


FIVE YEAR STRATEGY



2023-2028

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BUILDING A BETTER CANADA THROUGH A SUSTAINABLE PLANT-BASED FOOD, FEED AND INGREDIENT SECTOR

The Opportunity for Canada

The demand for plant-based food is increasing. Driven by a growing global population and an expanding middle-class, combined with consumers choosing plant-based foods for health, environmental and animal welfare reasons, it is expected that by 2035 the annual global market will be worth upwards of more than \$250 B.

Canada has the potential – and is well on our way – of being a global leader in plant-based ingredients and finished food products. Building on our strength as an agricultural powerhouse; with more than 28 M hectares of arable land and a leading producer of high-protein crops such as peas and canola, we have opportunity to turn this global demand into a long-term, sustainable economic driver for Canada. In fact, at Protein Industries Canada, we believe that by 2035, Canada will provide 10 per cent of the plant-based ingredients to the world – a goal, that when achieved, will contribute upwards of \$25 B a year to Canada’s economy, supported by 17,000 jobs.

Over the next five years, Protein Industries Canada will accelerate innovation in plant-based protein. We will do this by convening and champion trailblazing companies that are fueling a food revolution. Through our co-investment into technology leadership and capacity building, we will lessen risk and allows for bold initiatives, accelerating innovation. The outcome is a Canadian-made solution to a global food challenge. As a global agriculture powerhouse, Canada has the means, resources, and skill to turn crops into food – and transform the way the world eats.

A Global Need – A Canadian Solution

The world’s food systems are facing a potential crisis – not only does a growing global population require more protein and more calories, but there are also extraneous factors that will result in more wide-spread food insecurity. An increasing global population, combined with impacts of climate change; war and economic uncertainty means that our food system is under greater strain and more perilous than ever. Food production and food movement are all being impacted, and the results is a serious impact on human health and the stability of societies.

Canada has a role and responsibility to mitigate these challenges. By building a strong plant-based food sector, we will be able to secure not only Canada’s food supply chain, but also help provide solutions to some of humanities most pressing challenges. By further developing Canada’s ingredient processing and food manufacturing capabilities, we will reduce our reliance on fragile global supply chains, ensuring Canadians have continued access to food, but we will also enter global supply chains as a higher-value supplier of ingredients and finished food products. This will help drive more economic value for Canada, while also mitigating non-tariff trade barriers often faced by commodities.

Now more than ever, innovation in ingredients, products and processes are necessary to meet global demands and keep pace with consumer expectations. The need for better quality, affordable, healthier sustainable, and more choices in plant-based products is driving the growth of the sector. No longer are consumers willing to accept simple meat alternatives. Increasingly they are looking for options such as whole muscle cuts, cleaner labels and price parity with meat counterparts. To deliver on these

expectations, Canadian ingredient processors and food manufacturers must embrace collaboration along the value chain, improve their own sustainability to contribute to the national objectives, reach scale and make connections within the global marketplace.

Catalyzing Connections – Leveraging Canada’s Advantages

To reach these ambitious goals, Protein Industries Canada will build off the foundation laid between 2018-2023, with a focus over the next five years of further increasing the competitiveness, scale and commercialization of Canadian companies, while also continuing to build capacity within the ecosystem.

An integrated value chain is Canada’s unique advantage, and catalyzing collaboration and innovation along it – from genetics, crops, to ingredients and products - through a robust Technology Leadership investment portfolio will help secure Canada’s position as a global leader in plant-based food, feed and ingredients. By leveraging our natural advantages of farmland, rain-fed crops, people and a supportive government, we will focus on increasing Canada’s ingredient processing capacity – which provides the greatest opportunity for Canada. With a stronger processing sector, we will strengthen our international reputation and create a more resilient supply chain, securing Canada’s position as a leader in this increasingly competitive sector and prosperity for Canadians.

Continuing innovation to support the creation of new ingredients and products is one piece of the puzzle. Companies will only be successful in commercializing their innovation if the ecosystem that surrounds them is well developed and supportive. Over the next five years, Protein Industries Canada will prioritize work and investments within the ecosystem on increasing capital investment from; attracting, training and retaining labour; contributing to economic reconciliation and regulatory modernization.

Over the next five years, Protein Industries Canada will:

- Further integrate Canada’s food value chain from genetics to finished product;
- Support the scale of Canadian companies and improving their competitiveness;
- Further the global reach and impact of Canada’s plant-based food sector;
- Improve the sustainability and efficiency of Canada’s food supply chain with a focus on GHG emissions;
- Build out an integrated and resilient value chain that allows Canada to make our own ingredients and food and export high-value, nutritious products to countries around the world;
- Support the prosperity of Indigenous people through meaningful partnerships and mutually beneficial opportunities that lead to shared prosperity;
- Advance equality of opportunity of under-represented groups and people of diverse backgrounds in Canada’s plant-based sector
- Re-skill and introduce youth, Indigenous Peoples and New Canadians to the opportunities provided by the agriculture and food-processing sector;
- Attract private investment to the sector.

