

Economic Growth Strategy for Newfoundland and Labrador

RECOMMENDATIONS TO THE
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Final Report | February 2019

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Introduction

In the fall of 2018, the Government of Newfoundland and Labrador engaged the global consulting firm McKinsey & Company to make recommendations on economic growth. This engagement builds upon the Government's commitment to long-term economic development and advances the mandate of *The Way Forward*. These reports identified areas in which the Province can stimulate further growth, including detailed sector work plans, cross-cutting ideas to enable collaboration, and commitments for improving Government operations. In developing *The Way Forward*, the Government engaged with numerous stakeholders, drawing on the knowledge of public and private sector practitioners spanning a range of industries and functions.

As Newfoundland and Labrador looks toward 2030, the Government of Newfoundland and Labrador engaged McKinsey & Company to identify further opportunities for the Province's economic growth, bringing an independent and global perspective to challenge the current thinking and surface new opportunities. This work and the report that follows build upon *The Way Forward* by:

- Further prioritizing key industries where the Government can invest its energy and support, sharply focusing the longer list identified in *The Way Forward* based on an assessment of the areas that will have the greatest economic impact on the Province
- Raising aspirations for what is achievable based on international best practices and global demand, encouraging decision-makers to invest boldly
- Highlighting specific recommendations that could unlock the most significant opportunities, enabling the Government of Newfoundland and Labrador to prioritize its efforts to support the most urgent and impactful initiatives
- Proposing additional ideas for growth, drawn from a global set of benchmark examples.

This report contains information, analysis and recommendations for the consideration of the Government of Newfoundland and Labrador. Any proposed initiatives should be further assessed by the Province to determine the most suitable implementation approach in the context of ongoing work, priorities, and resource constraints.

Context: challenges and opportunities

The beginning of oil production in Newfoundland and Labrador in 1997 heralded a sustained period of economic growth in the province, transforming the economy. Currently, Newfoundland and Labrador's per capita GDP and per capita household

income are above the national average. Since 2013, however, the economy has slowed as lower commodity prices impacted the resource sector.

On the labour front, the unemployment rate is significantly higher than the national average (14.8% versus 5.6% nationally) and only about half of Newfoundland and Labrador's population of labour force age (i.e., those 15 years and older) are employed.¹ This challenge is particularly acute in rural communities, where the unemployment rate often approaches 20%.

The Province's economy also faces unique structural challenges compared to other Canadian provinces, including:

- **A high reliance on extractive sectors.** The Province enjoys a rich endowment of natural resources, with offshore oil and mining accounting for nearly a quarter of GDP and offshore oil royalties comprising more than 15% of Government revenue. However, this level of concentration in natural resource sectors means that the Province is highly exposed to global commodity prices, with market disruptions disproportionately harming the provincial economy.
- **Demographic headwinds.** The underlying demographic trends of Newfoundland and Labrador present significant challenges for the Province. Newfoundland and Labrador has the oldest population in Canada and its population is aging more quickly than in any other province. In 1971, the provincial median age was 20.9 years, 5.3 years younger than the Canadian average. In 2018, however, the provincial median age was 46.5 years, 5.7 years older than in Canadian average. Newfoundland and Labrador is also the only province to have witnessed a notable decline in population over the last few decades. When coupled with a declining share of working-age adults (due to an aging population and outward migration), these challenges hamper the opportunity for economic growth.²
- **Location and geography.** The Province's vast geography, dispersed, low-density population, and unpredictable climate present challenges for industry, including high seasonality in tourism, a harsh operating environment in offshore oil, and costly transportation requirements associated with the import and export of goods and services in agriculture, aquaculture and fisheries, and forestry. The ability to export local products is limited by a lack of trade infrastructure, improving which will require close collaboration with the Federal Government.

Recognizing these unique challenges, there are reasons for optimism, including but not limited to:

- **Recovery in the natural resources sector,** driven by higher commodity prices, renewed interest in offshore oil and gas exploration, and the potential for new discoveries in mining.

- **Exciting growth in aquaculture and fisheries**, along with renewed interest and success in local agriculture.
- **An exceptionally promising tourism sector**, coupled with the growing global interest in visiting Canada, positioning Newfoundland and Labrador for growth.
- **An emerging technology sector**, with high-potential companies focused primarily on ocean technology, with local champions in other fields. In 2017, the technology sector employed 6,436 people with \$712 million in labour compensation and \$1.387 billion in contribution to GDP.

Successfully implementing all of the economic growth opportunities presented in this report could meaningfully enhance the performance of the Newfoundland and Labrador economy. At full potential, these economic development initiatives could collectively contribute more than \$12 billion in incremental GDP while creating more than 30,000 new jobs by 2030 (Appendix A).

Objectives

This report describes a range of opportunities to substantially grow the economy of Newfoundland and Labrador by 2030. Three objectives set by the Government of Newfoundland and Labrador guide the growth recommendations:

- **Employment** – targeting an increase in the rate of employment in all regions of the Province.
- **Economic diversification** – aiming to diversify the Province’s economic output while maintaining the strength of existing core sectors such as offshore oil, mining and commercial fishery.
- **Regional development** – ensuring that the entire Province benefits from economic growth.

Guiding themes for Newfoundland and Labrador’s economic development efforts

Experience and lessons learned from other jurisdictions that have achieved a significant change in economic growth pointed to several overarching “themes” that guided the specific recommendations found later in this report. These include:

- **Ambition.** Setting aspirational targets is crucial to achieving a meaningful change in economic performance. In some sectors, *The Way Forward’s* plans and goals could be more ambitious. In tourism, for example, the Province could aspire to match Destination Canada’s target growth rate of 6.4% per annum, a substantially higher

growth benchmark than the existing targets. In the aquaculture industry, the entry of two major players (Grieg and Marine Harvest) will likely position the Province to considerably outperform the salmon production target set in *The Way Forward*.

- **External orientation.** Newfoundland and Labrador would need to attract outside capital, new technology, specialized expertise, and talent to develop internationally competitive export sectors. The Province can only grow its economy by marketing its goods and services for export. Growth of the provincial economy will also depend on outside investment, as local businesses and the Government often do not have sufficient funds to finance a meaningful increase in the level of economic activity.
- **Collaboration.** The Government of Newfoundland and Labrador cannot serve as the main job creation engine for the Province; entrepreneurship is required to establish and grow more local businesses. Although many of the specific recommendations that follow are specific to the Government of Newfoundland and Labrador, many would also require close partnership with business and other stakeholders.

Rather than focusing on how the Government could undertake economic growth initiatives on its own, the Province should continue to facilitate and enable the private sector to assume more leadership where appropriate (e.g., in developing the tourism industry), supporting and regulating private players along the way. Better collaboration among private companies and across sectors would stimulate growth in areas of untapped market opportunities.

For example, as the Government develops its Comprehensive Human Resource Plan, it would benefit from consulting and collaborating with industry to ensure that training programs are aligned with labour needs. The private sector could then take the lead in developing cross-sector initiatives (e.g. workforce reskilling programs) that will enhance the capabilities of the workforce.

Increased cooperation would also be needed within government, with the Department of Tourism, Culture, Industry and Innovation (TCII) taking a leading role in convening different departments, with the aim of applying a more strategic and targeted approach to investment attraction efforts. The Province could also continue to collaborate with partners beyond its borders, as part of the existing Atlantic Growth Strategy, and otherwise. Part of this effort will involve closer cooperation with the Federal Government, through a variety of potential mechanisms described throughout this report and summarized in the conclusion.

- **Execution.** Governments, business, education, labour, and other stakeholders must execute on prioritized initiatives with dedication and precision to ensure that this report delivers on its promise. As it does so the Government could consider adopting the proactive execution approach of leading public institutions around the world,

such as Singapore's investment promotion agency (the Singapore Economic Development Board) or the German Federal Labour Agency.

Finally, the Government could continue to cultivate top talent, rewarding and harnessing high-performing employees, and ensuring that the Province's most effective transformation leaders are responsible for executing this plan.

- **Focus.** To accelerate economic development, the Government of Newfoundland and Labrador would need to focus efforts on the opportunities that are aligned with the Province's economic development objectives and offer the highest returns. This would require redirecting resources and attention, while focusing on a fewer number of initiatives.

Approach to sector prioritization

A criteria-based approach underpinned the analysis of the most promising opportunities for economic development. Sectors were identified using the following criteria:

- **High export potential.** The most significant potential for incremental economic growth lies outside the Province as the potential for domestic growth is limited by the Province's geography, highly dispersed population, and size of the domestic market.
- **High demand markets.** The most promising sectors benefit from high demand potential. Entering or expanding in a high-growth market is more feasible than capturing market share from established incumbents in a stable or declining market. The growth potential in a given target market must be sufficient to justify Newfoundland and Labrador's entry.
- **Competitive advantages of Newfoundland and Labrador.** Newfoundland and Labrador should pursue opportunities in sectors where it enjoys a competitive advantage relative to other jurisdictions, such as cost, geography and natural resource endowments, high-tech knowledge, continuing potential in the ocean economy, highly regarded R&D facilities and educational institutions, and unique cultural assets.

Following this process, a number of cross-cutting enablers were identified – areas in which action is required to enable the realization of sectoral opportunities (e.g., investment attraction and digital innovation). In addition, several strategic sectoral opportunities were identified that warrant further examination, as they support, in one way or another, various regional economic development objectives.

This report is not intended to be an exhaustive overview of all economic development opportunities in all sectors and regions. As part of the research and engagement undertaken in developing this report, numerous other opportunities with provincial,

local or firm-level benefit were raised. For example, Newfoundland and Labrador enjoys substantial natural endowments in renewable energy, including considerable installed generation capacity and future opportunities to build out hydroelectric and wind generation. These endowments could help attract new businesses, such as data centres or other industrial customers. In addition, there are thriving businesses in other areas of the technology sector, such as Verafin’s focus on financial technology.

Three types of opportunities

This approach led to the identification of three types of opportunities: high-growth priority sectors; sectors with the capacity to support the Province’s regional development objectives (“targeted opportunities”); and cross-cutting enablers. The resulting areas by category are:

High-potential priority sectors	Targeted opportunities	Cross-cutting enablers
Ocean technology	Agriculture	Investment attraction
Offshore Oil	Forestry	Education
Mining	International education	Skills and workforce development
Aquaculture and Fisheries	Aerospace	Digitalization
Tourism		

High-potential priority sectors offer the potential to most meaningfully impact Newfoundland and Labrador’s economy. These are sectors where the Government should devote most of its attention and resources. Brief summaries of each sector follow, with more detail contained in the respective sections of this report.

Ocean technology

Today, Newfoundland and Labrador is home to leading research facilities, educational institutions, and many ocean technology companies, positioning it to develop a high-performing innovation cluster that could unlock the sector’s economic potential.

Several of Newfoundland and Labrador’s most economically important industries (e.g., offshore oil, commercial fishing, and the fast-growing aquaculture sector) require new

and common technological solutions to operate effectively in Newfoundland and Labrador's challenging offshore conditions.

There are several promising technological solutions in ocean technology where the Province has the potential for global leadership, including sensors and imaging, satellite technology, computerization, autonomous systems, subsea technology, and advanced manufacturing.

However, transforming the Province's ability to develop leading capabilities in ocean technology would require a bold and integrated vision, with a highly focused approach to execution.

The development of a globally leading ocean tech cluster would also require substantial collaboration across sectors to identify industry needs while developing and scaling local champions: either by supporting new entrepreneurs, or by taking existing players from good to great. Attracting new talent and capital would also be crucial to sustaining an active ecosystem.

Three specific recommendations can help turbo-charge this ocean technology cluster, building on, and in addition to, the plans enumerated in *The Way Forward*:

- **Enhance the Province's innovation infrastructure** to encourage entrepreneurship and cement Newfoundland and Labrador's reputation as a world-class ocean technology cluster. The Province could work closely with the sector to identify infrastructure gaps and needs, expanding innovation service providers to offer dedicated support to startups in ocean technology. This could include developing new laboratory facilities attuned to the needs of the public post-secondary system and industry, as well as ensuring sufficient internet bandwidth in rural areas.
- **Continue to offer targeted support services** to grow high-potential ocean technology firms at different stages of commercialization (e.g., legal and export support; training and professional development supports; facilitating access to selected facilities and labs; access to industry sponsors to test the commercialization potential of the technology under development and receive continuous feedback). The experience of successful technology clusters in other global jurisdictions reinforces the critical importance of support services and mentorship.
- **Launch a local innovation competition in ocean technology** to identify and advance high-potential local companies that focus on the unique challenges of the Province's ocean sector. Winners of the competition would receive funding and Government support, resulting in a robust portfolio of local champions that can take advantage of the federal Ocean Supercluster. As the competition scales, and the Province develops a reputation as an ocean technology hub, it may offer additional opportunities to attract international talent and capital.

Offshore oil

According to industry forecasts, global oil demand will continue to be robust in years to come, requiring significant additional deepwater oil production by 2030.

Achieving the ambitious targets set out in *Advance 2030* (e.g., daily production of 650,000 barrels) will require developing an operating environment attractive to multinational oil companies. Executed successfully, this can increase the pace and scale of exploration, while shortening the Province's historically lengthy development timeline (e.g., the median time from discovery to production in Newfoundland and Labrador is more than 17 years;³ in Norway, it is less than 9 years).

Early efforts to make Newfoundland and Labrador's production environment more attractive have already paid dividends. The Province's investment in offshore seismic surveys has achieved early wins, as witnessed in the recent interest in exploration licensing activity.

Three key actions could further improve the Province's relative competitiveness and accelerate exploration and development to meet its ambitious targets. These recommendations are driven by the needs of offshore oil operators, and the competing opportunities in comparable jurisdictions around the world. Already, the Government has outlined a comprehensive set of recommendations in *Advance 2030*. Of these, several strategies could be prioritized:

- **Employ incentives to stimulate and accelerate exploration.** This could include offering fiscal incentives to encourage exploration in "frontier" offshore areas and encouraging continuous exploration and accelerated development by structuring incentives to decline in value over time.
- **Work with the Federal Government to reduce the regulatory burden,** with a focus on securing environmental assessments for wider areas and achieving jurisdictional equivalency in the rig-intake process. This would enable operators to import rigs from comparable operating environments and expedite drilling plans.
- **Accelerate the development of Offshore Operations Centres of Excellence (CoE)** to convene industry and entrepreneurs with the aim of developing solutions to make local offshore oil production more cost-competitive. Focusing development in two areas may offer especially high potential for impact: digital solutions for remote operations (e.g., asset integrity; digital twinning; remote compliance assurance) and subsea technologies (sensors and imaging; autonomous technologies; long-distance tiebacks). Advances in these disciplines will serve the needs of local industry, capitalize on the Province's existing strengths, and generate valuable export opportunities.

Mining

Despite a long history of industry success, Newfoundland and Labrador has yet to realize its full mineral potential. Unexplored areas of the Province are believed to hold potential additional deposits of several high-value minerals (e.g., rare earth, gold, cobalt, nickel). However, the Province has in recent years witnessed a more pronounced decline in mining exploration activity than other provinces and territories.

This underperformance has three major causes. Industry awareness of Newfoundland and Labrador's mineral potential is low given the Province's actual geological potential and the history of attractive deposit discoveries. Opportunities also exist to expand public geoscience activities and increase the availability of public geoscience data in Newfoundland and Labrador. Finally, challenging access to infrastructure, particularly in Labrador, drives up exploration and development costs.

The recent *Mining the Future 2030* action plan offers a comprehensive set of actions to advance the Province's mineral industry. Of the recommendations, those with the highest potential to unlock discoveries of new deposits could be prioritized:

- **Launch targeted airborne geophysical surveys** focused on high-potential areas. This strategy has witnessed success in other jurisdictions, including Finland, and could reap similar benefits in Newfoundland and Labrador. Collaboration with the Federal Government and industry partners (e.g., aerospace companies) may help secure the necessary funding.
- **Leverage advanced analytics** to make the best use of available geological data. Recent analytics approaches are beginning to gain traction, for example, a partnership in Chile between Canadian company Barrick Gold and QPX, a mining analytics firm. The Government could consider collaborating with leading companies in this space to better target exploration efforts.
- **Adopt a one-team approach** to promote the Province's mineral potential, enlisting both geologists and investment attraction professionals in pursuing more investment in exploration.
- **Adapt the Junior Exploration Assistance Program**, encouraging exploration activity focused specifically on high-potential areas targeted by the Geological Survey.

Aquaculture and Fisheries

Global demand for salmon is strong and growing, with substantial supply constraints driving prices higher – between 2015 and 2018, average prices of salmon rose nearly 50%.⁴ Newfoundland and Labrador's favourable operating environment and existing expertise make it an attractive area for expanding production. The Government's recent

efforts to grow the aquaculture industry, as detailed in *The Way Forward on Aquaculture*, have delivered concrete results, with Grieg and Marine Harvest both making investments in the Province.

Industry leaders believe Newfoundland and Labrador has substantial additional potential for aquaculture development – this confidence suggests that the Province could set higher aspirations for its 2030 production targets.

To unlock the industry’s full promise, Newfoundland and Labrador would likely need to focus on several key activities:

- **Continue to expand production** by ensuring already licensed sites are optimally utilized
- Work with the Federal Government to **certify new water areas for aquaculture**
- Take advantage of recent changes to **CETA** to **grow the fisheries industry through increased export activity**. CETA now provides for tariff-free access to the most lucrative fish market in the world. This may provide opportunities for companies to develop new value-added products, Newfoundland and Labrador-based brands and consumer ready product forms.
- **Secure new investment commitments from outside industry** through coordinated investment attraction and Government support
- **Develop and market premium salmon associated with a distinctive brand**. Newfoundland and Labrador could leverage Canada’s reputation for high-quality and sustainable production to bring premium offerings to the market, capturing higher margins and benefitting the industry’s image as a whole
- **Develop a robust aquaculture supply and service sector to capture additional opportunities along the value chain**. For example, the Province could focus on building domestic capabilities in feed production, equipment maintenance, smolt hatching, and fish processing. Growth in aquaculture supply and service could tie in with the Province’s ocean technology innovation challenge and lead to significant new developments, including the potential to establish aquaculture service hubs in strategic sites across Newfoundland and Labrador.

Tourism

Tourism is a critical sector of the Province’s economy – the industry accounts for more than \$700 million in GDP and contributes approximately 20,000 jobs, making it the second largest employment sector in Newfoundland and Labrador. Although the industry has achieved an impressive growth rate over the past decade, the Province has not yet reached its full potential. A significant opportunity exists to accelerate growth

through 2030; if Newfoundland and Labrador could match the national target growth rate (6.4%) for non-resident tourism expenditure, the sector could nearly double in size.

The tourism industry faces several key constraints, but undertaking the following initiatives would unlock substantial opportunity for growth:

- **Select high-potential destinations for targeted growth initiatives**, building on the existing regional destination development plans and integrating proactive attraction of external capital and expertise. Some of the Province's existing attractions, like Gros Morne, Bonavista, L'anse aux Meadows and Twillingate-Fogo, already benefit from the foundations of a world-class tourism cluster, including a wide variety of tourist services and a beautiful natural site. Unlocking further economic growth would require continued and coordinated development across industry and the Government, developing a range of new experiences and accommodations while also closing logistical gaps (e.g. transportation and access), with the result of longer stays and increased tourist spend.
- **Attract foreign investment and private sector interest** to enable the Province to develop new properties, attractions, and tourism infrastructure as sites become more popular. The Province could consider developing compelling business cases that provide explicit and attractive value propositions for outside investors. These external operators could bring a range of new products to the Province's tourism sector, including themed package tours, expanded shore excursion programs for cruisers, agri-tourism experiences, and others.
- **Improve tourism infrastructure** to reduce capacity constraints, especially in terms of accommodation, local transportation links, and non-stop air links with major North American hubs. In parallel, the Province could invest in training programs that prepare the workforce for an increasingly professionalized and quickly growing tourism sector.

These new initiatives would require a focused cluster strategy, setting a targeted and focused vision for selected destinations, broadening outreach to the global tourism development market, and attracting external capital, expertise, and talent into the clusters. This would demand substantial and improved collaboration with the Province's investment attraction function, which could support tourism growth by encouraging private operators to develop enhanced infrastructure (e.g., accommodations, tour offerings, transportation options) around the Province's natural attractions.

Strategic or targeted opportunities are areas that did not emerge as top priority sectors because of their lower export potential, slower industry growth, or a lack of distinctive advantage for Newfoundland and Labrador. Still, further opportunities for growth exist, and improving the performance of these sectors may advance other

important provincial priorities, especially with respect to regional and rural development. These include:

Agriculture

The Way Forward on Agriculture targets an increase from 10 to 20% in food self-sufficiency by 2022. This is an important objective to enhance food security and support the growth of the economy by supplying local needs.

Several options could enable to the Province to unlock new growth in agricultural production:

- **Expand and develop a range of innovative agriculture assets**, including shared cold storage (e.g., to support vegetable production), farm equipment banks, and federally certified food processing plants, increasing the range of products that can be supplied locally (e.g., dairy processing, slaughterhouses). New farming techniques, such as hydroponics or vertical agriculture, could also be investigated, potentially increasing the sector's productivity
- **Market and promote local specialty products that could be exported**, as identified in *The Way Forward*, including honey, berries, and saltwater lamb
- **Explore commercial links between agriculture and tourism** to increase consumer demand for local and sustainable food and attract tourists seeking authentic culinary experiences

As the average age of industry workers continues to increase, relatively low wages and limited interest among young people inhibit the growth of the future workforce in this sector. Consequently, growing the agriculture sector will require executing on a robust workforce strategy, parts of which are already underway through the labour initiatives and analysis articulated within *The Way Forward on Agriculture*.

Forestry

Though forestry has traditionally been a major contributor to Newfoundland and Labrador's economy, declining demand and increased competition for newsprint – the Province's main export – presents challenges for an industry that supports more than 5,000 jobs and plays a key role in the western part of the Province. Already, the Province has released *The Way Forward on Forestry*, articulating a range of strategic initiatives aimed at generating new opportunities and growing the sector, all while ensuring sustainable management of the Province's forests.

As the market for forestry products evolves, it will be crucial to identify new approaches to, at minimum, sustain the current level of activity in the industry, preventing

significant regional, economic, and social disruption. Diversifying the production of Newfoundland and Labrador's forestry sector could enhance its competitive position and resilience. Potential actions could include:

- **Diversify pulp and paper production toward new paper products with stronger global demand growth** (e.g., linerboard, Kraft paper)
- **Grow production of construction materials for the local and export markets**, substituting for softwood lumber imports domestically and manufacturing advanced materials for export (potentially taking advantage of Newfoundland and Labrador's exclusion from US lumber duties)
- **Invest in biofuel and biomass production**, supporting Canada's climate goals, including black pellets that can be used as a replacement for coal and bio-diesel, produced using cutting-edge technology to convert local sawmill byproducts like wood chips and residue into fuel.

International education

Newfoundland and Labrador is home to Memorial University, a highly regarded comprehensive university that already attracts a substantial number of international students.

However, there is a significant opportunity for incremental growth, especially in large and relatively under-tapped markets, including India, China, and others. Other jurisdictions, like Australia, have managed to draw substantial numbers of international students by adopting a set of best practices, including a federally run international student helpline, a dedicated and visually attractive Study in Australia website,⁵ and a historical record of comprehensive strategies to guide sector development.⁶

As Newfoundland and Labrador looks to increase its international student population, potential approaches could include:

- Attract greater numbers of international students through a range of levers, including **creating a one-stop shop** to make the application journey easier for prospective students; **considering a partnership with educational institutions in target countries** to advertise Newfoundland's post-secondary options to foreign students; and **working with industry to create a funnel between post-secondary institutions and post-graduate employers**
- **Align fees for international students with peer institutions in Atlantic Canada.** Newfoundland and Labrador's post-secondary institutions charge international students considerably lower tuition fees than the regional average. Aligning with the Atlantic Canada average could meaningfully increase Memorial University's tuition revenues.

Aerospace

Newfoundland and Labrador enjoys a long history in aviation, with several well-established companies in the sector and a rich array of assets that could support future growth.

The Province could increase the economic impact of the aerospace industry several ways:

- Attract investment in a **commercial aircraft MRO (maintenance, repair, and overhaul) facility** focusing on outsourced heavy checks for the North American market
- **Collaborate with industry and post-secondary institutions to open a new aircraft mechanics training facility in St. John's and expand the aircraft mechanics training facility in Gander.** This could train new high school graduates interested in working with the industry while reskilling Newfoundlanders and Labradorians who work in sectors with declining market potential.

The availability of qualified labour is crucial to competing in aerospace. On this front, Newfoundland and Labrador's aerospace sector already faces a shortage of skilled airplane mechanics. Any future investment in the industry, whether attracting a foreign investment into a new commercial aircraft MRO facility or expanding the specialized (e.g., ISR) aerospace services of existing operators, would require an investment in new, better accessible training opportunities for airplane mechanics.

Enablers that underpin the sector-specific strategies. In addition to the high-priority sectors and targeted opportunities, three key functional enablers cut across industries. Economic development would require building a proactive and personalized approach to attracting inbound investment, ensuring that the Province has a workforce whose skills match the needs of a changing economy, and actively pursuing new digitalization efforts.

Investment attraction

In recent years, the Government has attracted several major investments, including aquaculture producers Marine Harvest and Grieg, cannabis producer Canopy, and a call centre for S&P Data. In offshore oil, the Government's strategic investments in petroleum geoscience have also led to increased investment in exploration.

