncertain if a future federal government with a different governing party will permit continuation.

### 11.3.2. Conclusion

Medicinal marijuana may provide an opportunity for developing a specialty greenhouse. Some potential investors are listed in the greenhouse business case section.

### 11.4. ELEVATED SOLAR FARMS

As illustrated in Figure 15 below, the price to performance ratio of solar panels is improving exponentially.<sup>43</sup> In the sunniest locations with low land costs, such as Mexico, utility scale solar electricity generation is now below the cost of a natural gas fired power plant. While the issue of economically viable battery storage to enable continuous solar power remains, utility scale batteries are now being installed in some jurisdictions and costs are dropping rapidly.

This opportunity uses pole mounted (8' high) off-the-shelf solar arrays suitable for ground level grazing, irrigation, or horticulture. This could provide shade to dryland areas while still permitting moisture to hit the ground, due to the slope of the robotically controlled panels.

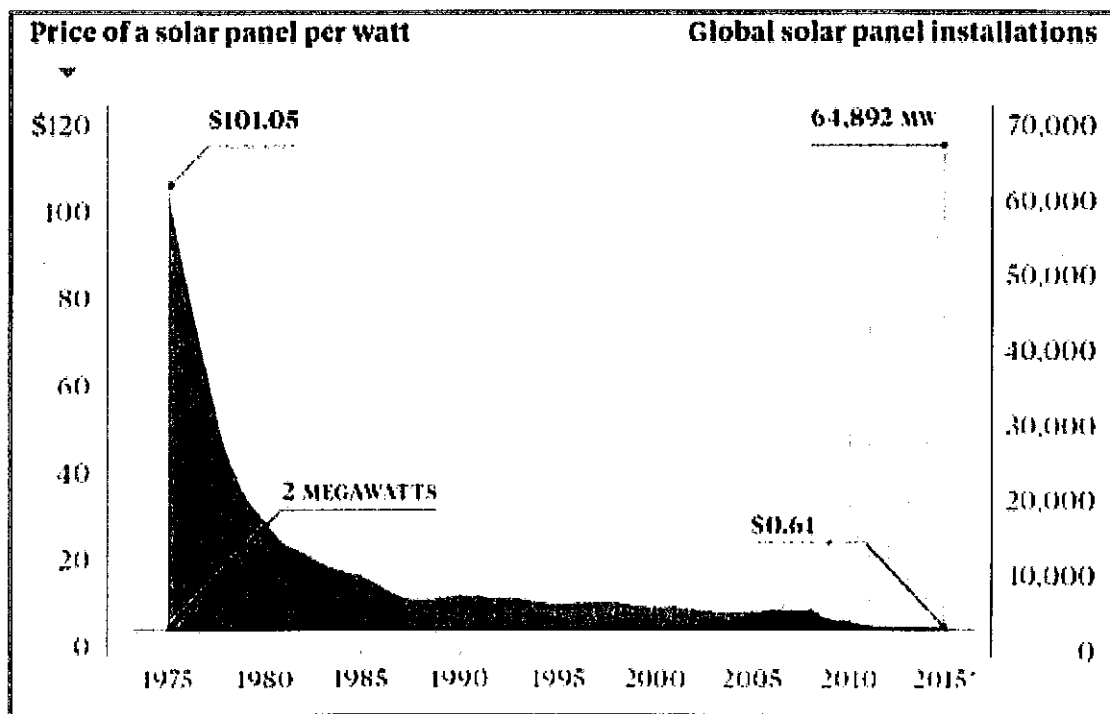


Figure 15 - Price to performance ratio of solar panels

<sup>43</sup> <http://cleantechnica.com/2014/09/04/solar-panel-cost-trends-10-charts/>

### 11.4.1. Evaluation

#### 11.4.1.1. Fit with EATC Region

Dryland areas and good to excellent sunlight conditions exist in the EATC.

#### 11.4.1.2. Cost Competitive

At electricity prices of \$25/MWh, the payback on a 1 MW elevated solar installation is 10 to 15 years without subsidies. This is based on an installed price of C\$1.00/watt and a capital cost of \$1.0 million to \$1.5 million. This size of unit would require 4 to 6 acres of land, however as this is dual use, it could be used for irrigated crops, grazing, or some horticultural crops.

#### 11.4.1.3. Market Growth

As electricity prices rise in Alberta, and if solar panel prices continue to fall at their current rate, this technology could become significantly more economic in Alberta within the next 24 to 48 months, even without green power incentives. The initial market would be larger rural feedlot operators, rural manufacturers, greenhouses with artificial lighting, or agricultural processors.

#### 11.4.1.4. Technology

Rapid advancements in cell efficiency and paneling technology such as transparent panels and lighter weight panels will reduce costs.

#### 11.4.1.5. Economic Impact

In addition to keeping Alberta's industrial and commercial energy consumers competitive by mitigating major energy price increases, the installation of these system could employ hundreds of technicians in Alberta within a few years.

#### 11.4.1.6. Risks and Issues

The cost of mechanical sunlight tracking systems is high. More investigation is required regarding compatible crops and issues around livestock use of same land. One Alberta company stated that the power purchase regulations force producers to take a 24 hour average price which was disadvantageous.

#### 11.4.2. Conclusion

Energy economics in Alberta combined with rapid cost drops in solar make this a promising opportunity in the services sector. This could fit well in an industry cluster that is trying to control medium and long term energy costs but requires economical battery technology to accomplish this.

### 11.5. AQUAPONICS FACILITY

Aquaponics produces fish excrement, fresh vegetables, and fish in a carefully controlled, closed loop greenhouse.

#### 11.5.1. Evaluation

##### 11.5.1.1. Fit with EATC Region

There already several greenhouse operations in the EATC. This is a good fit near major labour pools.

##### 11.5.1.2. Cost Competitive

The facility in Brooks has completed four generations of development on an aquaponics system. Proponents of a new facility claim that they will compete effectively with imported produce from California and Mexico.

#### 11.5.1.3. Market Growth

Aquaponics facilities can be used to produce most major vegetables and crops to displace imports. The locally raised, organically fed fish command a premium over imported tilapia, according to proponents.

#### 11.5.1.4. Technology

The technology is used globally in commercial operations. This technology has also been trialed at Red Hat Co-Op in Redcliff, AB and Northern Bioponics, BC. In China, root crops and fruits are also being grown using this technology.

#### 11.5.1.5. Economic Impact

Alternative Farming Solutions is planning a 50,000 sq. ft. aquaponics greenhouse in the Medicine Hat area to produce tilapia and micro-greens for local grocery stores. This will create 4 to 5 full time positions. The proponents indicated that grocery stores do not demand CFIA certification and that the produce is washed before distribution.

#### 11.5.1.6. Risks and Issues

If CFIA certification becomes a barrier to sales, this must be addressed. Increasing minimum wage rates and energy costs could make stand-alone facilities less competitive.

### 11.5.2. Conclusion

This opportunity could fit well within a greenhouse cluster if the economics can be proven.

## 11.6. HALAL MEAT

Halal food is that which adheres to Islamic law, as defined in the Quran. The Islamic form of slaughtering animals or poultry, dhabiha, involves killing through a cut to the jugular vein, carotid artery and windpipe. Animals must be alive and healthy at the time of slaughter and all blood is drained from the carcass.

This opportunity entails setting up a federally inspected slaughter house that can export to markets such as the Gulf Coast and East Asia.

- Feed – livestock (cattle – primarily beef).
- Process – Slaughter house.
- End product – Processed meat.

### 11.6.1. Evaluation

#### 11.6.1.1. Fit with EATC Region

The opportunity would be a good fit for EATC region due to the availability of feedstock.

#### 11.6.1.2. Cost Competitive

Setting up a slaughter house is capital intensive however, the demand for premium meat products is growing in both domestic and foreign markets. A report done in 2004 indicates that the estimated capital cost of setting up a federally inspected facility including freezer space, processing areas, etc. was approximately \$300 per sq. ft. Considering inflation, the capital cost would currently be \$369 per sq. ft. A 120 head/day would approximately be \$6.642 million.<sup>44</sup> In addition to the capital cost, the CFIA inspection cost would approximately be \$25,000 (considering 2 stations). As well, the cost of obtaining a Halal certification could be an additional \$100,000.

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<sup>44</sup> <https://www.gov.mb.ca/agriculture/livestock/pubs/beef-processing-final-report.pdf>

#### 11.6.1.3. Market Growth

Currently there are 1.1 million Muslims in Canada, the market size is approximately \$300 to \$600M, and an economic intelligence unit estimates total halal food imports to the Arabian Gulf are expected to more than double to \$53.1B by 2020, \$8.4B of which would be imported by the UAE alone. A report commissioned by Alberta Agriculture confirmed that over (74%) of Canadian Muslims are willing to pay premium for Halal meat.

#### 11.6.1.4. Technology

Assurance that the animal is slaughtered governed by the religious practices is a big issue currently faced in western Canada. Il Rashid Mosque is working on standardizing the certification process for western Canada – Alberta in particular. As well, there are no governing bodies to standardize the procedure. However, GCC (Arab Gulf Coast area) is currently in the process of selecting a singular body, which would govern all the bodies that provide Halal certification in the Canadian region and ensure compliance in Canadian facilities that export meat to GCC. Some of the Halal certification agencies include HMA ([www.hmacanada.org](http://www.hmacanada.org)), ISNA ([www.isna.ca](http://www.isna.ca)), and IFANCA ([www.ifanca.org](http://www.ifanca.org)). Of these three, IFANCA is being trusted more in the recent times.

#### 11.6.1.5. Economic Impact

If the slaughter procedures are standardized, the brand name that Canada commands in the meat industry would help secure premium export opportunities, leading to large profits.

#### 11.6.1.6. Risks and Issues

There is currently some misconception surrounding the slaughter methods used for Halal processing, which prevents some ranchers from supplying to the slaughter house. This is usually overcome through education. Measures are currently underway at Alberta Agriculture to address this concern.

### **11.6.2. Conclusion**

There is some discussion currently ongoing between the Federal Government and the Halal certification agency, however, there is no definite timeline as to when a standard procedure will be established. Hence, constant monitoring is required to understand the progress in this area. However, if a significant overseas investor with good market presence and international Halal certification connections were obtained, this could be an immediate target.

## **11.7. SPECIALTY PASTA**

This opportunity entails setting up a specialty pasta plant. This could include organic pasta, specialty grains, and pasta blended with vegetables or other healthy ingredients, to enhance nutritional value and aesthetics.

- Feed – white or whole wheat organic, conventional wheat flour, or semolina with durum wheat and specialty ingredients such as spinach, tomatoes, mushrooms, etc.
- Process – conventional processing plant would include mixing process, flavoring, rolling, pasteurization, and the cutting and packaging process.
- End Product – packaged pasta.

### **11.7.1. Evaluation**

#### **11.7.1.1. Fit with EATC Region**

Availability of wheat in Saskatchewan and Alberta makes this opportunity attractive to regions within the EATC.



#### 11.7.1.2. Cost Competitive

Availability of feedstock and the level of capital intensity makes this opportunity potentially cost competitive. The cost can be further reduced if a pasta plant is set up as a part of a cluster, with energy and infrastructure savings as well as potentially shared milling.

#### 11.7.1.3. Market Growth

The higher USD provides incentive for locally made products and provides export opportunities into the US. Current nationwide sales are approximately \$1.137B.

#### 11.7.1.4. Technology

Technology for pasta processing is well established.

#### 11.7.1.5. Economic Impact

A well-established market, availability of feedstock, and healthy eating trends makes specialty pasta a good candidate.

#### 11.7.1.6. Risks and Issues

This is a highly competitive market and producers were reticent to share information. Water, sewage, labour, and road transportation will be issues for this sector, so proximity to urban centres is likely required.

### 11.7.2. Conclusion

The pasta plant is a well-established industry and would fit well into a fractionation cluster.

## **11.8. PRE-MADE MEALS**

Pre-made meals are a variety of meat and specialty food selection. There are major players in this area, several recent entrants focusing on healthier, ethnic, and specialty products and have been successful in niche markets.

- Feed – vegetables, meat, etc.
- Processing – depends on the end product
- End Product – gluten free products, specialty meat products designed for ethnic communities (e.g. halal lasagna), etc.

### **11.8.1. Evaluation**

#### **11.8.1.1. Fit with EATC Region**

This opportunity has a limited fit with most of the EATC region as it tends to require larger centres with contract refrigeration space. However, Medicine Hat may be a good location.

#### **11.8.1.2. Cost Competitive**

Locally available inputs, feedstock, and easy adoption of high tech equipment could produce higher value specialty products.

#### **11.8.1.3. Market Growth**

Increasing trends toward healthier lifestyles has resulted in gluten free and organic pre-made meals. One such example would include organic halal products.

#### 11.8.1.4. Technology

Alberta is an early adopter of High Pressure Processing (HPP) and other technologies to better retain nutrients.

#### 11.8.1.5. Economic Impact

There are numerous examples of successful start-ups in Alberta.

#### 11.8.1.6. Risks and Issues

Minimum wage increases are a concern in this sector.

### 11.8.2. Conclusion

Pre-made meals could be an opportunity in the EATC but likely only very close to Edmonton or in Medicine Hat, as even Leduc based start-ups have migrated into Edmonton for improved refrigeration and distribution infrastructure.

## 11.9. MICROBREWERY

Locally owned and flavored beers are becoming an increasingly integral part of the Alberta economy.

- Feed – malting barley, water.
- Process – malting, milling, mashing, lautering, boiling, fermenting, conditioning, filtering, and packaging.
- End Product – specialty beers.

## 11.9.1. Evaluation

### 11.9.1.1. Fit with EATC Region

Several microbreweries are already established in EATC region.

### 11.9.1.2. Cost Competitive

With a production facility close to feedstock and the newly announced provincial program that provides tax rebate grants to microbreweries (under 300,000 hectolitres), profitability has been enhanced.

### 11.9.1.3. Market Growth

The density of microbreweries in Alberta is lower than in other provinces. The Alberta Small Brewers Association estimates the number of breweries to double, based on local population alone. For example, the number of microbreweries in Alberta is less than that of Vancouver Island (46). Of the 40 in Alberta about 1/3 are brew pubs. Ten more breweries are currently in the application process and another ten are in the conception stage. The weak CAD may open US export opportunities. Big Rock and Wild Rose are stand-alone exporters and some small breweries export through agents.

### 11.9.1.4. Technology

Well established "off-the shelf" technology is readily available.

### 11.9.1.5. Economic Impact

Employment impact varies from about 0.75 to 1.75 people per 1000 barrels of production.<sup>45</sup> To put this into perspective, in Alberta only Big Rock produces more than 25,000 barrels per year (1.17 barrels per hectalitre). The average Alberta microbrewery will likely employ 5-10 people.

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<sup>45</sup> <http://microbrewr.com/how-big-should-my-brewery-be/>

#### 11.9.1.6. Risks and Issues

Interprovincial trade barriers make it easier to sell into the USA than other provinces. This is a highly competitive sector depending on highly refined marketing programs. Rising energy costs and availability of water are also issues and would influence site location decisions.

#### 11.9.2. Conclusion

There is growth potential in this segment. The most successful Alberta microbrewers are in cities or tourist towns and several now combine brew pubs and even conference facilities or meeting spaces. However, with clever marketing there are even a few small-town brewers in rural Montana that are exporting beer into Alberta. In addition, brewery tourism is an opportunity that could be exploited if a number of small town breweries combine with restaurants and tourist attractions to create a "brewery trail."

### 11.10. BIOELECTRICITY - STRAW BASED POWER

The economics of retrofitting and operating coal fired power plants with straw fuel are uncertain. However, this opportunity warrants at least an initial assessment in light of the job losses faced by EATC residents due to early retirement of coal fired power plants such as Forestburg.

- Feed – Wheat straw
- Process – Retrofitting coal power plant. Significant modifications are needed to the boiler and the furnace as burning straw pellets creates clinker (stony residue formed in a furnace) and could lead to potential corrosion risks in the boiler<sup>46</sup>.
- Output – Power with lower CO<sub>2</sub> emission

<sup>46</sup> [http://www.pelheat.com/straw\\_pellets.html](http://www.pelheat.com/straw_pellets.html)

### 11.10.1. Evaluation

#### 11.10.1.1. Fit with EATC Region

Approximately 31,000 tonnes of wheat straw is produced in Alberta<sup>47</sup> annually. The southern region principle crop is wheat and hence the availability of feedstock within the region is not an issue. Forestburg coal power plant could serve as a potential site for conversion of the coal based plant as the phase out date could be 2020, as indicated by a representative from the Flagstaff County region.

#### 11.10.1.2. Cost Competitiveness

- Capital Cost – The capital costs of a biomass power plant is about \$1.9-2.9/kW, 3 to 4 times that of coal.
- Operating Cost –
  - The energy costs of straw and coal are similar. 1.075 tonnes (or \$26) of dry straw is required to generate 1 MWh of electricity versus 0.50 tonnes of coal at about \$43.00/tonne.
  - However, the transportation costs of straw are typically twice that of coal, again partly due to a lower energy density.
  - Independent studies have estimated a delivered generating cost of \$85/MW for a straw fired power plant, however this may include capital recovery.

#### 11.10.1.3. Market Growth

Conversion of a coal fired plant such as Forestburg would be a one- time project based on a subsidy to fill the employment void that will be left because of the coal phase out.

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<sup>47</sup>

<http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0010010&pattern=&stByVal=1&p1=1&p2=31&tabMode=dataTable&csid=>

#### 11.10.1.4. Technology

Biomass has been widely used around the world for power generation, although rarely in facilities that were based purely on commercial economic analysis; many units are demonstration units or have economics dictated by the alternate disposal cost of wastes. There are many technologies available in the market, although as mentioned above not on a pure commercial scale. One big issue with the feedstock is the fact that these pellets have to be dry for combustion. Research is currently being conducted to develop products that are impervious to water<sup>48</sup>.

#### 11.10.1.5. Economic Impact

This opportunity is intended to replace for jobs lost communities that are going to be affected by coal based power plant closures. Employment in the plant would likely be lower due a reduced feedstock volume that would cause the facility to run a partial capacity.

#### 11.10.1.6. Risks and Issues

The risks as discussed above are technical and commercial in nature:

- High capital cost.
- Uncertain if any equipment in existing coal fired power plants would be suitable.
- Additional investment may be required to pelletize the straw.
- Straw produces high ash content and also forms clinkers in the furnace. Potential increase in boiler erosion.
- It is very difficult to enter into medium or long term straw supply contracts with farmers.

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<sup>48</sup> <http://www.active-energy.com/sites/default/files/files/rns-reach-major-developments-aeg-coalswitch-08022016.pdf>

### **11.10.2. Conclusion**

The technical, financial and supply chain viability of converting coal fired power plants is highly questionable. However, a review of other studies on conversion of coal fired power plants to straw might be undertaken.



## 12. REGIONAL ASSESSMENT

The highly ranked opportunities from the previous section are now to be considered in the context of industry clusters in different regions.

In order to understand the current opportunities within the EATC, we spoke to some of the Economic Development officers and Reeves in all of the EATC regions, namely the HUB, BRAED, and Palliser regions. The results of these discussions and some desk research are as shown below but may not represent every facility in the region.

### 12.1. HUB REGION

The HUB region seems to be in the centre of crop production and has many major opportunities.

#### 12.1.1. Existing Relevant Businesses

In line with some of the opportunities evaluated above, the HUB region has the following agricultural assets:

- AITF decortication plant in Vegreville.
- Skyline greenhouse in Lavoy (<http://www.skylinegreenhouse.com/>).
- Innisfree, St. Paul, and Vegreville seed cleaning plants.
- Woycheshyn Farms in Vegreville.

Some major agri-based operating companies within the region include:

- Buhler industries in Vegreville.
- Richardson Pioneer in Lavoy, Lamont
- Cargill in Marwayne, Vegreville, Vermillion
- Viterra in Star, Lavoy, Vermillion
-

Minburn County has an industrial development area at the corner of Highway 36 and 16. This area has been zoned as industrial development section and would prove to be a possible location for a cluster.

The Industrial Heartland is bordering this region and has extensive industrial infrastructure and certain existing agricultural operations.

### **12.1.2. Crop and Other Feedstock Availability**

Data from the Alberta Agriculture and Forestry website indicates that most of the HUB region falls under the black chernozemic soil or dark brown chernozemic soil. The HUB region is predominantly with black chernozemic soil, which is more fertile in nature. As well, the soil and growing conditions are strong and there is a reasonable amount of moisture (in the range of 60 to 100 mm of average spring moisture content).

The primary crops grown in this region are wheat, barley (some malting), and oats. The representative from Minburn County indicated that the malt barley availability in that area is high and they would like to see investment related to barley plant.

### **12.1.3. Infrastructure**

#### **12.1.3.1. Rail**

CN and CP both run in the Alberta HUB. Lamont County is serviced by both CN and CP. A 286,000lb capacity line operated by CN runs east through Lamont, Vegreville, and Vermillion. CN also operates a 268,000lb line through Lac La Biche to Fort McMurray.

Rail terminals are at the locations listed above under major companies operating in the HUB region.

A CP line intersects the CN line just east of Bruderheim. Having a choice of rail lines offers freight rate negotiating advantages.