The Future of Food is Canada

The work of Protein Industries Canada, powered by the Global Innovation Cluster program, to increase ingredient processing and food manufacturing in Canada, is not just about turning crops into food. It is about building a better Canada.

Through innovative technologies, we are creating new ingredients and food products. And while it is easy to focus on the new processing technology, the new ingredient or the new item on the grocery store shelf, there is much more to the story. Ours is a story of passion, innovation and a belief that we can change the course for Canadian agriculture, and in doing so, build a better Canada. Driven by The Road to \$25 Billion, over the next five years we are working to create a sector that adds \$25 billion to Canada's economy annually by 2035, supported by 17,000 jobs.

The Road to \$25 Billion

In 2020, Protein Industries Canada commissioned Ernst and Young to complete a global market sizing and competitiveness study for plant-based foods. By 2035, the plant-based food market will reach hundreds of billions of dollars in value and the market will require between 50 and 70 MMT of incremental ingredient processing capacity.

Working off of this knowledge, Protein Industries Canada, in consultation with more than 100 stakeholders, developed **The Road to \$25 Billion**. *The Road to \$25 Billion* is a roadmap for Canada's plant-based food, feed and ingredient sector to reach \$25 B in sales by 2035. The Roadmap extends beyond Protein Industries Canada's mandate to include a strategy for the sector, contemplating the role of industry, academia, not-for-profits and all levels of government.

It is critical that Canada implements the actions of *The Road to \$25 Billion* and takes advantage of this once-in-a-generation opportunity. Today, more than any time in history, the world needs Canadian plant-based food, feed and ingredients. At an unprecedented rate, ingredient processing capacity is being built and supply chains are being established as countries race to satisfy demand. Within the next five to 10 years, significant global processing infrastructure will be established. Canada must act quickly to create the infrastructure, expertise and processing innovation to prove we are the preferred country to produce and provide plant-based ingredients.

BUILD A ROBUST TECHNOLOGY LEADERSHIP INVESTMENT PORTFOLIO AND DRIVE CO-INVESTMENT

Innovation is at the root of Canada's success in plant-based foods. The goal of the Technology Leadership Program is to create a pipeline of innovations across the value chain and across Technology Readiness Levels (TRL), fostering collaboration between SMEs, MNEs and large anchor firms. Protein Industries Canada will build off our successes and learnings from the first fund to establish a technology leadership program that will focus investments on projects that deliver the highest ROI, GDP and job growth, further solidify business relationships, build supply chain resiliency and help ensure a long-term stable flow of technologies into the ecosystem.

Since its formation, Protein Industries Canada has taken a value-chain approach to investment – from seed genetics to primary production through ingredient and food processing. We called this Create, Grow, Make and Sell. This approach – combined with the necessary inclusion of an SME in all projects — was highly successful in fostering collaborative innovation and creating feedback loops up and down the value chain. It also accelerated the pace of innovation, solidified business relationships, integrated supply chains and increased awareness of uniquely Canadian plant-based ingredients. In Fund I, Protein Industries Canada had 439 organizations collaborating in projects, a very high industry-matching-fund ratio of 1:1.72 and 301 IP assets. In Fund II, we are confident in our ability to build out a robust project pipeline.

Going forward, Protein Industries Canada will build on our Investment Thesis and evolve to employ a more stepwise and descriptive approach, allowing us to focus on global scale and value creation.

In Fund II, we will:

- Re-balance the distribution of investment to focus on the priority of ingredient processing – the largest value creation opportunity for Canada;
- Increase emphasis on sustainability through the incorporation of specific evaluation criteria and track progress towards the net zero target; and
- Ensure a path to commercialization through comprehensive business and risk assessments.

In Fund II, Protein Industries Canada’s investment portfolio will continue to focus on the value chain, with an increased emphasis on ingredient processing and selling at every point in the value chain.

CANADIAN VALUE CHAIN



Genetics (15%): advanced breeding technologies and germplasm development to improve protein content, quality and functionality, with an aim to improve processing efficiency and the development of novel ingredients.



Crops (10%): technologies related to data and predictive analytics, artificial intelligence, traceability systems, automation and sensor technology, to increase primary production efficiency and improve information flow along the value chain.



Ingredients (50%): the development, scaling and optimization of novel plant-based ingredients through the development of new technologies and the improvement of existing ingredient manufacturing processes.