Still, the Province often takes a passive approach to investment attraction, working primarily with companies that approach the provincial Government to facilitate their investments. Growing the economy will require Newfoundland and Labrador to **embark on a proactive attraction campaign** to target high-potential investors in

the Province's key sectors (e.g., aquaculture and fisheries, tourism). Specific strategies include:

- **Articulate a Provincial strategy for external investment attraction** based on identified sector needs, guiding the work of all stakeholders and codifying objectives and expected outcomes
- **Embark on a proactive attraction campaign targeting high-potential investors**, employing a multi-channel approach and sector-specific efforts led by subject matter experts
- Provide an **end-to-end investment facilitation service, complete with aftercare**, offering a seamless process between the decision to invest and the start of production
- Introduce a **robust performance management system** to track the progress and outcomes of each function, focusing on specific metrics to drive execution.

Several global examples offer models of how this can be done (e.g., IDA Ireland, EDB Singapore, Jobs Ohio).

Education, skills, and workforce development

Newfoundland and Labrador is facing a mismatch between the capabilities of its current workforce and the future needs of the economy, which will lead to shortages in fast-growing sectors. The projected evolution of the labour market will make these gaps even more acute in coming years. The Province could develop specific initiatives to address labour supply gaps in its priority sectors, for example:

- **Leverage the ongoing post-secondary education review and the development of the Comprehensive Human Resource Plan** to assess the nature of the Province's current skills readiness and advance the capabilities of its workforce
- **Encourage employers to take a more active role in skills development by co-developing job-ready curricula with post-secondary educational institutions, offering a broader range of work-integrated learning opportunities, and launching on-the-job reskilling programs.** These initiatives could vary by industry. For example, in the offshore oil sector, operators could work with the College of the North Atlantic (CNA) to develop programs aligned with the skills most needed on production sites. In aerospace, major companies could integrate co-op students directly into their workflows, affording them hands-on experience and a clear path to employment. And, in aquaculture, new entrants could fund enhanced programs that cover a broader range of the skills required to grow a major Atlantic salmon farming industry

- **Provide high-quality and easily accessible information to job seekers**, facilitating the job search through enhanced digital services coupled with in-person counselling. This would permit job seekers and students to make educated decisions that shape their career trajectories according to the dynamics of the labour market.

Digitalization

As the province seeks to diversify its economy, it must take intentional steps to increase the pace and scale of digitalization. New technologies will strengthen traditional industries and catalyze new ones, all while drawing new talent to the Province.

- **Take a strategic focus to digitalization efforts**, directing efforts to industries in which the Province has established strengths, for example, natural resources and the ocean sectors. Technology advances in these areas have the potential to offer cross-sector synergies, improving the effectiveness of existing industries while creating new opportunities in the development of the technologies themselves.
- **Consider launching a Digital Innovation Centre**, which will centralize and focus the Province's efforts at enabling a digital economy. This kind of centre could tie-in with other recommendations enumerated in this report, including the proposed Ocean Technology Cluster and/or the Offshore Centre of Excellence.

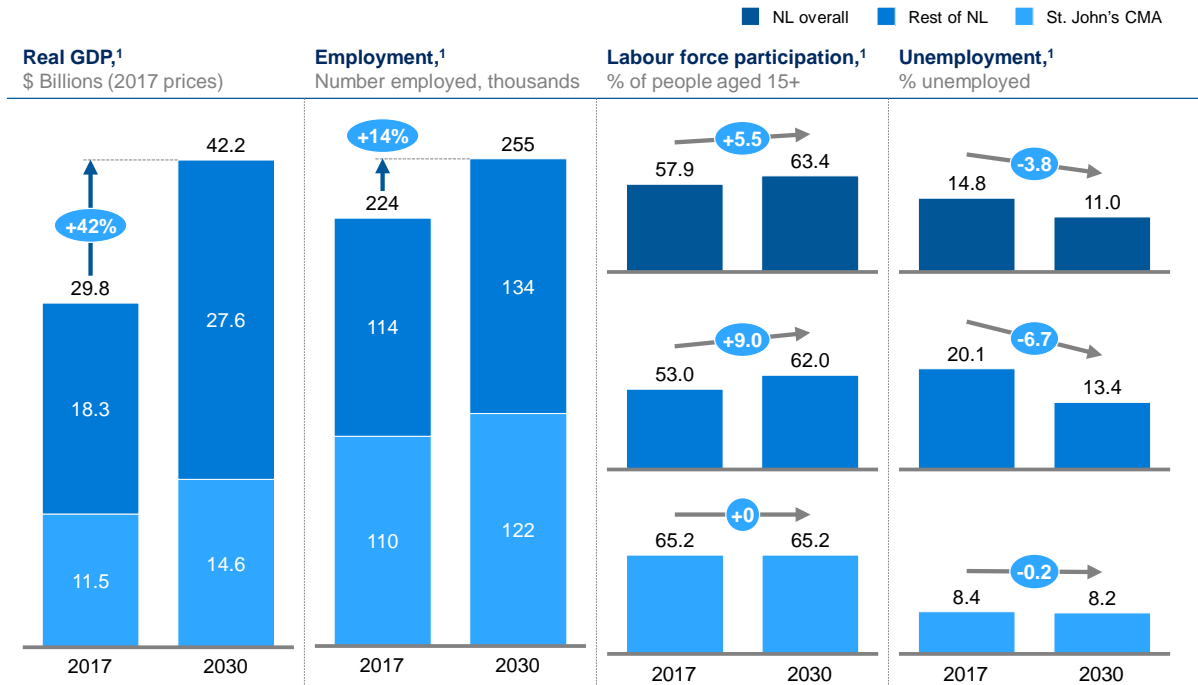
Potential impact

The full potential of these opportunities could amount to more than \$12 billion in incremental GDP and more than 30,000 new jobs by 2030 (Exhibit 1). Moreover, the potential GDP uplift and newly created jobs would be created throughout the province and across industries, with more than half of the new employment anticipated to be created in rural communities.⁷ The majority of incremental GDP would come from increased oil production, with mining and aquaculture as the next largest contributors (Exhibit 2). In terms of employment, oil, aquaculture, and tourism are expected to create more than 5,000 jobs each, whereas mining and ocean technology are likely to each contribute approximately 3,000 jobs.⁸

The future performance of the offshore oil sector, the largest contributor to the Province's economy, is highly contingent on commodity prices and geological risks related to the success rate of exploration drilling. The projections illustrated in Exhibit 1 assume that the aspirational production target of 650,000 barrels per day in *Advance 2030* is met and assumes a \$55 US dollar price for crude. A more conservative projection⁹ would result in approximately \$3 billion in incremental GDP and 2,500 new jobs in the offshore oil sector by 2030.

EXHIBIT 1

The full opportunity associated with the six prioritized areas would amount to a 40% increase in real GDP and a 14% increase in overall employment

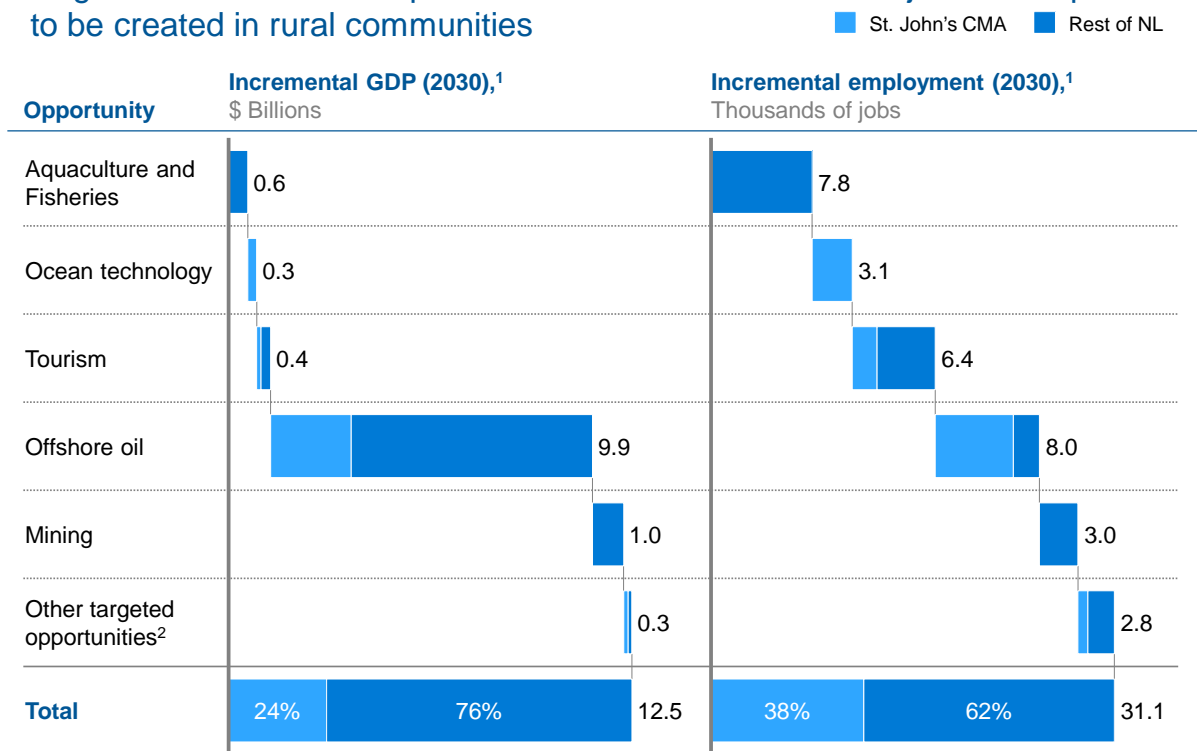


¹ Potential impact varies significantly with oil price; charts indicate expected impact at US \$55/barrel Brent crude; assumes that 30% of incremental tourism GDP and employment in St. John's area; assumes 25% of incremental oil GDP and 75% of incremental oil employment in St. John's

SOURCE: Statistics Canada; Government of Newfoundland and Labrador

EXHIBIT 2

Regional and rural development: more than half of the new jobs are expected to be created in rural communities



¹ Potential impact varies significantly with oil price; charts indicate expected impact at US \$55/barrel Brent crude with 650,000 barrels per day production level

² Includes agriculture, forestry, aerospace, and international education

SOURCE: Statistics Canada; Government of Newfoundland and Labrador

¹ "Annual Average Unemployment Rate: Canada and Provinces," Newfoundland & Labrador Statistics Agency, Department of Finance, January 2018, [stats.gov.nl.ca](https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410028703) – 14.8% is the 2017 year-end average unemployment rate for Newfoundland and Labrador; <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410028703>.

² "Annual Estimates of Population for Canada, Provinces and Territories, from July 1, 1971, to July 1, 2017," Department of Finance, September 2017, [stats.gov.nl.ca](https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410028703).

³ Historical lead times from discovery to first oil have been highly variable; the 17-year average is driven higher by a select number of projects with particularly long timelines.

⁴ "Price history – weekly, monthly and annual average," Fish Pool, fishpool.eu.

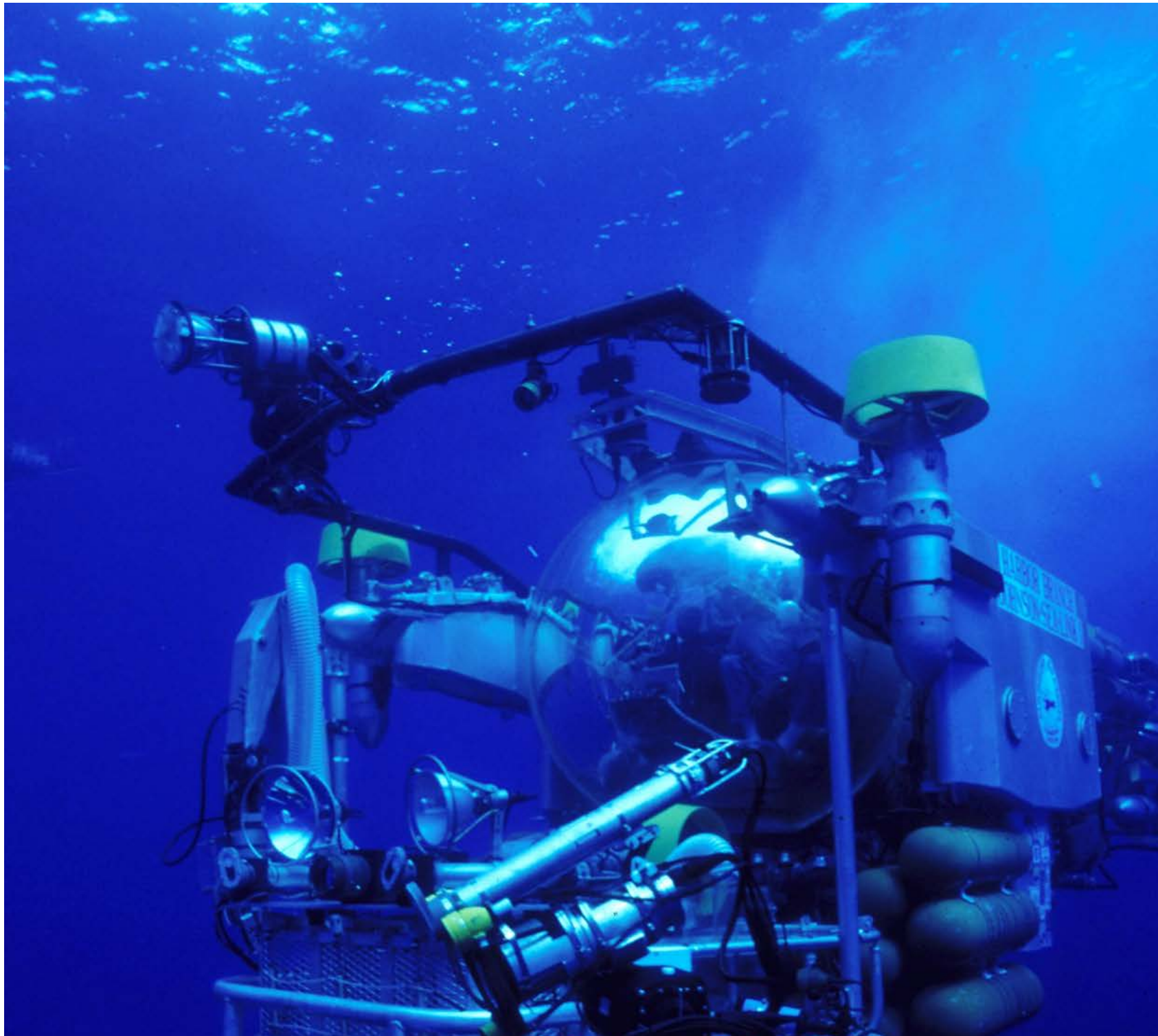
⁵ "Study in Australia," Australian Trade and Investment Commission, studyinaustralia.gov.au.

⁶ "International Students Strategy for Australia," Council of Australian Governments, apo.org.au.

⁷ The precise geographical distribution of new employment is subject to change based on implementation.

⁸ Note that both GDP and employment growth estimates include direct, indirect, and induced effects.

⁹ Conservative projection assumes 350,000 b/d volume and \$55 US dollar per barrel oil price.



Ocean technology

Priority sector: Ocean technology

Context

The global ocean economy is anticipated to double in size by 2030.¹ This rapid growth in ocean industries will require a new wave of innovation in science and technology. Newfoundland and Labrador is well-positioned to become a world leader in ocean technology given its leadership in the fishing industry, a fast-growing aquaculture sector, and its promising opportunity and expertise in offshore oil.

At present, the ocean innovation landscape is diffuse. Though sectoral interest is high, academia, industry, and entrepreneurs continue to work in largely siloed ways, with variable and fragmented access to provincial resources. Achieving a meaningful change in the Province's ability to develop leading capabilities in ocean technology would require a bold and integrated vision, with a highly focused approach to execution.

While Newfoundland and Labrador's expertise spans different ocean industries (e.g., fisheries, marine transport and surveillance, offshore oil, aquaculture), many of them share common technological needs that coalesce around the areas shown in Exhibit 3. Key technologies in these 6 cross-cutting ocean categories are projected to grow more than 9% per annum, reaching nearly \$50 billion in global economic potential by 2030.

Newfoundland and Labrador already benefits from a diverse ocean economy. The Province is home to various companies that work on enabling technologies, including those developing capabilities in remote monitoring, unmanned underwater vehicles, underwater robotics, simulation, and subsea imaging technologies.

Substantial economic development in ocean technology could significantly advance the technology sector as a whole, generating a critical mass in digital capabilities and venture capital that will ultimately enable the Province to branch out into other areas of technological innovation. Several opportunities will help Newfoundland and Labrador accelerate growth in ocean technology. *The Way Forward on Technology* already identifies various strategies to advance the growth of the burgeoning technology sector, including skill development programs, targeted immigration pathways, and support for high-growth technology firms seeking to scale. These initiatives are set against the backdrop of Canada's Ocean Supercluster, an industry-led collaboration built around Atlantic Canada's ocean-based companies with the objective of growing Canada's ocean industries from \$20 billion to more than \$30 billion by 2050.²

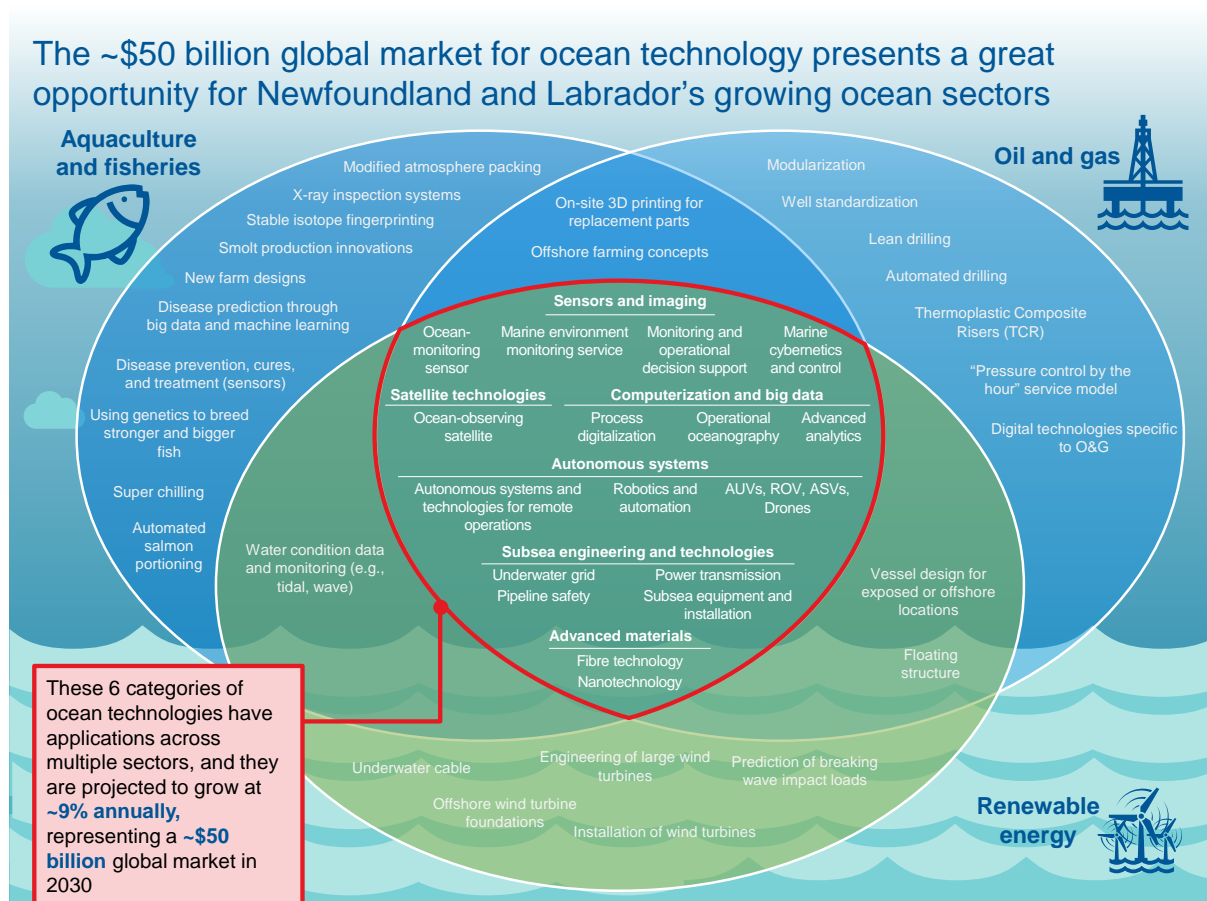
Given this convergence of opportunities, Newfoundland and Labrador's ocean industry could achieve significant economic growth by undertaking several initiatives to promote and develop its ocean technology sector:

- Enhancing the innovation ecosystem to stimulate domestic entrepreneurship, encourage industry leadership, and attract external talent

- Leveraging complementary initiatives such as the Ocean Supercluster to encourage new collaborations between industry players
- Strengthening the industry's reputation through a targeted investment attraction campaign
- Launching a local ocean industries innovation challenge to set a strategic focus for the Province

Together, these opportunities could drive substantial growth in Newfoundland and Labrador's ocean technology industry, contributing an additional 3,000 jobs to the Province's economy by 2030 and generating \$275 million in additional GDP.³

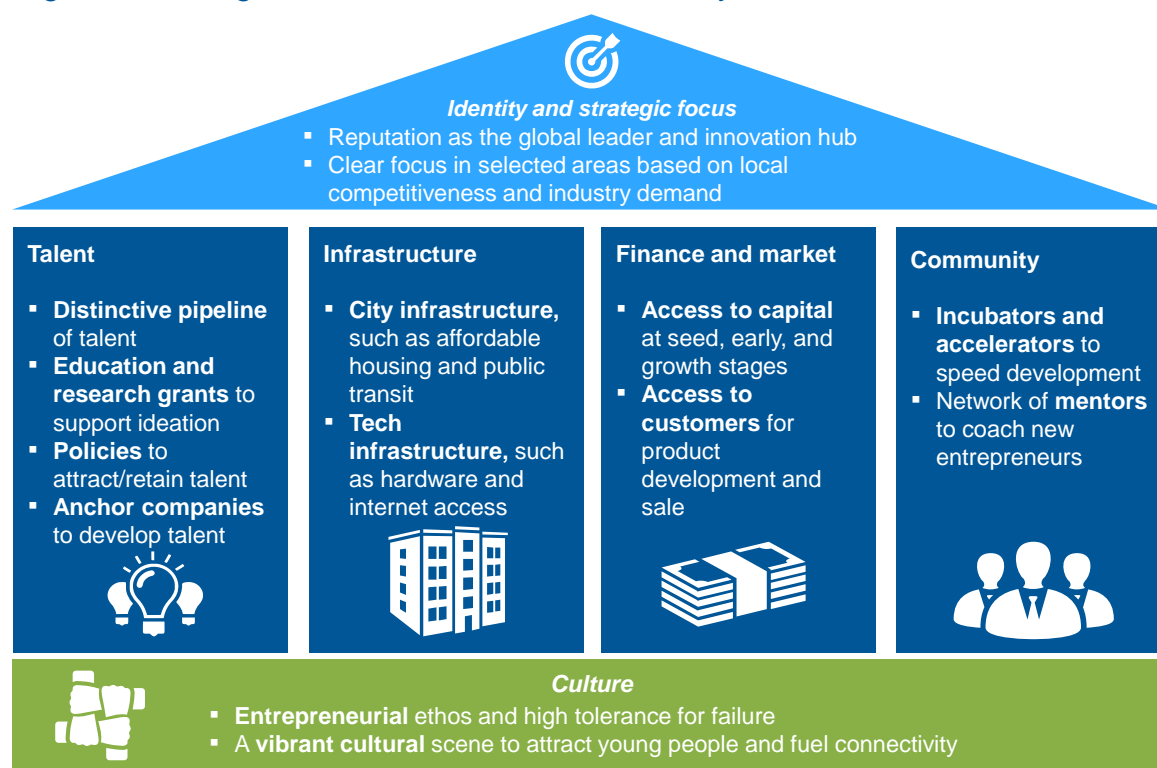
EXHIBIT 3



A recipe for a high-performing innovation ecosystem

Innovation clusters are “geographic concentrations of interconnected companies and institutions,” representing “critical masses of unusual competitive success in particular fields.”⁴ Various innovation and technology clusters, like Silicon Valley, have generated tremendous value through a dynamic ecosystem of capital, expertise, talent, public institutions, and industries. High-performing innovation clusters tend to share six characteristics, as depicted in Exhibit 4.

High-functioning innovation clusters have six key elements



Evaluating the performance of Newfoundland and Labrador's emerging ocean cluster across these dimensions presents mixed results.

■ **Strengths to build on:**

- **Identity and strategic focus.** Newfoundland and Labrador is recognized as a Canadian leader in offshore oil, fisheries, and aquaculture. At the same time, public awareness of technology is growing within the Province; efforts undertaken by the Newfoundland and Labrador Association of Technology Industries (NATI) and similar organizations include hackathons, innovation days, and other activities aimed at growing technological literacy.
- **Talent.** Newfoundland and Labrador has a broad complement of educational programs related to the ocean industries (e.g., MUN's Marine Institute).
- **Culture.** There is a strong entrepreneurship culture among engineers, as evidenced by the active startup scene.
- **Infrastructure.** Newfoundland and Labrador has more than 40 labs and research facilities focused on ocean research and technology.⁵

- **Finance.** The Government of Newfoundland and Labrador provides significant financing to fund innovation projects in academia and the private sector.⁶
- Areas of opportunity:
 - **Identity and strategic focus.** The Province’s international recognition as a sector leader in ocean technology is limited to specific market segments (e.g., ice management, cold ocean engineering).⁷
 - **Talent.** There is a shortage of talent in disciplines critical to technological innovation, such as computer science and data science. Companies report that it can take 6 months or longer to hire developers for Newfoundland and Labrador-based tech companies, even at salaries competitive with larger markets.
 - **Infrastructure.** Improving cellular and broadband service coverage in rural areas needs to continue to be a priority. Currently, there is no physical hub for ocean technology companies and service providers.
 - **Community.** There is an opportunity to increase targeted incubator and accelerator support for ocean technology startups and entrepreneurs.
 - **Finance.** The innovation ecosystem could benefit from the industry’s active participation in terms of both funding and expertise through mentorship. There is an exceptional opportunity to tap into global demand for ocean technology and applications. Enhanced support in capital attraction and export development could unlock significant growth and better market access.