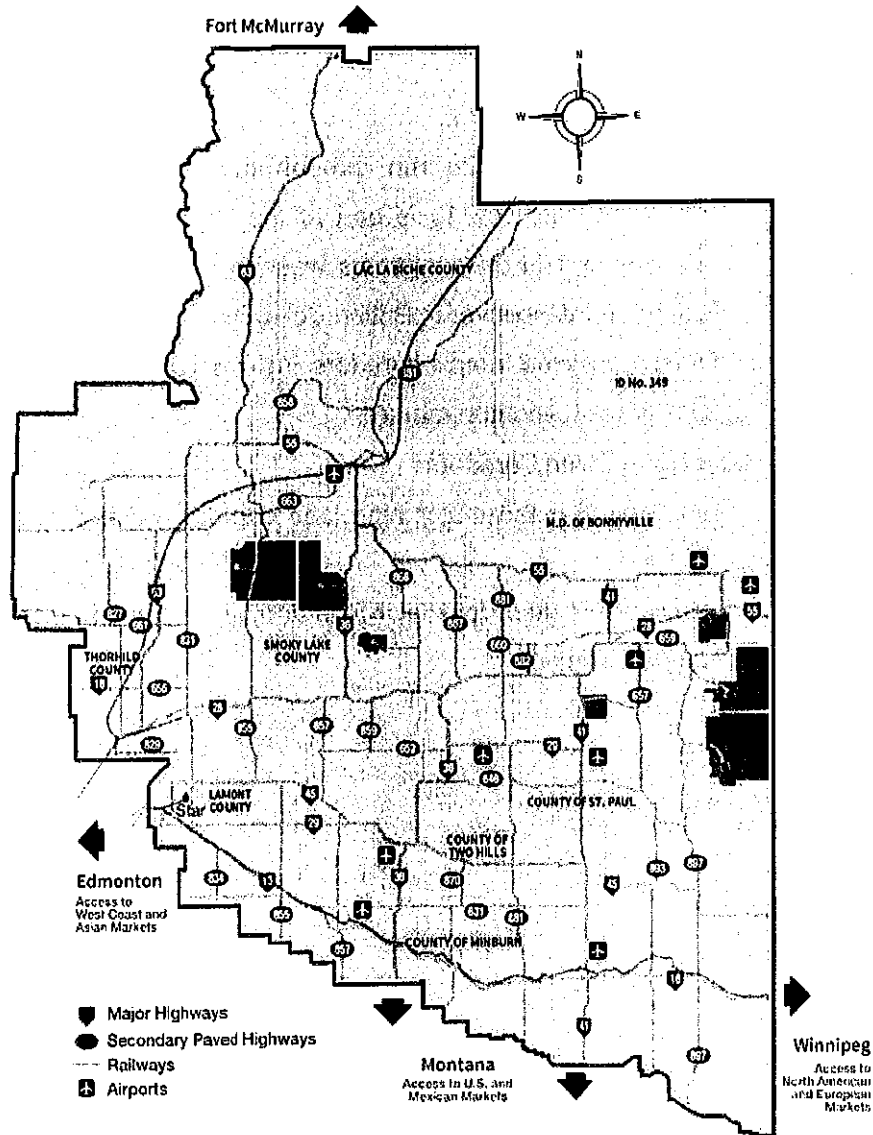


Figure 16 - Railway Network<sup>49</sup> in HUB Region

<sup>49</sup> <http://www.albertahub.com/>

### 12.1.3.2. Road

The hub region has highway networks as shown below.

- Major East-West Corridors:
  - Highways 16 and 28 run through the region feeding into the main hub of Edmonton. Highway 16 is part of the Yellowhead branch of the Trans-Canada Highway system that connects western Canada to the strategic ports of Prince Rupert and Vancouver in British Columbia.
  - Other East-West major corridors include Highways 29, 15 and 45, which links back to the Edmonton market.
- Major North-South Corridors:
  - Highway 36 is the major high load corridor which connect to the USA / Mexico markets
  - Highways 41 (north of Hwy 45) is another high load north-south corridor linking to southern markets

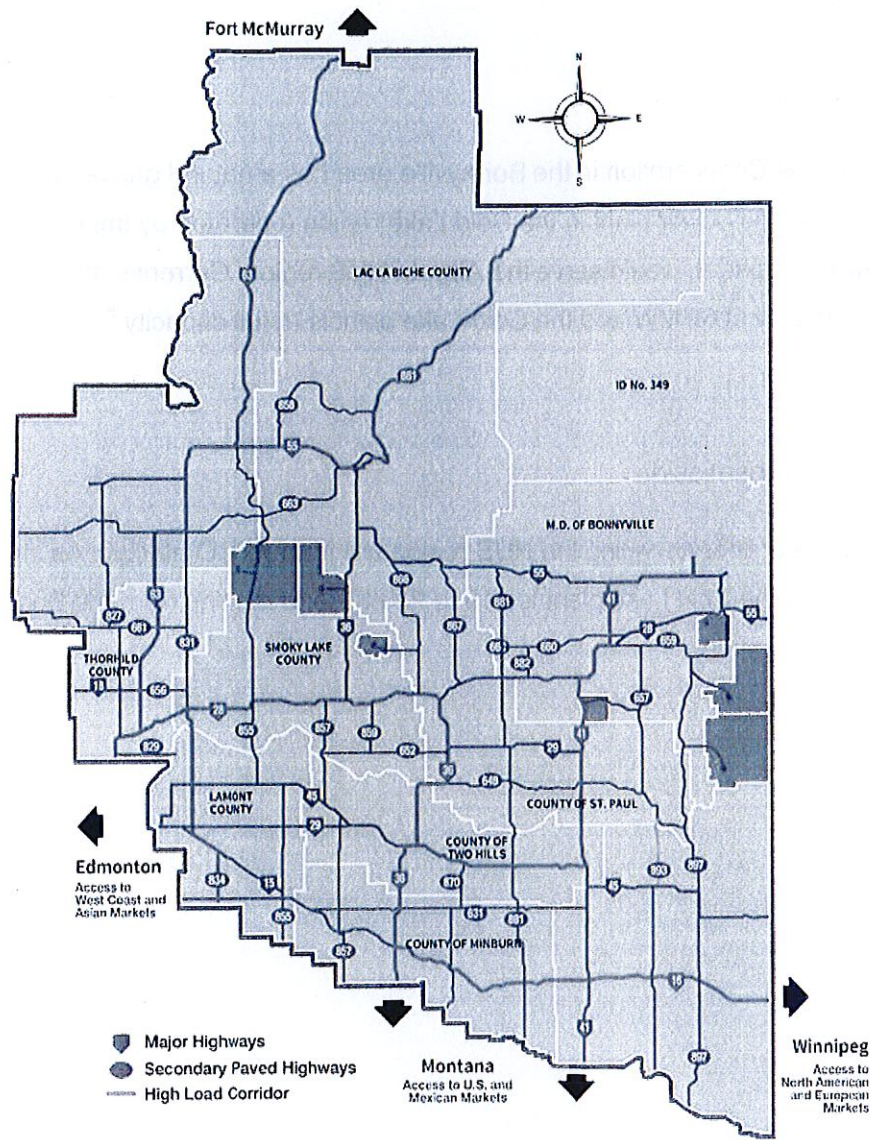


Figure 17 - Road Network<sup>50</sup> in HUB Region

<sup>50</sup> <http://www.albertahub.com/>

#### 12.1.3.3. Power

Foster Creek Cogeneration in the Bonnyville area has a natural gas feedstock and a capacity of 80 megawatts. The power plant in the Cold Lake region (operated by Imperial Oil), which has a 168 megawatts capacity, would serve the Alberta HUB region. Currently, the Bonnyville plant is operating below capacity at 68 MW and the Cold Lake plant is at full capacity.<sup>51</sup>

#### 12.1.3.4. Transmission

The two major lines servicing the HUB region are from ATCO electric. As shown on the map below, the line from the Cold Lake plant is 115 to 229 KV and the line from the Bonnyville plant is <115 KV.

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<sup>51</sup> [http://ets.aeso.ca/ets\\_web/ip/Market/Reports/CSDReportServlet](http://ets.aeso.ca/ets_web/ip/Market/Reports/CSDReportServlet)

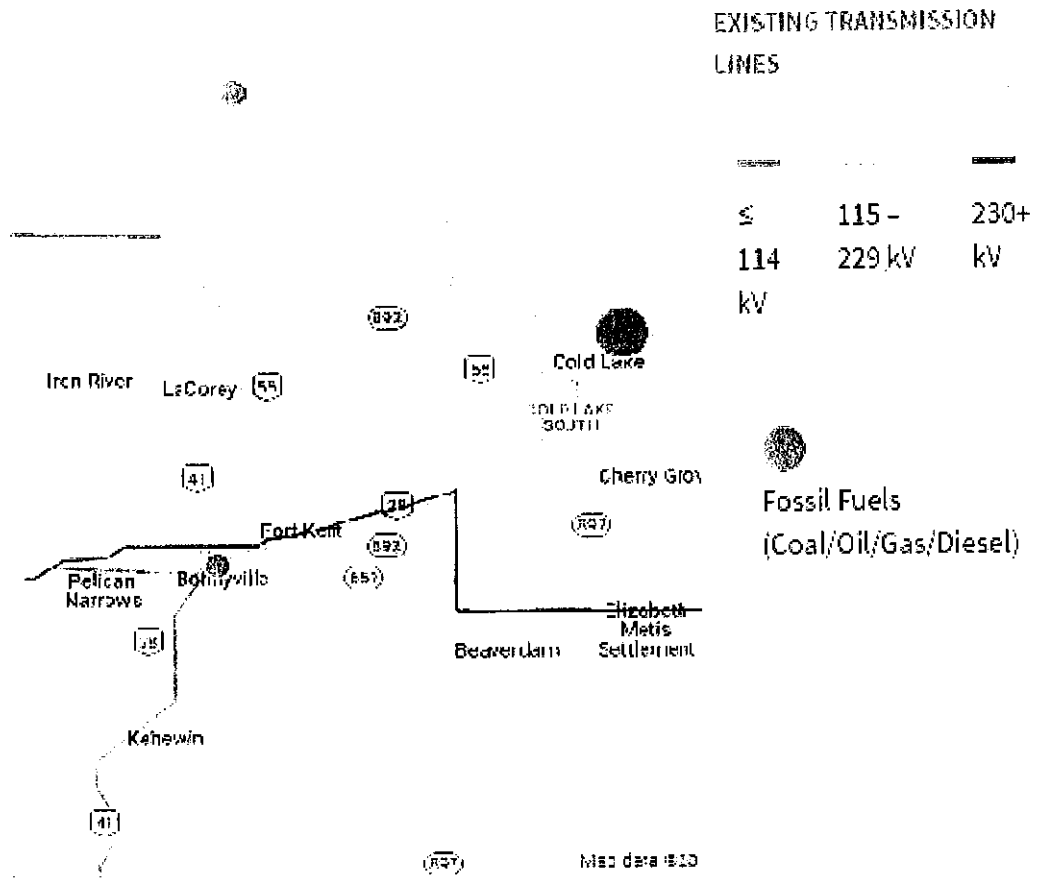


Figure 18 - Transmission Lines in HUB Region

12.1.3.5. Water

The Alberta HUB is primarily sourced by the North Saskatchewan river basin and Beaver river basin, whose mean annual discharge are primarily used for industrial and petroleum operation purposes. The average annual mean flow rate of the North Saskatchewan river over the past 102 years has been 239 m<sup>3</sup>/s or 7.5 million cubic decameters. Water supply is diverted to facilities which have applied for and obtained a water licensing agreement. The industrial consumption of this would be

approximately 1.6 million cubic decameters. This number has been relatively constant over the years. The actual usage data is unavailable.<sup>52</sup>

#### **12.1.4. Labour**

The availability of labour within the region may not be considered as an issue, as there are some moderately populated regions within the EATC namely Cold Lake, Bonnyville, Lac La Biche, Vegreville region. By providing training to personnel as well automating large facilities when possible, the HUB region would be able develop a pool of skilled labour suitable within their region.

#### **12.1.5. Education and R&D**

Lakeland College in Vermilion and the St. Paul Food processing Centre (Portage College) offer potential for collaborations in areas of green energy and food processing respectively.

#### **12.1.6. Conclusion Regarding Opportunities**

Considering availability of rail, water, labour, and electricity all of the primary opportunities identified in the early sections are a fit for the HUB region. These are:

- Pulse fractionation – pea production
- Greenhouse – low existing density considering proximity to Edmonton as major market
- Hemp decortication - It is possible to located the hemp processing facilities in this area due to the presence of feedstock.
- Pet food - Pet food plant could possibly be located near the Lamont County as it has access to resources from the Edmonton region as well (labour and rail).

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<sup>52</sup> <https://rivers.alberta.ca/>



## **12.2. BRAED REGION**

The BRAED region also has many possibilities due to its crops and existing businesses.

### **12.2.1. Existing businesses**

Some of the existing agricultural assets in this region, obtained through research and interviews with EDO's, are listed below.

- Pulse processing plant in Wainwright.
- Paterson Grain terminal in Daysland.
- Greenhouse assets (small scale operations).
- Brewery in Edgerton.

### **12.2.2. Crop and other feedstock availability**

The BRAED region falls mostly under brown chernozemic soil, which has a higher mean annual water deficit in the range of 19 to 38mm (compared to an average of 13 to 19mm).

The agricultural feedstock available in this area are: livestock, wheat, oats, barley, oats, canola, triticale, and hemp.

### **12.2.3. Infrastructure**

A summary of the infrastructure is shown below.

#### **12.2.3.1. Rail**

CN and CP both provide services to the BRAED region. CN runs a line connecting Camrose to the Alliance region with a 268,000lbs line and CP runs a main line east of Camrose through Hardisty.

They have two transload terminals located in the County of Wainwright. One is operated by Altex and the other is operated by Bunge Canada.

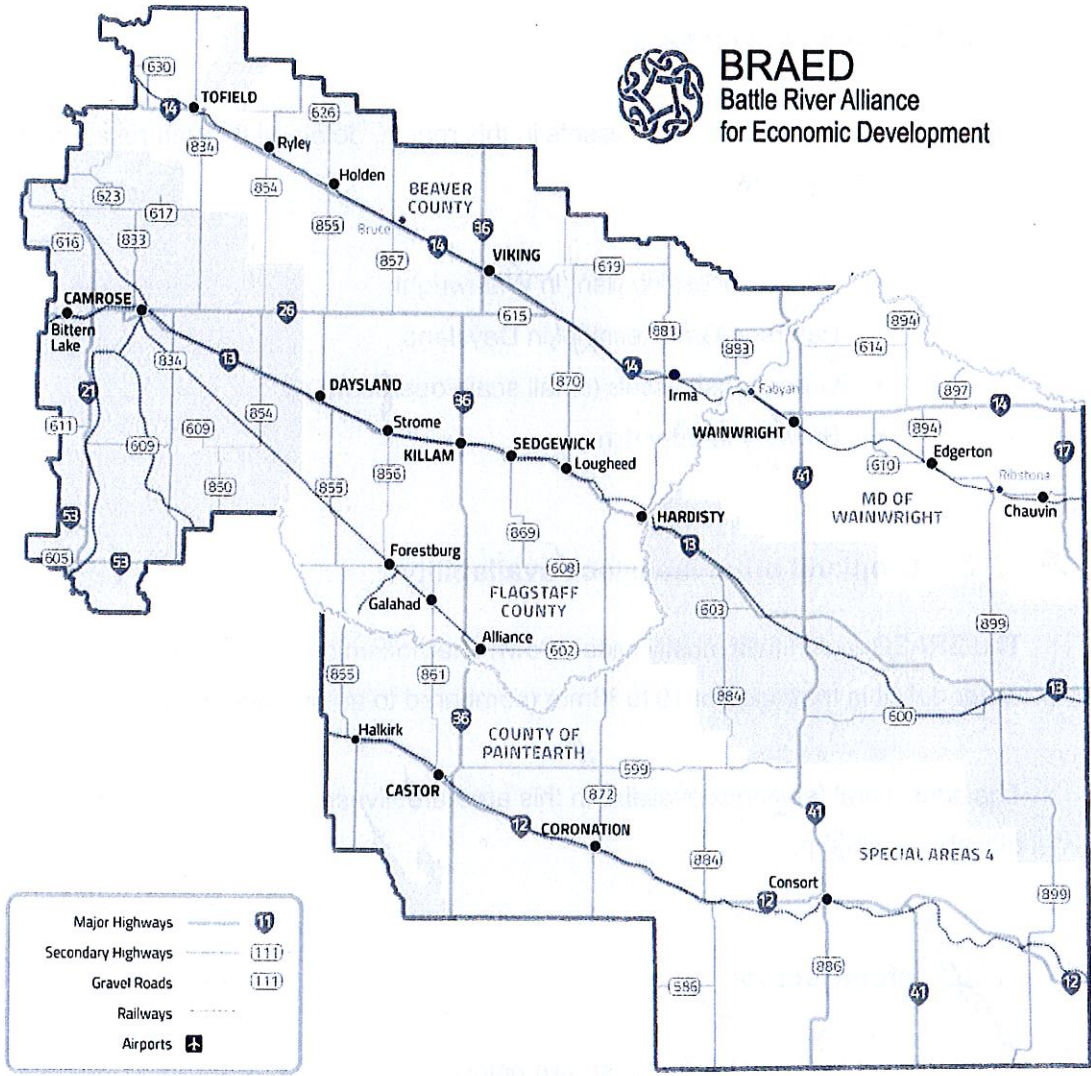


Figure 19 - Rail Network in BRAED Region

12.2.3.2. Road

The BRAED region in has two major roads, namely Highway 14 and 36 which intersects Viking in the north (nil fee from Viking). Highway 36 from Viking runs towards Alliance and Castor in the south. Towards East, highway 14 runs from Viking into Saskatchewan. Highway 41 connects south into the US market.

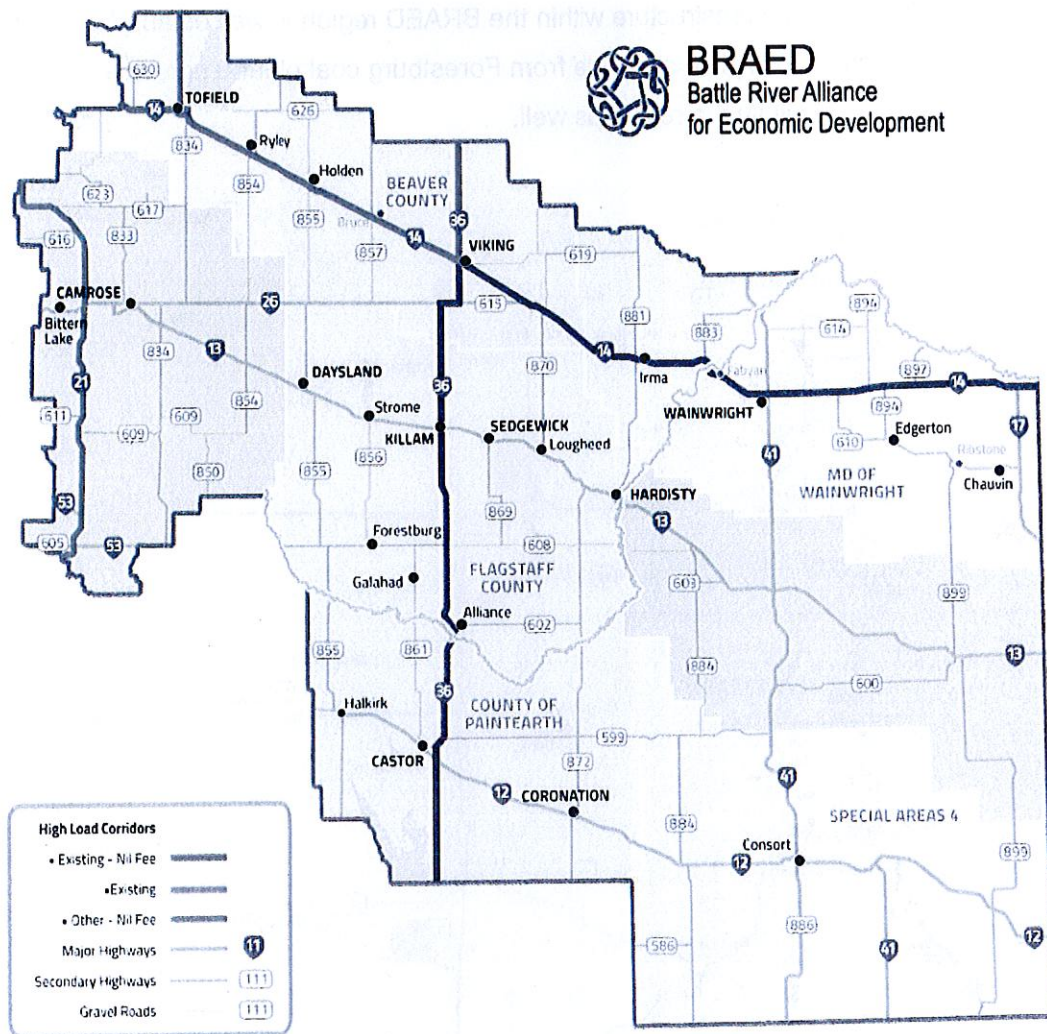


Figure 20 - Highway Network in BRAEDRegion

12.2.3.3. Power

There is currently no natural gas fired power plants located in this area. However, there is a Capital Power wind farm with 83 turbines and a capacity of 100-150MW in the County of Paintearth.

12.2.3.4. Transmission

The transmission infrastructure within the BRAED region is well established with a high capacity (greater than 230kV) line available from Forestburg coal plant. There are other, smaller capacity lines available within the region as well.