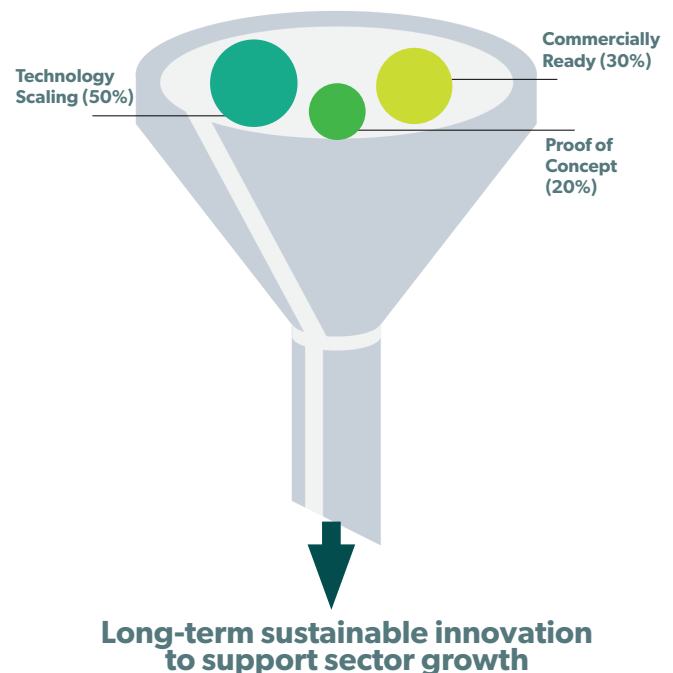
Products (25%): the creation of consumption-ready goods in the form of consumer packaged foods, animal feeds and industrial bio products.

We learned in Fund I that we need to establish a technology pipeline to build a suite of innovation that can sustain long-term growth and as such will build a pipeline with a mix of Technology Readiness Levels (TRLs):

Proof of Concept (20%): Projects that will demonstrate feasibility at pilot scale by generating data to assess technical and economic feasibility. These technologies would be expected to be commercialized within three to five years, and have the potential to transform the sector.

Technology Scaling (50%): Projects that will enable the first commercial deployment of a technology, enabling companies to establish a feedback loop with prospective customers, and to assess technical, economic and commercial feasibility.

Commercially Ready (30%): Projects that will enable companies to optimize and deploy commercially viable technology for Canadian crops and conditions.



GROW AND SCALE UP CANADIAN SMES

Canada's current ecosystem houses a range of business maturities - from start-ups and SMEs to mid-range Canadian firms and multinationals. Regardless of their maturity, footprint or resources, every firm within the ecosystem will employ partnering to achieve scale as a business growth strategy. Collaboration and partnership are rooted in the complexity of the innovation challenges, the urgency of intensifying global competition and the structure of the sector's value and supply chains where the output of one company becomes the input of another (crops become ingredients, which become food).

As a Global Innovation Cluster, the critical role for Protein Industries Canada is to guide and support our member companies as they partner for scale. We will do this by fostering collaborative innovation, delivering on a capital growth strategy, leveraging IP assets, creating a competitive business environment and supporting commercialization and prosperity.

A - FOSTERING COLLABORATIVE INNOVATION

Through our Technology Leadership Fund, Protein Industries Canada will support companies in scaling by focusing on collaborative innovation, supply chain integration and multiplication of wealth across the value-chain. As described in the previous section, we will build off our strengths from Fund I, while refining our investment thesis to be more deliberate, enhancing collaboration within our projects and improving our assessment of the path to commercialization.

By evolving value-chain verticals to Genetics, Crops, Ingredients and Products — a more accurate reflection of the continuum from field to fork — we will enhance collaboration within our technology projects, bringing companies from multiple verticals of the value chain together. This approach improves feedback loops, accelerates products iteration and improves supply chains integration, resulting in the multiplication of wealth as products move along the value chain.

We will also continue with the requirement of an SME to be part of every technology project. This brings benefits to the SME, including increasing their access to global supply chains, supporting business mentorship and allowing companies to scale at a pace they could not achieve alone. It also provides an innovation pipeline for multinationals that increasingly rely on start-ups and SMEs for new ideas, new technologies and new product concepts.

B - DELIVERING ON A CAPITAL GROWTH STRATEGY

The greatest barrier to scale is access to capital. The ingredient and food processing sectors are capital-intensive, and processors require a significant investment injection to reach full commercialization.

Despite the well-known and accepted global value of the plant-based food sector, very little capital, outside of self-financed infrastructure, has flowed into the Canadian ingredient manufacturing space. Currently, the perception of investors is that the time horizon is too long, the risk profile is too high, and the returns are too low and take too long to realize.

To address the lack of capital, Protein Industries Canada will continue to evolve and deliver our comprehensive Capital Growth Strategy, including further developing the Canadian Plant Protein Fund, working with federal lending agencies, and partnering with Invest in Canada to promote the sector in foreign capital markets.

Increasing Capital in a New Sector

In the past three years, Protein Industries Canada has supported the injection of more than \$260 million in capital investments to our members. Driven by our Capital Growth Strategy and by providing financial and technical due diligence, Protein Industries Canada has made significant progress in addressing this challenge and helping our members secure capital.

Protein Industries Canada is also working to support the creation of The Canadian Plant Protein Fund (CPPF). The Fund is structured to help address the current capital gap plaguing would-be Canadian plant protein processors. While Protein Industries Canada is not a direct investor or General Partner in the Fund, our work to create connections and share information about the sector to investors has been key in its establishment.

The Fund aims to invest in five to seven Canadian plant protein processors.

Several Indigenous organizations across the Prairie region are poised to become General Partners in the fund, and we have received a letter of intent for one to become a major investor. This represents the first time in Canada that a First Nations Tribal Council will participate directly as a General Partner in a fund of this nature, contributing to economic reconciliation and ensuring the benefit of the growth of this sector benefits every Canadian.