Similar cluster efforts, in ocean technology and other sectors, have been undertaken in various geographies with a record of success (Exhibits 5, 6).

EXHIBIT 5

Ocean Technology Innovation Cluster Stavanger



Ocean Technology Innovation Cluster Stavanger - OTICS is a formalized scientific cross disciplinary research cluster in collaborative partnerships with industrial companies and research institutions. The goal is to achieve high-quality research through international and national cooperation, and to establish the University of Stavanger as one of the leading research institutions in Ocean Technology

Success factors



- Strong academic and industrial competences at University of Stavanger (UiS)
- Active educational and research collaborations among the academic staff, research staff, laboratory engineers and industrial partners

Focus areas



- The organisation aims to develop excellent research within four focused research areas:
 - Aquaculture technology
 - Subsea technology and deep-sea mining
 - Fjord crossings
 - Marine Technology and Operations for Offshore Wind

Funding



- The program area which has been named Ocean Technology Innovation Cluster Stavanger (OTICS) a scheme at University of Stavanger which provides financial support to research groups for a three-year period

Partnership



- As the cluster recently formed in June 2018, in the long term, Muk Chen Ong (Leader OTICS) and Frøiland (head of external relations) hope to collaborate with a research center in Trondheim
- They also hope to signed a agreement for further cooperation by this autumn

EXHIBIT 6

Norwegian Innovation Clusters



Norwegian Innovation Clusters is a government supported cluster program. The program aims to trigger and enhance collaborative development activities in clusters. There are 14 Norwegian Centers of Expertise, of those relevant examples include: Aquaculture, Aquatech Cluster, Seafood Innovation Cluster, Maritime CleanTech

Role of government

- The program is organized by Innovation Norway, and supported by SIVA (The Industrial Development Corporation of Norway) and the Norwegian Research Council.
- Local municipalities also award research grants for R&D to be conducted within their limits
- Starting in the early 2000s Norway has had a policy to strengthen its business clusters through a national cluster programme

Industry

- Aquaculture includes all forms of fish production
- Aquatech is focused on sustainable food production - NCE Aquatech Cluster has 100 companies and have a total of approximately 15,500 employees (2015)
- The Seafood Innovation Cluster has over 90 partners representing 15 thousand employees. This cluster combines innovation, knowledge and entrepreneurship

Academia

- The University of Bergen
- Nofima-largest institutes for applied research within the fields of fisheries, aquaculture and food research in Europe.
- NIFES- conducts research on fish nutrition, seafood and the effects of fish and seafood consumption on our health
- Norway Institute of Marine Research

Funding

- Innovation Norway
- Norwegian Research Council- distributes NOK nine billion to research and innovation activities each year
- Municipalities Research Councils
- HORIZON 2020- biggest EU Research and Innovation program with nearly €30 billion of funding available over 7 years
- Fisheries and Aquaculture Research Fund (FHF)

Scaling and growth

- In June 2014 the "Norwegian Innovation Clusters" were launched, building upon the already existing programs of Arena and Norwegian Centers of Expertise, NCE
- NCE Aquaculture) was formally established as an NCE Havbruksklynge in 2007. Prior to this, partners worked together through a corporate network and an Arena project

Partners



Three interconnected initiatives would enable Newfoundland and Labrador to develop a high-performing ocean technology cluster

1. Enhance the Province's innovation infrastructure to encourage entrepreneurship and establish a reputation as a world-class cluster

Innovation infrastructure is a crucial driver for cluster development. Whether in the form of an entrepreneurship hub, new labs, or co-working sites, this kind of infrastructure provides a solid foundation for an emerging entrepreneurial culture. Better innovation infrastructure would serve as a nexus for a nascent entrepreneurial community, underpinned by increased access to external investors, companies, and expertise.

Currently, Newfoundland and Labrador has more than 40 labs and facilities that focus on ocean research and technology development, many of which are housed within Memorial University. These facilities provide an excellent foundation for innovation and present an opportunity for the Province to improve its innovation infrastructure to support increased local entrepreneurship, nascent startups, and small and medium-sized enterprises. Greater collaboration with academic institutions could also drive increased commercialization of research outcomes, turning university developments into new economic opportunities for the Province.

In particular, the Ocean Supercluster is anticipated to bring additional capital and resources to the Province along with a wide variety of cluster-related activities⁸ (e.g., industry events and technology forums). A strong innovation backbone would enable the Province to play a leading role in the Supercluster from the outset, benefiting from the full range of its resources. New investments in innovation infrastructure would also permit Newfoundland and Labrador to support and retain top talent and companies throughout the full cycle of innovation and commercialization (e.g., from startup, to local champion, to international exporter).

Innovation infrastructure encompasses a range of assets. A physical innovation hub is a common model that provides a “collision space” for founders to collaborate and co-create. For freelancers, hubs provide an affordable communal working space and a growing network of contacts and prospective clients. A physical hub also centralizes access to support services and vendors, enabling entrepreneurs to benefit from shared best practices and enhanced negotiating power.

To determine the need for innovation infrastructure, the Province could work closely with members of the ocean technology sector to identify gaps between the existing infrastructure and the needs of high-potential companies. The Province could consider enabling innovation infrastructure if there is a strong business case for filling the gaps. For example, advanced digital solutions are becoming increasingly prevalent in the offshore oil (e.g., remote operations) and aquaculture and fisheries (e.g., disease prevention through advanced analytics) sectors. It is critical to ensure companies that run enterprise-scale databases have access to sufficient internet bandwidth and relevant talent.

These new or repurposed facilities could provide the backbone for industrial innovation (e.g., warehouse space, marine infrastructure to support technology demonstration, cluster computing for high-performance processing). Similar to the objectives of the province's Regional Innovation Systems, collaboration with academia should continue to be a priority – shared lab space can offer the potential for students, researchers, and companies to benefit from one another's work, while increasing the innovation talent pool.

Incubators and accelerators are vital components of an innovation ecosystem, both of which aim to support startups with access to capital, market, and expertise. There is an opportunity to build upon existing incubators and accelerators in Newfoundland and Labrador and develop specific ocean technology programs to support the sector.

However, innovation infrastructure alone will not be sufficient to grow the ocean technology cluster. Private ocean industry players, who stand to gain the most from sectoral innovations, could take the lead in supporting, funding, and mentoring entrepreneurship in ocean technology. To this end, the Government should convene partnerships between industry and innovation service providers to better support local entrepreneurship.

TCII should work with other agencies to substantively advance Newfoundland and Labrador's reputation as a globally competitive hub for entrepreneurship. A prominent identity and well-established reputation in the global ocean technology market would increase the Province's ability to attract foreign investment, global partnerships, academic collaborations, and talent. In this vein, TCII could consider launching a dedicated investment attraction campaign to promote the Province's ocean technology sector, attracting additional capital to support local entrepreneurship.

As the ocean technology sector grows, the Province could explore a variety of promotional opportunities for the sector and encourage the industry and academia to contribute to awareness-building efforts. These could include: magazines and blogs that feature trends in technologies and investments in ocean industries (e.g., *International Ocean Systems*, *Marine Technology Reporter*, *Ocean News & Technology*); global conferences and summits that showcase the latest in ocean science and technology worldwide (e.g., Offshore Technology Conference, Oceanology International, Ocean Futures Forum, World Ocean Summit, BlueTech Expo); international forums and business alliances on the advancement of ocean economy (e.g., World Ocean Council); and leading academic journals (e.g., *The Journal of Ocean Technology*, *The Marine Professional*).

2. Offer streamlined and improved support services to grow ocean technology companies at different stages of commercialization

A robust and sustainable innovation cluster includes companies at all stages of the commercialization process with varying needs. Entrepreneurs with great ideas or proof of concept require seed capital, mentorship, and business support to get their companies off the ground. Small and medium-sized enterprises require additional investment, market incentives, and industry support to scale quickly.

Given this, the Province could consolidate and develop a set of comprehensive support services to grow early-stage startups and help small and medium-sized enterprises scale and access markets efficiently. These services could include:

- Management and legal support to help new entrepreneurs navigate the shift from engineering to business development
- Transitional support for foreign entrepreneurs or employees moving to Newfoundland and Labrador – helping to arrange visas, housing, settlement services, etc.
- Priority access to selected facilities and labs at Memorial University and other research centres that enable businesses to collaborate without intellectual property constraints
- Access to industry sponsors to test the commercialization potential of the technology under development and receive continuous feedback
- Guidance in navigating existing business support services offered at the provincial, regional, and federal levels (e.g., the Government of Newfoundland and Labrador’s programs and services, Business Development Canada, Export Development Canada, Trade Commissioner’s service, Atlantic Canada Opportunities Agency programs)
- Marketing support to guide companies as they shift from focusing on meeting local demand to taking an export-oriented approach (e.g., translation services, regulatory counsel, access to international chambers of commerce).

3. Launch a local ocean technology innovation competition to set the strategic focus and develop solutions that solve Newfoundland and Labrador’s unique challenges

In other jurisdictions around the world, innovation and entrepreneurship-related competitions have served as critical catalysts for cluster development. *The Way Forward* includes a commitment to launching an innovation challenge, aimed at “encourag[ing] outside-the-box thinking to address social, economic or technological problems, where no solution exists or where current solutions are inadequate.”

This kind of competition could drive substantial development in the Province’s ocean technology space. A local ocean technology competition would have three central objectives:

- **Increase the competitiveness of local industries.** Innovations in ocean technology could drive costs down in the oil, fishery and aquaculture sectors, among others. This would make Newfoundland and Labrador an increasingly attractive operating geography for foreign companies.
- **Incubate local champions.** This would initially be focused on developing capabilities for local operators but with the potential to grow into substantial export opportunities if successful
- **Encourage cross-sectoral collaboration on solutions that cut across industries.** As identified earlier in this report, several ocean-related sectors (like aquaculture, oil, commercial fishery and others) share similar operating challenges that

could be addressed by technological advancements. Given the critical mass of these industries in Newfoundland and Labrador, there is a promising opportunity to bring together industry players to co-solve problems across sectors.

An innovation competition that addresses these objectives would likely start local, then scale up as the participating companies grow. Initially, the competition would have two divisions, each targeted at companies at different stages in their growth:

- A division for startups with promising ideas but little in the way of existing commercialization. The award would provide a sum of money sufficient to develop initial proofs of concept, as well as incubation service to support companies as they iterate on their first prototypes, seek additional rounds of funding, and target early growth.
- A division for companies with existing commercial operations. The award size would enable them to scale up and substantially increase their marketing efforts to prepare for expansion to export markets. Crucially, winners in this division would receive substantive support in international promotion, potentially in collaboration with TCII.




The competition process would be similar for both of these divisions, including the following stages:

- Convene industry sponsors to define two to three challenges demanded by Newfoundland and Labrador's ocean industries that are addressable by technology
- Invite local firms (both startups and established companies) to apply with proposed solutions, prototypes, or products appropriate to their divisions
- Solicit in-kind awards from the Government of Newfoundland and Labrador and sponsors (marketing support, incubator and lab space, legal services, free office space, etc.)
- At the end of the program (e.g., 12 to 18 months), assess the progress of the participants and select winners with especially promising prototypes/solutions. These products could be procured by industry or sponsored for future development.

Structured in this way, Newfoundland and Labrador's technology competition would help the Province set a sharp strategic focus in advance of Canada's Ocean Supercluster. This would enable the Province to develop local champions with needs and expertise uniquely suited to the resources and initiatives provided by the Supercluster, which will position Newfoundland and Labrador to take maximum advantage of federal and private funding.

The evidence suggests that these innovation challenges can drive significant improvement in entrepreneurship ecosystems. Similar competitions around the world have led to the emergence of thriving innovation hubs (Exhibit 7).

Innovation competitions have proven to be effective catalysts for the development of innovation hubs globally

Examples	Description	Impact
	<ul style="list-style-type: none"> Mass Challenge is an annual competition, in which startups compete for admission to the 4-month startup accelerator program 	<ul style="list-style-type: none"> Mass Challenge has proved hugely successful at job growth and startup development: the 489 accepted startups to date have created 4,000 jobs and raised \$550 million in funding
	<ul style="list-style-type: none"> World's largest startup competition, with \$5 million in cash prizes and attractive incentives (e.g., 10-year free corporate income tax, 1-year free incubator space, and mentorship) 	<ul style="list-style-type: none"> Applications doubled within 1 year of the launch of the competition in 2014 (from 1,600 to 3,000 submissions) Winning companies have raised more than \$90 million since 2014
	<ul style="list-style-type: none"> The state of Minnesota partners with local companies, investors, and institutions to host an annual state-focused startup competition with an \$80,000 grand prize 	<ul style="list-style-type: none"> Minnesota Cup alumni have raised \$65 million of venture funding since 2009 37% of teams involved University of Minnesota alumni, reflecting strong engagement with the state's local skilled workforce
<p>"We have witnessed significant changes in the city's innovation culture. Imagine an auditorium of 3,000 seats completely filled up with enthusiastic entrepreneurs and citizens celebrating the winners of the competition...It has greatly accelerated the organic growth of the local ecosystem" – Senior Executive, international innovation competition</p>		

Eventually, and with the support of the Supercluster, the competition could evolve to draw top talent from across Canada and around the world, presenting further collaboration opportunities with programs and services offered by the Department of Advanced Education, Skills and Labour (AESL). The resulting flow of ideas, companies, and talent would help attract additional capital to the Province, luring investors in pursuit of innovative ideas.

Overall, the competition would focus the Government of Newfoundland and Labrador's efforts and innovation funding on the companies with the highest potential for commercialization and export.

The ocean technology competition would enable the Government of Newfoundland and Labrador to identify the companies with distinctive commercial potential that would also be best equipped to take full advantage of the resources provided by the forthcoming Supercluster.

At scale, a competition of this kind may have trickle-down effects for startup companies operating domestically, conferring the same "halo" effect witnessed in innovation hotspots like San Francisco (and in Canada, in Toronto and Montreal). An enhanced reputation would also enrich the ability of the innovation competition to attract top outside talent and external capital.

-
- ¹ The ocean economy encompasses ocean-based industries, such as aquaculture, fishing, offshore oil and gas, offshore wind, marine biotechnology, and related natural assets and ecosystem services. "Foresight Future of the Sea." Government Office for Science, March 2018, assets.publishing.service.gov.uk.
- ² "Canada's Ocean Supercluster," Ocean Super Cluster, oceansupercluster.ca.
- ³ These projections assume that the Province's ocean technology sector grows in line with the global rate of industry growth, and then adjusts upward for additional GDP stimulated by increased R&D activity in aquaculture and oil and gas.
- ⁴ Michael Porter, "Clusters and the New Economics of Competition," December 1998, hbr.org.
- ⁵ "Newfoundland and Labrador Ocean Research and Technology Development Facilities." Document provided by client.
- ⁶ "Premier Ball Welcomes Proposals for the Innovation and Business Development Fund," September 2018, releases.gov.nl.ca.
- ⁷ Newfoundland and Labrador is not cited in the 2018 World Ocean Council white paper – clusters mentioned include examples from Norway, Iceland, New Zealand, and the Blue Tech Clusters Alliance.
- ⁸ "Canada's Ocean Supercluster: Our Strategy," oceansupercluster.ca.



Offshore oil



Priority sector: Offshore oil

Context

The oil and gas industry is the second largest sector of Newfoundland and Labrador's economy in terms of GDP contribution¹ and the third largest source of government revenue.²

Oil is expected to remain an essential commodity in the world economy for years to come. By 2035, meeting the world's demand for oil and compensating for the declining capacity of current sources is likely to require an additional 44 million barrels of crude production per day from unsanctioned projects.³ This will require considerable increases in offshore oil drilling – “base case” projections suggest that, among all types of oil production, offshore oil will account for the largest source of unsanctioned projects, with approximately 20 million barrels per day (B/D) of future production required, half of which will have to be extracted in deep water.⁴

In early 2018, the Government of Newfoundland and Labrador, in collaboration with key stakeholders, released *Advance 2030: A Plan for Growth in the Newfoundland and Labrador Oil and Gas Industry*, a comprehensive strategy for growth in the sector. The vision includes plans aimed at increasing exploration and production, shortening time from prospectivity to production, increasing sector employment, developing an innovative supply and service sector, and integrating renewables within a world-class energy cluster.⁵

Already, strategic investments in petroleum geoscience have led to increased investment in exploration, as evidenced by the 2018 scheduled land tenure results, which witnessed a total of \$1.38 billion in bids and a record single bid of \$621 million by BHP Billiton Petroleum in the Eastern Newfoundland region.⁶

In 2017, the Province launched the Generic Offshore Oil Royalty Regime (GORR), with the aim of providing increased fiscal predictability to potential operators. Wood Mackenzie, an oil and gas advisory group, ranks Newfoundland and Labrador highly on a comparative ranking of jurisdictional fiscal attractiveness.⁷

Over the past 3 years, Newfoundland and Labrador's oil industry has witnessed 8 new entrants and \$3.9 billion in exploration work commitments. These outcomes sit against the backdrop of considerable new seismic exploration in 2017, which included one of the largest 3D surveys in the world.⁸

The Province can support the attainment of the *Advance 2030* production target (650,000 B/D) by: ensuring a competitive environment for investment in exploration and development; continuing to invest in exploration in advance of the scheduled land tenure system; deploying incentives to encourage new exploration; improving and streamlining the regulatory environment; and creating centres of excellence that leverage industry collaboration to drive down the Province's operating costs.

Achieving the targeted growth in oil production would contribute an additional \$9.8 billion to the Province's GDP by 2030, creating approximately 8,000 incremental jobs.^{9, 10}

Achieving the *Advance 2030* target

Newfoundland and Labrador's Advance 2030 target of 650,000 B/D is achievable but will require some early exploration success and the right conditions to expedite exploration and development.

By 2030, projected production based on existing and proposed production is likely to contribute approximately 50% of the 650,000 B/D target. Meeting the 2030 production target will require new discoveries, driven by accelerated exploration, coupled with additional tie-backs and asset life extension, all proceeding at a development pace faster than historical performance.

Some factors are beyond the Province's control. External forces (e.g., oil prices, federal policies, and the pace of renewable energy adoption) could affect the plausibility of achieving the 2030 target. However, several opportunities could help ensure that the Province maximizes its production potential:

- Improving on the anticipated 12-year development timeline for Bay du Nord and expediting sub-sea tie-backs (Mizzen, Harpoon)
- Accelerating the \$4.3 billion in existing exploration work commitments – encouraging operators to begin their exploration drilling earlier
- Attracting new exploration drilling commitments over the next 2 years, with Government action to accelerate timelines and incentivize exploration drilling.

Growing Newfoundland and Labrador's offshore oil industry will require improving competitiveness through greater regulatory certainty and a commitment to innovation and collaboration

Recent successes suggest that the Province's historically lengthy timelines from discovery to development could be shortened. As a result of successful negotiations of benefits and fiscal terms, the Bay du Nord deepwater oil development is expected to deliver first oil within 12 years. The GORR provides operators with increased fiscal predictability going forward, and local benefits will be achieved within a more competitive bid environment.

Historically, however, the Province's average time to development is the longest among other offshore oil and gas jurisdictions (Brazil, Gulf of Mexico, Norway, Angola, Australia), with very high variability.¹¹ Developers also note the complexity of Newfoundland and Labrador's permitting process. A report by Wood Mackenzie notes that "development permitting in Newfoundland and Labrador scores less attractively than it could, due to the number of potential steps and consultations required to have a development plan approved."¹²

One of the external factors beyond the Province's control is Bill C-69, the new federal Impact Assessment Act. Many think tanks, including C.D. Howe and the Fraser Institute, have assessed Bill C-69 as adding further uncertainty and regulatory risk. A related memorandum from C.D. Howe suggests that, "the legislation creates additional confusion about the standard for project approvals and many are concerned about predictability."¹³

Leading global technology and supply and service companies are important contributors to Newfoundland and Labrador's local supply chain. They bring global best practices, emerging technologies, experiences, capabilities, and expertise into the Province, driving the development of local talent and suppliers. In addition to project-specific work commitments, the Province could devote dedicated investment attraction efforts to foster long-term and strategic partnerships with global technology leaders and local small and medium-sized suppliers to the offshore oil industry, leveraging the Province's unique operating conditions, ocean resources and facilities, existing leaders in ocean technology, and industry presence to promote innovation and collaboration.

Three pathways to achieving the Advance 2030 target and improving competitiveness

There are three potential pathways to increase the Province's global competitiveness and the scale and pace of new development.

1. Investigate levers to stimulate and accelerate exploration

At present, Newfoundland and Labrador's exploration incentives lag those of key competing jurisdictions. The Province could evaluate a range of levers that would encourage new exploration and accelerate existing projects under license. For one, the Government could create targeted incentives to encourage exploration in "frontier" offshore areas, including areas without existing exploration or production and those located in deep water or more than 200 nautical miles from shore. These incentives could take various forms – for example, expanded eligible pre-development costs for royalty calculations.

The Province could also better clarify the scope of eligible pre-development costs (e.g., recovery of costs associated with unsuccessful exploration, acceptable timeframe). At present, section 60 of the GORR Regulations suggests that qualifying eligible pre-development costs is left to the discretion of the Minister, creating potential uncertainty for operators. More clearly enumerating qualifying costs would permit operators to more accurately model project economics and investment returns. Similarly, earlier and more frequent engagement between the Department of Natural Resources and operators could provide greater clarity on which ongoing costs may be deductible.

Crucially, Newfoundland and Labrador could explore incentives to encourage operators to commence exploration earlier in the 6-year exploration license period that they are granted, increasing the likelihood of a significant discovery by the early 2020s.

2. Collaborate with federal regulatory agencies to facilitate exploration projects that have secured corporate commitments

Newfoundland and Labrador should continue to support and accelerate existing efforts to secure wide-ranging environmental impact assessments for wider exploration areas. For example, the Regional Assessment of Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador aims to reduce duplication in environmental assessment processes for anticipated exploration drilling in the same region. If approved, this will shorten the overall exploration drilling timeline.

The Province could collaborate with Transport Canada to permanently exempt offshore rigs from rules for seagoing vessels, which are often misaligned with industry innovations and requirements. Ultimately, the Government of Newfoundland and Labrador could aim to achieve regulatory equivalency with other leading jurisdictions in offshore drilling (e.g., Norway, the United Kingdom). This would enable operators to move quickly from being granted a license to mobilizing the required equipment.

The Government should continue to work with industry advisory groups to identify other limiting regulations and work to find effective solutions.

3. Encourage investment and innovation in technologies that will reduce the cost of offshore oil exploration and development in Newfoundland and Labrador.

Offshore Centres of Excellence (CoEs) could bring together industry stakeholders to find long-term solutions, with the aim of permanently reducing the cost of offshore exploration and development through innovation and collaboration. Centres of Excellence could also collaborate closely with the ocean technology sector (e.g., local innovation competition) to maximize the impact. Centres of Excellence could deliver distinctive results in two high-impact areas in particular:

- **Digital solutions for offshore operations.** Given the remote offshore operating environment for oil producers in Newfoundland, digital innovations could substantially benefit local industry and accelerate the pace of innovation already underway. Various emerging solutions present opportunities for innovation:
 - Improvements in integrity management through innovations in real-time monitoring of equipment for preventive maintenance and failure detection (e.g., corrosion and erosion detection)
 - Mobile solutions to ensure compliance with company policies and regulations (e.g., mobile applications that connect offshore personnel directly to a single source of up-to-date maintenance and operational procedures)
 - Integrated operations through digital twinning for project design and execution and process automation (e.g., 3D models of a physical asset, plant process, or product that allow process simulations, asset tag data, risk calculations, and scheduling data in a single data platform and user interface).

- **Subsea technologies.** The Province’s experience in subsea engineering, fabrication, installation, and operations, coupled with its existing base of subsea technology companies, position it to develop solutions that cut across industries operating in these environments. These could include solutions in:
 - Sensors and imaging: ocean-monitoring sensors, environmental monitoring, and operational decision support
 - Autonomous systems: AUVs, ROVs, and UAVs for inspection and maintenance
 - Subsea engineering solutions: underwater grid, pipeline safety, power transmission, ice protection alternatives, subsea excavation, spoolbase production, riser innovations, towed solutions, and bundling
 - Advanced materials: fibre technology, composite materials, and nanotechnology.

The Province’s Centre of Excellence could adopt a model involving a three-way partnership between governments (federal and provincial), industry (offshore operators and supply and service companies), and other key stakeholders (e.g., higher education, research facilities, accelerators, entrepreneurship organizations).

Working together, the resulting Centre of Excellence would foster education and training, research and development, and technology demonstration and commercialization, providing resources and support for business startups, opportunities for supply chain development, and industry collaboration.

Once new solutions in the targeted areas (digital and subsea technologies) reach a sufficient level of maturity and have undergone testing in the challenging operating environment of Newfoundland and Labrador, they can be exported to customers in external markets, establishing the Province as a global centre of excellence.