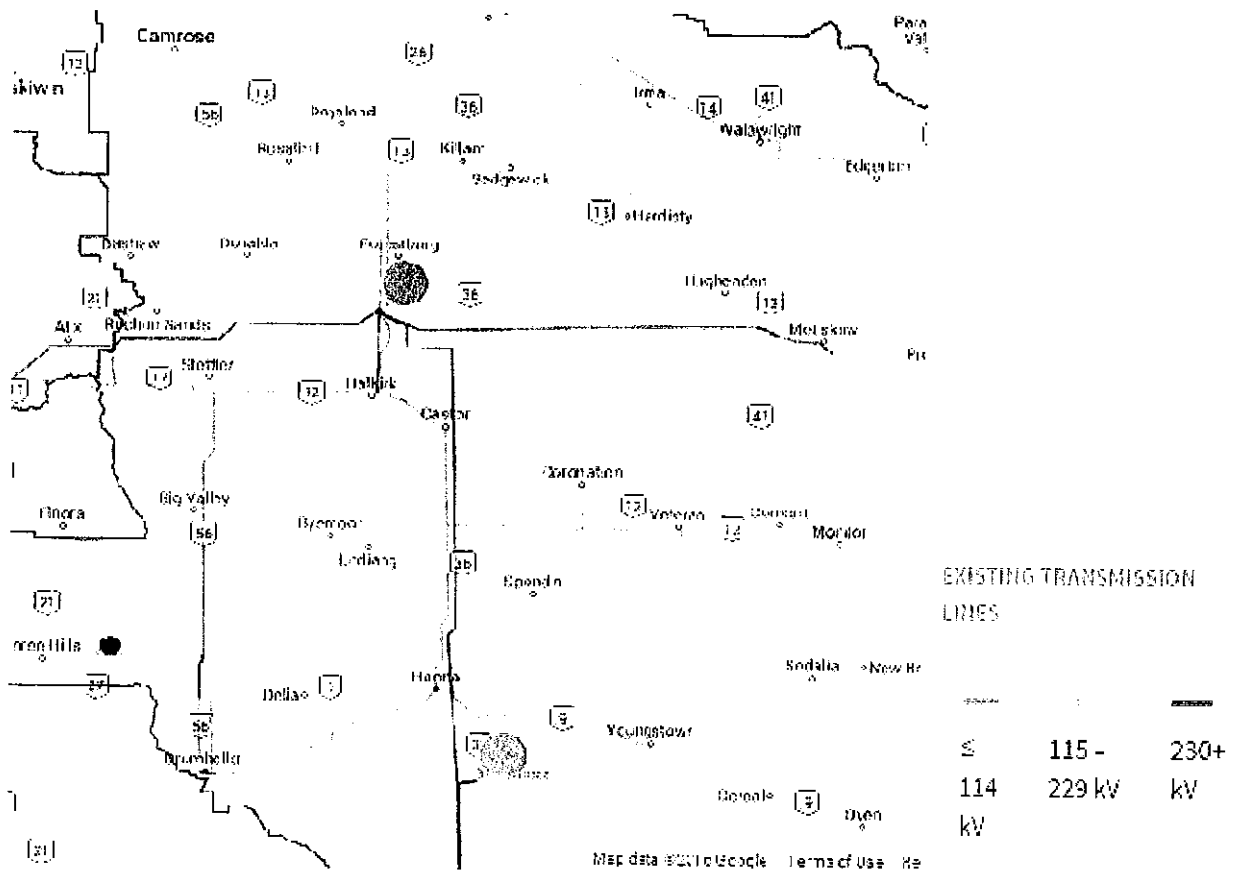


Figure 21 - Transmission Lines in – BRAED Region

#### 12.2.3.5. Water

The area is currently serviced by Battle River Basin, which is a major tributary of the North Saskatchewan River. BRAED has the Shirley McClellan water line running along highway 12. The water level in the Battle River varies from year to year as this river does not have a perennial flow. The current level of discharge from Battle River is 8.0m<sup>3</sup>.<sup>53</sup>

#### 12.2.4. Labour

The representatives from Wainwright County indicated that there is no shortage of labour in their area owing to the presence of a military camp nearby (with a steady influx of people in the region). The representatives from Flagstaff and Paintearth also indicated that labour should not be a problem. However, a facility such as meat processing in general would have a high turnover ratio, hence this should be observed with caution.

#### 12.2.5. Education and R&D

The University of Alberta Augustana College in Camrose offers degree and experiential learning programs.

#### 12.2.6. Conclusions Regarding Opportunities

The four primary opportunities are once again compatible with this region:

- Greenhouse – possible if locate near largest population centres
- Pulse processing – pea production
- Pet food plant – water requirements need to be considered in this region.
- Hemp processing – feedstock available - good growing areas

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<sup>53</sup> <https://rivers.alberta.ca/>

### 12.3. PALLISER REGION

The Palliser region could possibly hold opportunities related to meat processing and greenhouses. The representative from Cypress County and the County of Newell indicated that some of the opportunities in this area include:

- Meat value-added processing plants.
- Honey production.
- Seed grain production.
- Grain and pulse processing plants.
- Greenhouses.
- Potatoes (County of Newell has significant contracted potato production).

A summary of the infrastructure is shown below.

#### 12.3.1. Existing Businesses

The agriculture based assets and operations within the Palliser region are listed below.

- There are two pulse processing plants in Dunmore, one in Bow Island and Foremost.
- JBS Foods (2000 employees – meat processing)
- Feedlot operations within the region.
- Greenhouse operations ranging from 3 to 30 acres.
- Dairy farms.
- Meggitt Defence Systems Ltd. – specialize in unmanned aerial vehicles located in Medicine Hat.
- Acadia Seed Processing Co-op Ltd in Oyen, AB.
- Richardson Pioneer Grain Terminal in Oyen, AB.
- Essential oil processing.
- Brooks Crop Diversification Centre South

### **12.3.2. Crop and Feedstock Availability**

The Palliser region is primarily dominated by chernozemic soil with an annual water deficit of 13mm to 19mm. This implies that there is higher surface runoff and hence would require more water for growing crops.

The representatives indicated that the most favored crops in the region were grains and pulses. Substantial feedlot and meat processing operations are in the Palliser region.

### **12.3.3. Infrastructure**

#### **12.3.3.1. Rail**

Canadian Pacific is the predominant rail service provider in the region. The main line splits at Medicine Hat and runs through Lethbridge then through the Crownest Pass to BC, north through Calgary, and through Roger's Pass to BC.<sup>54</sup>

#### **12.3.3.2. Road**

The TransCanada Highway (Highway 1) bisects the Palliser region, connecting the region with both the Canadian coasts and all points in between. Highway 3 starts in Medicine Hat at the TransCanada Highway and is a major east-west route towards Vancouver. North-south secondary highways 36 and 41 connect to central and northern markets, cross the TransCanada, and heads south to two Canada/US border crossings.

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<sup>54</sup> Palliser Report from Alberta Hub <https://drive.google.com/file/d/0ByYEig9SWCqoVTIHSFpkaFRnVUU/view>

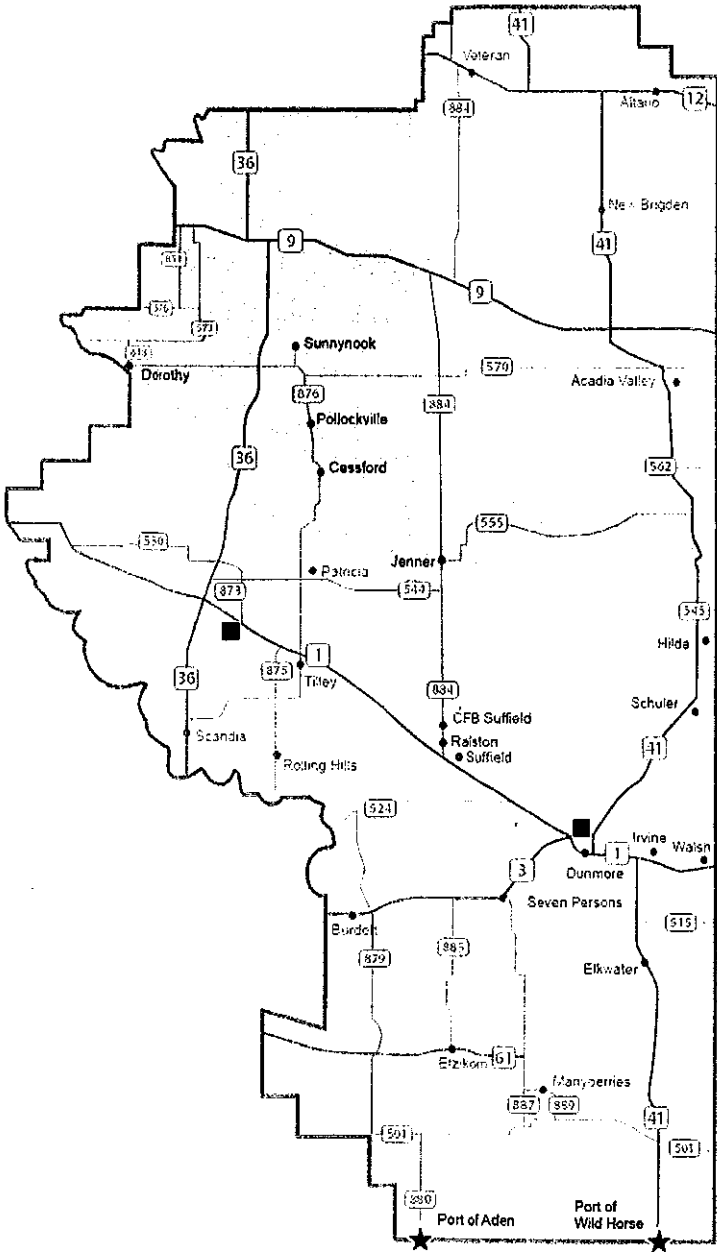


Figure 22 - Highways and Roadways in Palliser Region



#### 12.3.3.3. Power

Deregulation of utilities provides for competitive strength as Medicine Hat has their own utilities and can provide them to consumers at one of the lowest rates in western Canada. This is especially attractive for greenhouses as it makes their operating costs much lower than locating in other parts of Alberta or western Canada.

The City of Medicine Hat Electric Utility delivers electricity to approximately 25,000 customers within its service area. The Electric Utility generates, transmits, and distributes electricity to all customers within the City of Medicine Hat, Redcliff, Dunmore, Vegreville and outlying rural areas adjacent to the city. Hannah's Sheerness plant, which has a total capacity of 780 megawatts, is another source in the region for power, although destined for shutdown.

#### 12.3.3.4. Transmission

The Palliser region consists of high capacity transmission lines (230 kV) within their area, primarily from the Sheerness plant. Owing to the heat and power cluster within the region, the transmission network is extensive in nature.

#### 12.3.3.5. Water

The representatives from the Cypress County indicated that the water would be a problem. However, they are considering a new water line in the area. As well, the County of Newell has the Eastern Irrigation District hence informed that water should not be a problem. Although the EID provides water supply (EID has a couple of reservoirs, which also attract tourists), water is still considered a constraint for the whole region.

The southern Saskatchewan River, within the Medicine Hat region, has had a steady water flow of 100 to 200 m<sup>3</sup>/s (which is within the average season flow). Brooks, on the other hand, struggles with water supply and is highly dependent on the seasonal water flow. The average flow in 2016 has been lower than expectation.

#### **12.3.4. Labour**

Medicine Hat is one of the highest populated cities and Alberta with approximately 60,000 people within the region. Additionally, other places with the Palliser region such as Brooks and Cypress County are well populated regions within the EATC area. Hence, labour should not be considered an issue. It should be noted that the representative from Cypress County indicated the labour availability within the region.

#### **12.3.5. Education and R&D**

The Palliser region has several institutions that can support a value added ag processing cluster. These include Medicine Hat College and the Crop Diversification Centre South in Brooks which has a world class R&D greenhouse facility.

#### **12.3.6. Opportunities**

The Palliser region can support the primary opportunity candidates as follows:

- Pulse fractionation – most diverse pulse production in the province
- Greenhouse – good existing infrastructure, labour pool in Medicine Hat
- Hemp decortication – largest hemp production concentration in the province. While this is primarily for seed, varieties suitable for both seed and biomass (hurd and fibre) could be grown in the region.
- Pet food – no barriers except water availability may be issue in some regions.

## 12.4. INITIAL LOCATION REVIEW

Using the site location criteria developed for each opportunity in the previous sections of this report and the regional assessment above, a preliminary list of potential sites for industry clusters has been developed. As labour availability is a key driver for businesses of the scale required to generate significant employment, location near a larger town or city is important. Rail access is a key siting requirement for pulse and hemp opportunities, due to the importance of the export market. A rail regional map is shown in Figure 23. Water is also important, as is proximity to a major transmission line.

Table 12.1 is a list of potentially suitable sites along with some information on some key criteria. This is not an exhaustive list, or a detailed assessment. Some suitable locations may be missing and some listed may be eliminated based upon a more rigorous assessment. It is beyond the scope of this study to provide a detailed site selection. Such a selection would have to assess crop production potential, labour profiles, community acceptance, environmental issues, complementary existing infrastructure, detailed EVAAC tenant requirements and their related costs implications and overall site economics.

Depending on the requirements of lead, or “anchor” tenant(s), the location of the EVAAC may be based on the requirements of that lead company. However, from a regional planning perspective, it is important to focus on the requirements of the industry that is anticipated to provide the greatest ultimate long term growth in that region. The first mover may not necessarily be the long term growth driver.

This analysis provides a summary of six potential sites, two in each EATC region. All of the sites appear to meet the key criteria. Certain sites will require a more thorough comparison of the longer term water requirements and supply.

Region	Location	Rail	Rail Terminal	Labour	Water	Elec. Transmission
HUB	Bruderheim	CP / CN	Yes (in Elk Island) CN (Terminal at Fort Saskatchewan)	Edmonton	2,273 cubic meter capacity	230 kV line from ATCO Scotford co-gen (operating at 105 MW/ Max capacity 170 MW)
HUB	Vegreville	CN	Viterra terminal planned west of town	5,700	Piped from Edmonton. Surplus capacity.	<=114- and 115- 229 kV lines
BRAED	Camrose	CN / CP	Yes	18,000	Battle River / Dried Meat Lake (may be limited)	115 – 229 kV line
BRAED	Wainwright	CN	Yes – (operated by Altex Energy)	5,900	Battle River / Betty Lake (may be limited)	Forestburg - 115 – 229 kV line
Palliser	Brooks	CP	Yes	15,000	Bow River	Powered by Sheerness (780 MW) – with 230 kV lines
Palliser	Medicine Hat	CP	Yes	63,000	S. Saskatchewan River	Medicine Hat (87 Operating/ Capacity 210 (but in other sources shown as 50 MW)

Table 12.1 - Preliminary List of Example Cluster Sites

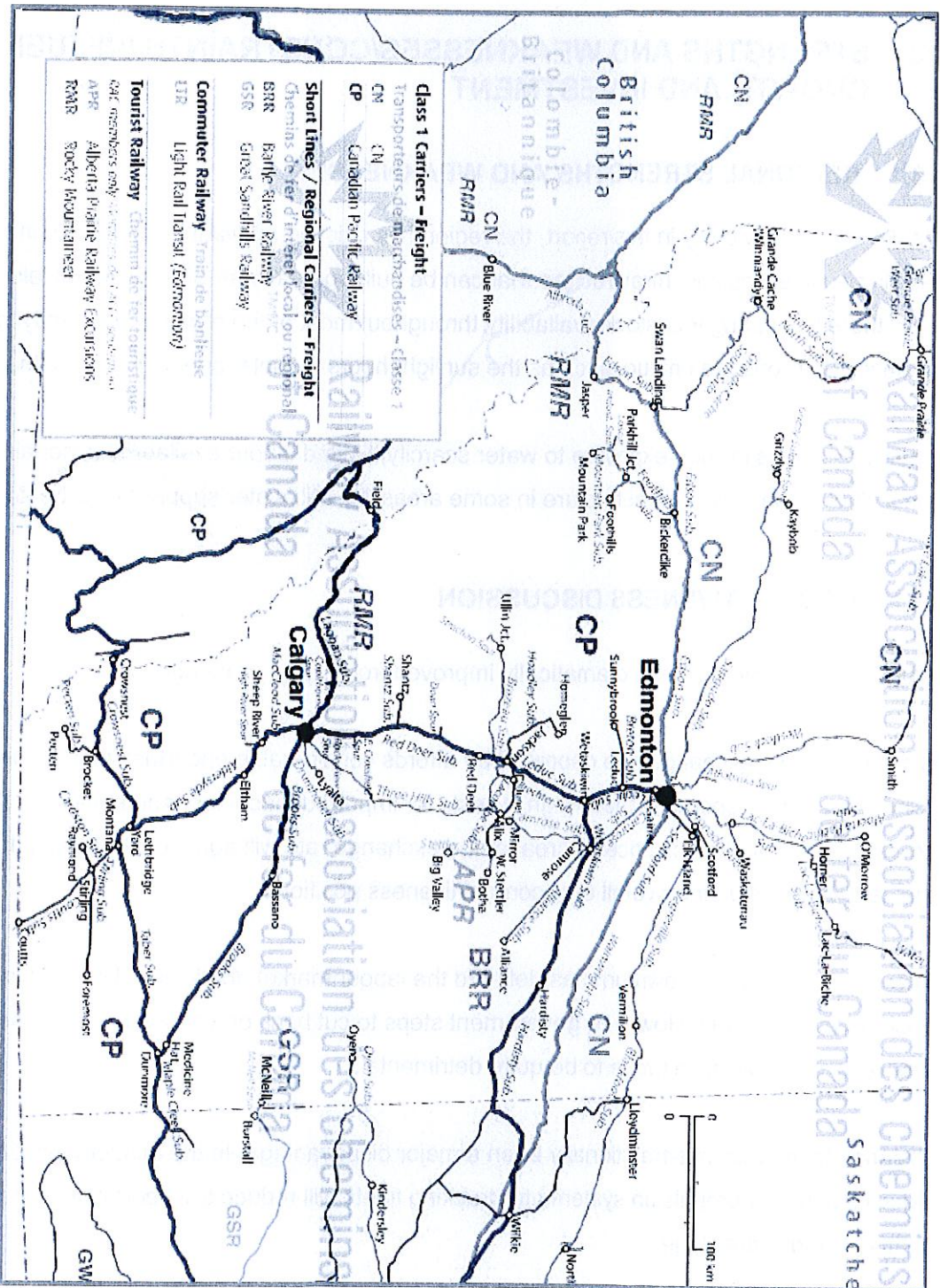


Figure 23 - Rail Map of Southern Alberta

## **13. STRENGTHS AND WEAKNESSES/CONSTRAINTS INFLUENCING GROWTH AND INVESTMENT**

### **13.1. REGIONAL STRENGTHS AND WEAKNESSES**

As discussed previously in this report, the region has existing relevant assets which includes certain existing businesses and infrastructure that can be built upon as part of a cluster development. As well, there is a strong feedstock availability throughout most of the region. Importantly, certain climatic conditions are unique, such as the sunlight hours for solar panels in the southeast.

The weaknesses include exposure to water scarcity, limited labour availability in certain areas, and the lack of some critical infrastructure in some areas (ie. rail, water supply, water treatment).

### **13.2. COMPETITIVENESS DISCUSSION**

Alberta competitiveness has dramatically improved from a few years ago.

Significantly, the exchange rate depreciation affords considerable opportunity for export growth (while new capital spending faces higher costs for imported machinery and equipment). There is, of course, the risk that as oil prices increase, the exchange rate will again increase and this increases the need to focus on the overall cost competitiveness position.

The oil and gas sector downturn has deflated the labour market and lowered cost. This is very positive and important. However, government steps to cut back on various forms of immigration programs may over time prove to be quite detrimental.

Distance to markets has traditionally been a major disadvantage. In the medium term, autonomous vehicles and new propulsion systems for trucking fleets will reduce transportation costs as a competitive disadvantage.

As discussed previously in this report, electricity costs are complex with many factors. Current generation costs are very low but this is expected to change dramatically over the medium term, certainly within the investment horizon of most major investments. More problematically, the

transmission costs continue to march upwards and will be a large source of competitive disadvantage. Added to this mix are punitive levels of carbon taxation which are not faced by most competitive jurisdictions. Alberta will have the most aggressive carbon taxing regime in Canada according to a recent article in the Financial Post.<sup>55</sup> Some of this can be mitigated through efforts discussed previously, related to green power and Industrial Systems Designations. However, overall energy costs are likely a major source of competitive disadvantage due to the combination of generation, transmission, and GHG related costs.

Over time, water will also likely become a source of competitive disadvantage. As desalination costs drop, water will likely be priced based on the distance to desalination plants, causing a disadvantage to inland producers that have water intensive processes.

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<sup>55</sup> <http://business.financialpost.com/news/energy/alberta-on-track-to-having-canadas-most-aggressive-carbon-pricing-system-by-2020-eclipsing-even-b-c?lsa=f0d2-2723>

## **14. GOVERNMENT POLICY/DIRECTION RECOMMENDATIONS**

### **14.1. GOVERNMENT POLICY/DIRECTION RECOMMENDATIONS**

There are several opportunities for governments to enhance economic outcomes and attract investment capital within this region. The role of government can be very accommodating or form a constraint. Government can influence the overall business mood and investment attractiveness. Some general policy areas that are relevant are as follows.

### **14.2. TAXATION LEVELS**

If corporate and personal taxes are high, this influences the ability to attract talented individuals and businesses. For example, the combined federal and provincial personal tax rates are now very high and this will be a negative influence as compared to individuals considering investing in most US jurisdictions. Carbon taxes are discussed separately below.