C- LEVERAGING IP ASSETS

Our members have already laid the foundation for global impact, with the creation of 164 IP assets covering copyright, datasets, patents, algorithms, trademarks and trade secrets, and with patent filings in high growth markets including the United States and the European Union. With an IP portfolio largely held by SMEs, heavily weighted toward environmental benefits and global in nature, the focus of Fund II will be to stack and scale these technologies and the follow-on innovations they generate. The design of the Fund II Technology Leadership Program – focusing on innovations throughout the TRL funnel—will ensure that we are building a technology pipeline that can support a decade of growth. Protein Industries Canada will build upon the success of our IP Hub and support the competitiveness of companies to reach scale.

Leveraging Protein Industries Canada’s IP Hub

Protein Industries Canada’s IP Hub contains abstracts and foreground IP generated through Fund I collaboration, and acts as a marketplace for collaboration between companies. By working with consortium members, we will further build out the data associated with foreground IP, better enabling Protein Industries Canada and our members to understand the sustainability and commercial advantages associated with the technologies and to identify stacking opportunities.

Creating Competitive Canadian Companies

Protein Industries Canada’s members hold an impressive suite of IP. A substantial number of these patents and trade secrets have significant commercial value and are ready to move beyond the pilot stage. Over the next five years, Protein Industries Canada will work with the capital community and other federal programs to help drive the most promising IP to commercial scale.

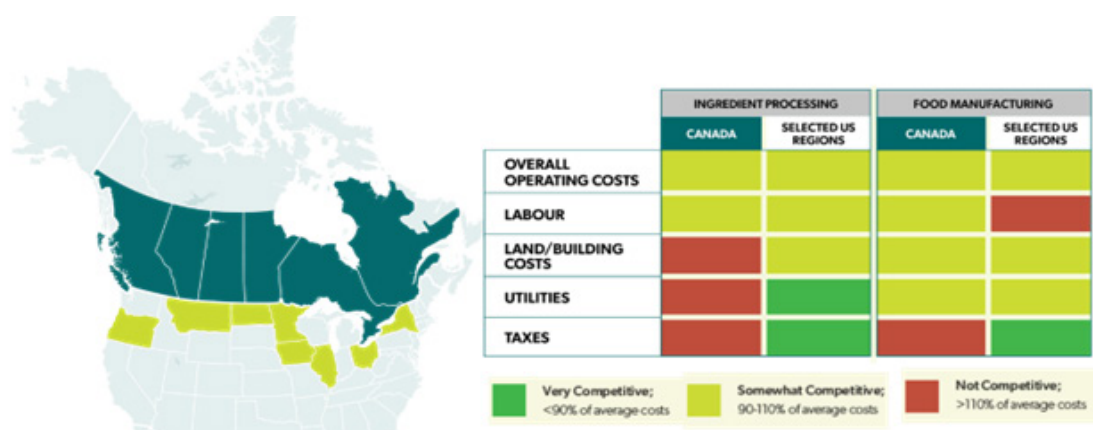
Protein Industries Canada will work with members to explore additional IP protection options (ex: industrial designs) that will increase the competitiveness of Canadian companies globally and enable them to secure licensing revenue through commercialization of IP assets. We will also drive engagement of member companies with further sources of latent Canadian IP. In addition to raising the profile of consortium members’ own background IP, Protein Industries Canada will work proactively with Canadian universities and public institutes (ex: NRC) to strategically identify and create awareness and share (via our IP Hub) latent IP that has potential to fill technology gaps that exist in the plant-based foods ecosystem.

SMEs are responsible for more than 70 per cent of the current patents generated by Protein Industries Canada’s co-investments. This includes technologies that improve environmental outcomes, such as patents in the areas of greenhouse gas reduction, supply chain improvement, traceability systems, water use reduction, clean water preservation, crop input reductions and food product innovation.

D- CREATING A COMPETITIVE BUSINESS ENVIRONMENT

Countries around the world are aggressively working to establish plant-based ingredient and food processing value-chains, including the establishment of processing and manufacturing facilities. A key aspect of scale-up success is ensuring Canada is competitive for ingredient processors to do business in Canada – with a focus on keeping Canadian companies in Canada.

Through an in-depth analysis we have developed an understanding of the decision factors for locating ingredient manufacturing facilities. These facilities can range from \$100 M to over \$1.0 B of capital investment plus ongoing operational costs. In addition to the proximity of raw commodities, factors that influence sighting locations include labour, land/building costs, utilities and taxes. From an ingredient manufacturing perspective, on average, Canadian provinces are less competitive than American states across utilities, building costs, and lease payments and property taxes.