Similar projects around the world can serve as exemplars for Newfoundland and Labrador as it develops its own Centre of Excellence. The Subsea CoE in East Kilbride, Scotland, facilitates company-led industrial projects and product development, small and medium-sized enterprise support, and hands-on industry training, all aimed at the global subsea sector, in which 370 Scottish companies compete. The Aberdeen-based Oil and Gas Technology Centre runs the Tie-back of the Future initiative in collaboration with Wood Mackenzie – a project that brings together operators, supply chain companies, and technology developers to enhance the development of subsea tie-backs and reduce associated costs.

The Province’s Centre of Excellence could bring together representatives from a variety of stakeholders, including academia, industry, and government. Various other models are also possible, as depicted in Exhibit 8, a taxonomy of governance options for centres of excellence.







In addition to a Centre of Excellence, substantially expanding the Province’s integrated operations capabilities in areas like ice management, environmental response, offshore supply logistics, emergency response, shared support infrastructure, and onshore technical

support services, could enhance operational efficiency and further drive down the costs of operators.

EXHIBIT 8

Potential governance models for a multi-stakeholder centre of excellence

Most suitable models for Newfoundland and Labrador

Source of funding	Governance models	Mandate	Pros and Cons	Examples
Private  Public	 Company-sponsored centre of excellence	Create a centre for proprietary R&D to ensure a company's position as a global leader in a certain area	+ Simple governance and operating model - Limited impact on the industry - Less collaboration	▪ Siemens Subsea Technology Center ▪ Subsea Centre of Excellence in Montrose
	 Industry-led innovation alliance	Collaborate and innovate to address common opportunity areas and gaps in the industry with joint projects and contribution	+ Shared contribution and benefits + Interchange of ideas, expertise, and best practices + Joint projects for targeted solutions - Funding and activities are subject to industry cyclicalty	▪ Canada's Oil Sands Innovation Alliance
	 Partnership involving government, industry, and non-profit (university or college, incubator, accelerator)	Identify and co-fund projects to develop and deploy new technology for the industry with specific focus areas	+ Direct industry impact + Focus and solution driven + High commercialization and export potential + Ecosystem approach to funding and collaboration - Strong coordination leadership required	▪ Oil & Gas Innovation Centre ▪ Oil & Gas Technology Centre
	 University-led research centre		+ - -	
	 Government funded innovation		+ -	

SOURCE: Expert interviews; press search; official websites

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- ¹ "Building for Our Future," Budget 2018: The Economy, 2018, economics.gov.nl.ca.
- ² "Report on the Program Expenditures and Revenues of the Consolidated Revenue Fund," April 2018, fin.gov.nl.ca.
- ³ McKinsey Energy Insights.
- ⁴ Under the accelerated energy transition case, offshore oil production is significantly curtailed.
- ⁵ "Provincial Government Releases Advance 2030 – A Plan for Growth in the Newfoundland and Labrador Oil and Gas Industry," February 2018, releases.gov.nl.ca
- ⁶ "Record Bids of \$1.38 Billion for Exploration Licenses in the Province's Offshore," November 2018, releases.gov.nl.ca
- ⁷ "Newfoundland & Labrador – Competitiveness in Oil & Gas Investment," Wood Mackenzie, February 2018, nr.gov.nl.ca.
- ⁸ Terry Roberts, "Super-sized seismic activity planned for Newfoundland's offshore this year," CBC, June 2017, cbc.ca
- ⁹ Projections assume 650,000 barrels/day of production, and Brent crude prices of \$55/barrel. Fluctuating oil prices could considerably affect these projections.
- ¹⁰ The methodology used in this report to estimate the GDP and employment impact of an expanded offshore oil sector does not include economic benefits from capital expenditure (e.g., spending on infrastructure, construction, drilling) leading up to 2013, nor does it consider the full spin off implications on consumer spending, public services, retail, healthcare, etc. In October 2018, NOIA released a report titled "Newfoundland and Labrador Offshore Oil & Gas Industry: Economic Impact Report" which provides a more detailed projection of economic benefits from the offshore oil and gas sector if the Advance 2030 goals were met.
- ¹¹ "Newfoundland & Labrador – Competitiveness in Oil & Gas Investment," Wood Mackenzie, February 2018, nr.gov.nl.ca.
- ¹² Ibid.
- ¹³ Grant Bishop, "Let's rethink Bill C-69," C.D. Howe Blog, cdhowe.org.

Mining



Priority sector: Mining

Context

Newfoundland and Labrador enjoys a well-established mining industry that supplies 14 different minerals to the global market. The sector produces approximately \$3 billion in mineral shipments annually, accounting for 6.4% of provincial GDP. The industry directly supports 4,800 jobs, with an additional 700 in construction, the majority of which are located in Labrador.¹

The sector has witnessed several major successes in recent years, including the opening of the Canada Fluorspar mine in St. Lawrence and decisions to develop the underground extension of the nickel/copper/cobalt mine at Voisey's Bay and to reopen the Scully iron ore mine at Wabush.² These developments and others have reaped financial dividends; in 2018 alone, Newfoundland saw the announcement of \$2.5 billion in mining investments.

Newfoundland and Labrador also benefits from a strong reputation in the mining industry – it was ranked the 11th most attractive jurisdiction in the world for mining investment according to the Fraser Institute's 2017 survey of mining executives, released in 2018.³

The Province's natural endowments indicate a significant opportunity to expand the sector

Given the promise of the Province's natural endowments, Newfoundland and Labrador has yet to realize its full potential as a mineral supplier. Several regions are promising: the Labrador Trough is believed to hold significant high-grade iron ore deposits; Central Newfoundland is still considered an attractive area for gold exploration; and it is expected that further base metal deposits (e.g., nickel, copper, cobalt) are available, especially in underexplored areas of Labrador. Recent successful exploration for rare earth elements similarly points to additional opportunities to mine such metals in Labrador.

The Province's unrealized potential is coupled with robust projections of global demand for its most mined minerals, which include high-grade iron ore, nickel, copper, cobalt, and gold, leading to attractive prices for these commodities.⁴ Though demand (and consequently prices) for these commodities are subject to variability, the future needs of the global economy suggest a positive outlook. If Newfoundland and Labrador's mining industry can keep pace with the expected growth in demand for these key minerals, mineral shipments could increase by nearly \$1 billion and generate up to 3,000 new jobs by 2030.

Of course, this potential can only be realized if exploration efforts identify substantial new deposits within the province. This will require consistent and substantial investment in mineral exploration by government, junior mining companies and established players.

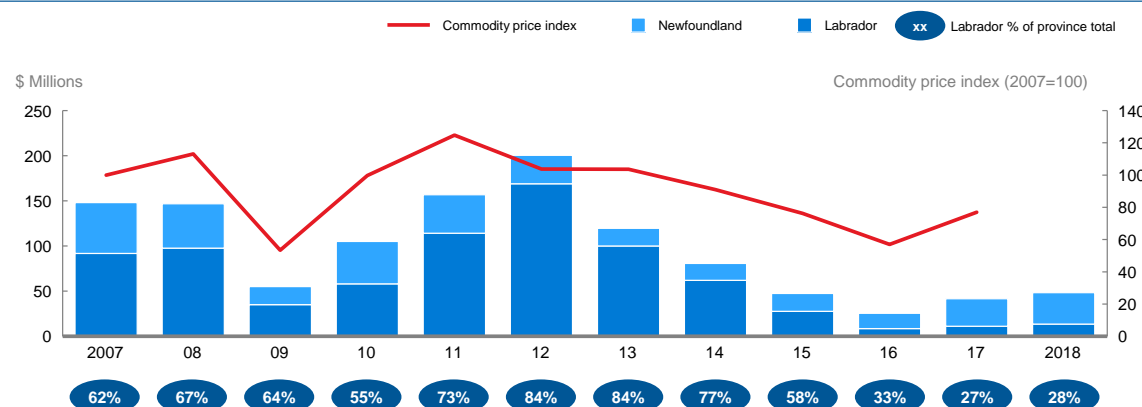
Newfoundland and Labrador will need to reverse the recent decline of investment in mineral exploration

Since 2012, Newfoundland and Labrador has witnessed a larger decline in mining exploration investment than its peer jurisdictions in Canada, a trend that has been particularly pronounced in Labrador. In 2018, total exploration spend for the Province was less than \$50 million (\$13 million in Labrador), compared to an average of nearly \$100 million for the Province (and nearly \$70 million in Labrador) over the preceding 10 years. This has led to a decline of the Province's share of Canadian mining exploration expenditure from a historical average of 4 to 5% to approximately 2% (Exhibit 9).⁵

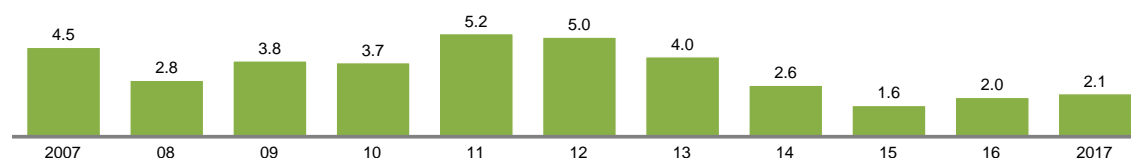
EXHIBIT 9

Newfoundland and Labrador has seen a more pronounced decline in mining exploration spend than peers, especially in Labrador

Mineral exploration and deposit appraisal expenditures in Newfoundland and Labrador



Newfoundland and Labrador expenditures as a share of Canadian total, %



SOURCE: World Bank Commodity Price Data; Mining Association of Canada; Australian Bureau of Statistics; IMF; Fraser Institute; NRCAn; Government of Newfoundland and Labrador

Although the Province is still considered to be one of the most attractive mining investment destinations in the world (11th), it falls behind Canadian peer jurisdictions such as Saskatchewan, Quebec, and Ontario for several reasons.⁶

Industry awareness of Newfoundland and Labrador's mineral prospects is insufficient given the Province's actual geological potential and the history of attractive deposit discoveries. Just over half of respondents to the Fraser Institute's survey believe that the Province's "pure" mineral potential encourages investment. This puts it in 28th place in the world behind peer jurisdictions such as Saskatchewan, Ontario, Quebec, and the Northwest Territories.

Newfoundland and Labrador lags even some jurisdictions (e.g., Ireland).⁷ that have seen limited mineral discoveries or mining activity in recent years

Public geoscience. Opportunities exist to increase the availability of public geoscience data in the Province. The Province's vast and diverse geography renders geospatial data especially costly. Though funding for surveying activities has remained largely constant, there remain opportunities to expand the funding envelope, increase surveying, and improve the quantity and quality of geophysical data.

As of writing, the last airborne geophysical survey was conducted in 2014.⁸ This is reflected in the fact that just over half of mining executives surveyed by the Fraser Institute view Newfoundland and Labrador's geological database as a factor that encourages investment in the Province. This compares to 90% in Finland (which is considered to have a best-in-class public geological survey) and 80% in Saskatchewan.⁹

Infrastructure. Challenges related to accessing infrastructure (including roads and electrical supply via the grid) in Labrador drive up exploration and development costs faced by mining companies and renders the Province a less attractive destination for mineral exploration.¹⁰ In the Fraser Institute's most recent survey of mining executives, 41% of respondents stated that infrastructure in the Province discourages investment. This suggests that Newfoundland and Labrador is viewed as being more in line with remote regions in Canada (Yukon, Northwest Territories, and Nunavut) than other major Canadian mining jurisdictions such as Quebec and Saskatchewan (where approximately 25% of respondents consider infrastructure to be a deterrent to investment).¹¹

Key pathways for stimulating mineral exploration

Mining the Future: 2030 presents a comprehensive set of ideas for addressing the Province's current disadvantages and capitalizing on the sector's growth opportunity. Although each of these ideas has individual merit, the Government should focus on the highest-potential actions, in particular:

1. **Launch an annual program of high-resolution, low-altitude airborne geophysical surveys targeting high-potential areas** (i.e., areas with geographical features that suggest potential to find deposits of high-value minerals, such as nickel, cobalt, or copper; proximity to existing deposit discoveries; access to transportation and electrical supply infrastructure).¹² The key attribute of Finland's best-in-class geological survey (GTK) is that it has collected detailed geophysical data covering the entire country's territory using a systematic program of airborne surveys. This involved flying at an altitude lower than 100 metres along parallel survey lines, with a spacing of 200 to 400 metres between the lines.¹³ Though resource intensive, this granular level of survey data provides a rich dataset that exploration companies can use to identify targets and stake exploration claims. Industry surveys have highlighted processed geophysical data (including magnetic, radiometric,

electromagnetic, and gravity data) as the most useful input to facilitate further private sector exploration.¹⁴

While Newfoundland and Labrador's Geological Survey does not have the budget at its disposal to embark on a comprehensive airborne survey program like Finland's, the Government of Newfoundland and Labrador could work with the Federal Government and private sector partners to allocate a fund for annual surveys of high-potential areas.

Such efforts are not without precedent. The cooperation agreement signed between the Newfoundland and Labrador and Quebec governments to jointly focus on Labrador Trough opportunities is one example of such a partnership. Though these efforts require capital investments, recent events have demonstrated their economic value. The Government's major seismic exploration program in the offshore oil industry (worth more than \$100 million) stimulated significant interest in private sector exploration.

Beyond conducting airborne surveys, the Geological Survey would need to engage industry representatives to ensure that the data are collected, processed, stored, and disseminated to meet the needs of the end users – the exploration companies that are likely to use the data to decide to stake exploration claims.

For one, close collaboration with the private sector could help identify high-potential areas, potentially via the Independent Geoscience Technical Advisory Committee proposed in *Mining the Future: 2030*. Once the highest-potential areas are identified, the Government would need to ensure that the data are produced in formats helpful to prospective mining companies. Important considerations might include integration of all data types, multiple data download options, a choice of data formats for download, and expert consultation to assist with data interpretation.

2. Explore opportunities to leverage leading analytical techniques to make the most of the geological data at its disposal

The Government already has a substantial geological database, including both its own surveys and data collected by private sector operators. In recent years, emerging techniques in advanced analytics have presented novel opportunities to identify new targets based on existing geological data. The Government could explore partnerships with advanced analytics companies (e.g., QPX, IBM) to better leverage existing and planned geophysics data while better targeting exploration efforts.

3. Adopt a “one team approach” in promoting the Province's mineral potential

Representatives of the Newfoundland and Labrador Geological Survey should continue to attend key industry gatherings (e.g., PDAC, Xplor, and Vancouver Resource Investment Conference) and showcase opportunities identified through their recent surveys and prospectivity analysis.

They could also seek closer cooperation with Department of Tourism, Culture, Industry and Innovation representatives dedicated to attracting external investment, who could bolster

the team's promotion capabilities by providing a broader perspective on the Government's offering to potential investors and complementing the team's marketing and promotion capabilities.

Outside of major industry gatherings, the Survey could continue to promote the Province's mineral potential through its publications and its website. These promotional efforts could be accompanied by regular and robust tracking of the conversion of industry contacts (i.e., a company claiming an exploration stake) generated through different channels, and the promotion strategy could then be adjusted based on its relative success.

4. Adapt the Junior Exploration Assistance Program to drive exploration activity in high-potential areas aligned with the Province's airborne survey program

Newfoundland and Labrador already benefits from a successful program offering assistance to exploration companies, providing partial cost reimbursement to compensate for the incremental costs imposed by infrastructural challenges.

However, the program is currently oversubscribed, with expense reimbursement claims for 2018 (totalling \$4.6 million) significantly exceeding the total budget of the program (\$1.3 million). As a result, assistance recipients are often reimbursed for only a fraction of the eligible expenses that they have claimed, potentially limiting the strength of the incentive created by the program.

Given the level of demand and the limited fiscal resources available, the Government could make better use of the assistance funds at its disposal by choosing one of the following alternatives:

- Focusing the program on specific exploration zones aligned with the targets identified for airborne geophysical surveys. Directing the support could enable the Government to send a clear signal to the private sector and drive exploration activity in areas with a higher likelihood of valuable discoveries.
- Redirecting the funds entirely to support the airborne geophysical surveys and a GIS database.

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- ¹ Newfoundland and Labrador Department of Natural Resources.
- ² “St. Lawrence fluorspar mine gets \$5M from feds, hundreds of jobs touted,” CBC, March 2017, cbc.ca; “Iron ore production to restart next year in Labrador mining town of Wabush,” *The Toronto Star*, November 2018, thestar.com.
- ³ “Fraser Institute Annual Survey of Mining Companies 2017,” Fraser Institute, 2018, fraserinstitute.org.
- ⁴ McKinsey Basic Materials Institute.
- ⁵ Newfoundland and Labrador Department of Natural Resources; the high levels of exploration investment, especially between 2006 and 2012, might have partially been driven by three consecutive “exploration rushes,” for iron ore, uranium, and nickel respectively. Still, the levels of exploration expenditure in Labrador over the past 2 years can hardly be justified given the mineral potential of the region.
- ⁶ “Fraser Institute Annual Survey of Mining Companies 2017,” Fraser Institute, 2018, fraserinstitute.org.
- ⁷ Ibid.
- ⁸ Interviews with Department of Natural Resources experts.
- ⁹ “Fraser Institute Annual Survey of Mining Companies 2017,” Fraser Institute, 2018, fraserinstitute.org; expert interviews.
- ¹⁰ Interviews with mineral exploration companies.
- ¹¹ “Fraser Institute Annual Survey of Mining Companies 2017,” Fraser Institute, 2018, fraserinstitute.org.
- ¹² The cost of such a program would depend on the size of the area targeted and the preferred line spacing. A complex geophysical survey covering 10,000 square kilometres, with distance between the lines of 400 metres, could cost approximately \$5 million (assuming a cost of \$200 per line kilometer).
- ¹³ “Unique geophysical airborne data covering all of Finland,” Geological Survey of Finland, 2008, en.gtk.fi; optimal altitude for surveys depends on the terrain.
- ¹⁴ Extractive Industry Sourcebook.

Aquaculture and Fisheries



Priority sector: Aquaculture and Fisheries

Context

Global demand for Atlantic salmon is projected to grow by 6% annually through 2022.^{1,2} However, the salmon market also confronts persistent supply constraints, driven by production challenges associated with diseases and limited areas for new development. As a result, salmon prices have increased sharply, driving up profits for producers.³

This confluence of market factors presents an exceptionally attractive opportunity for Newfoundland and Labrador. The Province has a long history in the seafood industry and the sector's products remain its primary agri-food export.

Atlantic salmon demand in the United States

In recent years, salmon's availability has increased in both American retail and food service, driven by growing demand for healthy food and a strong interest in sushi. According to experts, latent demand in the salmon market should be able to absorb up to 8% annual growth in supply (at current prices) – the implication being that the market could absorb approximately an additional 260,000 metric tons by 2023.

Canada's existing supply infrastructure positions Newfoundland and Labrador to take advantage of this fast-growing market, enabled by physical proximity, favourable trade agreements, and existing supplier relationships.

More recently, Newfoundland and Labrador has begun using its long coastline for aquaculture, positioning the Province for significant growth as the market becomes increasingly lucrative. This has already led to high levels of industry growth in recent years, with an overall upward trend in salmonid production and sales.

Several other aquaculture opportunities have been explored, but they do not present the same growth opportunity as Atlantic salmon production does. For example:

- Mussels for export are also produced in northern Newfoundland, but the market is both slower growing and considerably smaller in absolute terms, with 2.6% growth between 2015 and 2016, and a total provincial market value of approximately \$14 million⁴
- Oyster production also has potential, but this industry's development is still in the early stages with limited scale
- Early attempts at cod farming have proven challenging, because of technical limitations and unpromising economics.⁵

For these reasons, this chapter focuses principally on Atlantic salmon.

Newfoundland and Labrador enjoys several natural advantages that render its operating environment cost-competitive with its peer countries and its production environment relatively attractive. The Province's coastal waters include sites with good current flows and high levels of oxygen, creating suitable farming conditions for salmon. Newfoundland's deep bays also allow aquaculture producers to establish sites in more sheltered environments, playing a part in mitigating the risk of salmon escapes.

These factors have attracted Marine Harvest, Cooke Aquaculture and Grieg – some of the largest players in salmon farming. Marine Harvest and Grieg have recently made major investments in Newfoundland and Labrador that will grow the local industry considerably, increasing local employment, and creating opportunities for the development of local supply chain and associated technology companies. Still, Newfoundland and Labrador's attractiveness as an aquaculture hub positions the Province to expand beyond these investments – its potential is well recognized by industry leaders.

"Newfoundland has potential. It's a huge area, and if we do the farming right, it can grow in the future."

– Alf-Helge Aarskog, CEO, Marine Harvest

Newfoundland and Labrador's attractive natural potential, coupled with high levels of demonstrated corporate interest, position the Province to exceed the 50,000 metric tons 2023 production target put forward in *The Way Forward on Aquaculture*.

This report builds on and advances *The Way Forward* recommendations by:

- Raising aspirations and identifying opportunities for realizing this ambition
- Prioritizing top initiatives for immediate action
- Identifying options for growth in the aquaculture supply and services sector.

All told, by 2030, the sector could be producing more than 5 times current volumes, exceeding 100,000 metric tons annually. Fully realized, increased salmon production, coupled with a substantially more integrated aquaculture supply and services network, could contribute up to \$600 million in GDP uplift and generate more than 7,000 additional jobs by 2030. Many of these jobs would be concentrated in the Province's rural and remote communities, supporting the Government of Newfoundland and Labrador's priority to advance regional economic development.

In addition to the aquaculture opportunities discussed below, recent changes to the prevailing tariff regime, in particular, modifications to the Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union, present new opportunities for growing the Province's fishery exports.⁶ Under the new agreement, 96% of EU tariff lines for fish and seafood have become duty free; after 7 years, 100% will be free of duties. Given that the

EU is the world's largest importer of fish and seafood, this could afford Newfoundland and Labrador's fisheries a lucrative new opportunity for export-based expansion.

In addition to tariff free access, non-tariff barriers have been eliminated, furthering increasing the opportunities available for companies in Newfoundland and Labrador.

Under the new regime, fish and seafood companies are no longer limited to traditional markets like the United States, constrained by regulations that restrict product form and packaging, or confined to exporting product during low-season periods to avoid tariffs. Compared to competitors in other jurisdictions, Newfoundland and Labrador now boasts preferential access to the world's largest market, increasing its attractiveness to lure investment and positioning itself for future growth.

Key opportunity: Further expand aquaculture production to contribute to meeting growing global demand

Newfoundland and Labrador's competitive advantages and a highly attractive global market present an opportunity for the Province to further expand Atlantic salmon production using several levers, some already identified in *The Way Forward on Aquaculture*.

1. Begin commercial production at already licensed sites

Nearly half of Newfoundland and Labrador's licensed aquaculture sites are inactive,⁷ a lower proportion than in some of its peer countries. Though the existing bay management system accounts partially for this lower utilization rate, innovations in environmental management may open new opportunities to activate a greater proportion of these sites. If successful, this could result in more than 15,000 metric tons of additional annual production, so long as long-term sustainability is ensured.

2. License new sites

Newfoundland and Labrador could leverage its suitable ocean conditions to license additional sites, opening new geographies to prospective seafood producers. This will require continued cooperation with the Federal Department of Fisheries and Oceans, Environment and Climate Change Canada, and Transport Canada to ensure that new sites are approved efficiently for aquaculture development.

3. Attract new aquaculture companies or stimulate new investment from existing players

The recently announced investments from Grieg and Marine Harvest signal Newfoundland and Labrador's attractiveness as a site for aquaculture. The Province should facilitate the commercial success of these projects, encouraging existing companies to continue developing new sites, or potentially targeting additional industry players in pursuit of an attractive aquaculture ecosystem.

Longer-term partnerships with Grieg and Marine Harvest could prove beneficial for the industry and the Government alike. Offering major companies incentives like expedited licensing could secure industry commitments related to the creation of new jobs, guaranteed production levels, and tax revenues.

4. Develop and produce premium salmon associated with a distinctive brand

Given global interest in salmon products and the perception of Canada as a high-quality and environmentally sustainable producer, there is an opportunity to introduce premium offerings at the high end of the market. This would permit producers in Newfoundland and Labrador to achieve higher margins on top tier salmon and may have positive ancillary branding effects even for more conventional products. If such a marketing strategy is implemented, the Province could evaluate how the \$400 million federal-provincial Atlantic Fisheries Fund might provide complementary financial support for these efforts.⁸

This branding strategy could also represent an opportunity to support local processing, enabling Newfoundland and Labrador to market its salmon as “hand selected” or “homegrown.” To achieve that, opportunities exist to partner with seafood processing businesses with experience in processing value-added products and marketing internationally.

Bakkafrost, which produces salmon in the Faroe Islands, has successfully employed this strategy, marketing Bakkafrost Salmon as being “fed a wholesome diet that we carefully harvest from their natural environment surrounding the Faroe Islands”.⁹ This focus on quality and “purity” enables its products to command higher market prices than fish sourced elsewhere, even though the aquaculture techniques Bakkafrost uses are similar to those of its competitors. Similarly, Marine Harvest markets select British Columbia salmon under the “Sterling” brand, emphasizing the purity of the natural environment and the expertise of the “Sterling Specialists”, a group of dedicated fish inspectors.

Aquaculture sustainability

Increasing production levels should be accompanied by efforts to ensure that aquaculture remains sustainable and natural ecosystems are protected. The use of technology can reduce the environmental impact of aquaculture in various ways – for example, by using advanced analytics to predict potentially harmful weather events or the spreading diseases.

These sustainability challenges may also offer considerable opportunities for new partnerships with industry or the development of novel technologies to address the

issues accompanying scaled-up production (e.g., linking with the Ocean Tech Challenge outlined below).