### **14.3. RURAL DEVELOPMENT BONDS**

There is significant amount of capital in Alberta seeking a reasonable rate of return at low risk. One option would be to consider enablement of rural development bonds. A program was launched in 1990 by the Province of Saskatchewan which enabled “Community Bond Corporations” to be formed. The program guaranteed the principal of local citizen bondholders and was focused on sustainable new wealth creation. Among several criteria, it excluded retail, wholesale, and bailouts. The bonds could invest in up to 50% of the project, with entrepreneurs/owners investing at least 25%.<sup>56</sup>

A case study undertaken at the University of Alberta reviewed a previous case study for the Town of Olds for community development bonds.<sup>57</sup> These were more targeted at community infrastructure projects such as seniors housing, rather than wealth creation businesses with export potential, which is the topic of this report. However, there are useful insights in the U of A report.

<sup>56</sup> <http://communityrenewal.ca/sites/all/files/resource/MW040212.pdf>

<sup>57</sup> <https://era.library.ualberta.ca/files/js956g83f/PR-11-02.pdf>



#### **14.4. GHG PENALTIES AND TAXES**

The pending GHG penalties will also have a detrimental impact as most jurisdictions do not face such penalties. This is particularly the case in the US. There are supposed to be allowances provided for “export exposed” industries but it is unclear how this will be handled.

#### **14.5. LABOUR AND IMMIGRATION RELATED POLICIES**

Certainly, the introduction of the farm safety regulations created a very high profile adverse reaction. There is potential for new labour legislation to be introduced in 2017 that may have a strong pro-union bias. This will have a negative impact on the investment attractiveness for certain industries that may consider investing in Alberta.

Labour related policies that can be of assistance include training grants and immigration rules that would allow more foreign workers. Many aspects of the value added agriculture sectors require ongoing access to the immigrant labour pool. Provincial and federal officials must be continuously reminded of the importance of the Foreign Temporary Worker Program, especially for rural businesses with limited access to labour pools. Access to a greater number of permanent foreign workers is also important, likely more important. This will become quite relevant if the oil and gas industry rebounds and labour markets tighten.

#### **14.6. ENCOURAGE FOREIGN INVESTMENT**

Federal or provincial constraints on foreign investment could be removed. This includes the provincial Foreign Ownership of Land restrictions.

#### **14.7. EXPORT MARKET SUPPORT**

Ongoing federal monies for export market development remains valuable.

## 14.8. DEVELOP CLUSTER RELATED INCENTIVES

The Lougheed and Getty Governments in Alberta in the 1970s and 1980's achieved what are arguably the greatest economic diversification successes ever achieved by a Canadian province; development of global scale value added forest products export industry and development of a world scale petrochemical export complex. This was achieved through close consultation with industry, retention of private sector experts, management of the feedstock price and availability (stumpage fees and FMAs for forestry and ethane pricing for petrochemicals), and investment in key infrastructure such as roads, rail and water.

The equivalent effort in the value added agricultural domain would be public investment in the cluster infrastructure proposed herein and enhanced crop insurance to help manage risk for producers and processors, as discussed below.

Some specific economic diversification cluster stimulation incentives include the following:

- Funding for local economic development agencies to promote and develop the clusters. There are many models around the world that could be followed.
- Public funding for key shared infrastructure such as rail, road, water supply and water treatment.
- Rural development bonds, as described earlier
- Flexible interpretation, or new regulations, related to Industrial System Designations, (ISDs) to accommodate shared electricity infrastructure and avoid transmission costs.
- Targeted incentives for cluster participants willing to co-locate and share assets, infrastructure and services.
- Incentives tied to value added investment based on precedents used for the petrochemical industry such as the Incremental Ethane Extraction Program (IEEP). These programs lead to capital cost rebates.

Saskatchewan has been successful in attracting investment. Further investigation of their programs would be advisable.<sup>58</sup>

<sup>58</sup> [http://www.nationalpost.com/m/wp/news/blog.html?b=news.nationalpost.com/news/businesses-drawn-to-saskatchewans-agriculture-sector&\\_lsa=1da8-127a](http://www.nationalpost.com/m/wp/news/blog.html?b=news.nationalpost.com/news/businesses-drawn-to-saskatchewans-agriculture-sector&_lsa=1da8-127a)

#### **14.9. INSURANCE AND RISK MANAGEMENT**

Government has traditionally played a role in providing various forms of insurance for the agricultural sector and has helped to mitigate risks. It is important that this continues and options should be explored as to how financial vehicles could be employed to lessen risks related to certain new crops. This is both from the point of view of the producer as well as the processor who is purchasing the feedstock. Large capital intensive projects face considerable feedstock risk as producers are not accustomed to long term contracts and market leverage accrues to producers after the projects and built and the capital sunk.

#### **14.10. US BORDER CROSSING**

The program to extend hours and services at the Wildhorse border crossing in the Palliser region should be done in consultation with EVAACs to ensure export products can be handled there in a commercially expeditious manner.

#### **14.11. INTER-GOVERNMENTAL COOPERATION**

An enhanced focus on removal of interprovincial trade barriers would assist industries such as breweries. Support of intergovernmental trade initiatives such as the Protein Highway<sup>59</sup> would be of specific value to a pulse processing cluster. This program promotes northern US states and western Canadian provinces to share research and promote the region as the world's largest provider of plant protein.

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<sup>59</sup> <http://www.theglobeandmail.com/report-on-business/parts-of-canada-us-team-up-for-protein-highway-project/article29218869/>

## 15. STRATEGY

### 15.1. STRATEGIC APPROACH

The strategy proposed herein is based on four fundamental principles:

2. Think Big. There will only be measurable long term job creation if the industries we attract are of a sufficient scale, growth and product export potential.
3. Investment in Competitive Advantage is the Foundation. In order to both overcome EATC weaknesses and provide sustainable competitive advantage to companies, we must invest in the Green Diversification Infrastructure (via EVAACs) that enhances business cases and growth opportunities of investor companies over the long term.
4. Market Pull over Producer Push. Sustainable growth can only be based on what global markets want, not necessarily what we are currently producing. If it can compete with other crop alternatives on a profit per acres basis and fits into rotations, producers will meet market demand.
5. Understand the Pains, Gains and Goals of your Team and Target Investors. The strategy identifies key external parties who will need to be motivated to fund, promote and ultimately invest in the EATC. The best way to motivate these parties is not with generic investment attraction brochures, but custom tailored and personal messaging for each party that addresses their key motivators at different stages of the process.

To get the traction needed to bring an investment and project to life, it requires an overarching strategy of *focused, rapid, deep dives* into each opportunity. Jurisdictions using a broad “shotgun” approach to economic development will rarely attract significant investment.

Table 16.1 below summarizes high level strategies for the three key opportunities selected through the ranking process. These strategies are explained in further detail and prioritized below.

Secondary business opportunities, which had a cursory assessment, will also be discussed in the next section. Specific action steps are provided later in the report.

STRATEGY - MACRO	TIME TO RESULT	GOVT. INVEST- MENT	Greenhouse Produce & Floriculture	Degree of Fit for	
				Pulse Processing	Hemp Biocomposites
<b>MARKETING -</b> Promoting regional advantages.	Long	Low	Low - no major competitive advantage over other jurisdictions.	Good for international markets.	Medium – raises awareness. Good for international markets
<b>CLUSTERING -</b> Competitive advantage thru shared utilities, production, infrastructure, R&D, supply chain, marketing.	Medium-Long	Medium-High	Good - opportunity to drive down utility costs and other operating and some capital costs.	Good - permits value added processing lower capital and operating cost.	Good – opportunity to reduce capital and operating costs, with shared decortication plant. Can use flue gas from power plant in manufacturing hempcrete blocks
<b>ECONOMIC GARDENING -</b> value added thru growth of small and medium scale businesses; sometimes supported by R&D	Short – Medium	Low-Medium	Medium - in aquaponics and broadening of hydroponic crop applications.	Good - large potential for value added products by existing pulse processors.	Medium –Good - if innovation help open new niche in growing market
<b>SHOVEL READY – BUSINESS DEVELOPMENT</b> approach investors with specific projects to serve niches.	Medium – depending on scale	Medium - High	Medium – Good for overseas investors unfamiliar with local markets.	Good - identify underserved locations in producing areas.	Low-Medium – tends to require proprietary technologies.

Table 15.1 – Macro Strategies for 3 Key Opportunities

The strategy combines elements from all of the above. Customized marketing tools encouraging medium sized local businesses with high growth potential to expand into a cluster are proposed as a

shovel ready project, seed financed by government. Simultaneously, larger foreign investors with access to large export markets will be attracted.

## **15.2. MARKETING STRATEGY**

Marketing is the first, but also an ongoing, element of the investment attraction process. It usually consists of brochures, websites and trade shows which may raise general awareness of potential investors. That said, while the EATC is able to tag along with provincially and federally sponsored programs, there is an opportunity to do it better. It is important to differentiate the EATC by demonstrating a deeper understanding of the key competitiveness drivers in the target sector using the content of the business case herein and the comprehensive investment attraction studies previously completed. The key is to avoid generic business attraction pitches, but to weave the advantages of the EATC into the business plans that must be developed for each of the primary major opportunities: pulse processing, greenhouses, hemp products and pet foods.

The EVAAC strategy requires government seed funding. This could be proposed to government as a Green Diversification Infrastructure Initiative. This fits well with current provincial government priorities:

- Green – Agriculture based businesses maximizing use of green energy sources in an efficient, shared facility.
- Diversification – Value added secondary and tertiary agriculture processing that maximizes export revenues from locally grown commodities.
- Infrastructure – Shared agricultural processing complexes with common energy and transportation facilities to enhance the cost competitiveness of a wide array of value added agriculture businesses.

The following marketing approach is recommended:

1. Build excitement around the Green Diversification Infrastructure initiative with the EATC Value Added Ag Complex “EVAAC” as defined in the following Clustering subsection with a professionally developed branding and promotional program.

2. Deeply understand the target investor's business, growth objectives and profitability drivers – through initial research and early conversations.
3. Before you pitch, adjust messaging to their circumstance.
4. Bring in relevant industry sector veterans in for key pitches and negotiations.

### **15.3. GOVERNANCE STRATEGY**

Many effective clusters in other jurisdictions have government legislated mandates that create a cluster development authority with the power to undertake all planning and business development tasks required to develop and administer the cluster.

Effective promotion, coordination and initial project funding is required. Investment attraction for a cluster cannot be a part time job. It requires a separate agency or team. In some jurisdictions, these have been called Enterprise Zone agencies. This team should require some key personnel from the private sector with experience in development and management of large industrial projects and to open doors to assist with attraction of key industry targets.

Any effort to set up such a form of governance would be a long, time-consuming process. It is therefore recommended that the EATC develop a preliminary cluster governance model in parallel with the marketing and business development activity, as outlined in the Action Steps section.

Much of the marketing material needed to attract funders and investors can be altered and tailored and then used to convince legislators to formalize some sort of "Special Diversification Zone" authority. There are many successful models from around the world. Work has been done previously for the department of Economic Development and Trade in Alberta.

### **15.4. CLUSTER STRATEGY FOR THE EATC**

A cornerstone of the strategy to attract investment to the EATC is to develop business clusters to enhance the competitiveness of investor businesses. This strategy is based on creating a multi-industry cluster in each of the EATC regions based on shared energy, transportation/loading, utility and value added processing infrastructure to attract and grow the high ranking business opportunities identified previously. This will serve to enhance competitiveness.

Many jurisdictions employ experts to produce detailed feasibility studies to attract investment and some produce financeable business plans. This would be helpful but this alone will likely be insufficient to attract investment to the EATC. The plan must integrate the competitiveness enhancement elements of the EVAAC and be pursued and promoted by a strong credible team.

As described in the Government Policy/Direction Recommendation section herein, this was proven by the Lougheed and Getty governments in the 1970s and 1980s with development of the petrochemical and value added forest products industries. These initiatives provided some public investment for infrastructure and provided other measures that lowered feedstock risks. Similar results can be achieved on a smaller scale in the EATC.



## 15.5. CLUSTER DESIGN

Building on the example from the Minot, ND, Value Added Ag Complex referred to in the Cluster Example section, an “**EATC Value Added Ag Complex**” (EVAAC) would be designed to attract industries such as pulse and grain processing, bio-fibre production, food and ingredient manufacturers, greenhouses, and a specialty pet food manufacturer (buyers of plant fibre and proteins). Figure 24 illustrates some secondary and tertiary processors that could be attracted by the foundational processing business units such as decortication, cleaning and sorting.

The EATC Value Added Ag Complexes (EVAACs) should include the following elements, partly based on our previous analysis of site location and investment criteria:

1. Rail and container transload on site.
2. Highway access.
3. Close to producers for feedstock.
4. Access to nearby labour pool.
5. Electricity:
  - a. Natural gas connectivity for centralized heat and power.
  - b. Near major transmission line access point to sell surplus power into the grid
  - c. Industrial System (ISD) designation to enable self-generation and avoid transmission charges.
  - d. Maximize use of green power options using incentives for solar, wind, batteries, geothermal, etc.
6. Food grade water supply sufficient for wet fractionation.
7. Sewage service.
8. Sufficient land to attract greenhouses, food and pet food manufacturers.
9. Common buildings to reduce capital costs.
10. Access to Alberta SuperNet or fast wireless for high speed data.

The Action Steps in the following section will outline required tasks required to plan and develop Shovel Ready projects for EVAAC core infrastructure. Development of tenant specific projects would be managed by the tenants but synchronized with the EVAAC.

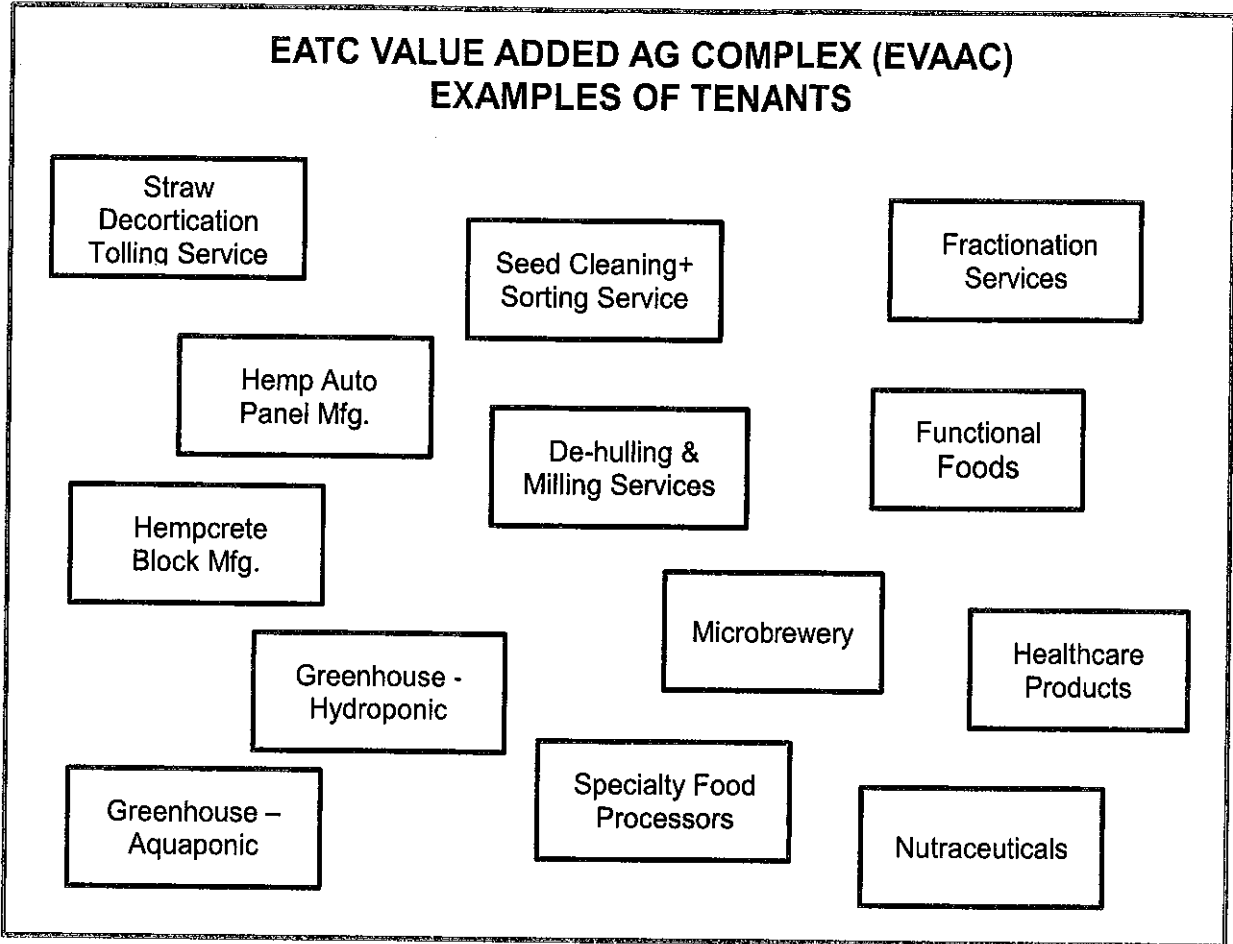


Figure 24 – EVAAC Example Tenants

Given the solid foundation the EATC has in pea production, an anchor tenant in the EVAAC could be a pea processor. This could begin with cleaning, sorting and bagging and expand into one of the value added pulse processing pathways shown in Figure 25. In this example, milling and then dry or wet fractionation produce ingredients of higher purity and value which could attract food, nutraceutical or health products.

The cluster could also include grain processing. Figures 26 and 27 indicate additional possible process trains for barley and wheat respectively. Note that the fractionation processes shown in the pulse diagram can also be applied to the barley and wheat process flows to yield higher value fractions. This also allows for sharing of dry and wet fractionation equipment.

Some processing equipment may be shared between pulse and grain processing. For example, the cereals could share milling equipment and with the right equipment selection and adjustment between batches, the air classifiers might be shared among all crops. Wet fractionation equipment might also be shared among all crops. Cost - benefit assessments need to be done by experts to determine if efficiency compromises of adjusting equipment are offset by capital cost savings for the various steps in the process.