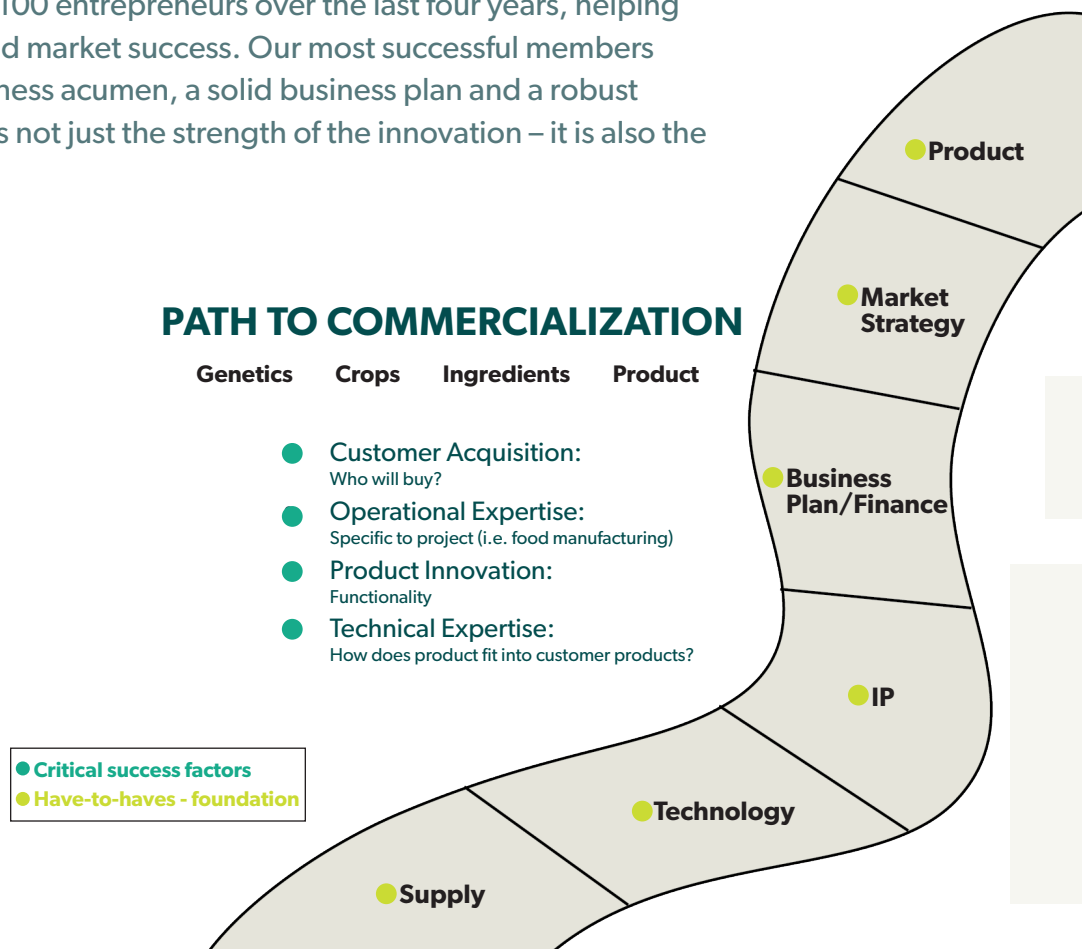


The United States has noticed the innovation coming from Canadian companies and is being aggressive in enticing Canadian companies to move to the United States. It is key that Canada is not only the preferred place to invest for other foreign companies, but that our business policies support Canadian companies scaling up in Canada.

To help make Canada more attractive for ingredient manufacturing, Protein Industries Canada will work with all levels of governments, as well as regional economic development agencies, to design and communicate competitive investment attraction policies.

E- SUPPORTING COMMERCIALIZATION AND PROSPERITY

We have worked with more than 100 entrepreneurs over the last four years, helping uncover keys to value creation and market success. Our most successful members have three elements: strong business acumen, a solid business plan and a robust customer acquisition strategy. It is not just the strength of the innovation – it is also the strength of the companies.



Many of our SMEs are founder-led and have deep technical knowledge, but often need to improve financial, marketing and accounting skills. Improving the business skills of our members is a critical piece to ensuring they are investable. Protein Industries Canada will work with our members to continue to develop their business acumen, through education and mentorship programs.

The second element of success is the strength of the business plan covering the path to commercialization. As we evaluate projects in Fund II, we will help members strengthen their path to commercialization through improving collaboration within projects, improving risk mitigation strategies and better defining finance, production, procurement, research and marketing aspects of the projects.

Finally, we have seen great success when the final element of a robust customer acquisition strategy is built into projects and plans. We will work with members to accomplish this by incorporating customers directly into projects and working to better define markets based on product performance, price and fit.

INNOVATION ECOSYSTEM BUILDING

The Road to \$25 Billion highlighted the characteristics of a thriving ecosystem. Similar to what individual companies need to scale, ecosystems need the right supports to thrive. A robust ecosystem is a magnet for talent and investment, and it will foster collaboration between public and private entities. A globally relevant ecosystem thrives at the nexus of deep market knowledge, acute understanding of sector needs, and fostering the right partnerships.

How companies work in ecosystems and how ecosystems support companies is Protein Industries Canada's part. *The Road to \$25 Billion*, along with our work over the first four years, has focused us on market knowledge, innovation infrastructure, access to talent, labour and skills including an increased focus on equity, diversity and inclusion, and a supportive regulatory framework.