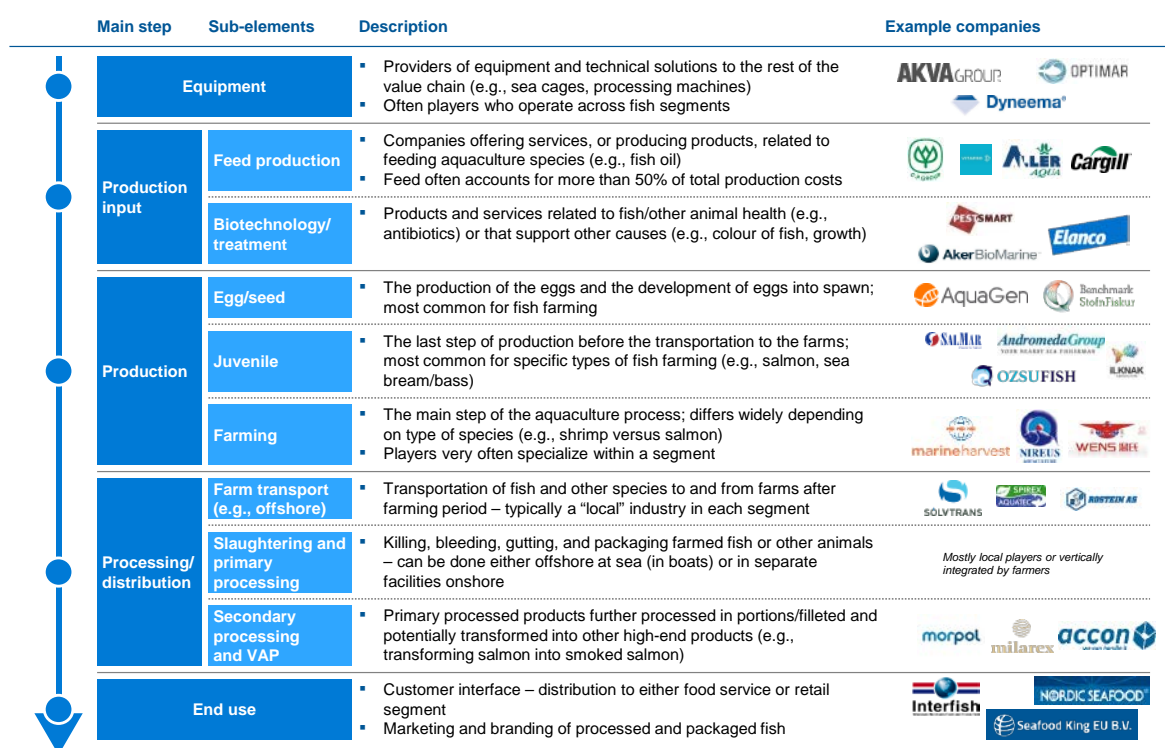
The Government could support such innovations through market incentives. Norway, for example, has offered discounted R&D licences to farmers willing to trial more environmentally friendly methods of production. Similar incentives in Newfoundland and Labrador could enable new methods for sustainable production all while stimulating industry growth and technological innovation.

Additional opportunity: Build a mature aquaculture supply and services sector to meet the needs of local industry and export leading solutions internationally

Although fish production represents the most valuable component of the aquaculture process, the value chain is long – and other steps in the process account for more than half of the final product's total value (Exhibit 10). This offers substantial opportunities for aquaculture supply and services companies to capture additional value as the industry grows. The Government has already undertaken an industry survey of existing players along the value chain, which will help identify gaps that could be filled by existing or new operations based in the Province.

EXHIBIT 10

Aquaculture value chain



SOURCE: Industry expert interviews

The Government could facilitate the realization of these opportunities in several ways.

Support existing local companies and joint ventures with foreign investors in setting up additional facilities along the service and supply value chain

The Province could consider working with domestic players to capture supply chain opportunities stemming from industry growth. This may require partnership with foreign investors, who will bring external capital and new expertise. Several segments of the aquaculture supply and services sector represent particularly attractive opportunities for Newfoundland and Labrador.

- **Equipment.** Growing demand for farming equipment such as feed barges and well-boats could be met by the proposed future manufacturing operations of global players in Newfoundland and Labrador (e.g., Gael Force, AKVA) or by growing and sustaining existing local players.
New aquaculture operations will also require an expanded sub-industry to perform repair and maintenance tasks. Third-party entrants in this sub-industry would benefit from the large volume of new entrants and the constancy of wear and tear. Operational challenges associated with moving heavy equipment and the importance of on-demand response make local service industries essential to aquaculture.
- **Eggs/smolt.** Increased egg and smolt production is expected due to a proposed expansion of hatchery capacity by Marine Harvest.
- **Harvesting.** Increased future demand for harvesting could be satisfied by a greater number of locally built well-boats, in tandem with the support sub-industry required to maintain and repair harvest equipment.
- **Primary processing.** The need for local slaughter and processing offers the potential to open new plants run either by the producers themselves or by third-party processors. Growing future demand could be met by increased automation or other advances in processing technology. The Government may wish to consider how the Atlantic Fisheries Fund could enable the upgrading of existing plants to meet growing demand.
- **Secondary processing.** Increased collaboration between Grieg and local processing businesses like Ocean Choice International (OCI) could expand secondary processing capabilities locally.¹⁰ Newfoundland and Labrador could consider encouraging producers to keep secondary processing in Province, potentially by imposing a minimum local processing requirement for foreign operators focused on salmon farming (where permitted by trade obligations.)
- **Waste management.** Increased aquaculture development would result in substantial amounts of new waste – including metabolic, pathogenic, and dissolved waste. Ensuring a sustainable industry would call for new ways of handling these by-products of fish farming. Innovations in feed management, solid waste removal, water filtration, disinfection

technology, and other related capabilities would ensure environmental protection while offering the potential to generate considerable new value for domestic players.

- **Technology.** Digitization in the aquaculture industry could offer substantial financial upside. Supply chain optimization via blockchain solutions, or the use of advanced analytics and machine learning to better predict growth and mitigate disease may offer promising pathways for innovation. Remote sensing or autonomous vehicles, coupled with enhanced telecommunications technology, could permit more accurate monitoring and easier maintenance.
- **Feed.** The quantity of feed required to sustain large-scale aquaculture makes long-distance transport economically infeasible, meaning that production would have to be largely local. Given the substantial value involved in feed production (feed accounts for nearly half of the value of salmonid production) and the entry of new and large-scale producers that will dramatically increase demand, in-housing feed production represents a significant economic opportunity.

Although opportunities for large-scale agriculture in Newfoundland and Labrador are limited, technologies that utilize novel sources of protein (e.g., insects, algae, organic waste) may offer the potential for industry disruption.

Granting feed companies preferred access to land or emphasizing the economic savings aquaculture operators can gain by producing in Newfoundland and Labrador rather than other nearby provinces could drive province-wide growth in this industry.

Feed extrusion plant (Westbury, Tasmania, Australia)

Construction on a new feed plant in Westbury, Tasmania, began in early 2018, enabled by AUS \$2 million in funding from the Tasmanian government. The facility will manufacture and supply feed to the Tasmanian salmon industry, with the potential to manufacture feed for other aquaculture species in Australia and New Zealand.

The plant was strategically located to receive ingredients from local suppliers, and it is aimed at facilitating a consistent and efficient supply chain for the aquaculture industry as a whole.

Source: Jane Byrne, “Ridley salmon feed plant build progressing quickly, set to go on stream in first half of 2019,” Feed Navigator, December 2018, [feednavigator.com](https://www.feednavigator.com).

Encourage local projects to develop aquaculture service hubs

Areas where existing physical infrastructure can be reused or rehabilitated offer particularly promising sites for new aquaculture service hubs.

Aquaculture Hub + Inner City Development (Southland, New Zealand)

The Government of New Zealand has dedicated approximately \$2 million to fund an inner-city development in Southland, the country's southernmost region. Around \$500,000 of this funding was earmarked for a commercial hatchery and nursery, which will enable the production of salmon and mussels.

The investment is projected to unlock more than \$400 million in export potential and generate more than 500 jobs within the region. The project also aims to upskill local workers to meet the needs of the aquaculture industry, while drawing in high-skill labour, including researchers and production staff, from outside the region.

Source: Zane Small, "Government funding boost set to transform Invercargill CBD," Newshub, December 2018, [newshub.co.nz](https://www.newshub.co.nz).

Integrate aquaculture into the Province's Ocean Technology Innovation Challenge

Incorporating aquaculture into the Province's Ocean Technology Challenge could lend momentum to startups working on projects with the potential to unlock and sustain future production growth. A wide variety of industry challenges call for innovative technology solutions.

Sophisticated farming techniques are required in newly licensed and exposed farming areas on the Province's southwest shore and Placentia Bay (e.g., larger smolts, robust farming nets). Proposed utilization rates near maximum allowed biomass (MAB) will require careful management of disease (e.g., infectious salmon anemia, sea lice) using non-medicinal methods, such as maintaining cleaner fish, utilizing vaccines, and tracking mitigation effectiveness using digitization and automation. These will necessitate innovative approaches to fish farming.

For new entrants, Newfoundland and Labrador's geography may differ significantly from the operating environments of global aquaculture firms. Local innovation tailored to the Province's characteristics would allow foreign players to begin operations quickly with products and capabilities that benefit from local expertise, rather than building ad hoc solutions themselves.

Fortunately, many technologies relevant to offshore oil production are also germane to aquaculture support and services. An ocean technology competition would help identify possible synergies and aid existing companies in marketing and redeveloping their products for an aquaculture client base.

The competition could also encourage collaboration between industry players that may not otherwise have considered working together. Carefully structured incentives can reduce cannibalization and unproductive competition.

Aquaculture Accelerator (Hawaii, United States of America)

Three State of Hawaii agencies formed a strategic partnership and issued an RFI to establish and operate an aquaculture accelerator. The proposed initiative aims to create a facility and program at NELHA, the National Energy Laboratory of Hawaii Authority, to attract and assist entrepreneurs in commercializing their projects.

The initiative will target companies that service global markets, particularly those that work on developing new cultured species, feed sources, and enabling technologies. Ultimately, Hawaii hopes to attract new investor capital and develop a fund for follow-on developments in aquaculture innovation.

Source: “Investing in Hawaii’s Future,” Hawaii Strategic Development Corp., hsdc.hawaii.gov.

Ensure that the size and skill of the Province’s workforce can keep pace with growth in the aquaculture and fisheries industry

At present, the Canadian aquaculture industry suffers from a labour shortage; data from the Canadian Agriculture Human Resources Council indicates an 11% industry vacancy rate, resulting in millions in lost revenue.¹¹

Employees in the aquaculture industry are considerably younger than those working in fishing, though rapid growth will require more than doubling the current workforce.¹² This may prove challenging given the specialized skills required to participate in the aquaculture labour force.

Closing the skill gap would require developing a substantial pipeline of skilled labour to meet the needs of a growing industry. Some efforts are already underway, including investments that offer secondary school students opportunities to learn about ocean technology and small scholarships for those pursuing post-secondary education in marine or aquatic-related studies.¹³

For example, in October 2018, the Government of Newfoundland and Labrador disbursed \$588,000 to the Newfoundland Aquaculture Industry Association to develop enhanced labour market information tools, with the aim of accelerating aquaculture growth.¹⁴ In the same vein, the Newfoundland and Labrador Workforce Innovation Centre is conducting a research project to assess the possibility of developing skills-training programs to enhance the aquaculture sector.¹⁵

Several other approaches could ensure that the Province’s talent capacities align with industry needs.

The Province could support the efforts outlined in *The Way Forward on Aquaculture* to increase the visibility of the aquaculture industry, include efforts underway to profile the industry in labour market information tools and developing options to increase awareness among youth.

Although some related educational programs exist, they are typically advanced degrees: for example, Memorial University offers an online master's degree in aquaculture technology and an advanced diploma in sustainable aquaculture. As part of the Province's post-secondary review, the Government of Newfoundland and Labrador could assess the potential of introducing new programs at the College of the North Atlantic (CNA) to meet needs of this fast-growing industry.

Any new development of aquaculture educational offerings would benefit from industry input, ensuring tight alignment between curriculum design and the needs of industrial producers. New programs should also be situated as close to production facilities as possible (e.g., at CNA's Burin, Corner Brook, Port Aux Basques or Stephenville locations) to facilitate collaboration between industry and education and enable efficient reskilling of the existing workforce.

As these programs are developed, post-secondary institutions could prioritize opportunities to introduce work-integrated learning/co-op programs, increasing the labour market readiness of recent graduates.

¹ Rabobank & Kontali, Global Seafood Market with Focus on Atlantic Salmon: Size, Trends & Forecasts (2018-2022), NAIA, United Nations, February 2018.

² Henchion, M., Hayes, M., Mullen, A. M., Fenelon, M., & Tiwari, B. (2017). Future Protein Supply and Demand: Strategies and Factors Influencing a Sustainable Equilibrium. *Foods*, July 2017, MDPI, Basel, Switzerland, 6(7), 53. doi:10.3390/foods6070053.

³ Fish Pool Index.

⁴ "Industry by the Numbers," NAIA, naia.ca.

⁵ "Hope fades for future of cod farming," CBC, July 2012, cbc.ca.

⁶ "Opportunities and Benefits of CETA for Canada's Fish and Seafood Exporters," Government of Canada, international.gc.ca

⁷ Some of the licensed sites are inactive because the licensee failed to establish economically viable farms. However, with the introduction of new farming technology (e.g., ocean-based closed systems) some of these sites could be used to set up functioning farms.

⁸ "Atlantic Fisheries Fund," Fisheries and Oceans Canada, dfo-mpo.gc.ca.

⁹ "Why Bakkafrøst Salmon?", Bakkafrøst, bakkafrøst.com.

¹⁰ At present, Newfoundland imposes minimum processing requirements on the production of some fish cultures, but not salmon. Applying similar regulations to salmonid production is one option for increasing the proportion of secondary processing conducted in the Province, if consistent with trade obligations.

¹¹ Liza Mayer, "Funding to boost NL's aquaculture labour market," *Aquaculture North America*, October 2018, aquaculturenorthamerica.com.

¹² Janelle Skeard, Colln Holloway, Kelly Vodden, "The Analysis of Labour Market Factors Impacting Primary Industries in the Province of Newfoundland and Labrador, with a special interest in the Clarendville-Bonavista Rural Secretariat region," January 2011, ope.gov.nl.ca; "Industry and Government Partnering to Realize the Potential of Sustainable Aquaculture Growth," September 2017, naia.ca.

¹³ "Connecting Coastal Classrooms to Ocean Science Technology," *Cold Harvester: Newfoundland Aquaculture*, January 2018, naia.ca.

¹⁴ "\$588k grant to boost NL aquaculture labour market," *Fish Farming Expert*, September 2018, fishfarmingexpert.com.

¹⁵ "Entry and Retention in the Aquaculture Sector," NL Workforce Innovation Centre, nlwic.ca.



Tourism



Priority sector: Tourism

Context

Tourism is a critical and growing sector of the economy of Newfoundland and Labrador. In 2017, the industry generated \$716 million in GDP, accounting for 2.4% of the Province's economy, and contributed approximately 20,000 jobs, becoming the second largest employment sector in Newfoundland and Labrador. Since 2008, the industry has grown at a healthy average rate of 3.7% per annum.

Tourism offers many benefits to the economy in addition to its contribution to GDP. Unlike most industries that are subject to the ebbs and flows of local economic conditions, growth in tourism is largely driven by the performance of other economies. This enables the industry to function as an economic stabilizer, even amid down periods for the domestic economy.

EXHIBIT 11

Several emerging destinations across Newfoundland and Labrador are well-positioned to become world-class clusters



Newfoundland and Labrador is uniquely positioned to capture the benefits of tourism. The Province enjoys enviable natural and cultural assets that position the tourism sector for continued growth and present opportunities to develop world-class clusters (Exhibit 11). The Province is home to four UNESCO World Heritage Sites, including Gros Morne, which is rated the most beautiful park in Canada on TripAdvisor. Iceberg Alley, a strip of sea located off the Province's coast, is one of the best places in the world to view icebergs.

In addition to its natural assets, the Province also prides itself on its rich cultural heritage. Visitors can tour the UNESCO World Heritage Site at L'Anse aux Meadows, the only authenticated Viking settlement in North America and delve into the region's traditional culture through a variety of storytelling and theatre festivals.

All of these attractions are accessible by air from different parts of the world. Newfoundland and Labrador is within close range of major travel markets in North America and Western Europe. For example, St. John's is a 3.5-hour flight from both Toronto and New York, and less than 5 hours away from London. Its unique geographical location between North America and Western Europe is comparable to Reykjavík, Iceland, a destination that has emerged as a tourist hot spot and global transit hub for low-cost carriers in the past decade.

The Department of Tourism, Culture, Industry and Innovation (TCII), together with the private sector and local communities, have undertaken a variety of initiatives to support recent growth, including:

- Investments in infrastructure, improved air access (including the expansion of St. John's International Airport), enhancement of convention facilities, construction of new accommodations, and the addition of new restaurants and attractions
- Creation of destination development plans (DDPs) that provide an assessment of the competitiveness of the Province's regions and their respective tourism services and attractions, which resulted in regional plans to develop tourism products and services
- Widespread marketing efforts, including the Province's award-winning advertising campaigns that have increased consumer awareness and attracted new visitors.

These initiatives provide a strong foundation and lend momentum to future growth – while pointing to a substantial opportunity to raise Newfoundland and Labrador's aspirations. Unlocking the full potential of the Province's assets would require opening the sector to external capital and expertise.

A promising tourism landscape

Newfoundland and Labrador's tourism growth rate lags that of the global sector by 4% per annum.¹ At this rate, Newfoundland and Labrador is not on track to meet its 2020 target of \$1.6 billion. However, several indicators point to significant opportunities to accelerate the current rate of growth.

Tailwind from the Federal Government's renewed focus on tourism

In 2018, Destination Canada launched a report to advocate for the strategic importance of tourism. The report recognizes substantial potential for growth in Canada's tourism sector and the need for Canada to capture its "fair share" of the growth in the sector globally.² Nationally, Canada is targeting a 6.4% per annum non-resident tourism growth rate, which is projected to double the size of the sector by 2030. Given Newfoundland and Labrador's unique assets and untapped potential, the Province has the possibility to match the Canadian target over the next decade.

Destination Canada also identifies five key challenges faced by Canada's tourism sector, including concentrated demand in only three provinces (Ontario, Quebec, and British Columbia), difficult air access and ground transportation, a labour shortage, a lack of investment, and insufficiently integrated governance.

The Federal Government's commitment to address these issues presents an opportunity for the Province to double down on its growth efforts, collaborating with the Federal Government on solving issues like air access. In particular, Newfoundland and Labrador's unique natural assets position the Province to benefit from Destination Canada's call for action to promote nature-based attractions and tourism cluster development.

Forward momentum from global tourism trends

Globally, several tailwinds will help the Province. Global adventure tourism is expected to grow three-fold in the next 7 years.³ This trend is especially promising for Newfoundland and Labrador as 21% of tourists already cite nature and wildlife as the primary reason for visiting the Province.⁴

The population visiting Newfoundland and Labrador provides advantages, too. At present, 60% of visitors to the Province are aged 55 or older.⁵ Baby boomers spend one-and-a-half times more than the average tourist,⁶ presenting the Province with a considerable growth opportunity in tourist spending.

Attracting Chinese tourists, the world's largest source market for international tourism, will also be crucial to growing the sector. According to Destination Canada, the number

of Chinese visitors to Canada tripled between 2007 and 2017 and is expected to grow by 40% by 2022. Given its natural endowments, Newfoundland and Labrador is well-positioned to attract more Chinese tourists, 65% of whom report natural scenery as a major attraction.⁷

The Province's climate and proximity to icebergs may also play in its favour, building on a trend of strong growth in markets with cold weather. Virtuoso, a leading luxury travel agency, describes this trend as "cold is hot".⁸ A notable example is Iceland, which has tripled its visitors from 0.6 million to 2.2 million in 7 years (24% per annum), with tourism representing 42% of its exports of goods and services.⁹ Similarly, Finland's Lapland visitors grew from 1.1 million to 1.6 million in 4 years and is now facing a shortage of 2,000 hotel rooms in the winter months.¹⁰

Matching Destination Canada's target of non-resident spending growth rate of 6.4% per annum would unlock approximately \$2 billion in annual tourism spending for Newfoundland and Labrador by 2030, with the potential to support more than 10,000 new jobs.

Developing world-class destinations

Realizing these aspirations will require an integrated approach to attract more visitors, increase the duration of stays, and encourage year-round travel. Such an approach demands proactive attraction of external investment, targeted development of key destinations, and centralized coordination of stakeholders toward a shared vision and master plan. As travelers become more global, savvy, and well informed, Newfoundland and Labrador would need to develop world-class destinations to attract more tourists from outside the Province and Canada.

Though such destinations are by nature unique, world-class attractions tend to share some common characteristics:

- **Iconic identity.** The identity and focus of top destinations is often unique to the region, its culture and people, and distinct from other places. These destinations usually benefit from natural endowments or a cultural and historical anchor (e.g., wine regions, icebergs). Their identity is globally recognized, which is achieved through active and targeted marketing campaigns.
- **Diverse range of visitor attractions.** World-class destinations offer a wide range of products and attractions (e.g., entertainment and activity options, historical sites, national parks) that cater to the interests of different types of tourists. Such diversity enhances the tourist experience while increasing the average length of stay and the amount of tourist spending.

- **Adequate accommodations across various price points and quality.** World-class destinations typically offer a range of accommodation options to suit the needs of the different types of travelers they seek to attract. A vibrant sharing economy can help alleviate supply shortages in peak season.
- **Established infrastructure with integrated transportation.** Seamless access is the foundation of any successful tourism destination. World-class destinations are supported by an established transportation network facilitating inbound and local travel (airport, flight connections, railway links, rental cars, etc.)

Five targeted efforts to develop world-class destinations

To support the development of world-class destinations, Newfoundland and Labrador would need to proactively close five key gaps between its tourism sector and those of leading jurisdictions around the world.

1. Improve air access to the Province through strategic partnerships with airlines

Air travel to Newfoundland and Labrador is expensive, and there are limited direct flights to and from international destinations. Even within Canada, direct flights from Toronto are among the most expensive in the country. It can be substantially cheaper to fly from Toronto to Reykjavik (\$190) than it is to fly to St. John's (\$523) when booking 7 days before the departure date.¹¹ There are also limited low-cost carrier (LCC) and charter options to connect Newfoundland and Labrador to large tourism source markets such as Toronto and New York City.

Example: Developing Gros Morne as a potential world-class destination in Newfoundland and Labrador

Assessed against these key characteristics, Gros Morne presents significant potential for further development into a world-class destination. The park benefits several communities that have enjoyed rapid development over the past decade. For example, Rocky Harbour has developed a wide variety of tourist services, including hotels, cottages, and other forms of accommodation. Attractions include museums and restaurants serving local favorites like moose burgers. Surrounding towns offer live entertainment in the summer season, which is expected to grow with the anticipated new performing arts stage being built in Cow Head to accommodate the summer theatre festival.

While Gros Morne has the foundational elements of a world-class destination, such as an iconic identity, strong local entrepreneurship, and diverse product offerings,

unlocking future growth would require the Province to address critical gaps that may inhibit its future growth across the following areas:

- **Diversify the range of visitor attractions.** Gros Morne’s iconic natural assets position it to attract foreign investment in the fast-growing adventure tourism sector – e.g., upgraded camping/glamping facilities, spas, geological tours, and pre-packaged itineraries across different price points. These investments would diversify the range of product offerings and increase visitor spending at the Park.
- **Increase accommodations across various price points and quality.** Accommodations near Gros Morne face accessibility and capacity issues. An online search conducted in 2018 for July 2019 showed only 7 available properties, 5 of which were sold out 7 months in advance. In addition to the need for more capacity, Gros Morne could also benefit from internationally recognized hotels in the middle and luxury ranges. Compared to Iceland’s top tourism destination Gullfoss, Gros Morne has significantly fewer accommodation options, including at the high end of the market.
- **Address access issues through an integrated transportation strategy.** Tourists interested in visiting Gros Morne face transportation challenges given limited air access, and a lack of rental car or public transportation options. Gros Morne is 30 minutes from the Deer Lake Airport, 4 hours from the Marine Atlantic Ferry Terminal in Port aux Basque, and 7 hours from St. John’s. Flight capacity in the summer is limited, and rental cars are often unavailable in Deer Lake.

Even for those who secure a rental car, the “one way” drop fee for those wanting to drive to St. John’s can be prohibitive. Public local transportation is also limited. To fully support future growth, Gros Morne will require upgraded transportation options – e.g., increasing the number of rental cars, allowing ride sharing, subsidizing bus companies in their nascent stages, attracting new low-cost airlines, and developing a public transit network with online booking.

The Province should work closely with the Federal Government to tackle this issue. As market demand grows, Newfoundland and Labrador could actively seek partnership opportunities with airlines to increase the number of direct flights to major airports. For example, the Province could explore ways to reduce airport-related costs that currently comprise a relatively large part of the overall cost structure for airlines (e.g., landing fees, check-in handling). The Province could also engage the local aerospace industry to design innovative collaborations to supply

local air transportation demand (e.g., air travel between key destinations in the Province as part of a high-end package tour).

2. Improve transportation access within the Province

The land area of Newfoundland and Labrador is nearly four times as large as that of Iceland. The accessibility, availability, and affordability of various transportation options are critical for prospective visitors. The Province's 2016 Visitor Exit Survey reports that one-third of visitors stay between four and seven nights, with many travellers commenting that they did not have enough time to visit all the attractions they had planned on seeing. Increasing affordable means of transportation would be imperative to ensure that exploring the Province is convenient and enjoyable.