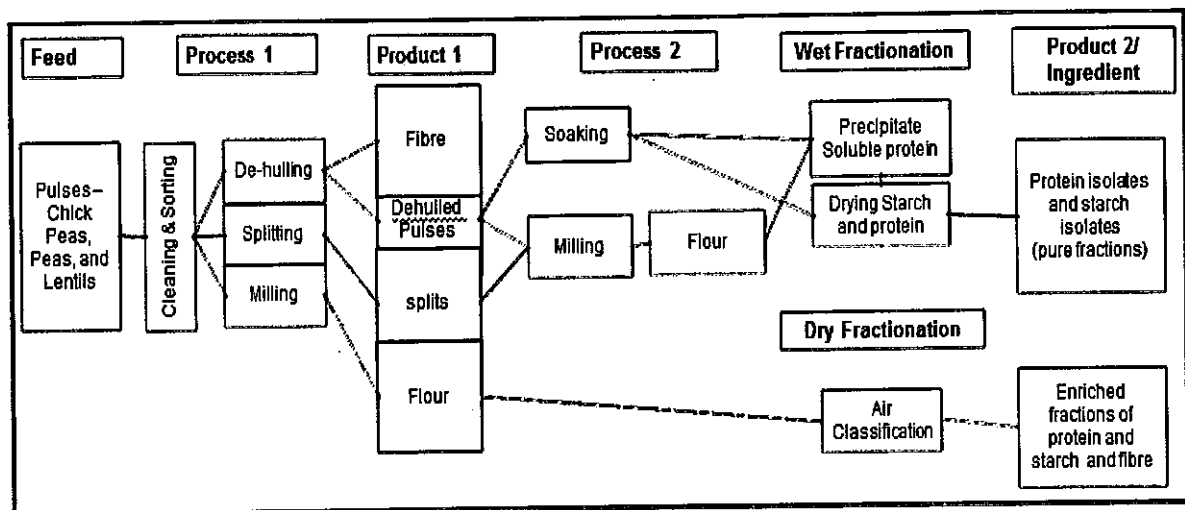


Figure 25 - Value Added Processing Pathway - Peas

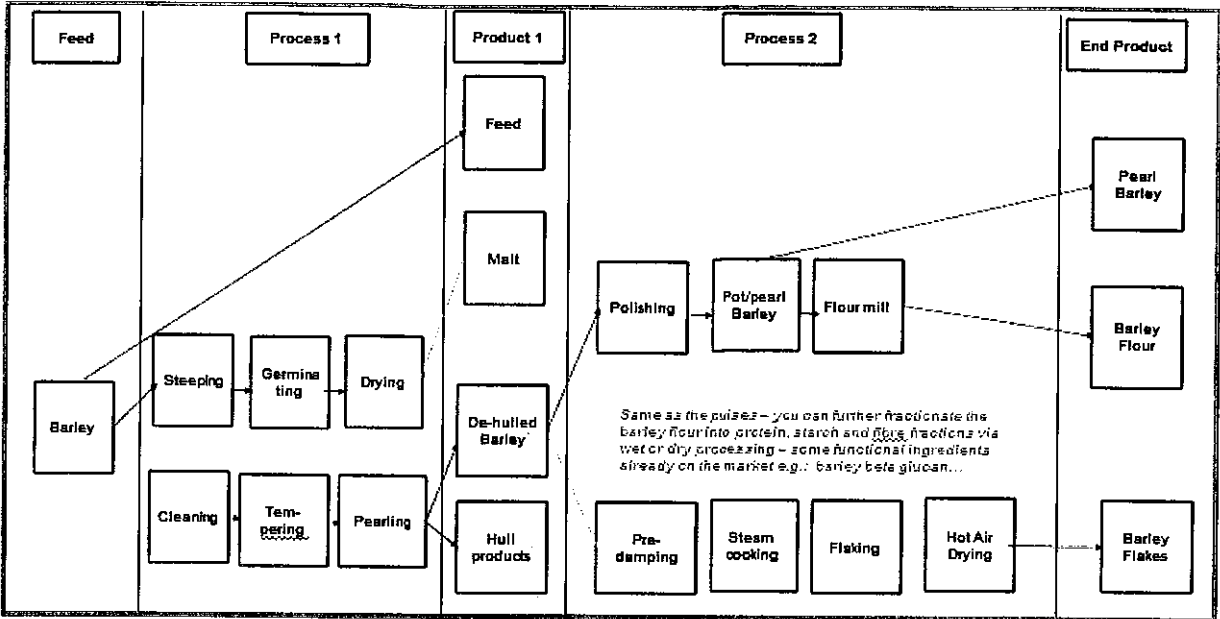


Figure 26 - Value Added Processing Pathway - Barley

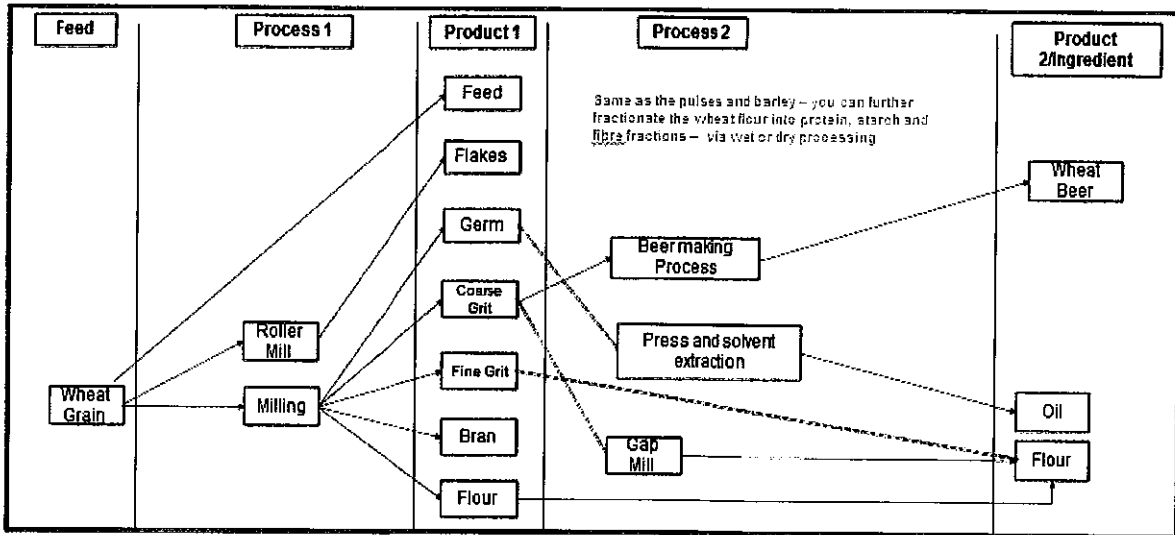
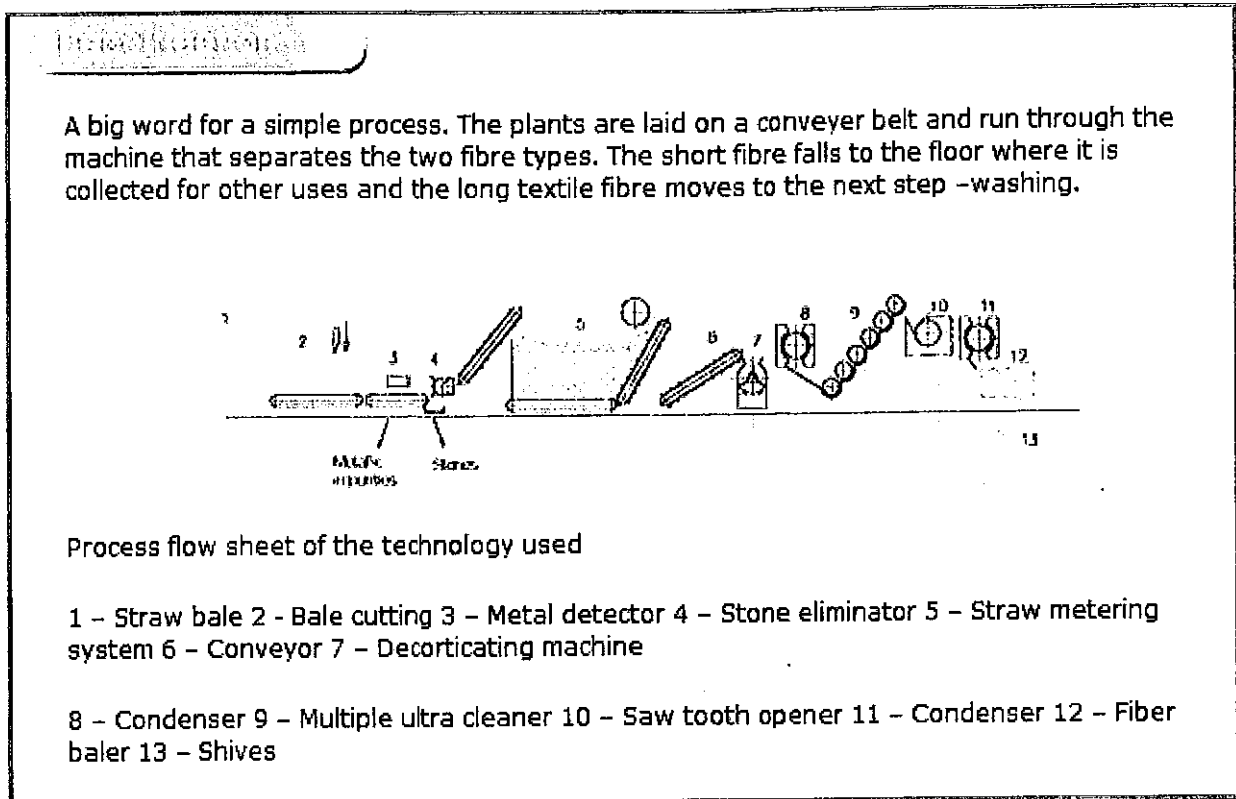


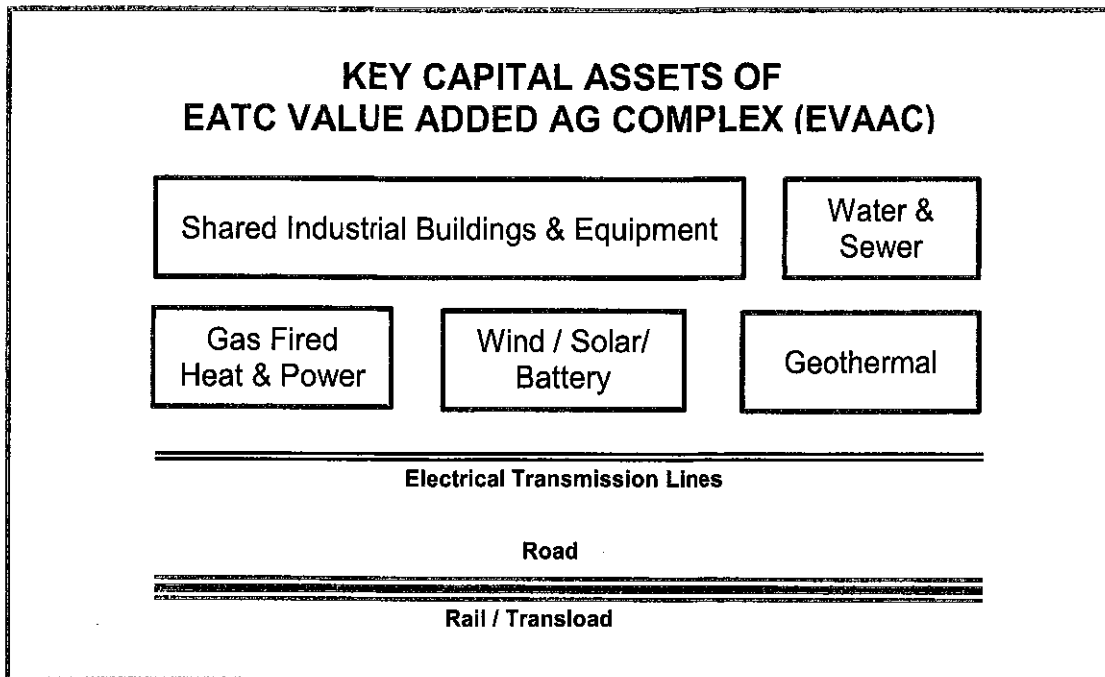
Figure 27 - Value Added Processing Pathway - Wheat Grain

If processing of bales is contemplated, other biomass arriving at the EVAAC in bale form could be handled by the front end of the decortication process. Hemp bales are processed in this manner to separate the fibre from the woody hurd as per Figure 28 below.



*Figure 28 - Decortication Process*

Figure 29 below illustrates some key infrastructure elements of an EVAAC. Energy aspects of EVAAC are discussed in further detail below in the Energy subsection.



*Figure 29 - Key Infrastructure Elements of an EVAAC*

It is anticipated the EVAAC would require commitment of public monies to develop the plan and infrastructure as will be outlined later in further detail.

The various potential infrastructure synergies in the cluster include:

- Electricity primary and backup supply
- Water supply
- Sewage
- Rail
- Transload
- Truck loading
- Crop processing equipment

## 15.6. CLUSTER ENERGY PLAN

It is clear that lower, more stable, heat and power costs will be important to both the greenhouse and crop fractionation segments to enhance and sustain competitiveness as costs rise in Alberta. In the absence of a proactive plan in this regard, the anticipated combination of generation, transmission and GHG costs will very likely become a major source of competitive disadvantage compared to other jurisdictions.

The likely near term candidates are natural gas fired co-generation perhaps combined with solar for electricity and potentially geothermal for heat with various back up scenarios (either standby Direct Transmission Service (DTS) with the grid and its attendant transmission costs) or back-up generators with high inherent variable power costs.

The upcoming carbon tax on natural gas is a disincentive to developing gas fired cogeneration facilities. However, the strengths and weaknesses of the options mentioned above must weigh the impact and potential duration of the proposed \$35/mWh subsidy for green energy which may improve the economics of certain projects. It is not yet certain what form this subsidy will take and whether it would be guaranteed for the economic life of a heat and power project asset.

Instead of improving the export competitiveness of greenhouse crops, a heat and power cluster may, for the medium term, simply help level the playing field for greenhouse producers.

As a first pass, this may consist of using waste heat from any industrial process that could be economically connected and obtaining electricity directly from the source, without transmission line charges via an Alberta Industrial Systems Designation (ISD). Waste heat engineered greenhouse systems are operated in many parts of the world, including two operations in Ontario.

In the circumstance where future governments retain the carbon tax on natural gas, growers may wish to seek alternative energy sources. Table 16.2 following summarizes some options which may be considered.

Heat / Power Source	Strengths	Weaknesses
Industrial Waste Heat	Clean recovery of waste heat.	Investment recovery timeframe of owner eliminates savings opportunity for greenhouse; engineering and operations; location may not be near low cost land for greenhouse.
Gas Fired CoGen	High efficiency, high availability; both heat and power.	Emissions, carbon tax harms economics, but impacted lessened due to integration efficiencies.
Biomass heating or CoGen	May be subsidized.	Emissions, unsubsidized economics are poor; high feedstock price volatility if using ag fibre.
Passive Solar	Cleaner, Relatively low cost.	Unable to supply entire heat requirement, requires expensive back - up solutions.
Active Solar	Cleaner, Likely to be subsidized, could provide heat and power.	Requires large land area to provide both heat and power; currently high capital cost; requires battery system or expensive back-up solutions.
Geothermal (shallow)	Clean, low operating costs, long term solution, may be subsidized.	High capital cost, requires appropriate surface geology.
Wind	Cleaner, could use same land as solar farm, may be subsidized.	Intermittent, not relevant in most of the locations in the regions in question.

Table 15.2 – Options in light of the Carbon Tax

While it would seem logical to first look for existing industrial facilities with waste heat potential that meet the other critical site location criteria, this option has already been assessed by at least one greenhouse co-op with two studies. Based on the studies and subsequent commercial negotiations with a private industrial heat source, the Red Hat Co-op abandoned this idea due to excessive cost. The value of greenhouse gas credits alone was at the time insufficient to justify the investment by



the owner and the normal commercial required investment recovery horizon reduced the cost reduction incentive for the co-op to the point where it abandoned the idea.

If other sources of industrial waste heat can be found in locations that meet the critical location criteria for greenhouse operators (mentioned in the previous section), it may be worth approaching them. However, mutual expectations of cost recovery and savings should be explored early on, so as to not waste time and money studying technical options if there are no commercial terms acceptable to both parties.

If discussions with publicly owned sources of waste heat are not fruitful, construction of a new cluster should be considered. While this would require greater investment and time, if at least partly government supported, a much longer investment recovery horizon is possible, perhaps 20 or 30 years. This would enable reduction in monthly rents payable by cluster members. Taking the long view enables consideration of heat and power producing options with a higher initial capital investment but with lower operating costs and better long term price stability. Building a new cluster also permits optimization of location from the perspective of labour, water access, transportation and other factors.

Within the next several years, a gas fired cogeneration plant with a small generator back-up within an Industrial Systems Designation (ISD) site to avoid electricity transmission costs is the most practical option for heat and power.

However, depending on the scale and deployment details, size of provincial green energy subsidies and rate of price reduction in grid scale batteries, other energy options presented in the greenhouse section may become viable. For heat, shallow, commercial grade geothermal heating offers low and consistent operating costs. If this were combined with a solar farm, small scale wind turbines and battery storage, both heat and power costs could be minimized and stabilized over the long term. Combining the government green energy subsidy and rapid reduction in the price of solar panels, this option merits further investigation. In addition, the green energy component may assist in obtain project funding from government.

It must be noted that the ability to avoid expensive transmission costs will not likely be possible with solar power in the near term without economical battery storage and improved price-performance of solar panels.

If the cluster was on a green-field site instead of building on an existing cluster, it is estimated that at least quarter section of land would be needed for the greenhouse space. Depending on whether transparent solar panels could be economically used for greenhouse roofs, additional land may be needed for an adjacent solar farm. Depending on nearby land use and prices, elevated solar farming may be advantageous to permit dual use of the land.

For those cluster members growing vegetables, other co-op type infrastructure, such as a shared packing plant would reduce costs if they do not already have this contracted.

Careful planning and professional execution done in close collaboration with industry could provide EVAAC partner tenants with a sustainable competitive advantage.

## **15.7. ADDENDUM SECTIONS – BUSINESS OPPORTUNITIES BY REGION**

In addition to this main report and its recommendations, three addendum reports were produced selecting a primary and secondary business opportunity for each of Palliser, BRAED and HUB regions. Additional key infrastructure maps for each region have been added to these reports and a list of regional advantages, where possible. These are listed in Appendix D and could be pursued prior to, or in parallel with, the EVAAC Green Diversification Infrastructure strategy.

## 16. ACTION STEPS FOR PRIMARY OPPORTUNITIES

The action plan provides a step by step approach to executing the strategy outlined above.

Our overall objective is to differentiate the EATC so as to attract job creating companies beyond the cottage industry scale. This requires investment in EVAAC infrastructure to enhance the competitiveness of companies locating in the EATC.

In order to accomplish this in a reasonable time frame, several stakeholders need to be mobilized. These include:

- Existing government programs to provide resources to develop and promote the EVAAC plan.
- Politicians to support larger scale EVAAC infrastructure funding.
- Government bureaucrats to enable EVAAC funding.
- Provincial and federal investment attraction teams.

Local and foreign investors in the target industries (“opportunities”) must be simultaneously attracted and engaged.

The action plan seeks to accomplish the following:

Short Term:

- Build initial EVAAC team.
- Validate or exclude potential investors that were identified in our research as seeking to relocate or expand.
- Develop and execute EVAAC marketing plan tailored to the needs and motivations of the stakeholders listed above in order to create awareness, attract and mobilize them.
- Initiate EVAAC program funding tasks
- Draft EVAAC governance structure

#### Medium Term:

- Attract investors.
- Pursue government funding for infrastructure.
- Construct and commission EVAAC.

As mentioned in the cluster strategy section, many successful clusters around the world have legislated structures with various structures in place with strong teams. If, after researching these models in detail it is decided that this is an optimal path forward, this strategy can be pursued in parallel with the other action steps proposed herein. Waiting for legislative action could add significant time to the process.

The GANTT chart below provides a list of proposed action items focused on the following key milestones that seek to have an operational tenant in an EVAAC in 37 months :

1. Secured EVAAC Program Funding
2. Secured Initial EVAAC Tenants
3. Secured EVAAC Capital Project Funding
4. Begin Construction of EVAAC
5. Commissioning of Tenant Operations in EVAAC

The tasks have been divided into the following categories:

- Marketing
- Organization
- Business Development
- Funding
- Project

As some of these tasks are dependent on others, they are organized by approximate sequence, rather than by category.







## 17. FUNDING

While several of the action steps listed in this report can be handled with in-house resources, Table 17.1 below listed the primary initiatives that will likely require external funding.

One or two anchor tenants should be secured for each EVAAC prior to construction. Private sector investors wishing to locate in the EVAAC would fund their own businesses in the most efficient manner maximizing utilization of grants, tax credits and other available incentives. Table 18.1 also summarizes some of the funding sources.

PROJECTS AND FUNDERS	
PROJECT	FUNDER & FORM
EATC Value Added Ag Complex (EVAAC) feasibility study and business development program	Provincial & Federal Governments and related institution grants
EATC Value Added Ag Complex (EVAAC) infrastructure or value added processing related funding	Provincial & Federal Governments programs or grants
Greenhouse Project within EVAAC	Private Investors
Pulse Processing Plant within EVAAC	Private Investors
Biocomposites within EVAAC	Private Investors
Other Value Added Ag projects within EVAAC	Private Investors

*Table 17.1 – Potential Funding Sources*

As discussed in the Government Policy/Direction Recommendations section, there may be potential to attract government funding or incentives that reduce capital costs. This would relate government funding infrastructure or some form of incentive tied to value added processing (potential to advocate



for something modelled after the Incremental Ethane Extraction Program or similar programs used for value added petrochemical projects).

Also as discussed in the Government Policy section there are potential programs that can reduce certain operating costs including labour (training grants, foreign worker programs) as well as energy costs (renewable power subsidies, Industrial System Designation (ISD) to reduce transmission costs).

In addition it is worth exploring the development of insurance products that could help manage feedstock risk for large scale capital projects. Organizations such as AFSC, Farm Credit Canada are potential participants.

Investment and policy proposals to government are best aligned with current government priorities. EVAAC offers several possible themes that may align:

- Economic diversification
- Green energy, and GHG reductions
- Re-employment of coal workers

A detailed list of government funding programs is shown in Appendix A.

## **18. SYNCHRONIZATION WITH EXISTING EATC STRATEGY**

This section will summarize previous EATC investment attraction and strategy report conclusions and then briefly discuss how these fit in the overriding strategy developed in this report.

### **18.1. SUMMARY OF PREVIOUS STRATEGY RECOMMENDATIONS**

#### **18.1.1. PEP Agri-food Economic Partnership**

- Develop a agri-food database through the collection of data on an annual basis. Hire a data/surveyor company to complete survey.
- Further investigation and development of pulse processing opportunity profile. An opportunity assessment should be completed to assess the full potential of pulse processing. Including market, regulatory, and technical sections.
- Work with Travel Alberta to promote identified opportunities at the Alberta Welcome Centre on Highway #1. PEP to have an information Kiosk for visitors.
- Develop a value add agriculture strategy.

#### **18.1.2. Agriculture Inventory Project**

- Culinary tourism – promote BRAED products to Slow Food Edmonton and Slow Food Calgary. Support and encourage local producers to supply local dining establishments to list with Alberta Agriculture’s ‘Dine Alberta’ program and encourage area producers to list their products with the ‘Alberta Regional Cuisine Sourcing Directory’.
- A ‘culinary circle tour’ could be developed within BRAED or in partnership with Central Alberta Economic Partnership (CAEP) to include producers and value added manufacturers in the respective regions to promote agricultural tourism and increase market share for area producers. The tours could include tours of Camrose processors as well as touring several of the organic and natural producers. The tour may include dining on local cuisine at various locations.