Market knowledge

The plant-based food, feed and ingredient sector is developing at an extremely rapid pace. To be commercially relevant, our ecosystem requires deep insight into consumer trends and competitive intelligence about other jurisdictions.

As heard loudly during stakeholder consultations, these are insights that no SME could gain on their own and are a critical service that Protein Industries Canada must continue to offer as the trusted source of market and customer insight. We will continue to scope, support, and disseminate market research, including monitoring and communicating domestic and international trends. In addition, we will continue to be a resource to our members and support their strategic planning efforts, provide insight for environmental scans, and assist with assumption development and testing.

Innovation infrastructure

Over the course of Fund I, and throughout our stakeholder engagement sessions, we have consistently heard about the need for increased access to research and product-scaling infrastructure. In many cases, companies are contracting work abroad because the required facilities do not exist in Canada, or they don't have the capacity. The lack of infrastructure reflects the ecosystem maturity. We are approaching a critical mass that would justify private sector investment into contract research, toll processing, co-manufacturing and co-packing facilities. Protein Industries Canada will work to gain a deep understanding of current infrastructure and capacity (i.e. expertise within facilities) to help companies make best possible use of current infrastructure. We will then work with private sector contract research and toll manufacturing companies to build the business case for establishing operations in Canada. Other areas of focus will be increasing capacity in publicly funded research institutions and making connections between entrepreneurs and researchers.

Access to talent, labour and skills

When asked, our members consistently rate access to talent, labour and skills as one of their top three constraints of the ecosystem. Requirements span from moderately skilled labour to highly specialized roles in food chemistry and food formulation. In addition, members cite business acumen, financial literacy, marketing, sales and critical thinking skills as important.

We estimate the sector needs an additional 17,000 people to achieve the goals set out in *The Road to \$25 Billion*. This demonstrates both a need and a great opportunity. Protein Industries Canada will work to connect the sector with academic institutions, as well as collaborate with Canada's Universities, Canada's Polytechnic Institutions, Indigenous training institutions and a host of talent and skill-focused NGOs to continue to support and develop programs to fill the labour gap and attract highly specialized foreign talent into the sector.

Supportive Regulatory Framework

The federal regulatory framework is science-based and designed to protect human, animal and environmental health. The strength of this framework underpins Canada's global reputation and must be maintained. However, as countries scale up their own plant-based processing capacity, countries such as Singapore are increasingly using the regulatory system to not only promote safety, but also to support innovation.

There is an opportunity to modernize Canada's regulatory system to support continued innovation of plant-based foods, specifically for it to be more responsive and timely and to offer harmonization of regulations with other jurisdictions. Protein Industries Canada will continue to build upon the Regulatory Centre of Excellence we created in 2020, funding research in support of regulatory modernization in the areas of protein labelling regulations for protein nutrient content claims, nomenclature and discretionary fortification of simulated plant-based meat and poultry products.

An Inclusive sector that brings benefit to every Canadian

Protein Industries Canada is committed to inclusion of Indigenous People and new Canadians into the economic opportunity presented by the growth of the plant-based sector. This potential includes utilizing the land-base held by many First Nations to create added wealth, as well as new employment and investment opportunities that can contribute to food security.

Building off of our learnings in Fund I and respecting the feedback heard during the consultation process, Protein Industries Canada will focus our effort to increase awareness amongst both the agrifood sector and First Nations populations about the opportunities and benefits of collaboration. This will primarily be achieved by acting as a catalyst for engagement and creating opportunities for participation, including with post-secondary institutions, through events and educational sessions. We will also work to implement the recommendations of the Luminary project, which provided 10 recommendations to increase Indigenous Engagement into the agrifood sector.

ENHANCED GLOBAL PRESENCE

Canada has a worldwide reputation as an agricultural powerhouse. The need for Canada to strengthen our global presence has only enhanced with the supply chain disruptions brought on by COVID-19, climate change and the Ukraine-Russia conflict. Canada has the opportunity to be firmly established as a globally relevant, reliable and strategic partner in global value chains for plant-based products. We need to seize that opportunity and connect global processors and multinational food brands to Canadian companies. Domestic and international firms recognize Protein Industries Canada as a trusted partner to facilitate joint ventures and business-to-business transactions. Building on and evolving our International Engagement Strategy released in 2019, along with continued partnerships with the Trade Commission Service, Global Affairs Canada and Invest in Canada, Protein Industries Canada will focus on Foreign Direct Investment, the development of key markets and collaborative innovation with key international partners.

FOREIGN DIRECT INVESTMENT (FDI)

As major ingredient manufacturers and food processors observe growth trends and learn more about Canada's value proposition, conversations and considerations of acquisition and greenfield investments extend easily from collaboration discussions with our members. Large brands, acquirers and manufacturers value Protein Industries Canada's insights and due diligence to ground truth the Canadian value proposition and support their plans to develop and expand Canadian footprints. The recapitalization of the Global Innovation Clusters is key to these activities, as the development of these opportunities requires a long time horizon. Protein Industries Canada business development is currently working on FDI greenfield opportunities for several companies. To aid in these discussions, we have developed a comprehensive business competitiveness study and related value proposition materials to reduce barriers and dispel myths with quantified strategic insights.