At present, rental cars need to be booked well in advance and are not always affordable. For example, tourists who want to drive from Deer Lake Airport to St. John's can be charged a prohibitively high drop fee. Public transportation is also lacking within the Province, making it difficult to access major tourist destinations via bus.

Newfoundland and Labrador could pursue efforts to expand transportation options and create seamless visitor journeys, including:

- Proactively attracting Uber, Car2Go, and peer-to-peer car-sharing companies to Newfoundland and Labrador to increase supply and create a more competitive market
- Introducing an online site to easily book domestic travel between key tourist sites. In Australia, the Queensland transport and tourism departments worked together and developed a cohesive strategy for tourists to travel across the region. A mobile app was created to allow easy access to transit for tourists
- Launching more shuttle routes to link key sites. For example, Yellowstone National Park in the United States has multiple commercial buses that take tourists to the site and an internal bus system to travel within the park. Newfoundland and Labrador could consider establishing a frequent bus link between Gros Morne and St. John's
- Offer roundtrip shuttles from St. John's and Gros Morne to Farewell ferry station to facilitate easier access to Fogo Island; a shuttle from Deer Lake to Corner Brook to provide access to Marble Mountain; and a shuttle between Gros Morne and L'Anse aux Meadows to make it easier for tourists to visit two of Newfoundland and Labrador's UNESCO World Heritage sites in the same trip.

3. Curate unique traveler-centric products and experiences that promote Newfoundland and Labrador across all seasons

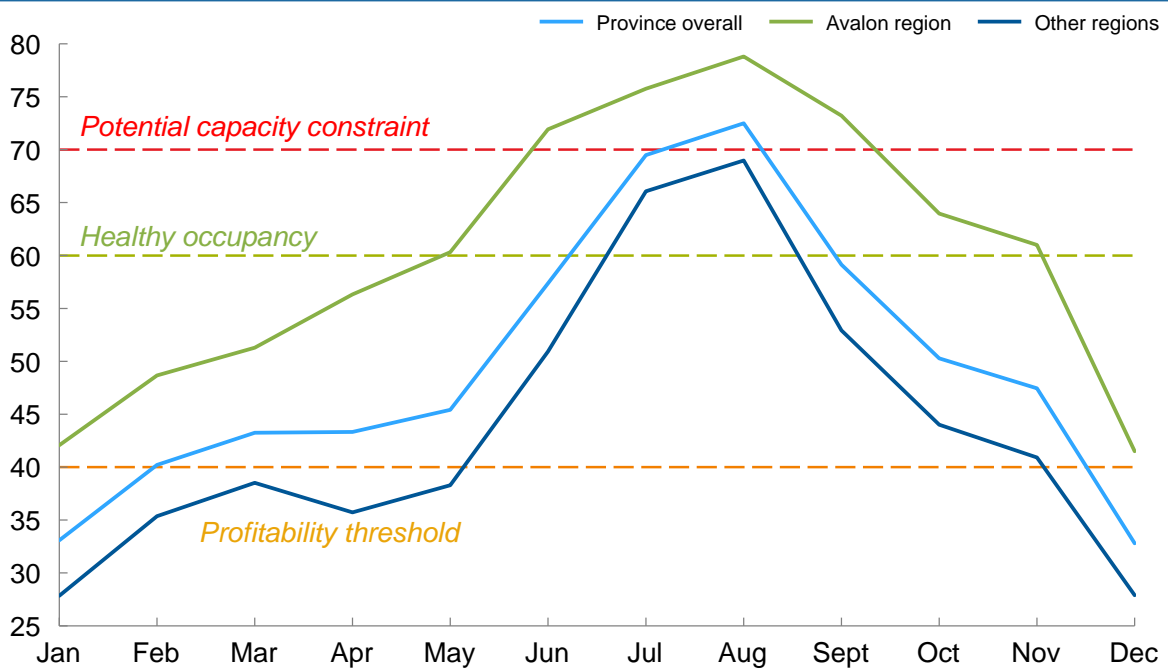
Newfoundland and Labrador's tourism sector is substantially affected by issues of seasonality. Almost 75% of tourists to the Province arrive from May to August, and most parks and tour operators only run through this peak season. During the winter months, hotels experience occupancy issues, falling below profitable levels of business (Exhibit 12). Overcoming seasonality is not easy and requires a concerted effort to diversify product offerings, ensure affordable and adequate air access and ground transportation, and launch targeted marketing. Given the wide range of assets for winter tourism in the Province (e.g., skiing, snowmobiling, and events like Cain's Quest in Labrador), there is an opportunity to curate more products and experiences that are suitable year-round.

When designing new products and experiences, the Province should embrace a traveler-centric approach, ensuring a smooth end-to-end journey. For example, starting from the planning stage, the Province could explore ways to centralize various resources and information and make them accessible in multiple languages. Iceland's tourism website, for example, can be viewed in 13 different languages, making it highly accessible to a range of prospective travelers.¹²

EXHIBIT 12

Accommodations operate below healthy occupancy levels in the off season but often face capacity constraints in the summer

Occupancy, Average % of available rooms occupied (2011-16)



SOURCE: Department of Tourism, Culture, Industry and Innovation

Newfoundland and Labrador could also consider introducing package experiences that showcase the best of the Province to key traveler segments (e.g., baby boomers, ecotourists, Chinese visitors). Package tours can connect multiple destinations, offer thematic experiences, increase the lengths of stay, and tailor to varied traveler needs. Newfoundland and Labrador might consider creating packages that include:

- Products that span additional seasons with an emphasis on adventure activities (e.g., snowmobiling in Labrador, ziplining in Petty Harbour at Canada's longest zipline course)
- Shore excursion packages for cruise (day) visitors and marketing campaigns to attract return customers for longer stays
- Package tours for outbound Chinese tourists as part of their itinerary to Northeast Canada with roundtrip flights, group tours, language guides, and structured daily activities.¹³ Semi-guided and high-end package tours are growing rapidly among outbound Chinese travelers as more mature travelers demand a customized and

flexible travel experience in destinations where language and cultural challenges can make it difficult to participate without a translator.¹⁴

- Agri-tourism products and unique culinary experiences in collaboration with the local agriculture industry. Agri-tourism benefits from a growing interest in immersive experiences that take advantage of local culture (e.g., cranberry farms and bee production in central Newfoundland). Developing such attractions could offer opportunities for rural and undeveloped destinations in Newfoundland and Labrador to compete for international tourists. Two of the many successful examples of agri-tourism globally are:
 - Mokumoku Farm in Japan is an agricultural theme park that offers tourist attractions across the entire value chain of food production, ranging from R&D, food education, farming, processing, and retail. Visitors can participate in various activities at each stage of the value chain.
 - The Great Ocean Road in Australia offers a range of attractions to showcase the scenic coastlines. Food and wine are at the heart of the experience, with gourmet food trails (12 Apostles gourmet trail, Bellarine taste trail) and scenic helicopter flights.

Already, the Government has created effective marketing campaigns to increase awareness of Newfoundland and Labrador. To support the development of world-class destinations and all-season attractions, the Province could continue to invest in active and destination-specific marketing campaigns to attract targeted tourist segments and source geographies.

4. Increase accommodation capacity near key attractions to relieve constraints in peak season

Newfoundland and Labrador faces substantial accommodation constraints in peak season, driven by limited accommodation offerings. The Avalon Region experiences significant accommodation capacity constraints during the peak season, reaching a 79% average occupancy rate in August. Similarly, the Western Region reached a 77% occupancy rate in August 2016.¹⁵

The diversification of product offerings across seasons would drive demand and mitigate seasonality over time. To prepare for future demand, increasing the number of rooms available near key attractions would be vital to maximizing growth potential. To accommodate the projected tourist growth and relieve capacity constraints in peak season, the Province could promote investment opportunities in hotel developments. For example, developing 3 additional hotels in Gros Morne would add nearly 15,000 room nights/month. Developing branded properties is

likely to drive increased tourist volumes while increasing capacity, reducing the risk of harming existing operators.

Although hotel development takes time, embracing the sharing economy (e.g., Airbnb, VRBO) could be considered as an important and immediate approach to increase capacity during the peak season. In 2017, Airbnb effectively doubled the number of rooms available to tourists in Iceland¹⁶ and contributed nearly CAD\$500 million to Iceland's economy through host earnings and guest spending.¹⁷ The City of Reykjavik has since collaborated with Airbnb to jointly promote an online registration process for hosts to ensure that the system is safe and sustainable.

5. Continue to develop training programs to reskill and upskill workers in tourism

Tourism is the Province's second largest sector by total employment. The Province has already made recent commitments to supporting tourism operators and investing in tourism training.¹⁸ To accommodate an increase in visitors by 2030, the sector will require 6,000 more people. Continued investments in various forms of additional training for tourism workers is critical to prepare for the projected influx of travelers.

Reskilling efforts may build on the work of the NL Workforce Innovation Centre to reskill individuals in rural tourism destinations with low workforce participation and retrain those who are looking to re-enter the workforce through the tourism sector.

Skill development programs for entrepreneurs could also be prioritized, driving innovative and authentic tourist experiences. Other jurisdictions have employed this tactic with success. Morocco introduced a variety of tax and training incentives and witnessed exponential tourism growth. Singapore's Tourism Talent Plan enlarges the pool of workers with service skills for tourism jobs by providing continuing education for adult workers and enhanced pre-employment training for students.

As the sector expands, it would be important to train a workforce with specialized skills. Newfoundland and Labrador could learn from Singapore, whose tourism workforce development efforts offer advanced specialist training in niche tourism areas. Multilingual tourist workers and individuals with strong expertise in Newfoundland and Labrador's natural assets will help support growth in key demographics (e.g., adventure tourists, Chinese tourists).

Building tourism clusters to set a strategic focus

A cluster is an interconnected and innovation-driven system of companies and institutions, focused on shared aims and expertise rather than a single geographic focus. The cluster concept is not unique to tourism. In fact, many sectors have leveraged the cluster strategy to attract, engage, coordinate, and sustain an interconnected system of companies, institutions, entrepreneurs, and talent (e.g., Silicon Valley).

The Ocean Supercluster initiative in Atlantic Canada is an example of a cluster initiative that aims to foster new partnerships with different stakeholders to accelerate innovation and commercialization of Canada's ocean economy. In tourism, clusters are an effective vehicle for developing world-class destinations, as they help coordinate efforts from multiple stakeholders toward a common vision for the destination. Tourism clusters assemble capital, labour, and marketing in a way such that the sum of the parts is greater than the individual and often sub-scale efforts.

Clusterization has been responsible for the transformation of tourism sectors

Napa Valley California, USA

Napa County used to be highly dependent on the agricultural industry (grape growing and wine making), but today, Napa Valley's tourism destinations attract 3.3 million visitors per year and support 11,776 jobs. Several initiatives were launched by the Napa Valley Economic Development Corporation to diversify the economy toward tourism and attract visitors, including joint promotion and branding, development of tourism infrastructure, professionalization of employment in the sector, touristic product development covering a wide range of tourism assets aside from wine making, and linkage of the wine cluster with the tourism cluster (dining, accommodation, tastings).

Tirol, Austria

The Austrian region Tirol relies on tourism for 16% of its GDP, and it provides a good example of regional tourism development and marketing, as exemplified in the Wellness Cluster Tirol initiative. As the centre of competence for innovation and cooperation, the Tirol Tourist Board operates the cluster and facilitates the collaboration of tourism and health-related businesses along the whole value chain. More than 120 companies within the network contribute to the common mission of increasing the region's value propositions in health and wellness tourism. The unique wellness supply in Tirol has increased 30 times faster than the whole of Austria. Nine percent of Tirol visitors say that wellness is the primary reasons for their visit.

Schleswig-Holstein, Germany

The Tourism Cluster of Schleswig-Holstein is an industry network for all tourism-related businesses and their employees. Founded in 2015, its mission is to deliver and realize targets set out in the state's tourism strategy 2025 and enhance the competitiveness of the local tourism industry. The cluster's central function is to connect and inform businesses, regarding funding, financing, and collaboration opportunities; support in project collaboration and development; and training and certification. Tourist arrivals have grown by 10% since the inception of the cluster, with the highest vacation rental growth across Germany.

Given the complexity and large number of stakeholders (e.g., local tour operators) in tourism, most tourism destinations rely on a central management organization (e.g., local government, tourism authority) to coordinate the cluster, launch initiatives, offer services, and create a network (e.g., Cluster Montagne, Schleswig-Holstein Tourism Cluster).

A successful tourism cluster typically articulates a clearly defined target and vision. In the case of Tirol, Austria, developing a tourism destination with a focus on health and wellness offered a common mission that unites investors and businesses in the cluster. In the past few years, TCII in the Government of Newfoundland and Labrador has invested significant efforts to collaborate with stakeholders from all regions of the Province (local operators, communities, entrepreneurs, tourism authorities, etc.) in the creation of destination development plans (DDPs).

To achieve a meaningful change in tourism growth, the Province would need to strengthen the cluster approach by setting a targeted and focused vision for selected destinations (e.g., developing Gros Morne into a world-class all-season destination), broadening outreach to the global tourism development market, and attracting external capital, expertise, and talent into the clusters.

As the tourism sector is developed, the Province may also want to consider how it could better collaborate with non-profit organizations implicated in the tourism industry. The Gros Morne Co-operating Association, for example, is an organization focused on preserving and interpreting the park's heritage. Similarly, Go Western Newfoundland is a non-profit dedicated to developing and marketing Western Newfoundland as a multi-season tourism destination, bringing together operators and other stakeholders to advance the region's image as an attractive destination for visitors. These organization and their peers can play important roles as the Province seeks to scale this industry.

Focus areas for attracting external investments

A lack of external investment will significantly undermine the Government's ability to develop successful clusters and turn the Province's iconic assets into world-class destinations. The Province should commit to attracting external and foreign investment and seeking active engagement from the private sector. Investments in this sector would introduce fresh ideas and global best practices, create diverse and high-quality jobs, resolve access issues, and accelerate growth.

Fully realized, these actions could set the Province on track to increase annual tourism spending to approximately \$2 billion by 2030. The Government of Newfoundland and Labrador could consider soliciting ideas from the private sector and attracting external investment for the following focus areas, with illustrative considerations and examples provided of how this approach could benefit the Gros Morne region:

- **Hotel developments.** The Western Region has a current capacity of 320,000 room nights per year. A large share of these nights is used by the approximately 240,000¹⁹ annual visitors to Gros Morne. If park visits grow in line with Newfoundland and Labrador's expected tourism growth, significant additional hotel capacity would be required, even if the increase were to occur in the shoulder season – the period between peak and off-peak seasons. Three hotels with 150 rooms each could go a long way to providing the additional capacity, adding nearly 15,000 more room nights per month.
- **Transportation.** Several bus routes from Deer Lake to Gros Morne, Marble Mountain, and St. John's could be added and peer-to-peer car rentals could be used to open immediate supply enabling people to travel around the area. Seasonal Marine Atlantic ferry service direct from North Sydney to Corner Brook could promote interprovincial travel to Gros Morne.
- **Spa development.** A development featuring a hotel and spa, run by an experienced operator, could complement the experiences of hiking and skiing travellers, making winter tourism more competitive to other jurisdictions.
- **Tour operators.** The Province could focus on attracting experienced tour operators who are familiar with designing and delivering hiking and winter tourism products. These operators could accelerate the Province's marketing efforts and help promote winter tourism to mitigate seasonality.
- **Historic downtown areas in communities such as Rocky Harbour, Norris Point or Woody Point.** The Province could consider creating tax benefits for stores and businesses that undertake renovations in accordance with guidelines and

attract new businesses with tax benefits for specific types of tourist features (e.g., galleries, restaurants).

- **Restaurants.** The additional 1,400 visitors/day that Gros Morne may attract by 2030 could each spend \$50/day on food, yielding additional revenues of \$70,000/day. The Province could consider offering incentives to bring in 20+ restaurants and other food options, such as breweries, gastro pubs, and fine dining
- **Employee residence and services.** A significant increase in accommodations, restaurants, and tour offerings would also require new facilities for student housing and services during the summer months, similar to those that exist in Banff and Jasper.

A roadmap for attracting external investment

Developing successful tourism clusters will require concerted effort and leadership. The first step to attracting external investments and partnerships is to develop a compelling business case for selected tourism destinations. The business case should include a clear strategic vision and value proposition for the destination (e.g., winter tourism in Gros Morne) and detailed development requirements (e.g., hotels, skiing attractions, high-end winter lodge).

Next, the Province could reach out to potential investors, developers, and infrastructure stakeholders in Canada and across the world to create an awareness of Newfoundland and Labrador's cluster initiatives. This would require a team of industry experts with strong sales capabilities and established industry networks to complement the existing capabilities at TCIL.

There are many different approaches to investment attraction. In addition to pre-determined incentive packages, the Government could explore innovative approaches to soliciting ideas, development plans, and incentives requirements directly from the industry. For example, a public request for proposals or a tourism development challenge (e.g., The Smart City Challenge by the U.S. Department of Transportation to source ideas from mid-sized American cities for creating smart transportation systems) are both viable approaches to engage potential investors. The experiences of other jurisdictions can guide the way for Newfoundland and Labrador.

Examples of incentives used by governments to attract private sector investment in tourism development

Property and sales tax-based incentives

- In 1967, Florida enacted the Reedy Creek Improvement District as part of the package to attract Walt Disney to develop the 27,000 acres in the Orlando area. Strengthening the role of this entity, the Florida Supreme Court ruled in 1968 that Reedy Creek could issue tax-exempt bonds for infrastructure improvements backed by property taxes.
- In 2001, the City of Orlando, to promote the development of a \$3 billion project by Universal Studios, created a tax increment district along with the issuance of a special assessment bonds in the Republic Drive interchange assessment area.
- In 2013, the city of Waynesboro, Virginia, created a Tourist Development Zone (TDZ). The industries located in the TDZ may be eligible for special local incentives ranging from tax and fee reimbursement, local memberships, and marketing and training support. Capital improvements, job creation, quality of jobs, and other factors are scored, and a corresponding level of incentives can be earned.

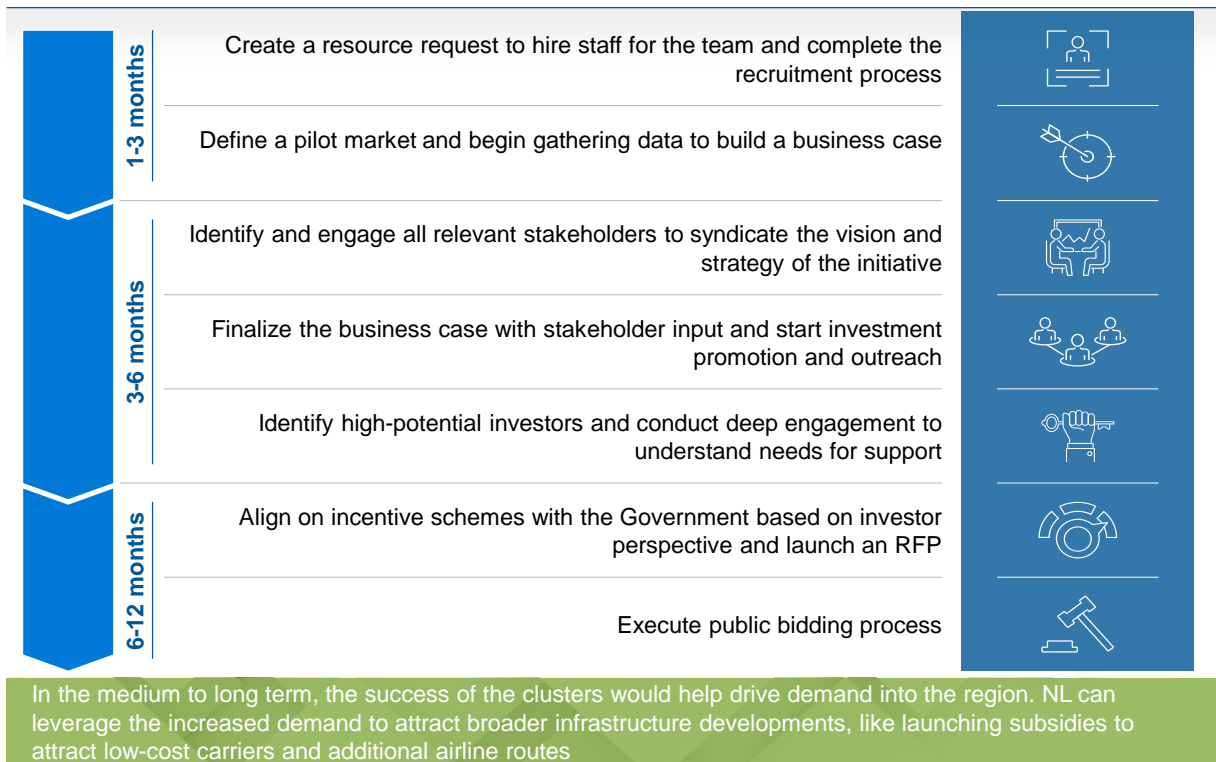
Incentives to stimulate air traffic

- Athens Airport set up an incentive program to stimulate new air traffic with the aim of adding 3 or more international routes. Incentives for new routes include heavily discounted parking and landing charges (e.g., 100% discount for the first 2 years and declining discount rates for the following 3 years).
- Prague Airport offers a wide variety of incentives to stimulate the development of new routes. Incentives are designed for airlines that meet specific requirements during the defined period (e.g., discount on landing fees of up to 95%). These conditional requirements include airline ranking by number of passengers, opening new destinations, increasing total seat capacity and frequency on existing connections. The airport also offers co-branding incentives with the aim of promoting airlines and airport through covering locations in other major cities.

The Province should adopt a balanced approach to tourism development to ensure long-term sustainability. That may require setting explicit requirements for local participation, employment, environmental and cultural preservation, and other criteria of success to protect and preserve local communities.

A successful investment attraction drive will bring new stakeholders and capital to the clusters, working toward the common goal of developing world-class destinations in targeted regions. The Province could then leverage the increased demand to develop broader infrastructure, such as launching subsidies and marketing partnerships to attract low-cost carriers and additional airline routes. Exhibit 13 includes a sample timeline for the implementation of this approach.

Potential timeline for cluster development



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- ² “Unlocking the Potential of Canada’s Visitor Economy,” Destination Canada, December 2018, [destinationcanada.com](https://www.destinationcanada.com).
- ³ Allied Market Research, “[Adventure Tourism Market by Type, Activity, Type of Traveler, Age Group, and Sales Channel: Global Opportunity Analysis and Industry Forecast, 2017-2023](#).”
- ⁴ Government of Newfoundland and Labrador, “2016 Exit Survey,” June 2018, tcii.gov.nl.ca.
- ⁵ Ibid.
- ⁶ US Travelers, Pew Research.
- ⁷ McKinsey 2015 China Travel Consumer Survey.
- ⁸ “Virtuoso Report Reveals What Travelers Will Seek in 2018,” Virtuoso, November 2017, [virtuoso.com](https://www.virtuoso.com).
- ⁹ “Numbers of Foreign Visitors,” 2017, ferdamalastofa.is
- ¹⁰ “Foreign Overnights in Finland,” Visit Finland, April 2018, visitfinland.fi
- ¹¹ Google flight search performed 02/17/2019 for one-way fares – cheapest YYZ-KEF fare offered on WOW Air, cheapest YYZ-YYT fare offered on Air Canada.
- ¹² Jurisdictions have introduced a range of tactics for raising potential visitors’ awareness of their offerings. Some have even introduced VR and AR tools to showcase the natural wonders of their country/region to outside tourists who may have little appreciation of its endowments.
- ¹³ McKinsey 2015 China Travel Consumer Survey.
- ¹⁴ Alex Dichter, Guang Chen, Steve Saxon, Peimin Suo, and Jackey Yu, “Chinese Tourists: Dispelling the Myths,” McKinsey & Company, September 2018, [mckinsey.com](https://www.mckinsey.com).
- ¹⁵ 70% occupancy is indicative of potential capacity constraints.
- ¹⁶ Andrew Sheivachman, “Iceland Tourism and the Mixed Blessings of Airbnb,” Skift, August 2016, [skift.com](https://www.skift.com).
- ¹⁷ “Helping hosts to share their homes responsibly in Iceland,” Airbnbcitizen, December 2018, airbnbcitizen.com.
- ¹⁸ “The Way Forward: 2017-20 Provincial Tourism Development Plan,” 2017, tcii.gov.nl.ca.
- ¹⁹ “Number of visitors to Gros Morne National Park,” Statista, 2019, [statista.com](https://www.statista.com).



Agriculture



Targeted opportunity: Agriculture

Context

Since the 1940s, Newfoundland and Labrador's food system has undergone significant changes, with the Province's food self-sufficiency declining from nearly 90% to only 10%. The attendant increase in food imports is attributable to both a reduction in domestic agricultural activity and significant changes to local diets.

In *The Way Forward on Agriculture*, the Government of Newfoundland and Labrador committed to a target of increasing food self-sufficiency to at least 20% by 2022, increasing exports of locally competitive food commodities, increasing local food production in Labrador and generating new agricultural employment opportunities along the way.¹

This ambitious plan to increase the economic contribution of the Province's sector includes a range of initiatives related to production, business development, human resources and labour, research, innovation and diversification, market access and development, and processing and value-added production.

Although the agricultural sector does not represent one of the largest economic and employment growth opportunities for the Province, it nonetheless offers excellent prospects for new employment in communities throughout the province, as well as the possibility of enriching local diets with local products.