- Opportunity for increased revenues may be accomplished by securing additional value chain opportunities for BRAED producers. For example, currently no one in the BRAED area is supplying bison to Carmen Creek Gourmet Meats Inc. based in Calgary. This marketer and distributor of a variety of additive and growth promotant free branded gourmet bison products supplies 218 Safeway stores, and Moxies restaurant chain just this year added Carmen Creek's product to its menu selection.
- Shochu Barley – Applied research during 2008 was undertaken near Killam. The AC Metcalfe is a familiar barley variety with the right kernel hardness, starch content and quality for pearling that makes it an acceptable product for shochu, a popular distilled beverage in Japan. This crop may be an opportunity for 50 – 100 growers province wide. In 2008 Alberta shipped 50,000 tonnes to Japan which could increase to 60,000 tonnes by 2013.
- Lupin – are member of the legume family. Newly bred variants of sweet lupin lack any bitter taste and require no soaking in salt solution. The seeds are used for different foods from vegan sausages to lupin-tofu or baking enhancing lupin flour. Given that lupin seeds have the full range of essential amino acids and that, contrary to soy, can be grown in more temperate to cool climates, lupins are becoming increasingly recognized as a cash crop alternative to soy.
- Industrial Hemp - Hemp has many industrial uses. The Alberta Research Council is experimenting on the use of hemp composite for car bodies. There will be a demonstration of such a vehicle at the 2010 Olympics in Vancouver, BC.
- Bio-fuels – the Canadian government has mandated a 5% bio-fuel content in all motor vehicle fuel by 2010. It is estimated to increase demand to 3 billion litres per year. What is not produced in Canada will need to be imported. Besides wheat, which is currently use in Alberta for ethanol production, consideration may be given to industrial hemp.
  - Industrial hemp production – As a biofuel cannabis sativa and its related species provide denser cellulose content than does corn, higher sugar content and derives higher ethanol per metric tonne at lower costs. Alberta based ethanol plants are using wheat as a feedstock. Using hemp as the feedstock could mitigate producer fear considering that beef, pork and poultry producers all feed their animals the same grains that is required for ethanol production.

- Manure based power generation – a number of opportunities can also be met when partnering a biomass boiler or anaerobic digester with an existing animal feed operation and an ethanol plant. This could be explored utilizing new generation cooperative funding opportunities.

### **18.1.3. Hub Food Diversification Strategy**

- Develop a comprehensive digital mapping/database system of food growers.
- Identify opportunities/address challenges.
- Identify food infrastructure needs for growth.
- Identify/support/advocate market access (local/regional/provincial/national/international).
- Increase awareness and value of the Northeast Alberta Food Growers Association.
- Highlight the Food Science Center at Portage College, educational opportunities.

### **18.1.4. Hub Crop Diversification Strategy**

- Develop a comprehensive digital mapping/database system of alternative crops.
- Identify opportunities/address challenges.
- Identify infrastructure needs for growth.
- Identify/support/advocate market access (local/regional/provincial/national/international).
- Highlight the applied research that has been completed pertaining to the climate of the Alberta HUB region (AITF, Lakeland College, and Agriculture Research Associations).
- Develop a value-added industry based on alternative crop production.
- Provide site selection criteria to potential investors. Develop a comprehensive ag profile.

### **18.1.5. Investment Attraction Strategy**

- Short Term –
  - Having significant experience in multi-year FDI projects, it is the opinion of the consulting team that more EATC capacity building work needs to be done in 2012 before a formal investor contacting effort process is started.
  - Develop lead handling protocol.
  - Develop marketing material.

- Medium term - Closely monitor the investment attraction efforts in neighboring regions such as Wood Buffalo and CAEP, who have investment attraction initiatives that are a year or two ahead of the EATC.
- Long term –
  - Lobbying missions in Alberta and Ottawa to advocate for initiatives, raise funds, educate legislators and their staffs, recognize their support, and report on successes throughout the region.
  - Work actively with other trade organizations such a Ports-to-Plains Alliance, Canadian Consulates, Chambers of Commerce, etc., to advocate for EATC businesses attraction expansion and retention.
  - Work to continually update EATC initiatives, the website, marketing materials, etc., so as to report on events and news significant to EATC members, and monitor highway and other key legislation through the an EATC newsletter.
  - Develop working groups for each major EATC sector such an energy, agriculture, manufacturing, defense, transportation and tourism.

#### **18.1.6. MNP Regional Business Investment Strategy – 2005 Hub Region**

Recommended value added sectors to pursue: pre-built housing, pea processing, greenhouses.

#### **18.1.7. BRAED Economic Development Strategy**

- Marketing- Brand the region as the “Battle River Region”- not just BRAED
  - Develop website
  - Exhibition sponsorship
  - Develop tours
  - Create signage
- Communication awareness
- Peer group development (understand military market potential)

#### **18.1.8. Opportunities in Pulse Processing – Feasibility Study – Field Guide Consulting**

- Excellent source of pulse background, opportunities and foreign investment attraction drivers. Should be the key reference document for pulse sector development going forward.

## 18.2. ALIGNMENT WITH PREVIOUS RECOMMENDATIONS

It is understood that this study is the result of one of the recommendations in a previous report.

Some of the previous strategy recommendations made several years ago, such as biofuels development, have been invalidated by commodity prices and technological advancements in other areas. Others are tactical promotional strategies that have already been successfully executed or recommend gathering of specific data to assist in economic development. Others related to recommendations for development of cottage industries such as regional tourism, which while valid, are not related to the focus of this assignment, which is focused on the attraction and development of medium scale opportunities with strong growth, employment and export potential.

The strategy proposed aligns with and builds upon most of the EATC strategies defined by the documents above.

Based on methodical consideration, screening and ranking of many opportunities available, this study prioritizes additional business opportunities that could fit into the EATC and builds upon some that were previously recommended, such as pulse processing and greenhouse development.

As stated previously, the strategy proposed herein is based on four fundamental principles:

1. **Think Big.** There will only be measurable long term job creation if the industries we attract are of a sufficient scale, growth and product export potential.
2. **Investment in Competitive Advantage is the Foundation.** In order to both overcome EATC weaknesses and provide sustainable competitive advantage to companies, we must invest in the infrastructure (EVAAC) that enhances business cases and growth opportunities of investor companies over the long term. Consistent with this fundamental need, the cluster approach was developed and determined to be necessary.
3. **Market Pull over Producer Push.** Sustainable growth can only be based on what global markets want, not necessarily what we are currently producing. If a required feedstock crop

can compete with other crop alternatives on a profit per acres basis and fits into rotations, producers will meet market demand. There is clear market pull in greenhouse and pulse processing and strong growth potential in hemp based products.

4. Understand the Pains, Gains and Objectives of your Team and Target Investors. The strategy identifies key external parties who will need to be motivated to fund, promote and ultimately invest in the EATC. The best way to motivate these parties is not with generic investment attraction brochures, but custom tailored and personal messaging for each party that addresses their key motivators at different stages of the process.

## **APPENDIX A – FUNDING SOURCES**

### **Federal Funds**

The list below consists of federal funds.

#### **AgriInnovation Program**

The AgriInnovation Program makes two types of investments: those targeted at research and development activities that bring innovation to the sector; and those that help industry bring the results of research and development to market through adoption/commercialization. This is a five-year program ending on March 31, 2018.

This program is divided into the following 2 streams:

1. Industry-led Research and Development Stream supports projects that result in an innovative practice, process or product.
2. Enabling Commercialization and Adoption Stream supports projects that prepare for the commercialization of an innovative technology, process or product through commercial demonstration, commercialization or adoption.

#### **AgriCompetitiveness Program**

The AgriCompetitiveness Program is a five-year (2013-2018), \$114.5-million program comprising a combination of government initiatives and contribution funding for industry-led projects. The AgriCompetitiveness Program will make directed investments that will help the sector adapt to rapidly changing and emerging global and domestic opportunities and issues, respond to market trends and enhance business and entrepreneurial capacity. The AgriCompetitiveness Program will enhance the capacity of the sector to develop leadership, strategies, networks and tools for improving competitiveness, adapting to challenges, innovating and managing risk.



**AgriMarketing Program**

The AgriMarketing Program helps farmers and food processors compete in markets at home and abroad. It supports the agriculture industry by creating and maintaining access to markets and taking advantage of market opportunities. Currently, there is \$341 million available in the form of government projects and contribution funding during five years (2013-2018).

**Provincial Program**

The below are Alberta based grants available for food processors.

**Agri-Processing Automation and Efficiency Program - Livestock**

Under the Growing Forward 2 Agri-Processing Automation and Efficiency Program, successful applicants are eligible for reimbursement of certain capital and non-capital expenses.

Reimbursement of capital expenses (20%). Eligible capital costs include the engineering design, acquisition and installation (including modifications, if needed) of automated machinery and equipment. The new facility or equipment must be installed and used in Alberta for at least three years.

Reimbursement of non-capital expenses (50%). Eligible non-capital costs include third-party costs for consulting and engineering fees, consultant and coaching fees related to process improvement and related travel. Training costs (maximum eight weeks or \$4,000 per employee) that will enable the new technology to become operational may also be eligible.

**Agri-Processing Product and Market Development - Livestock**

Under the Growing Forward 2 Agri-Processing Product and Market Development Program, successful applicants are eligible for reimbursement of 50% of certain costs related to product and market development.

Successful applicants are eligible for reimbursement of 50% of costs related to product development, market development (domestic and international), labeling, market research, business and marketing plans, and consulting or coaching fees for these activities.

Individuals, businesses and groups can apply for multiple projects to a maximum of \$500,000 per fiscal year for Alberta Livestock and Meat Agency (ALMA) funding. A number of exclusions apply. Contact us for more information.

**Business Management Skills Development**

The purpose of this program is to help Alberta's new or established producers, agri-processing companies and producer groups improve their business management skills, enhancing the industry's competitiveness and sustainability. This program is currently not accepting applications.

**Business Opportunity**

The purpose of the program is to help Alberta's new or established producers, agri-processing companies and producer groups enhance their competitiveness and growth prospects by connecting them with expert business advice. This program is currently not accepting applications.

**Food Safety Systems Processor**

The purpose of the program is to help food processors invest in new or improved food safety systems and production practices, enhancing the industry's competitiveness and food safety performance. Under the Growing Forward 2 Food Safety Systems Processor Program,

successful applicants are eligible for reimbursement of up to a maximum of \$25,000 over the Program Term. This includes:

- Reimbursement of non-capital expenses (50%) related to the implementation of approved food safety programs.
- Reimbursement of capital expenses (20%) related to improving a specific food safety issue, to a maximum of \$15,000.
- Reimbursement of food safety testing equipment expenses (80%), to a maximum of \$5,000.

### **Livestock Welfare Processor**

This program helps meat processors to improve animal handling and ensure humane slaughter at provincially or federally licensed meat and poultry facilities. This activity supports the growth and sustainability of Alberta's livestock industry and provides a stable, socially acceptable business environment.

The *Growing Forward 2* Livestock Welfare Processor Program helps the industry in three key areas.

1. Enhanced profitability for processors. The program helps processors adopt new or improved animal welfare production practices that result in better quality meat and stronger profits.
2. Increased market competitiveness. Implementing humane animal processing practices is an important priority for the livestock industry. A commitment to performance standards and new technologies that improve animal welfare will support the industry's long-term growth.
3. Public confidence in Alberta's livestock sector. When Alberta processors address public concern about the care and handling of animals, particularly during slaughter, the livestock industry as a whole benefits.

**APPENDIX B – REGIONAL INFORMATION INTERVIEWS**

	Name	Ag Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
<b>Alberta HUB</b>										
	Town of Vermillion	Mary Lee Prior								
	Lamont County	Jim Newman			<ul style="list-style-type: none"> <li>Infinity Energy – renewables; waste to energy; hybrid solar</li> </ul>		<ul style="list-style-type: none"> <li>Starr – Viterra’s grain terminal for sale - Moving to Minburn</li> <li>Cenovus Canexus rail terminal – 1 train per week - Bruderheim</li> <li>Terminals – rail car storage</li> <li>Lamont – grain terminal</li> </ul>		<ul style="list-style-type: none"> <li>Grains Connect – pulse – Calgary based building one in Sask and in AB</li> </ul>	<ul style="list-style-type: none"> <li>Grain guys want loop tracks Just beginning to formulate Ag strategy now. Have been focussed on Heartland industrial add ons until now</li> </ul>
	Smoky Lake	Shaun Green	Winding Road Artisan Cheese					Canola, Livestock	Value added ag manufacturing; Food processing	

Name	Ag Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
County of Vermillion River	Lonnie Wolgen		Favorable to greenhouse cluster idea and they had already discussed the concept combined with heat and power generation (which they do yet currently do).			- they own a large gas utility that would be feedstock for small gas fired cogen plant – they might even be a partner	- good interest among growers in hemp production - good pea production but it varies dramatically with prices – a processor with long term contracts would smooth out that problem for growers	Greenhouse, hemp processing, pulse processing	
Portage College	Reuel Thomas				Greenhouses, Pulse processing	St. Paul Food processing Centre has equipment for training and new business incubation		Food processing	
Lakeland College	Josie Van Lent				Greenhouses, Pulse processing	Have hands on experience in solar, geothermal, wind. Good fit w EVAAC cluster. Have full commercial farm operation. Have a "Net Zero" Dairy program.	Pulses, beef, dairy	Value Added Ag processing	Crop focussed in Ag

	Name	Ag Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
	Milburn County	- Innisfree and Vegreville seed cleaning plants have the ability to clean and process both peas and lentils. - Skyline Greenhouse In Lavooy grows a variety of vegetables for the local area.	- Buhler Industries Inc. - Richardson Pioneer (Lavooy, AB). - Woycheshyn Farms (Vegreville, AB).	Not available.	No 'value-add' manufacturing.	Malt or Barley plant.	- The corner of Highway 36 and Highway 16, which is currently zoned as industrial region, would be a good place for new projects. - They have access to railway, roadway, natural gas power, and water line (fairly close by).	Malt Barley		
	Thorhild County	None within Thorhild County.	- Utilities: North Parkland Power Rural Electrification Association Ltd. - Manufacturing: Country Steel Fabricators Ltd. - Petroleum: McEwen's Fuel and Fertilizers. - Education: Aspen View School Division. - Local Government: Thorhild County.	In the greater general location of the Hamlet of Thorhild.	None within Thorhild County.				- Franchise of restaurant. - Hotel for visitors.	
	St. Paul	- Seed Cleaning: St. Paul, AB.	- Devon. - CNRL. - Extreme Oilfield Technologies.							
<b>BRAED Region</b>	Paintearth	Carol Thompson				Plants related to the meat processing industry would be a good fit.	- Water : they have the Shirley McClellan water line running all the way through the highway. - Land is not expensive. - Power: they have an 83 turbine wind farm in their area producing about 100-150 MW. - Labour: should not be a problem.	Cattle mostly, with some sheep.		They only have a couple of manufacturing plants in their region: - Tank manufacturing - Pipeline manufacturing

Name	Ag Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
<p>Wainwright</p> <p>Carley Herbert</p>	<p>- Pulse processing: Wainwright, AB.</p> <p>- Greenhouse (a small scale operation). - 4 seed cleaning plant. - Paterson Grain is currently building a terminal in Daysland. - Agriculture Tourism: ranch styled B&amp;B places, bird watching. - Battle River Train Excursion: doing well on ticket sales. - In winter there are winter sport activities.</p>	<p>- DND (Base in Wainwright). - Wainwright Health Care Complex. - DAVCO Welding.</p>	<p>- Culinary: honey, meat, cheese and brewery.</p>	<p>- Brewery: Edgerton. - Honey: Wainwright and Irma. - Cheese: Vermilion (not in the MD of Wainwright but very close).</p>	<p>- Hotels to hold visitors. - Franchise restaurants. - Green energy to replace Frostburg coal power plant.</p>	<p>- Water: Battle River Basin and underground aquifer (which has not been explored at all). - Land: abundantly available. - Power: Frostburg (natural gas and coal). - Labour: available in Flagstaff county.</p>	<p>- They have a lot of livestock (primarily hog, bison, etc.). - They have a lot of crops namely wheat, barley, oats, canola, triticale, hemp. - There are a lot of restaurants that would like locally grown foods.</p>		<p>The military base has two training programs and houses up to 5,000 people.</p>
<p>County of Flagstaff</p>	<p>Kristy Jackson</p>						<p>Meat and Grains.</p>		

Name	Ag Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
<p><b>Palliser</b></p> <p>County of Newell</p> <p>Molly Douglass</p>	<ul style="list-style-type: none"> <li>- Brooks: JBS Beef packaging plant – workers from Brooks and Newell.</li> <li>- Bassano: Bassano Growers Ltd. (<a href="http://bassanogrowers.ca/">http://bassanogrowers.ca/</a>).</li> <li>- Honey production: Bassano.</li> <li>- Seed grain production: Canola and Alfalfa.</li> <li>- They have tourist attraction in the Eastern Irrigation District, which has a number of reservoirs.</li> </ul>		<p>Greenhouse, as they produce about 37% of all natural gas in Alberta.</p>	<p>Technology: they have a high-tech manufacturing facility called (<a href="http://www.gerthermglobalpwer.com/">http://www.gerthermglobalpwer.com/</a>) located in Bassano and a Crop Diversification center (CDC) (provincially run) that does R&amp;D.</p> <p>- Brooks has a satellite campus of Medicine Hat College located close to the CDC.</p>	<p>Meat value-add opportunity.</p>	<ul style="list-style-type: none"> <li>- Water: With EID they have a lot of water.</li> <li>- Land: abundantly available.</li> <li>- Power: Natural gas abundantly available.</li> <li>JBS meat packing facility runs a co-gen plant.</li> <li>- Labour: there is a shortage. With the recent oil price drop, people are looking for jobs. The JBS facility has the lowest turnover but apparently struggle with attracting labour.</li> </ul>	<ul style="list-style-type: none"> <li>- Growth of alfalfa and canola seed crops is fairly big in the Newell region.</li> <li>- They are very big on potatoes.</li> </ul>		<ul style="list-style-type: none"> <li>- There are numerous feeder operations, including Lakeside.</li> <li>- Other large ones are Takeda Feeding Co and South Slope Feeders Ltd.</li> <li>- The energy business in the past had grown numerous metal manufacturing businesses in the area with plenty of skilled workers.</li> <li>- EID handles water delivery.</li> <li>- They have great irrigation system and are wealthy because of the fact that they own a lot of land.</li> </ul>



Name	Age Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
Cypress County	<ul style="list-style-type: none"> <li>- Pulse processing: 2 In Dunmore, AB.</li> <li>- Deerview Meats: built a slaughter house (<a href="http://www.deerviewmeats.com/">http://www.deerviewmeats.com/</a>).</li> <li>- The region has a couple of feedlots.</li> <li>- Greenhouse operations ranging from 3 to 30 acres.</li> <li>- Dairy farm: 200 cows - he mentioned that the capital was around \$5MM. They are planning to move into a new facility.</li> <li>- Technology: Meggitt Defence Systems Ltd. specialize in unmanned aerial vehicles located in Medicine Hat.</li> <li>- There have been a lot of applications for wind farms, but none have taken off as a project.</li> </ul>	<ul style="list-style-type: none"> <li>- Wedding Star Ltd.</li> <li>- Lawrence Meier Trucking Ltd.</li> <li>- Medicine Hat Co-op Agricultural Center</li> <li>- Retail Gas Store.</li> <li>- Prairie Rose School Division (all within or close to the Hamlet of Dunmore).</li> <li>- Paterson Grain.</li> <li>- Viera Elevators.</li> <li>- Bauer Farms.</li> <li>- Roseglan Colony.</li> </ul>	Cluster of greenhouses west of Medicine Hat.	None in Cypress County.	Interest of solar power.	<ul style="list-style-type: none"> <li>- They have an industrial area (Area 120) close to Dunmore which is touted as an industrial region. It has good access to labour.</li> <li>- John Deere has already moved to this region.</li> <li>- Taxes are 1/3 lower than a large centre.</li> <li>- Water: they have a shortage of water. In Area 120 they are considering a new water line.</li> <li>- Land: plenty available.</li> <li>- Power: There are a lot of power lines (we need to check if this County has a power plant nearby).</li> <li>- Labour: should not be a problem.</li> </ul>	<ul style="list-style-type: none"> <li>- Grains and Pulses: best option.</li> <li>- Livestock: cattle, close to Brooks.</li> </ul>	<ul style="list-style-type: none"> <li>- Grains and Pulses.</li> <li>- They used to have alfalfa but this has faded out.</li> </ul>	Very little manufacturing in Cypress County other than stake and lath (Reddick Stake and Lath, Cypress Stake and Lath), wedding and party supplies (Wedding Star), and gravel extraction (various gravel pits).
Special Area	<ul style="list-style-type: none"> <li>- No processing facilities in special areas.</li> <li>- The pulses are mainly processed in Saskatchewan with smaller plants south of Lethbridge and in the Red Deer area. Some are shipped by rail car through shortline rail at Alliance and possibly through Brooks or Medicine Hat.</li> </ul>	Agricultural employers are at fertilizer and farm dealerships.		Not a lot of value-add agriculture. Several feedlots in conjunction with cow/calf operations and some chicken and hog barns mostly at Hurterite colonies.		High freight cost in the area due to distance from ports. Transportation gets small on rail either east or west.			Several producers would have between 500,000 and 1 million bushels to market each year and getting bigger.