MARKET KNOWLEDGE, DEVELOPMENT AND CONNECTIONS

Market development activities create opportunities for Canadian SMEs. By working with Protein Industries Canada, member companies can expand their reach in key markets, while benefiting from the global recognition created by the Global Innovation Cluster initiative. Opportunities exist to expand the international market reach of Canadian companies and to further establish Canada's reputation as a leader in plant-based food and ingredients.

Food is often unique to – and can help define – a country's culture. It is critical as an export-dominated sector that we are creating products that meet the taste, texture and nutritional needs of our global customers. Protein Industries Canada will ensure that Canadian companies have a sound understanding of potential markets, as well as deep knowledge of customers within each market, to ensure that products meet the expectation of a globally unique client. This will be accomplished by furthering partnerships with Global Affairs Canada and the Trade Commission Service and ensuring that Canadian companies are export ready. We will also continue to work with the Trade Commissioner Service to hold pitch sessions to investors and buyers in key markets, such as Japan, China, the United Kingdom and Singapore.

The underpinning of global success is understanding and communicating the attributes of doing business with – and in – Canada. Building off of our known attributes as a reliable supplier of high-quality crops, Protein Industries Canada will work to further define the attributes that distinguish Canadian products in key international markets – such as sustainability, quality and safety.

COLLABORATIVE INNOVATION

Canada has emerged on the global stage as a burgeoning hub for plant-based food innovation, however other jurisdictions with more history continue to outpace Canadian innovation. We can harness Canada’s growing reputation to increase international collaboration in key markets by developing strategic partnerships with Innovate UK, the Eureka Network and A-STAR.

Innovate UK

Protein Industries Canada is currently working with Innovate UK, who is looking to commit £6.0 M to co-invest with Canadian companies in the alternative protein space. We already have member companies within our ecosystem that are co-innovating with UK-based companies, and this opportunity will allow us to leverage significant investment from a market that represents sales as well as technology and customer acquisition.

Eureka Network

Canada recently signed on to become a full member of the Eureka Network, an intergovernmental network of funding agencies from 40 countries supporting international collaboration. As such, Canadian companies can become full members of project consortia. Of note is that agriculture and food are priority sectors in Canada-EU cooperation. Protein Industries Canada has begun discussions with the NRC on how to ensure our members are benefitting from collaboration with the Eureka network.

A-STAR Singapore

Singapore represents a key international partner from both innovation and market development perspectives. Singapore is fast emerging as a global leader in alternative protein technologies and product development. Protein Industries Canada continues to explore ways to collaborate with the newly formed Singapore Institute of Technology. Canada is a priority market for Singapore due to our diversity of technologies and ingredients. Protein Industries Canada continues to work with Global Affairs Canada to connect Canadian technologies with Singapore companies and investors through the Canadian Technology Accelerator. Graduates of the program obtain an enhanced understanding of Singapore’s growing agrifood tech infrastructure, investment community and regulatory environment.

MISSIONS

Greening Canada's economy and GHG reduction

The health of the environment – specifically through the reduction of GHG emissions – is an ever-increasing priority, for companies and for consumers. It is one of the foundational trends driving the demand for plant-based foods. Plant-based food innovation and growing the Canadian ingredient and food processing sector can help change the trajectory for agrifood emissions and help Canada reach its agrifood emission targets.

In Protein Industries Canada's first round of projects, 21 per cent of projects filed IP attributed to GHG reduction, 66 per cent of projects filed IP related to water use or clean water preservation, and 62 per cent included IP related to crop input reduction.

GHG EMISSION REDUCTION TO 2030

In their 2021 report, *Food for Thought*, the Boston Consulting Group reported that most consumers are willing to increase plant-based foods in their diet if they don't have to sacrifice taste, texture and price. Globally, transitioning to plant-based diets will have tangible and measurable impact; in fact, just an 11 per cent shift in meat and eggs will lead to a significant reduction in GHG emissions. "...by 2035, the [11 per cent] shift to plant-based meat and eggs alone will have saved more than 1 gigaton of CO₂ eqv. That's the equivalent of Japan going completely carbon neutral for an entire year. Eating that much plant-based protein would save enough water to supply the city of London for 40 years." The work of Protein Industries Canada to focus on new product innovation and improve accessibility to plant-based foods is key to helping Canada reach its own targets, while also demonstrating to the world global leadership.

- 1. Measure – Verify – Report:** Currently, the agrifood sector lacks accurate data and information regarding the movement of commodities, ingredients and food throughout the value chain. This creates challenges in tracking emissions. Protein Industries Canada will build upon investments in Fund I to further refine our traceability systems so that we can measure, verify and report emissions and, more importantly, design meaningful interventions that we can track and quantify. This base level of tracking and knowledge is critical to emissions reductions between now and 2030.
- 2. Advance the Pulse Industry:** A second route to absolute emission reduction is to support the growth of Canada's pulse sector by accelerating innovation in pulse breeding, production, ingredients and food products. Pulse crops require little to no synthetic nitrogen fertilizer, thereby making a direct contribution to ECC's 2030 Emissions Reduction Plan. "Under Canada's strengthened climate plan, Canada committed to setting a national fertilizer emission reduction target of 30 per cent below 2020 levels by 2030."