In this section, we identify the most significant barriers that the sector must overcome and highlight the initiatives that are likely to have the greatest impact in the industry's development.

Several challenges impede the sector's development

The key factor that limits the competitiveness of the Province's agricultural sector is the relatively short growing season – between 120 and 150 days per year across most of the island, and fewer than 100 days in Labrador, as opposed to more than 160 days across most of Nova Scotia.²

Local producers also face significant supply chain limitations, driven largely by three factors: 1) poor infrastructure that makes it difficult to bring their product to market (within the Province or beyond); 2) limited processing capacity for dairy, meat, or fruits, restricting the range of locally sourced products that can be marketed in the Province; and 3) insufficient cold storage, constraining the scale of vegetable production.

The sector also faces significant human resource constraints. As fewer younger people are willing to consider occupations in the sector, both the number and the average age of farmers has been increasing. Between 2011 and 2016, the latest year for which federal Census of Agriculture data is available, the number of farm operators in the Province declined by a quarter (from 665 to 500). And, in 2016, only 5 percent of farm operators were under the age of 35, whereas nearly three-fifths were 55 or older.³

The Government of Newfoundland and Labrador should explore multiple pathways for supporting the sector's growth

1. Innovative farming techniques

Supporting the adoption of innovative farming techniques could help overcome some of the structural disadvantages of the Province, especially the short growing season.

The Netherlands and Israel, two countries with similarly challenging natural conditions, have made great strides in adopting technology to increase their agricultural productivity (e.g., hydroponic irrigation in water-poor Israel and vertical agriculture in densely populated Netherlands).

Similar innovation opportunities for Newfoundland might materialize through synergies with other sectors (e.g., using excess steam from paper and pulp production to heat greenhouses). To encourage these innovations, the Government could play a role in helping realize such partnerships by identifying and facilitating opportunities and de-risking initial investments through loan guarantees and grants. The Government could also consider how it could take advantage of the existing federal research farm in St. John's, the Centre for Agriculture and Forestry Development in Wooddale and research facilities at Pynn's Brook to facilitate further innovations in agriculture.

2. External investment

Attracting external investors to both farming and processing could grow the domestic agriculture industry considerably and develop local champions.

In *The Way Forward on Agriculture – Sector Work Plan*, the Government has committed to a number of initiatives that could be used to attract investors to the agricultural sector – notably, identifying and allocating 64,000 hectares of Crown land for agricultural production.⁴ These incentives should be leveraged in outreach efforts aimed at potential investors, following the targeted approach set out in the chapter on investment attraction.

The Department of Fisheries and Land Resources would need to work closely with both agricultural producers and retailers to identify the kinds of processing facilities that are most needed in the local agri-food supply chain – i.e., facilities whose absence prevents the use of locally grown products in food ultimately sold in the Province (e.g., dairy or red meat processing plants). With these missing links identified, the Government should formulate detailed business cases outlining the potential investment opportunity for use in engaging potential external investors.

Another attractive investment opportunity might be associated with agricultural products in which Newfoundland and Labrador has a competitive advantage – for example, partridgeberries, cranberries, saltwater lamb, and disease-free bees. These specialty food products could serve as the basis of new export businesses, as outlined in *The Way Forward on Agriculture*.

In parallel with these efforts, Newfoundland and Labrador should also consider the possibility of secondary dairy processing, enabling a broader specialty industry centred on high-value premium products. At present, the only secondary dairy processing facilities in the Province are boutique producers like Five Brothers Cheese.⁵

The Province has historically been a net exporter of industrial milk,⁶ presenting opportunities to extract more value from the domestic dairy industry, potentially through identifying new opportunities for secondary processing. Once the requisite facilities exist, Newfoundland and Labrador could consider leveraging its brand reputation as “natural and uncomplicated,” and “quietly and proudly independent,” to position its secondary dairy products at the high end of the market.⁷ Specialty products might distinguish themselves by tying their brands to the Province’s identity. Cows Creamery in Charlottetown, Prince Edward Island provides a good example of how an Atlantic Canada peer has pursued a similar strategy.

3. Attracting talent and enhancing training opportunities

Already, the sector’s existing Action Plan includes a commitment to enhancing training opportunities with a view to growing the agriculture sector. This is exemplified by the recently announced agricultural technician training program, launching at CNA’s Corner Brook campus.⁸ In addition, Young Farmers program provides supplementary resources to support and advance the next generation of Newfoundland and Labrador’s agricultural producers.

As part of the upcoming post-secondary education review, the Government should consult the agriculture sector more broadly to assess the full extent of the projected labour shortage and determine the number of training positions required to close the

gap. These may include opportunities to integrate or develop the offerings of MUN's Grenfell Campus and the Workforce Innovation Centre.

In the meantime, the Department of Advanced Education, Skills and Labour (AESL) should ensure that career guidance and advisory programs actively promote entrepreneurial opportunities, particularly among clients located in rural areas more suitable for agricultural activity.

4. Creating synergies with culinary tourism

Government departments and private sector players in the agriculture and tourism sectors should collaborate with the Department of Tourism, Culture, Industry and Innovation (TCII) to develop culinary tourism tie-ins, growing the agricultural and tourism sectors in parallel.

Consumer demand for local and sustainable food can drive the development of tourism sites that offer culinary experiences rooted in the Province's agricultural industry: Mallard Cottage, for example, is a rustic restaurant and inn that celebrates the Province's vast range of game, seafood, and produce, while delivering an authentic Newfoundland and Labrador experience.

Similarly, the Fogo Island Inn has become a world-class destination, in part by offering a dining experience that "uses ingredients dictated by Fogo Island's still-wild world to create dishes that are grounded in this place."⁹

A variety of food festivals across the Province, including *Roots, Rants and Roars*, *The Gathering*, and *Songs, Stages, and Seafood*, provide additional opportunities to enhance the visibility of locally grown foods while highlighting the Province's culinary talent.

These assets sit against the backdrop of increasing consumer interest in food transparency,¹⁰ which will provide new opportunities for producers to bring customers "behind the counter." A number of craft breweries across the Province are pioneering this approach, offering tours of their facilities. As this trend grows, there may be further opportunities to develop distinctive tourist experiences along the local agri-food supply chain, potentially at farm-inns or other food production sites.

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- ¹ “The Way Forward on Agriculture,” The Government of Newfoundland and Labrador, October 2017, flr.gov.nl.ca.
 - ² “Length of Growing Season in the Atlantic Region,” Agriculture and Agri-Food Canada, June 2014, agr.gc.ca.
 - ³ “2016 Census of Agriculture,” Statistics Canada, May 2017, statcan.gc.ca.
 - ⁴ “Grow your own: How N.L. plans to produce more of its own food,” CBC News, February 2017, cbc.ca.
 - ⁵ Ashley Fitzpatrick, “Secondary Processing Key to Growing Newfoundland and Labrador Agrifoods: Minister,” *The Telegram*, May 2018, thetelegram.com.
 - ⁶ Fisheries and Land Resources, Government of Newfoundland and Labrador, June 2018, faa.gov.nl.ca.
 - ⁷ “Newfoundland and Labrador Brand,” Tourism, Culture, Industry and Innovation, Government of Newfoundland and Labrador, May 2018, tcii.gov.nl.ca.
 - ⁸ Lindsay Bird, “With Far Fewer Farmers, How Can N.L. Grow More Food?” CBC News, November 2018, cbc.ca.
 - ⁹ Fogo Island Inn, fogoislandinn.ca.
 - ¹⁰ “Research Reveals What Consumers Want from Food and Ag,” Georgia Crop Improvement Association, georgiacrop.com.

Forestry



Targeted opportunity: Forestry

Context

Forestry has traditionally been a major sector of Newfoundland and Labrador's economy, playing a significant role in western and central Newfoundland. The first pulp mill was established in the late 19th century in Black River, Placentia Bay. Though short-lived, this facility inaugurated the provincial forestry industry. Early in the 20th century, new pulp and paper mills were established at Grand Falls-Windsor and Corner Brook, and later "the third mill" opened in Stephenville. Today, only Corner Brook Pulp and Paper (CBPP) remains operational.

Throughout the second half of the 20th century, Newfoundland's paper mills were a major supplier of newsprint, primarily to the large North American market. However, since 2000, the industry has experienced increasing competition and declining demand for its key product.

As print media has digitized, North American demand for newsprint has declined by almost 80% between 2000 and 2017 (from approximately 12 million tons to 3 million)¹. In addition, Newfoundland's pulp and paper industry has faced growing competition to its emerging market exports from lower-cost producers like Brazil.

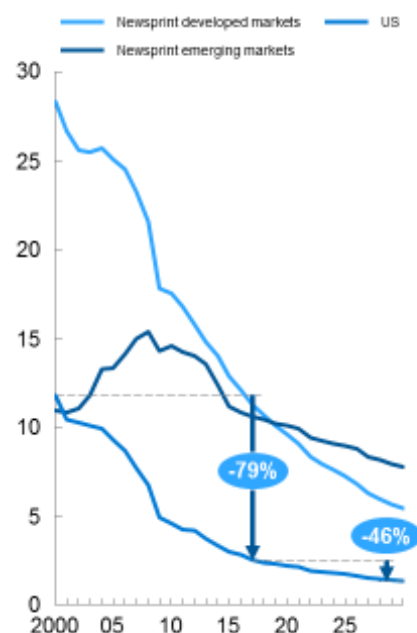
As a result, the value of Newfoundland and Labrador's newsprint exports declined by 81% between 2000 and 2017,² while the number of employees in the Corner Brook mill has declined from more than 2,000 to about 300 (see Exhibit 14). Still, the industry remains important to the Province's economy, with approximately 5,000 employed in the integrated industry, including sawmills, woodlands, and related occupations.

In spite of these headwinds, the industry has managed to sustain relatively constant production over the past 8 years, albeit at a considerably lower level than in the past. For example, the remaining mill in Corner Brook has survived by exporting newsprint to the United States, and to geographies as far away as India. Efforts at diversification and revitalization, some already underway, will be crucial to sustaining this industry.

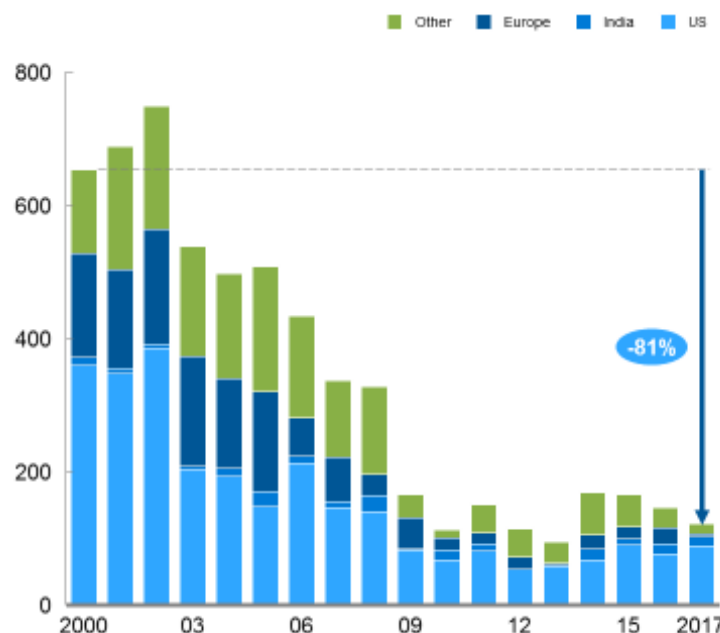
In January 2019, the Government of Newfoundland and Labrador, in collaboration with industry and other stakeholders, released *The Way Forward on Forestry* sector workplan. The document sets out a number of strategic initiatives meant to advance new opportunities and grow the sector, all while ensuring sustainable management of the Province's forests.

Newfoundland and Labrador's newsprint exports have declined in line with declining demand in North America

Global newsprint demand development by market, Million metric tons



Value of Newfoundland and Labrador's newsprint exports by market, \$ Millions



SOURCE: RSI; NL Forestry Work Plan Steering Committee; ISED – Trade Data Online

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The negative outlook for the sector presents a major economic challenge for the Province, as the paper mill is the primary consumer of the island's timber harvest and supports numerous jobs in the logging industry. Despite a downwards trend, the Province's forestry industry continues to contribute \$286 million to GDP and supports over 5,000 jobs, mostly in the western and central parts of the Province.

Given this sector's significance, the Government should work with industry stakeholders to identify what would be required to sustain the current levels of production and employment. This might be achieved by diversifying the current paper product mix and ensuring that existing processing assets are fully utilized, while sustaining existing demand for the logging industry.

An industry reorientation would require significant leadership from key local private sector players, supported by Government action to facilitate new investments, offer targeted assistance, and promote synergies with other sectors.

Opportunities for diversification

There are several opportunities for diversifying the production of Newfoundland and Labrador's forestry industry. These could include production of:

1. **Products with stronger global demand.** The provincial industry can shift its focus toward producing paper products with stronger global demand, particularly those that can leverage recycled fibre from the region. Two key examples of such products are: 1) liner board, the demand for which is steadily increasing given the rise of e-commerce and the rapid increase of shipped packages; and 2) Kraft paper, which is also in growing demand, especially in Europe, as retailers substitute plastic with paper bags in response to regulation and environmental concerns.
2. **Softwood lumber and advanced materials for construction.** Another avenue for diversification is the shift toward construction materials – particularly softwood lumber – for both the local and the export markets. Currently, Newfoundland and Labrador's construction industry imports a large proportion of the softwood lumber used domestically. New and highly efficient sawmills in Newfoundland have the potential to produce materials at competitive prices, substituting for imports. Already, advancements in sawmill technologies have stimulated regrowth in the lumber industry; today the Province's mills produce over 90 million board feet of lumber per year.

A favourable tariff regime may also allow the Province to grow its American export business through a competitive cost position.³ The Canada-U.S. softwood lumber agreement has provided exclusions for the Province's lumber exporters from U.S. export tariffs and represents a new opportunity for Newfoundland and Labrador to grow its softwood lumber exports into the U.S. This growth could be supported via a renewed focus on advanced building materials that could be marketed locally and exported out of Province (e.g., cross-laminated timber). Related research could be conducted at a newly-developed Wood Products Innovation Centre, as described in *The Way Forward on Forestry*.

3. **Forestry Biomass and Biofuels.** As identified in *The Way Forward on Forestry*, forestry biomass and biofuels present a potential alternative forestry product that can be explored as a substitute for higher-emission fossil fuels in some instances. For example, black pellets, which can be used as a replacement for coal and store large volumes of energy, are currently in high demand in Europe, potentially making them economical to export from Newfoundland and Labrador. Producing biofuels would require further study and growth in the Province's sawmill production to ensure there are sufficient quantities of wood by-products (chips and residue) to improve fuel production viability.

- 4. Synergies with other industries.** The CBPP mill operation currently generates excess steam, which could be used as an input in other processes. For example, setting up greenhouses in the vicinity of the Corner Brook mill could use the industry's excess steam for heating. Developing this opportunity may also align with the Province's strategic objective to increase food self-sufficiency.

¹ Fastmarkets RISI.

² ISED Trade Data Online; <https://www.cbc.ca/news/canada/newfoundland-labrador/trump-protectionism-tariffs-newsprint-corner-brook-newfoundland-1.4502693>.

³ "No tariffs on N.L. softwood lumber products headed to U.S.", *The Telegram*, thetelegram.com.



International education



Targeted opportunity: International education

Context

Globally, approximately 5 million students study outside their home countries each year, more than triple the number in 1990.¹ At present, the United States attracts the largest single share of these students – although Canada has witnessed remarkable levels of growth in recent years.

In 2016, for example, Canada hosted more than half a million international students, nearly double the number just 8 years earlier.² Economically, these students contributed \$15.5 billion to GDP, and directly or indirectly supported about 170,000 jobs.³

Although Newfoundland and Labrador has benefited from this trend, its international student population remains relatively small. In 2016, the Province hosted 3,227 international students, who contributed approximately \$63 million to GDP, directly or indirectly supporting around 750 jobs.

Memorial University of Newfoundland and Labrador has one of the lowest tuition rates for international students in Canada. Peer institutions across Atlantic Canada currently charge substantially higher tuition fees. This is despite the fact that a number of these universities have lower rankings than MUN⁴ and are located in provinces with a higher cost of living.

Newfoundland and Labrador is well-positioned to both increase international student intake and explore the potential for aligning its fees with its Atlantic Canada peers while retaining its competitive advantage. Together, these actions could meaningfully increase international students' contribution to the Provincial economy.

Attracting new international students from leading source markets

At present, the composition of Newfoundland and Labrador's international student population skews more heavily toward Nigeria (10%) and Bangladesh (7%) than the mix of international students in Canada as a whole, where Nigerian and Bangladeshi students represent 1 and 3% of international students, respectively.

Chinese students, though, are relatively underrepresented at MUN, comprising just 21% of the international student population. This stands in contrast to Canada as a whole, where Chinese students comprise 34% of the international population.

The number of international students from China and India is poised to grow substantially. By 2024, it is expected that China and India will send approximately

855,000 and 376,000 students abroad, respectively. Together, they will account for nearly one-third of global outbound higher education students. Increasing the proportion of students from these source countries will be crucial to maximizing the economic potential of Newfoundland and Labrador's higher education sector.

To earn a share of these growing populations, the Province could undertake several initiatives:

1. Develop a “one stop shop” for international student recruitment

MUN, College of the North Atlantic, and private agencies that assist with student applications all undertake individual marketing and with student recruitment efforts, leading to a fragmented promotion landscape.

The Government could expand its network of recruitment agencies significantly and work with them to integrate marketing efforts, as well as develop a single digital portal to support prospective international students (at all levels of education) throughout the application process. This would include providing information on education options, visa and settlement advice, and general help. This would align with the Province's other external promotion efforts (e.g., attracting tourists, and attracting investments) and would provide prospective students with a more seamless experience, with credible sources of information.

Nova Scotia, a competitor for international students hoping to study abroad in Atlantic Canada, already offers an online portal of this kind. *Study Nova Scotia*⁵ is run by EduNova (studynovascotia.ca), a co-operative industry association of education and training providers in Nova Scotia. On the website, students, parents, counsellors, and agents are provided with information regarding application processes, visa requirements, and fees. This is accompanied by information about the Province's unique draws, including leisure activities, cultural assets, and direct comparisons to other provinces.

2. Partnerships with school systems and counsellors in target countries

The Province could form more partnerships in growing source markets (e.g., China, India), which would help increase awareness of Newfoundland and Labrador as an attractive destination for international students. For example, institutions in the Province could collaborate with overseas universities to establish joint undergraduate programs like the “2+2 program” run by many Chinese universities. Students in these programs complete the first 2 years of their education in China followed by 2 years at a Canadian institution. University of Waterloo, for example, offers China 2+2 programs in a range of disciplines with multiple partner universities. Participating in such programs is attractive for international students, as the total tuition fees and

living costs they incur in Canada can be reduced significantly compared to a 4-year program. These programs can also target disciplines that are in high demand by local industry, like computer science, providing incoming students with more employment opportunities and serving as a source of talent for the Province's growing technology sector.

3. Further strengthening the reputation of the Province's post-secondary education institutions

Developing a distinctive reputation as a destination for high-potential students would help the Province secure a strong talent base for the future. To achieve this, the Province could leverage different approaches to bolster the reputation of its post-secondary education, in Canada and internationally. Institutions can offer scholarships to attract top talent and promote Newfoundland and Labrador's affordable cost of living (e.g., food, transportation, housing) and vibrant cultural scene. The Province could work with all sectors related to the ocean economy, including the new technology cluster, to create a funnel between post-secondary institutions and post-graduate job opportunities. This long-term focus will encourage students to choose Newfoundland and Labrador and offer employers a global pool of talent. In addition to high-quality education, the Province could emphasize its warm and welcoming culture in contrast to increasing anti-immigrant sentiment in some of Canada's peer countries. This would create a more sustainable and effective competitive advantage for the Province's post-secondary education than its low tuition rates.

Aligning tuition fees with peer institutions

In addition to attracting more students from new sources, MUN could investigate the opportunity of raising international student tuition fees in line with peer institutions while maintaining its reputation for quality education at affordable rates.

As mentioned, MUN charges international students substantially lower tuition fees than its peers across the region – fees in Newfoundland and Labrador are 36% lower for undergraduates and 79% lower for graduate students than the average for universities in Atlantic Canada (Exhibit 15). This gap could be reduced while maintaining cost competitiveness and delivering good value for students. For example, most of the institutions listed in Exhibit 15 rank lower than Memorial University in *Maclean's* university rankings,⁶ yet they charge much higher tuition.

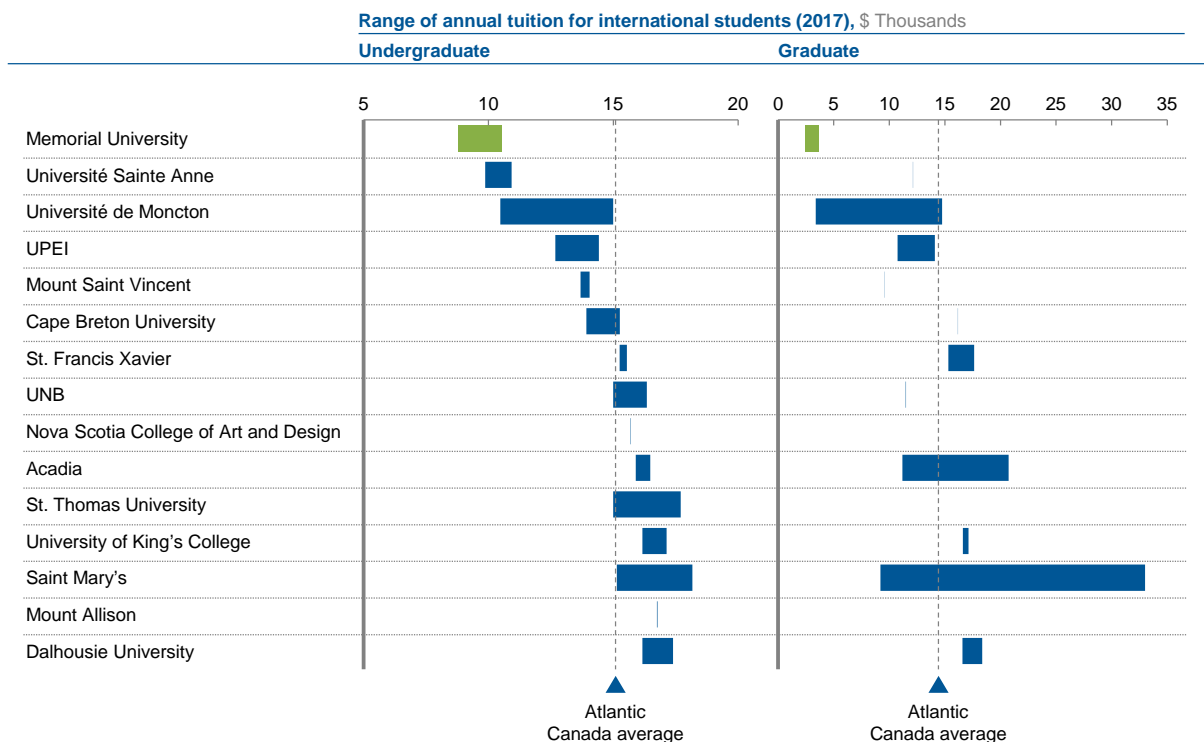
Investigating the possibility of raising tuition for international students would help the Province strike a balance between creating significant financial uplift and maintaining its reputation as a high-quality and affordable destination for education.

A study on the sensitivity of demand to changes in tuition across higher education institutions in Ontario highlights a positive and significant relationship between enrollment and tuition fees for international students at research-intensive universities – in other words, enrollment increases as tuition fees increase. The results also suggest that international students might be willing to enroll in highly ranked universities regardless of higher tuition fees. For comprehensive and teaching-intensive universities, the study implies that a tuition increase is unlikely to affect students' decisions to enroll, highlighting rank and reputation as the primary deciding factors.⁶

A similar analysis by *Forbes* revealed that international student enrollment at the group of Big 10 public research universities in the United States increased by 74% between 2007-2008 and 2014-2015 (more than the 56% increase seen across the country), even though tuition fees grew on average by 29% over the same period.⁷ This counterintuitive relationship exists because tuition fees are often seen as a marker of the quality of a university's education, and international students interested in engineering, business, and computer science often select universities based on their expectations of the higher job market return value of upper division programs.⁸

EXHIBIT 15

MUN's average international student tuition fees are significantly lower than the average fees at peer universities in Atlantic Canada



In this context, Newfoundland and Labrador could take a measured approach to evaluating tuition increases for international students, leveraging Memorial University's ranking and reputation to close the fee gap with other Atlantic Canada schools.

¹ "Measuring Up: Global Market Share and National Targets in International Education," ICEF Monitor, April 2017, monitor.icef.com.

² "Economic Impact of International Education in Canada – 2017 Update," International Education, Government of Canada, February 2018, international.gc.ca.

³ Ibid.

⁴ "University Rankings 2019: Canada's Top Comprehensive Schools," *Maclean's*, October 2018, macleans.ca.

⁵ "Study Nova Scotia", EduNova, studynovascotia.ca

⁶ Farhan, Bayan Yousef, "Tuition Elasticity of Demand as a Tool to Manage Higher Education Institutions," *International Journal of Arts & Sciences* 9.1 (2016): 159.

⁷ Choudaha, Rahul, and Di Hu, "Big Ten Universities Become Bigger With International Students," *Forbes*, August 2016, forbes.com.

⁸ Peia, Shaohua, and Janice Friedela, "The Rising Cost of Being Foreign: Impact of Differential Tuition on International Students," *Journal of Comparative & International Higher Education* 9, 2017.