Name	Ag Value-add processing success stories	Industry employers in their area	Clusters available in their area	Value-add manufacturing	Value-add investment fit for the area	Infrastructure	Feedstock available within the region	Business that they would like to attract	Miscellaneous
County of 40 miles	- Pulse processing: Bow Island, Foremost.	<ul style="list-style-type: none"> <li>- Spitz.</li> <li>- Parrish.</li> <li>- Heinbecker.</li> <li>- Independent agricultural producers.</li> </ul>	Essential Oil Processing.	<ul style="list-style-type: none"> <li>- PepsiCo, includes packaging for additional products.</li> <li>- Several independent mint processing facilities.</li> </ul>		- 40 Mile Rail just began short line rail service from Foremost, AB.			- Unmanned Vehicle: County of Foremost.
Special Areas	<ul style="list-style-type: none"> <li>- Acadia Seed Processing Co-op Ltd.: seed cleaning facility located at Oyen, AB.</li> <li>- Richardson Pioneer Grain Terminal located at Oyen, AB.</li> </ul>	<ul style="list-style-type: none"> <li>- Dryland Cattle Trading Corp: Veteran, AB - Cattle Auction.</li> <li>- Goodbrand Land &amp; Cattle Co. Inc.</li> <li>- Youngstown, AB: Feedlot and Ranch.</li> <li>- Kuhn Farms-Acadia Valley: Farm/Crop Production.</li> <li>- Richardson Pioneer: Oyen, AB.</li> <li>- Grain Terminal/Agronomics.</li> </ul>	<ul style="list-style-type: none"> <li>- Hanna, AB.</li> <li>- Oyen, AB.</li> <li>- Consort, AB.</li> </ul>	<ul style="list-style-type: none"> <li>- Goodbrand Land &amp; Cattle Co. Inc.: cattle feedlot and finishing.</li> <li>- Youngstown, AB.</li> <li>- TK Ranch: grass fed beef, lamb, pork.</li> <li>- Hanna, AB.</li> </ul>					
Jordan Christanson									

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## **APPENDIX D – LIST OF ADDENDUM REPORTS**

In addition to this main report and its recommendations, the three following supplemental addendum reports were produced selecting a primary and secondary business opportunity for each of Palliser, BRAED and Alberta HUB regions. These are based on information provided in this report plus additional live maps showing key infrastructure. Where possible, regional advantages have been identified. (Note that the Palliser region requested the two opportunities in separate documents – hence there are two documents shown for Palliser below.)

**ADDENDUM “A” ALBERTA HUB REGION VALUE  
ADDED AGRICULTURE INVESTMENT ATTRACTION  
BUSINESS OPPORTUNITY**

**ADDENDUM “B” BRAED REGION VALUE  
ADDED AGRICULTURE INVESTMENT ATTRACTION  
BUSINESS OPPORTUNITY**

**ADDENDUM “C” PALLISER REGION VALUE  
ADDED AGRICULTURE INVESTMENT ATTRACTION  
BUSINESS OPPORTUNITY: PULSE PROCESSING**

**ADDENDUM “D” PALLISER REGION VALUE  
ADDED AGRICULTURE INVESTMENT ATTRACTION  
BUSINESS OPPORTUNITY: HEMP BIOCOMPOSITES**

**BRAED REGION  
VALUE ADDED AGRICULTURE  
INVESTMENT ATTRACTION  
BUSINESS OPPORTUNITY**

**ADDENDUM “B”**

to the

**Value Added Agriculture  
Investment Attraction Strategy  
for  
Eastern Alberta Trade Corridor**

12 December 2016



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## **1. INTRODUCTION**

This report is an addendum to the Value Added Agriculture Investment Attraction Strategy for the Eastern Alberta Trade Corridor that will be referred to as the Strategy Document. The Strategy Document assessed and screened a large number of possible opportunities for the EATC regions. The document recommended an industry cluster approach to reduce energy costs and to share infrastructure costs in order to enhance competitiveness. It provided an assessment of opportunities suitable for a series of multi-industry EATC Value Added Agriculture Complexes (EVAACs) in each of the HUB, BRAED and Palliser member regions. This strategy would require government seed funding to develop the cluster in a Green Infrastructure Development described in the main Strategy Document.

This addendum provides a primary and a secondary opportunity for the region which could be developed prior to or in parallel with the primary cluster strategy. Note that this document does not replace the opportunity sections of the main Strategy Document, which include important information such as investor targets. This document summarizes key aspects required to develop promotional programs more specific to this region. Important information required to better understand and converse with industry players and investors should be referred to in the Strategy Document.

There are also potential immediate investment attraction opportunities in the Action Plan section of the main Strategy Document that should be investigated.



## **2. PULSE PROCESSING**

The primary opportunity recommended for the BRAED region is added value pulse processing. While there is significant pea production and primary processing exists in the region, there are significant opportunities to attract foreign investors for secondary and tertiary processing into food products.

Several trends support growth in demand for pulse crops globally. Pulses are an important part of the diets in regions with the fastest population growth, namely India, Africa, the Middle East, and Central and Latin America. The global health food market is expected to reach \$1 trillion in 2017 and is growing as developing countries become more affluent. The recent recognition of the health risks of sugar consumption also favours adoption of low glycemic index foods such as pulses. Major food product research initiatives by pulse industry associations and food processors are expanding the uses of pulses as healthy ingredients. Between 2003 and 2013, over 2,000 new food products containing pulses were developed.

## 2.1. ADVANTAGES OF PULSE PROCESSING IN THE BRAED REGION

The following highlights the strengths and weaknesses relative to the BRAED region:

BRAED versus	BRAED Advantages	BRAED Disadvantages
N. Alberta Regions	<ul style="list-style-type: none"> <li>• Lower transport costs to export markets</li> <li>• Good labour supply</li> <li>• Some existing processing plants</li> <li>• Potentially better access to shipping containers</li> </ul>	<ul style="list-style-type: none"> <li>• Water availability in some regions</li> </ul>
S. Alberta Regions	<ul style="list-style-type: none"> <li>• Minimal</li> </ul>	<ul style="list-style-type: none"> <li>• Slightly higher freight costs to export markets</li> </ul>
Other Provinces and States	<ul style="list-style-type: none"> <li>• Currency advantage over US states</li> </ul>	<ul style="list-style-type: none"> <li>• Higher energy costs</li> <li>• Proximity to eastern markets</li> </ul>
Globally	<ul style="list-style-type: none"> <li>• Stable government</li> <li>• Free trade agreements with NAFTA and Europe</li> <li>• Reliable logistics network</li> <li>• High product quality and consistency</li> <li>• Educated and productive workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Trade Barriers on processed goods</li> <li>• Higher energy costs</li> <li>• Slow approval process for new varieties</li> <li>• Transport cost to ports</li> </ul>

*Table 1 - BRAED Advantages/Disadvantages for Pulse Production*

## 2.2. FEEDSTOCK

The BRAED region's production of pulses is primarily field peas, as shown in Table 2 below. Provincially, they are grown from dryland fields in southern Alberta, through Central Alberta, and up into the Peace River Region.

The next specialty crop production report by Census Division (2016) is being conducted at the time of writing of this report. Thus, the most recent data is from 2011. The Census Divisions referred to in Table 2 below are mapped in Figure 1.

Note that Census Divisions do not match REDA boundaries, hence this is an approximate and overstated estimate of BRAED pulse production as CD 10 overlaps into the HUB region.

<b>EATC REGIONS INCLUDING BRAED 2011 Production (tonnes)</b>					
<b>Census Divis.</b>	<b>Dry Peas</b>	<b>Lentils</b>	<b>Dry Beans</b>	<b>Chick Peas</b>	<b>Notes</b>
7	58,347	-	-	-	
10	94,084	-	-	-	
<b>Total (EATC)</b>	<b>152,431</b>	-	-	-	

Table 2 - Specialty Crop Production Report by Census Division

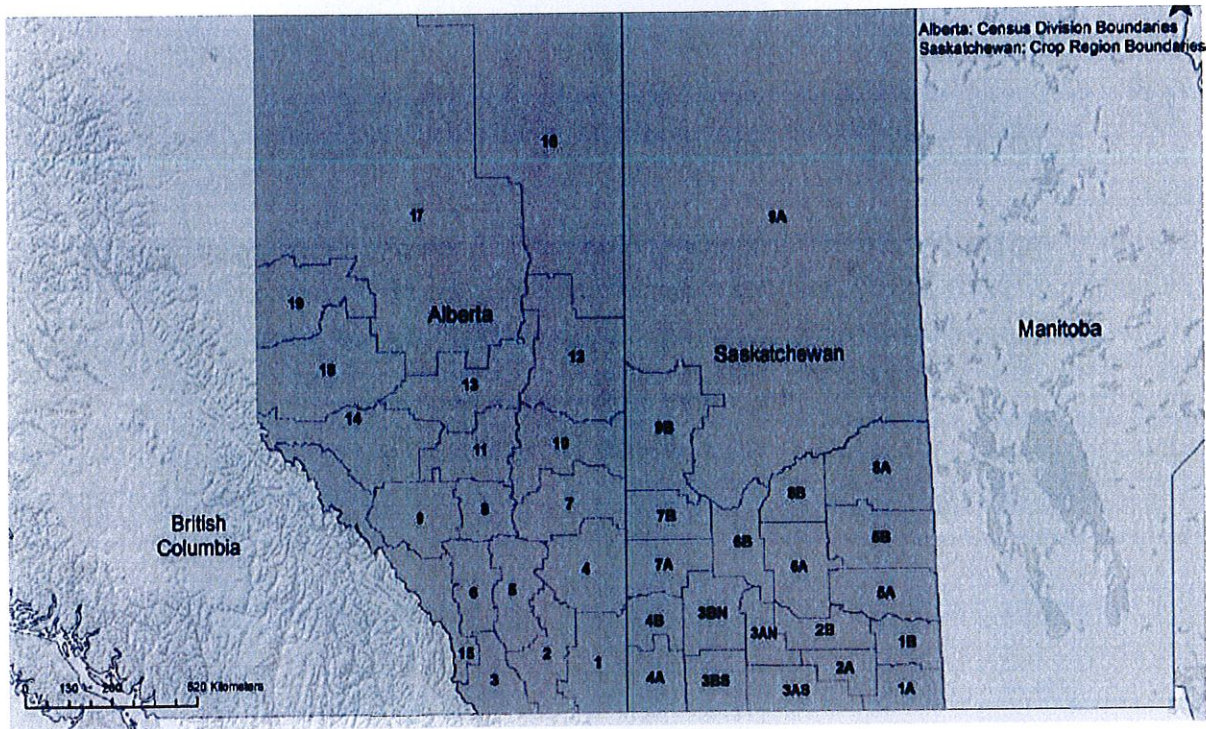


Figure 1 – Census Division Map

Source: "Opportunities in Pulse Processing Report" Field Guide Consulting 2013

As per Table 3 below, Alberta's pulse acreage has grown by 186% between 2012 and 2016 and its share of total Canadian acreage increased from 14% to 23%. This trend should prove attractive to investors. As well, there has been significant production growth in the sector. Pea production doubled between 2001 and 2012 in Alberta. Based on this forecast, the estimated value of dry pea exports from Alberta could exceed \$0.3 billion in 2016-17.

<b>SEEDED ACRES 2016</b>					
<b>Column1</b>	<b>Alberta</b>	<b>Manitoba</b>	<b>Saskatchewan</b>	<b>Canada</b>	<b>% Alberta</b>
Beans, all dry	45,000	117,000	-	287,000	16%
Chick peas	-	-	160,000	160,000	0%
Lentils	565,000	-	5,275,000	5,840,000	10%
Peas, dry	1,860,000	165,000	2,200,000	4,274,000	44%
<b>TOTAL 2016</b>	<b>2,470,000</b>	<b>282,000</b>	<b>7,635,000</b>	<b>10,561,000</b>	<b>23%</b>
TOTAL 2012	862,312	190,000	4,935,000	6,355,000	14%
Increase	<b>186%</b>	<b>48%</b>	<b>55%</b>	<b>66%</b>	<b>72%</b>

*Table 3 - Growth in Seeded Acres*

*Source: Statistics Canada*

### 2.3. VALUE CHAIN & PRODUCTS

Figure 2 below illustrates the pulse processing value chain. There are several elements that represent potential investment attraction opportunities which will be explored.

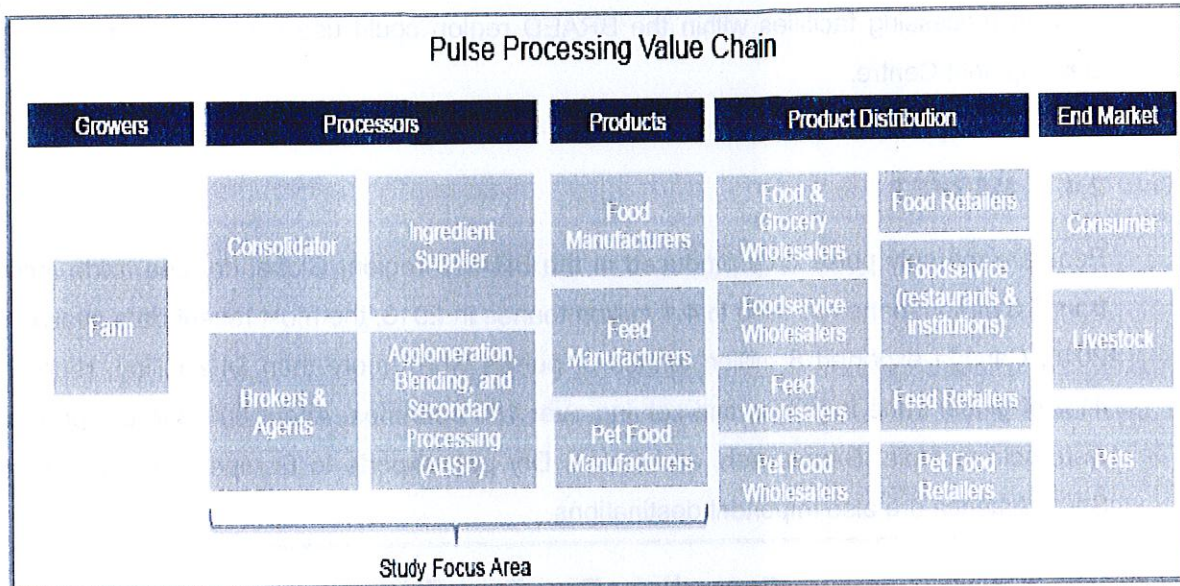


Figure 2 - Pulse Processing Value Chain

Source: "Opportunities in Pulse Processing Report" Field Guide Consulting 2013

A comprehensive study conducted in 2013 for the Economic Development Alliance for Southeast Alberta<sup>1</sup> identified three elements of the value chain with investment attraction potential as per the diagram above. These are:

- Pulse Consolidators – consolidators buy from growers and perform primary processing and may sell to secondary processors or export directly;
- Pulse Ingredient Manufacturers – milling to produce flours and further fractionation to extract proteins, starches, and fibre; and
- Food Manufacturers – consumer food products such as spreads, baked goods, prepared meals, etc. The Leduc Food Processing Development Centre provides R&D and incubator facilities. However, the EATC could attract commercial scale manufacturers.

<sup>1</sup> Pulse Processing Opportunities in Southeast Alberta – Field Guide Consulting 2013 - prepared for The Economic Development Alliance of Southeast Alberta

Attraction of pulse consolidators and ingredient manufacturers are both actionable opportunities for the BRAED region and can serve as attractors to food manufacturers in the medium to long term.

While the BRAED region does not have the facilities to conduct R&D in this sector, companies locating processing facilities within the BRAED region could use the Leduc Food Processing Development Centre.

## 2.4. MARKET

Peas are the only pulse crop produced in the BRAED region. Global dry pea trade increased from 0.5 million tonnes in 1980 to 4.1 million tonnes in 2013, the most recent data available.<sup>2</sup> In 2015, Canada exported 6 million tonnes of pulses worth more than \$4.2 billion, representing 41% of global trade in pulses and serving over 150 countries. About 80% the dry pea exports were sold to India, Bangladesh, and China. Dry pea exports to Europe, North America, and South America are also important destinations.

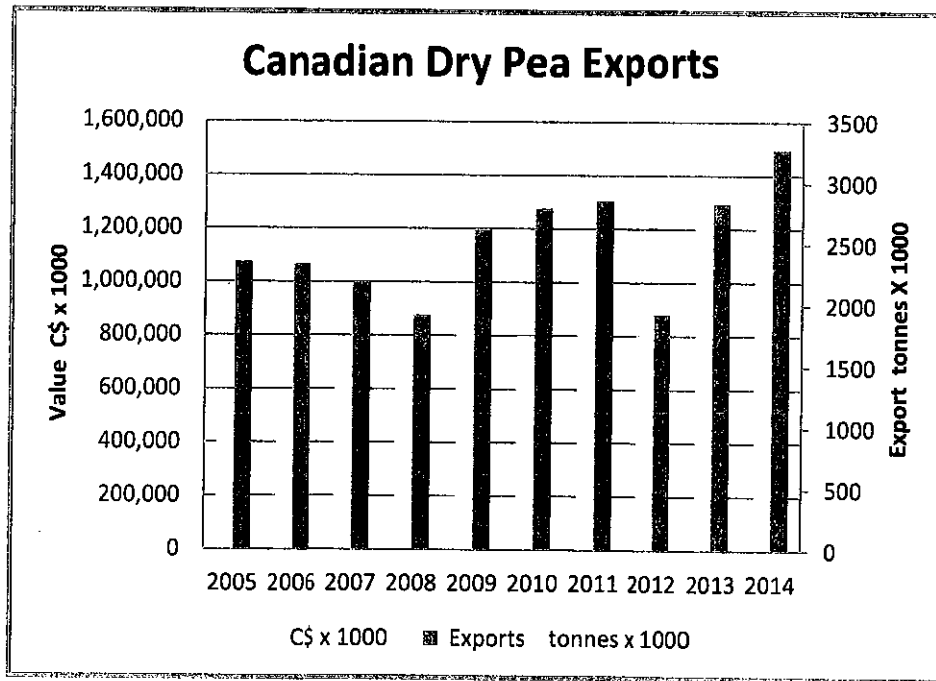


Figure 3 - Canadian Dry Pea Exports  
Source: Statistics Canada,<sup>1</sup> January 2016

<sup>2</sup> <http://faostat3.fao.org/download/T/TP/E>

While Canadian pea exports were up only 30% over the 10 year period as shown in Figure 2 above, the value of exports almost tripled, indicating a significant strengthening in global pricing.

## **2.5. TYPICAL CAPITAL & OPERATING COSTS**

Capital costs for a basic 30,000 to 50,000 tonnes per year pea processing plant with storage, handling, cleaning, splitting, storage, weighing, rail siding and loading facilities were in the range of \$2 million to \$7 million in 2005,<sup>3</sup> depending on existing infrastructure. The US Bureau of Labour Statistics Producer Price Index for food processing for the period 2005 to 2016 denotes a 10.2% increase. Thus, the capital costs would fall approximately into the range of \$3.3 million to \$7.7 million.

Labour represents about 50% of a primary pulse processing plant, electricity 25% and the remainder is comprised of maintenance, consumables, and general expenses. Employment at such a plant will typically range from between 15 to 40 people, depending on the size and scope of the operations.

## **2.6. EXISTING PROCESSING / TRANSPORTATION CAPACITY IN BRAED REGION**

Appendix A provides instruction on how to access the online map below, which enables drill down into details as well as editing of logistics and the location of pulse processing facilities. A list of pulse processing plants in Alberta is provided in the pulse processing section of the main Strategy Document.

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<sup>3</sup> Alberta HUB Regional Investment Strategy Report 2005 - MNP

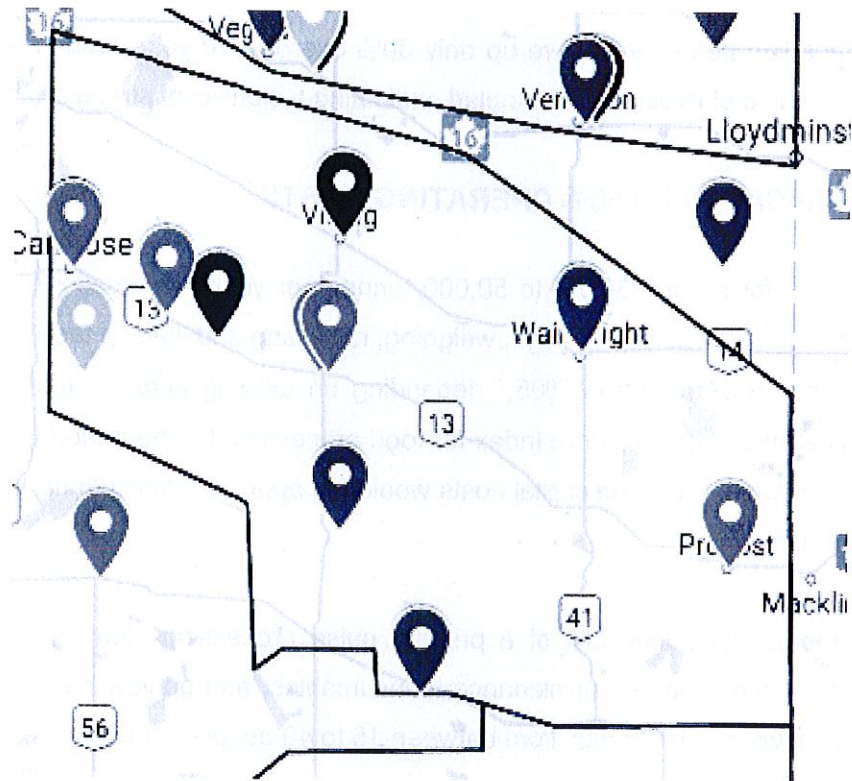


Figure 4 - BRAED Region Infrastructure

**Legend:**

Orange (CP – Grain loading terminal), Dark Blue (Seed Cleaning Plant),  
 Purple (CN – Grain loading terminal), Light Blue (Transload Facility), Green (Greenhouses)  
 for the BRAED region.

CN and CP both provide services to the BRAED region. CN runs a line connecting Camrose to the Alliance region with a 268,000lb line and CP runs a main line east of Camrose through Hardisty. They have two transload terminals located in the County of Wainwright. One is operated by Altex and the other is operated by Bunge Canada.

The BRAED region has two major roadways, namely Highway 14 and Highway 36 which intersect Viking in the north (nil fee from Viking). Highway 36 from Viking runs toward Alliance and Castor in the south. To the east, Highway 14 runs from Viking into Saskatchewan. Highway 41 connects south into the US market.