- 3. Reduce Food Miles:** GHG emissions will also be decreased through the reduction of food miles. Investment into processing technologies in Canada will reduce the shipment of low-bulk density commodities in favour of high-bulk density high-value ingredients directly to food manufacturers. Although the transportation of agricultural commodities represents a small fraction of total GHG emissions, reducing food miles is a critical step on route to net zero emissions.
- 4. Bio-industrial — reducing reliance on fossil fuels:** An added benefit of growing the plant protein sector is increased volumes of high-quality co-products. Canola protein extraction innovation will help improve the economics of processing where oil can be used as a feedstock for bio-based aviation fuel (replacing fossil-based fuels), protein can be directed towards aquaculture feed (reducing wild-caught fish meal) and fibre can be used for bio-industrial product applications (replacing petroleum-based and other non-sustainable feedstocks). Similarly, starch derived from pea processing can be a feedstock for ethanol production and fibre can be used as a carrier for micronutrient fertilizers. Widely applying the principles of a circular economy across the entirety of our ingredient manufacturing portfolio will contribute to absolute GHG emissions reductions.

TECHNOLOGICAL ADVANCES THAT CAN DRIVE GHG EMISSIONS TO NET ZERO BY 2050

We know that our investments and actions can significantly drive down emissions by 2030, but the ultimate goal for Canada is net zero by 2050. Protein Industries Canada will work with the national research entities such as the NRC and Canada's universities to evaluate pathways to net zero by 2050. This could include evaluating technologies related to replacing synthetic fertilizer and the development of nitrogen-fixing crops.

Supply Chain Resiliency

COVID-19 has exposed the fragility of Canada's food supply chain. The early days of COVID-19 saw widespread food shortages for staples and ingredients that the majority of Canadians have never before witnessed. These challenges are being exacerbated and replicated on a global stage as the illegal war in Ukraine continues and climate change creates variability in the production of raw commodities. To avoid disruption to our food supply chain, Canada has a responsibility to strengthen domestic processing capacity. As a net exporter of food, we need to strengthen integration into global supply chains. The key to supply chain resiliency lies in improving information flow, scaling our ingredient manufacturing capacity and expanding upon our value chain approach to innovation.

SUPPLY CHAIN INFORMATION FLOW

Improved information flow could have mitigated some of the challenges in Canada's agrifood supply chain in recent years. Our complex agrifood supply chain starts on Canada's 200,000 farms, requires digitization and better traceability to provide visibility across the value chain and provide early warning of emerging issues.

Through a collaborative partnership with Scale.AI, Protein Industries Canada will build on the Food Convergence Innovation project initiated by McGill University, which created a national platform that connects local and provincial tools to support collaboration and the sourcing of ingredients, packaging and other products from Canadian businesses and organizations. The format connects at several levels to address supply chain challenges, find domestic solutions to disruptions, find opportunities to collaborate and increase the resilience and value of the sectors involved. This project has started the complex process of digitizing and connecting Canada's agrifood supply chain.

SCALING INGREDIENT MANUFACTURING

Canada is too reliant on the importation of food. As a northern climate, we may never fully transition away from food imports, but over the last few decades we have doubled the number of calories we import per capita, leaving us vulnerable to supply chain disruption and food insecurity. Scaling ingredient manufacturing technologies will improve domestic food security and allow us to better integrate into global supply chains with ingredients versus commodities. Commodities are subject to non-tariff trade barriers and are far more substitutable than ingredients. Increasing our ingredient manufacturing capacity helps insulate industry from wide swings in global commodity markets and ensures a steady supply of domestically available ingredients.

EXPANDING THE VALUE CHAIN APPROACH

As stated previously, we will continue with a value chain approach to innovation, expanding it and being more deliberate in Fund II. This approach will better integrate customers and tighter supply chain integration. Another focus in Fund II will be to extend the value chain approach into global supply chains with the inclusion of more global food brands directly in Protein Industries Canada projects. This approach will integrate Canadian ingredient manufacturers with global companies.

CONCLUSION

The Future of Food is Canada

The work of Protein Industries Canada, powered by the Global Innovation Cluster program, to increase ingredient processing and food manufacturing in Canada is not just about turning crops into food. It is about building a better Canada.

Through innovative technologies, we are creating new ingredients and food products. And while it is easy to focus on the new processing technology, the new ingredient or the new item on the grocery store shelf, there is much more to the story. Ours is a story of passion, innovation and a belief that we can change the course for Canadian agriculture, and, in doing so, build a better Canada. Driven by *The Road to \$25 Billion*, we are working to create a sector that adds \$25 billion to Canada's economy annually by 2035, supported by 17,000 jobs.



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