In terms of processing facilities, the BRAED region has three pulse cleaning plants located in Wainwright, Alliance, and Coronation. A complete list of pea processing facilities is available in the main Strategy Document.

## 2.7. LOCATION SITING CRITERIA

The criteria listed in Table 4 below narrows down the potential sites to those in or nearby rail corridors with a proximity to growers. It will be helpful to scan rail lines for existing sidings. Any unused sidings recently built to handle frac sand would present an opportunity.

<b>KEY LOCATION CRITERIA FOR PULSE FRACTIONATION</b>	
<b>Pulse Consolidators</b>	<b>Ingredient Manufacturers</b>
Rail service and container availability (min. 40 railcar siding).	Rail service and container availability (min. 40 railcar siding).
Proximity to growers, which in medium term may be impacted by water supply.	Market Access – Tariffs.
Local crop failure history.	Proximity to growers.
Labour availability and cost.	Water and sewer access (more important for wet fractionation).
Electricity and other operating costs.	Labour availability and cost.
Competition among crops.	Electricity and other operating costs.

*Table 4 - Key Location Criteria for Pulse Fractionation*

## 2.8. EXAMPLE SITE LOCATIONS IN THE BRAED REGION

As wet processing of pulses requires water, careful assessment of long term availability is required for potential sites, prior to development.

Region	Location	Rail	Rail Terminal	Labour	Water	Elec. Transmission
BRAED	Camrose	CN / CP	Yes	18,000	Battle River / Dried Meat Lake (may be limited)	115 – 229 kV line
BRAED	Wainwright	CN	Yes – (operated by Altex Energy)	5,900	Battle River / Betty Lake (may be limited)	Forestburg - 115 – 229 kV line

Table 5 - Preliminary List of Example Cluster Sites

## 2.9. RISKS AND MITIGANTS

Table 6 below summarizes the key operating risks and mitigants for this segment that need to be understood to help formulate the investment attraction strategy. Several of these risks are inherent in both the BRAED region and in Alberta.

KEY RISKS & MITIGANTS	
RISK	MITIGANT
Commodity price	Global demand for plant protein in sustained upward trend. Watch for emerging futures market.
Trade barriers	Select export markets with lowest tariffs. Work with Pulse Canada and government toward tariff reductions.
CAD vs USD exchange rate	Currency hedging.
Electricity cost and carbon taxes	Self-generation to avoid transmission costs. Maximize use of green energy subsidies.
Shipping container availability	Locate near container port or near inbound user of containers.
Shipping costs	Focus on highest value products in nearest markets.
Labour availability	Locate near larger population centre.

Table 6 - Key Risks & Mitigants

### 3. HEMP BASED BIOCOMPOSITES

The secondary opportunity recommended for BRAED is hemp based biocomposites. While the hemp based food and supplement markets are somewhat competitive, with established manufacturers in both the US and Canada, there are possible emerging hemp fibre and hemp hurd opportunities in automotive parts and building products respectively, ramping up manufacturing in Alberta. Small quantities of hemp fibre are being consumed locally and some is being exported to the US from the Palliser region. The BRAED region is capable of growing all varieties of hemp and has sufficient infrastructure to export intermediate or finished products.

Biocomposites are materials formed by blending natural fibres with other natural or synthetic materials. The following assessment is based on the use of hemp as a feedstock, which has good growth potential in the EATC. Hemp has been grown for industrial purposes for many decades. Global production of industrial hemp exceeded 350,000 tonnes in 1961 and, for a variety of reasons, declined to under 100,000 tonnes by 2000. Introduction of low THC hemp varieties and an interest in bio-based products is causing a resurgence.

#### 3.1. ADVANTAGES OF HEMP BIOCOMPOSITES IN THE BRAED REGION

BRAED versus	BRAED Advantages	BRAED Disadvantages
Other Alberta Regions	<ul style="list-style-type: none"> <li>• Existing grower base</li> <li>• Closer to markets</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal</li> </ul>
Other Provinces and States	<ul style="list-style-type: none"> <li>• Some exchange rate advantage over US states producing hemp</li> </ul>	<ul style="list-style-type: none"> <li>• Higher energy costs</li> </ul>
Globally	<ul style="list-style-type: none"> <li>• Stable government</li> <li>• Educated workforce</li> <li>• Reliable logistics</li> <li>• Free trade agreements w US and Europe</li> </ul>	<ul style="list-style-type: none"> <li>• Much smaller selection of approved hemp varieties than jurisdictions such as Ukraine</li> <li>• Slow approval process for new varieties</li> <li>• Transport cost to ports</li> </ul>

Table 7 - BRAED Advantages/Disadvantages for Hemp Biocomposites

### **3.2. FEEDSTOCK**

While hemp is grown in the BRAED region, there are unfortunately no published county by county statistics to quantify industrial hemp production in Alberta.

Industrial hemp is grown primarily for its seeds and fibres, or in some cases both. Straw from the hemp crop, which was largely considered as a waste in the past, is currently used to produce hemp fibres, which is processed further and can be used in variety of industries such as textile, bioplastics, and pulp and paper. It should be noted that the hemp straw consists of 15% to 30% fibre, 55% to 60% hurd (the woody core of the stem), and 15 to 25% is dust, which can possibly be pelletized and used as biofuel. The leaves contain 23% protein among other valuable compounds.

There are several hemp varieties, some with a significant biomass proportion growing 2 to 3 metres in height. Shorter varieties are easier to harvest for producers who only want seed. Seed is harvested later than pure fibre crops as it needs to mature longer. Specially equipped combines can harvest the entire crop so it is conceivable that both food and fibre could be grown in the same field to enhance producer netbacks, given an appropriate hemp variety.

### **3.3. VALUE CHAIN & PRODUCTS**

Figure 5 below illustrates the numerous steps in the processing value chain and the resulting products. This value chain excludes leaves, which could also serve as feedstock for health, food, and animal feed products. Players in the value chain will vary by primary product type.

The industrial fibre value chain is comprised of producers, processors, primary manufacturers (e.g. door panels), secondary manufacturers (e.g. auto parts companies), and tertiary manufacturers (e.g. auto companies).

The food and health product value chain is comprised of producers, processors, food manufacturers, distributors, and retailers. The shortest version of this value chain would be a producer selling directly to the manufacturer, who then has a retail outlet or distributes to other retailers directly.

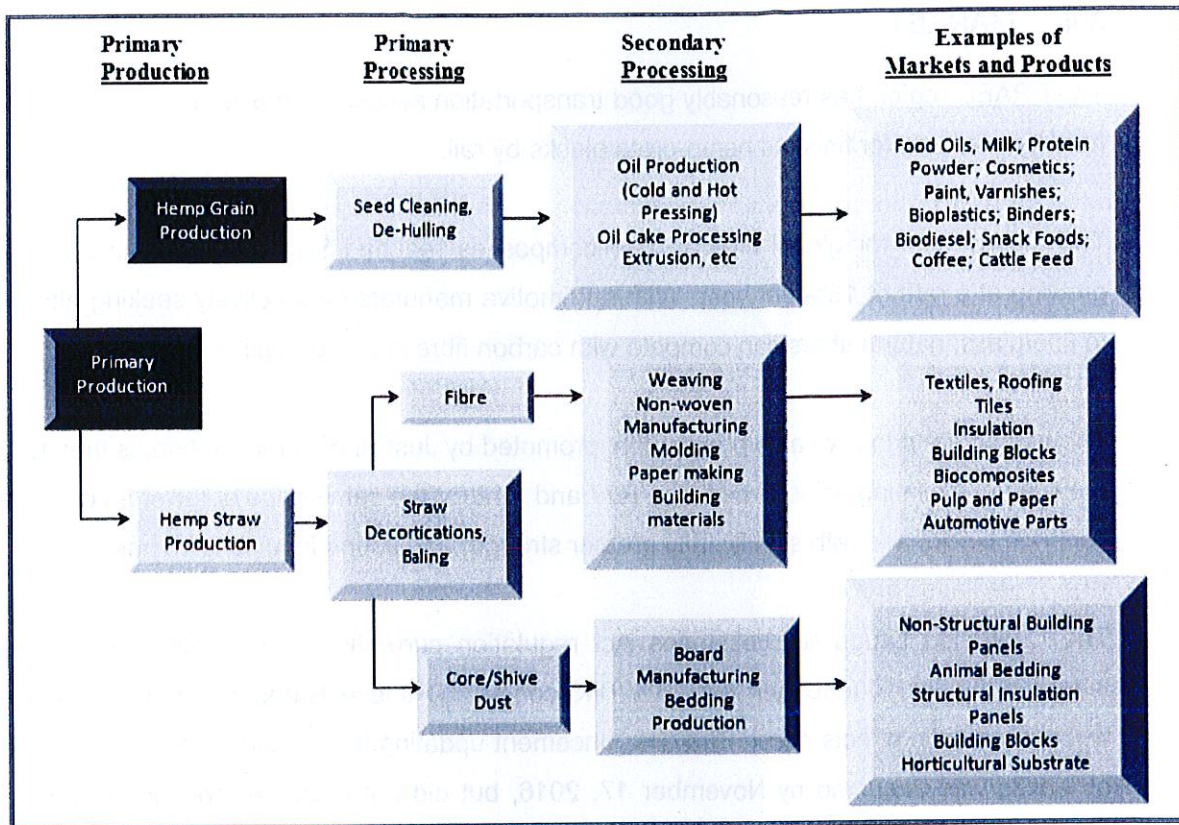


Figure 5 - Hemp Processing Value Chain & Product Examples

Source: Government of Alberta website

Active projects in Alberta include fibre mats for automotive interior panels and hemp-crete construction blocks.

Internationally, hemp is becoming a mainstream fibre in many domains. For example, Nike uses hemp fibres in its running shoes. There are several Canadian companies—including Hemp Oil Canada Inc., Hempola Valley Farms, Fresh Hemp Foods Ltd., Ruths Hemp Foods, Cool Hemp, and Natures Path, etc.—who are working to develop and market hemp seed products. These companies are all involved in the hemp seed market and are producing a wide range of products. These products are snack foods, hemp meal and flour, edible oil, shampoo and conditioners, moisturizers, commercial oil paints, beer, aromatherapy, and cosmetic products. As the Controlled Drugs & Substances Act regulations have until now prevented harvesting of the leaves, there has been no commercial activity in this domain.

### **3.4. MARKET**

The BRAED region has reasonably good transportation access for movement of hemp fibre and hurd by road and for finished hemp-crete blocks by rail.

The market size for global natural fibre composites reached \$US 2.1 billion in 2010 and is growing at a rate of 15% per year. With automotive manufacturers actively seeking alternatives to fiberglass, natural fibres can compete with carbon fibre in some applications.

The hempcrete primary value proposition, promoted by Just BioFiber in Alberta, is that its blocks provide an insulating value of between R27 and R42 for the same price or lower as conventional concrete blocks and with significantly greater strength and sound insulating values.

The Controlled Drugs & Substances Act regulation currently forces farmers to discard the leaves in the field, due to their low 0.3% THC content. This level is deemed to be above the limit wherein narcotic effects occur. The announcement updating this regulation to permit harvesting of leaves was expected by November 17, 2016, but did not occur. As mentioned above, this would open a significant new co-product revenue source for higher value foods, medicinal products, nutraceuticals, and animal feed. Last year, the US Industrial Hemp Farming Act of 2015 was introduced into the Senate, which would change the material's designation as a controlled substance and permit farmers in the US to produce industrial hemp. Twenty-eight states, including Kentucky, currently have laws that involve industrial hemp production.

### **3.5. TYPICAL CAPITAL & OPERATING COSTS**

With ready access to feedstock and a cluster to reduce capital and operating costs, this opportunity can likely be competitive in nature if supported by both fibre mat and hempcrete customers. To determine if a standalone decortication process is viable, the following economic indicators were considered:

- A standalone dry decortication unit with straw processing capacity of 4 to 7 MT/h, would approximately cost \$8M to \$10M.
- The outputs of this plant would be bast fibres, clean hurd, and dust in bulk.

- In a report developed for Alberta Agriculture in 2012,<sup>4</sup> the prices of processed fibre and hurd was determined approximately as \$1,000 per tonne and \$370 per tonne respectively to the manufacturer.
- One agriculture report stated that in a 3 MT/h plant, the operating costs were \$5.5M, of which one half was feedstock.
- Given yields of 30% fibre and 55% hurd, the maximum annual fibre production from a 3 tonnes/h decortication plant running 24 hours per day for 350 days per year would be about 6,300 tonnes of fibre and 13,800 tonnes of hurd.
- It is estimated that the demand for hemp fibre for automotive interior manufacturing in Alberta will be between 2,000 and 6,000 tonnes per annum.<sup>5</sup> At an average price of \$1,000/tonne for processed fibre, the total fibre revenue for a decorticator selling into an automotive panel manufacturer in Alberta would be \$2M to \$6M.
- A full scale hempcrete building block plant would consume 16,000 tonnes of hurd annually. Thus, at a price of \$370/tonne, a decorticator could earn an additional \$5.9M.

These figures were developed in discussion with industry experts and some of the costs were based on the Alberta Agriculture report.

### **3.6. PROCESSING AND TRANSPORTATION CAPACITY IN THE BRAED REGION**

There is currently no large scale hemp fibre processing facility in the BRAED region. Please refer to Appendix A to access the online map of rail, road and seed cleaning plants.

### **3.7. ELECTRICITY**

There are currently no natural gas fired power plants located in this area. However, there is a Capital Power wind farm with 83 turbines and a capacity of 100 to 150MW in the County of Paintearth.

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<sup>4</sup>

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/econ14086/\\$file/hemp\\_production\\_marketassessment\\_report.pdf?OpenElement](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/econ14086/$file/hemp_production_marketassessment_report.pdf?OpenElement)

<sup>5</sup> Biocomposites Group

The transmission infrastructure within the BRAED region is well established with a high capacity (greater than 230kV) line available from the Forestburg coal plant. There are other, smaller capacity lines available within the region as well.

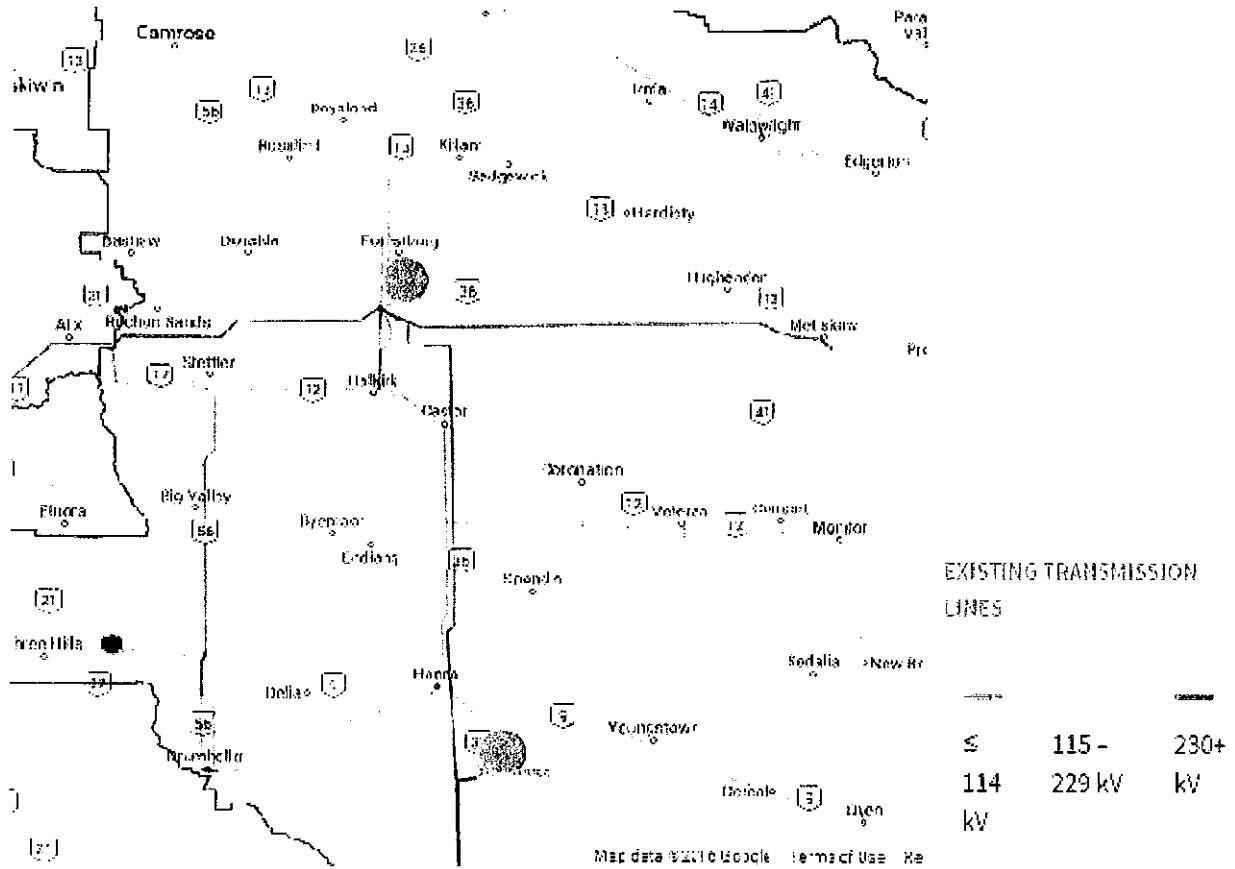


Figure 6 - Transmission Lines in – BRAED Region

### 3.8. LOCATION SITING CRITERIA

Proximity to producers and a labour pool are important to decortication operations and to the hempcrete block manufacturer. In addition, access to rail is mandatory for the hempcrete operator.



### 3.9. EXAMPLE SITE LOCATIONS IN THE BRAED REGION

Region	Location	Rail	Rail Terminal	Labour	Water	Elec. Transmission
BRAED	Camrose	CN / CP	Yes	18,000	Battle River / Dried Meat Lake (may be limited)	115 – 229 kV line
BRAED	Wainwright	CN	Yes – (operated by Altex Energy)	5,900	Battle River / Betty Lake (may be limited)	Forestburg - 115 – 229 kV line

Table 8 - Preliminary List of Example Cluster Sites

### 3.10. RISKS AND MITIGANTS

Table 9 below summarizes the key operating risks and mitigants for this segment that need to be understood to help formulate the investment attraction strategy. Several of these risks are inherent in both the BRAED region and in Alberta.

KEY RISKS & MITIGANTS	
RISK	MITIGANT
Commodity price	North American demand for hemp fibre is growing. Hemp hurd demand depends on new uses such as building materials. Larger scale facilities will reduce unit production costs.
Trade barriers	Select export markets with lowest tariffs.
CAD vs USD exchange rate	Currency hedging.
Electricity cost and carbon taxes	Self-generation to avoid transmission costs. Maximize use of green energy subsidies.

<b>RISK</b>	<b>MITIGANT</b>
Shipping container availability	Locate near container port or near inbound user of containers.
Shipping costs	Focus on highest value products in nearest markets.
Labour availability	Locate near larger population centre.

*Table 9 - Key Risks & Mitigants*

## APPENDIX A – EATC Google Maps Access Instructions

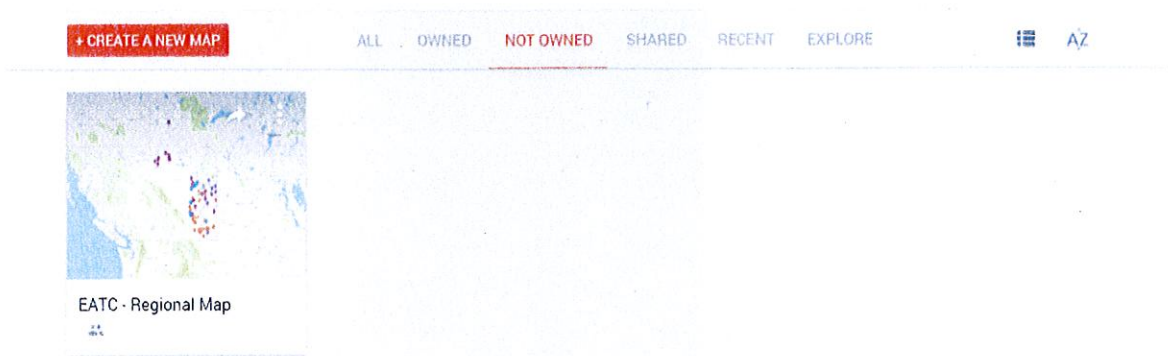
1. Click on the below link (alternatively one can search “my maps” in the google search bar).  
<https://www.google.com/mymaps>
2. Once you click on the above link, Google would request a user name and password for accessing the maps. Please use the below email.

User name – [eatcmaps@gmail.com](mailto:eatcmaps@gmail.com)



Password – Eatcstrategy (with a capital E)

3. Click on the “Not Owned” tab as shown below to access the EATC regional map.

NOTE: Due to limitations of the Google graphics package, the region boundaries cannot be exact. They are approximations.




4. Click on boxes on left to reveal layers as shown:

 Add layer  Share  Preview

Seed Cleaning Plants


 Individual styles


 Vegreville - Seed Cleaning Pl...

 Marwayne - Seed Cleaning


 Alliance - Seed Cleaning Plant


 Paradise Valley - Battle River...


 Bonnyville - Seed Cleaning Pl...

 Coronation - Seed Cleaning C...

 Foremost - Cooperative Seed

 St Paul - Seed Cleaning

 Vermilion - Seed Cleaning Pl...

 Wainwright - Seed Cleaning...

Greenhouse Growers

 Individual styles