Aerospace



Targeted opportunity: Aerospace

Context

Newfoundland and Labrador has enjoyed a rich aviation history. Its geographic location on the easternmost point of North America made it a common departure point in early attempts to traverse the Atlantic and, in June 1919, the first transatlantic flight took off from Lester's Field in St. John's.¹ Since then, the Province has been an aerospace hub – highlighted by Gander Airport's historical role as a refuelling hub for transatlantic flights, the prominence of aviation in the development of the offshore oil industry, and the many local companies that have emerged over the years in aerospace manufacturing and services.

Today, new opportunities in aerospace beckon. Globally, the aircraft maintenance, repair, and overhaul (MRO) sector is a steadily growing US \$133 billion market,² led by growth in the commercial aircraft segment and driven by growing global fleets and a move by airlines to outsource more labour-intensive checks.³

Rising costs have made Asia-based service providers decreasingly attractive, resulting in a trend in near-shoring. Major examples of this phenomenon include:

- TechOps Mexico is a Mexican MRO hub operated as a joint venture between Aeromexico and Delta Air Lines, leveraging low labour costs in Mexico
- Lufthansa Technik operates a facility in Puerto Rico to address the needs of customers from Central, South, and North America; the facility includes a dedicated technical school to train skilled staff.

Growth in the MRO industry generally is driven by high demand to refit aircraft with additional seat capacity, convert old commercial aircraft to freighters, and extend the service life of aircraft older than 50 years.

Overall, the aerospace services industry has a dearth of skilled personnel – airlines are seeking high-quality, cost-efficient providers that, in turn, are struggling to secure qualified aircraft mechanics.

Future shortages are likely to continue, given that the average age of an aircraft mechanic in North America is over 50⁴ and that many aircraft mechanics leave for other industries. The aviation industry loses approximately one-third of airframe- and powerplant-licensed technicians to other sectors requiring similar skills.⁵

As the aerospace industry becomes increasingly digital, with modern aircraft transmitting extraordinary amounts of data, and new capabilities requiring considerable technological sophistication, people with highly technical skillsets are in high demand – but in even shorter supply.

Newfoundland and Labrador's competitive position

Several factors make Newfoundland and Labrador a relatively attractive environment for aerospace operations.

Strengths

Cost. Aerospace maintenance and retrofit costs are largely driven by labour, which accounts for 68% of the overall cost of an MRO operation.⁶ Newfoundland and Labrador's local labour rates are competitive, but technicians are highly mobile, often resulting in a need to import more expensive labour from outside the Province.

Infrastructure. Aerospace operations require airport capacity to allow planes to land and park, as well as hangar space that can accommodate the size of aircraft being served. Each of Newfoundland and Labrador's four major airports has a full-length runway, accompanied by existing hangars or space to accommodate new hangars suitable for servicing regional and narrow body jets.

Location. The proximity of an MRO operation to major hub airports reduces fuel costs and the time that aircraft must spend out of service. Although airports in Newfoundland and Labrador are not major hub airports, they are within a 4-hour flight from many large hub airports in Canada and the northeastern United States. The Province's airports are also located within the flight range of narrow body jets operating in western Europe, with the potential to serve both the North American and the European markets.

Market access. The existence of trade agreements and tax-free zones ensures the timely delivery of aircraft components and the elimination of duties on civilian aircraft parts when traded between Canada, the United States, and Western Europe.

Record of international exports. The Province enjoys a rich history of successful aerospace companies that have achieved international success. Canadian Helicopter Corporation (CHC), one of Canada's largest rotary-aircraft companies, traces its origins to Sealand Helicopters, a company founded in St. John's. Today, CHC, now based in British Columbia, provides aerospace services to 30 countries around the world. Likewise, PAL Aerospace, Newfoundland and Labrador's largest aerospace company, operates across Atlantic Canada and, in recent years, has increased its portfolio of foreign clients. At present, PAL provides training, procurement services, obsolescence and maintainability management out of Port of Spain, Trinidad and Tobago. PAL also serves the Royal Dutch Navy and the UAE Armed Forces, providing surveillance and intelligence services, with a satellite system in Abu Dhabi on the way.

In addition, PAL's MRO operation conducts heavy inspections on regional and light aircraft for several international airlines. The expertise already developed at PAL affords Newfoundland and Labrador an advantageous position to consider externally-oriented opportunities.

Despite these strengths, Newfoundland and Labrador has several structural challenges that diminish its competitive position.

Areas for improvement

Infrastructure. Previous attempts to attract MRO players to the Province were hampered by need to invest in larger hangars to accommodate wide-body jets. Current facilities can accommodate a range of narrow-body jets, including the Boeing 737 and Airbus A320 (and their variants), although larger aircraft will require further expansion.

Climate. Geographic and climate factors render the Province less competitive. Newfoundland and Labrador's comparatively remote location and unpredictable winter conditions can drive up spare parts transportation costs and delivery times compared with mainland locations.

Talent. As with the rest of North America, Newfoundland and Labrador faces a critical talent shortage in aircraft maintenance, driven by insufficient training capacity. The only aircraft mechanic training program in the Province is located at the College of the North Atlantic's Gander campus.⁷ However, the class size is small, graduating only about 12 students annually. This number is insufficient to meet the Province's existing demand, leading local operators to hire outside the Province at substantial additional cost.

The sector's growth depends on the availability of skilled labour

If Newfoundland and Labrador could address the domestic shortage of qualified aircraft mechanics, while enhancing its digital aerospace capabilities, it would be able to unlock significant economic opportunities.

Increase training offerings in the sector

Addressing the labour shortage would require developing a new training program to increase the annual number of qualified aircraft mechanics significantly, as well as develop a digitally capable workforce.

For example, aircraft service companies could co-develop a training facility or programs with existing institutions near St. John's, home to the majority of Newfoundland and Labrador's aerospace operations. This facility could feature offerings specifically tailored to tradespeople looking to reskill – helping employees in declining industries transition to the aerospace sector that has a substantial labour demand. Such partnership between industry players and CNA will be key to attracting and retraining mid-career candidates.

Red River College, Winnipeg: Apprentice Aircraft Journeyperson Program

Red River College in Winnipeg offers the Apprentice Aircraft Maintenance Journeyperson (AMJ) program, a partnership between the college, Apprenticeship Manitoba, and local aircraft maintenance providers.

Over the course of 4 years, students receive 6,000 hours of on-the-job training, consisting of monitored work experience. For 9 weeks each year, they also receive structured training at Red River College. By the time students graduate, they have completed the experience and training requirements for a Transport Canada Aircraft Maintenance Engineer Licence.

In Gander, the existing training facility could be expanded to the extent that local demand can accommodate increased aerospace labour. Expanding the Gander site would need to be accompanied by the development of supporting student infrastructure: dedicated student housing, renewed or expanded links to aerospace employers, etc.

The Government, in collaboration with industry, could focus on promoting aircraft maintenance as a career option, highlighting the promising industry outlook and availability of training programs. Training programs could continue to incorporate substantial work-integrated learning opportunities, giving students hands-on opportunities to develop their skills and enabling aerospace operators to begin training future mechanics in the skills they will need when hired.

As aerospace operations grow more advanced, skilled practitioners will need to have knowledge of more than nuts and bolts – the industry will increasingly value those with expertise in digital applications and data analytics. This will necessitate expanding the scope of industry training to include instruction in technological skills.

One approach to achieve this could be to develop new partnerships between aerospace and ocean technology companies. As both industries become increasingly reliant on digital technologies, close collaboration would enable sharing of best practices and better integration of new sources of data. As the amount of data in the offshore sector grows, for example, partners could collect and collate this information into an integrated set of data. This could be commercialized for and sold to various operators, including oil and gas companies and commercial fishers.

Supporting the skills development required for these types of companies to grow locally would require broad efforts – for example, establishing training programs involving partnerships between Memorial, CNA, and industry players.

Although these initiatives would require some capital investment, demand for aircraft mechanics is strong across Canada and the world; even if there were insufficient private

industry demand for mechanics within Newfoundland, qualified mechanics could easily find work elsewhere.

If the labour issue is sufficiently addressed, Newfoundland and Labrador could consider two options to grow its aerospace industry significantly.

Increasing the Province's presence in the international market for specialized services

The Province could leverage its existing expertise in intelligence, surveillance, and reconnaissance to grow a specialized industry internationally.

PAL, Newfoundland and Labrador's largest aerospace player, has developed the *Force Multiplier*, an ISR platform that retrofits Dash-8 Q300 aircraft to serve as surveillance assets.⁸ This highly specialized platform integrates components from advanced manufacturers around the world to create a locally designed and assembled advanced technological solution. The Province could support growth in the aerospace sector by working closely with existing players to identify specific needs to scale exports.

Attracting an at-scale MRO operation

Newfoundland and Labrador could host additional MRO operations for heavy checks of commercial aircraft by attracting either a joint venture with an airline or an outsourced MRO services company.

An airline joint venture could involve Star Alliance members Air Canada and United Airlines, who might jointly establish an MRO base in Newfoundland and Labrador to be price competitive with Latin American bases.

An opportunity may also exist for North American MRO players (e.g., AAR) to establish highly efficient greenfield operations with access to both European and North American hubs or for major overseas MRO players (e.g., ST Engineering, Haeco, Lufthansa Technik) to expand their North American footprints.

Of course, any investment in bringing new players to the Province should be evaluated against opportunities to scale and enhance the capabilities of existing players. This could take various forms, including encouraging partnerships with third parties to fund expansion (e.g., Airpro, a joint venture between PAL and Airbus Defence and Space) or creating investment opportunities to develop new lines of business.

Some of these opportunities could be applied to other recommendations contained in this report. For example, hiring local technology companies to conduct the airborne geological surveys discussed in the mining section could provide strategic benefits. If sufficiently developed, the corresponding technological advancements could also present opportunities for export.

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- ¹ Jenny Higgins, "Aviation: The Pioneer Period," Newfoundland and Labrador Heritage Web Site, 2012, heritage.nf.ca.
- ² ICF International.
- ³ Henry Canaday, "U.S. MRO Trends Still Favor Outsourcing," MRO Network, July 2018, mro-network.com.
- ⁴ Leslie Josephs, "College or \$70,000 a Year? Aviation Industry Scrambles for Mechanics as Retirements Loom," CNBC, September 2018, cnbc.com.
- ⁵ Paul Seidenman and David J.Spanovich, "MRO Workforce Shortage Looms, As Providers Seek Solutions," MRO Network, May 2017, mro-network.com.
- ⁶ Interviews with industry experts.
- ⁷ College of the North Atlantic, cna.nl.ca.
- ⁸ PAL Aerospace, palaerospace.com.



Investment attraction

Enabler: Investment attraction

Context

Through *The Way Forward* and this review, the Government of Newfoundland and Labrador has identified several priority sectors as key drivers of economic development for the Province. Realizing the full potential of each of these sectors requires attracting external investment. For example, the offshore oil industry requires additional investment to fuel new exploration drilling. Additional capital is needed to develop tourism clusters and provide transportation linkages between different destinations. The aquaculture industry requires continuous investment to support the fast-growing operations. And excess energy, if available, could enable the creation of a data centre.

External investments can act as catalysts, spurring the growth of individual sectors by injecting capital that otherwise might not be available for new projects. These investments come in different forms – for example, in the entrance of anchor companies, the creation of joint ventures, and capital for new developments or upgrades. In addition to providing capital, these investment projects bring best-practice experience and introduce new expertise and technology. Also, they often involve partnerships with local firms, which helps increase the local industry's competitiveness.

External investments help increase the connection between the local sector and international markets. Investors tend to repatriate products they develop abroad and bring international networks of their own. The economic impact of new external investments usually goes beyond the scope of the specific project, as new productive capacity increases demand along the supply chain that, in turn, creates new opportunities for local firms. For example, investments in new Atlantic salmon farms create the need for new hatcheries, feed production facilities, processing operations, and repair and maintenance services.

Foreign direct investment (FDI) in Newfoundland and Labrador has declined significantly since the beginning of the decade. Between 2012 and 2017, the Province attracted an annual average of just \$27 million greenfield FDI versus \$152 million in the preceding 5 years.¹

This decline is partly due to the 2014 commodity price shock and the fact that several large projects like Hebron moved beyond their most capital-intensive stages. The bulk of FDI in the Province has traditionally targeted the natural resources sectors, peaking when foreign operators embark on major construction projects, like Vale's Long Harbour nickel processing plant.

Attracting investment is key to unlocking Newfoundland and Labrador's future growth potential – and the Province has an opportunity to become a strong performer in attracting greenfield FDI.

Over the past year, the Government has managed to attract several flagship investments, such as aquaculture producers Marine Harvest and Grieg, cannabis producer Canopy, and a call centre, S&P Data. In offshore oil, the Government's strategic investments in petroleum geoscience have also led to increased investment in exploration.

However, pursuing flagship deals and executing strategic and proactive investment attraction plans are not yet central to the Government's current approach.

Newfoundland and Labrador can attract greater external investment by capitalizing on its key assets and opportunities

Achieving its objectives would require the Province to proactively drive activity and focus on the areas with the highest growth potential. At present, the Government engages in limited proactive targeting of potential investors outside the natural resources sectors, with sector experts in individual departments responsible for such outreach efforts, even though the Government has a centralized unit for facilitating investments – TCII's Major Projects Unit. This unit has the analytical capabilities to assess suitable deals and government opportunities for co-investment, but it works primarily with potential investors that approach the Government, making most deals opportunistic rather than targeted to advance the Province's broader economic development objectives. Furthermore, the approach to conducting proactive investment attraction and the capabilities required to execute well vary widely by sector. For example, investments in petroleum geoscience are key in offshore oil since the additional prospectivity information helps de-risk the investment of future operators. Promoting the data to prospective investors also requires deep industry expertise and strong sales capabilities.

If the Province is able to produce surplus renewable energy, this could be used to attract a major multinational technology company to establish a large-scale data centre operation in Newfoundland and Labrador. Foreign direct investment of this kind could assist the province in growing the local market for its electricity and providing employment and economic opportunities in the increasingly important technology sector.

The Government's *The Way Forward* plans and the present Economic Growth Strategy have uncovered a number of attractive opportunities for external investments that would address the key needs for the growth of the Province's sectors. To realize these opportunities, the Government of Newfoundland and Labrador could adopt a strategic investment attraction approach anchored in its economic development objectives and featuring proactive outreach targeting select high-potential investors.

Aquaculture's progress and projected growth position the sector for investment along the industry supply chain

Aquaculture presents a compelling business case for investment attraction.

Newfoundland and Labrador should build on the momentum of recent investments

(e.g., Marine Harvest, Greig) and continue to seek investments in other elements of the supply chain to accommodate future aquaculture farming opportunities.

The Province has a well-established seafood industry, with aquaculture highlighted as a priority sector in the Government's economic growth strategy. Foreign investment in the aquaculture supply and service sector can further strengthen the ecosystem around the growing salmon farming sector.

Newfoundland and Labrador's salmon production is projected to grow from approximately 20,000 to 90,000 metric tons. This anticipated market demand creates an opportunity to attract external investment in the supply and service sector. To capitalize on the interest, the Government has made commitments in The Way Forward to engage in targeted investment prospecting to encourage new entrants to expand to underutilized and freed-up water areas. The novel technologies required to use the new and exposed sites also create opportunities for new product development with international export potential.

Several areas in aquaculture present investment opportunities, including:

- Equipment manufacturing, such as mooring systems and well-boats to improve production efficiency and primary processing capabilities
- Technology firms, to create innovative solutions for Newfoundland and Labrador's local challenges like early disease detection
- Marine transport and waste removal services, to sustain production efforts.

In addition to promoting efficiency, external investments in aquaculture would help advance the Province's economic development objectives to create new employment opportunities in remote and rural areas that currently have high unemployment rates. Achieving this growth potential in aquaculture would increase the sector's GDP contribution to the local economy from approximately 40 cents to potentially 70 cents (current levels for British Columbia and Norway) for every \$1 of revenue generated in the salmon farming industry.¹

SOURCE: "Global Seafood Market with Focus on Atlantic Salmon: Size, Trends & Forecasts (2018-2022)," Research and Markets, February 2018.

The Province's untapped tourism potential offers a wide range of opportunities for external investment in the sector

As discussed in the tourism chapter, developing a world class tourism cluster would require attracting foreign investment. The Province's highly rated natural attractions, combined with a growing interest in the kinds of experiences and destinations it offers, presents an opportunity to significantly increase the size of the tourism sector by 2030.

To realize this growth opportunity, investments would be required in several categories of cluster development, such as hotels, air access, and transportation. Investments in this sector would introduce fresh ideas and global best practices, create diverse and high-quality jobs, resolve access issues, and accelerate growth to reach the 2030 target of approximately \$2 billion in tourism spending.

Several opportunities are associated with the need to improve accessibility and curated products and experiences:

- Premium hotels with iconic designs and global brands to build on the success of Fogo Island and attract high-spend travelers
- Diverse tourist products curated by full-service tour operators, showcasing the full extent of Newfoundland and Labrador's offerings in adventure tourism, Northern Lights, and unique winter visitor experience
- Additional airline routes connecting the Province to major Northeast US cities and Western Europe through low-cost carriers or charter flights
- Restaurants that build on Newfoundland and Labrador's "foodie" brand.

The Government could adopt a strategic investment attraction approach aligned with the Province's economic development strategy

To successfully capture the opportunity, the Province could adopt four distinct strategies that have been employed by leading jurisdictions around the world:

1. Articulate a clear strategy for attracting external investment that guides the work of all government entities and stakeholders

Based on the economic development objectives set by the Province through *The Way Forward* process and this review, the strategy would focus efforts on the highest-potential sectors.

It could also include a detailed assessment of the types of foreign investments required to accelerate the growth of each sector (e.g., an anchor investor to lead the growth of the sector or additional local suppliers to meet the needs of existing anchor companies). In some cases, the analysis may indicate that developing a world-class cluster would require attracting companies that would compete with local champions. Nevertheless, the Government could consider pursuing such opportunities if they are likely to advance the long-term development of the sector.

The Government could formulate investment prospectuses based on identified market needs and the potential growth opportunities for key sectors and use them in its outreach efforts. Clearly codified objectives and expected outcomes would articulate the vision and build support among relevant departments and key stakeholders. Resources for investment

attraction and incentives would be managed centrally and allocated only for projects that are closely aligned with the strategy.

In addition, the Province could consider giving priority to projects that have the potential to foster valuable synergies between its priority sectors – e.g., tourism, agriculture, and aquaculture; ocean technology and offshore oil; and aerospace and mining exploration.

Singapore's decision to adopt a focused and strategic approach for its investment attraction program could serve as a best-practice example. In 2016, the Singaporean Economic Development Board (EDB) committed to consolidating Singapore's position as a high-value manufacturing location as part of its industry transformation program. EDB's efforts concentrated on key economic development areas, working with companies in electronics, aerospace, energy and chemicals, logistics, etc., to harness technologies and upgrade their workforces.²

2. Embark on a proactive attraction campaign targeting high-potential investors

The Government could publicize the Province's top investment opportunities (detailed in the investment prospectuses) through multiple channels, including the Government's website, investor conferences, and trade and investment delegations. This broader outreach could be complemented by targeted investment attraction efforts led by sector experts with extensive business experience, distinctive sales capabilities, and strong networks in their industries. The capabilities of this group of experts will complement the analytical skills of TCII's Major Projects Unit and fill any gaps in sales-related skills and industry expertise.

This group of experts would build shortlists of target investors that could fill the identified market gaps and systematically engage these targets to articulate the opportunity in the Province. Where appropriate, these shortlists would be accompanied by tailored incentive packages that address the specific needs of individual investors (e.g., shovel-ready sites, co-investment packages, government loans). This group would also work closely with TCII's Major Projects Unit to assess the potential attractiveness of individual deals and the benefits of providing incentives.

To procure the capabilities required for this type of effort, some dedicated investment attraction agencies, like EDB Singapore, create permanent positions on an integrated team. Other agencies source such talent externally through professional service contracts and offer performance-based incentives. The latter approach would offer the Government flexibility in deciding how much and what kind of resources to procure depending on the strategic direction of the attraction campaign.

Several leading investment promotion agencies have undertaken proactive attraction campaigns. The Portland Development Commission, for example, pursues a broader outreach strategy by distributing monthly briefings for potential investors to promote significant upcoming opportunities in the region. Jobs Ohio, a private non-profit designed to drive job creation and capital investment, focuses on nine targeted industries that are aligned with its economic strategy: advanced manufacturing, aerospace and aviation,

automotive, biohealth, financial services, food processing, information technology, logistics and distribution, and shale energy and petrochemical. The group matches businesses with industry experts to identify and fill gaps to attract companies to Ohio.

3. Provide an end-to-end investment facilitation service complete with aftercare

An end-to-end investment facilitation service would build on the work currently undertaken by TCII's Major Projects Unit, creating a seamless journey that connects the different stages in the investment process – from decision making to the start of production.

Each investor could be assigned a “concierge” – a government officer who serves as the potential investors' primary point of contact, helping them navigate the Province's business, regulatory, and stakeholder systems. The concierge could also provide information on tax, education and research programs, labour law, and financing options.

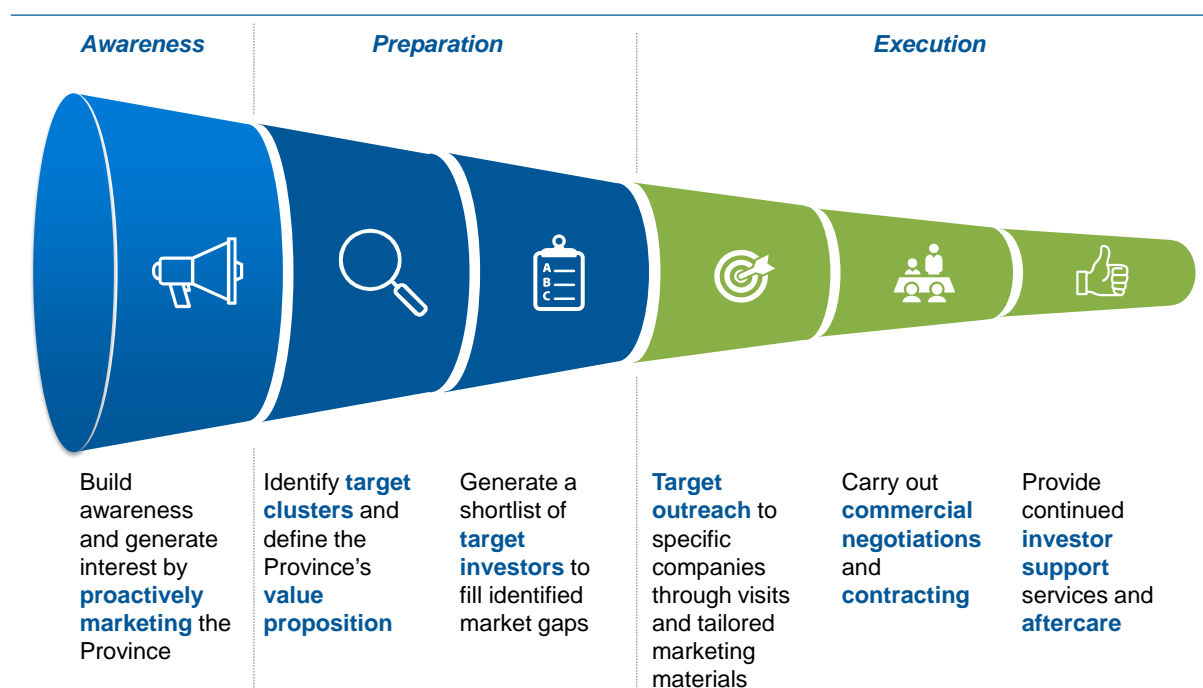
The investment facilitation service would coordinate investors' interactions with government departments to ensure timely completion of all licencing, permitting, and other administrative processes. The platform would also help investors engage with other relevant local services, such as skills development and infrastructure agencies.

EDB Singapore has created a one-stop agency that is involved in all steps of foreign investment, from settling the investment strategy through aftercare. EDB negotiates and assists in settlement by aiding investors in securing work permits and registering businesses, finding business locations (e.g., EDB staff look for suitable land), setting up the business (e.g., incentive scheme), recruiting and training staff (e.g., funding trainings), connecting investors to potential business partners, and financing projects through conditional grants (e.g., payments against milestones).

IDA Ireland, the country's investment attraction agency, is also involved in all steps of the investment lifecycle, devoting special attention to aftercare assistance for existing investors. In the first half of 2018, Ireland welcomed 75 new companies and approved 64 investment projects from existing companies that chose to expand their services.³ This approach has led Ireland to be named the best country for high-value FDI for 6 consecutive years.⁴

Exhibit 16 shows the step-by-step approach to executing the investment facilitation service. Steps 2 and 3 are central to developing meaningful interest in Newfoundland and Labrador's investment opportunities and building the capabilities necessary to execute and drive economic growth.

A strategic investor attraction approach relies on targeting investors aligned with the Province's economic development strategy



4. Introduce a central coordination function to ensure accountability and delivery

Interdepartmental coordination is pivotal for successful targeted and strategic investment attraction. Global best practices show that high-performing investment agencies have cultures that are responsive, fast moving, and agile. A central coordination function, like an interdepartmental management committee, would serve as the governance body to ensure best performance management. The committee would facilitate collaboration and execute decision making on investment priorities, marketing, incentives, and resource allocation. It would foster a strong customer-centric culture, creating a welcoming and seamless journey with relevant departments and stakeholders along the investment attraction funnel (Exhibit 14).

In addition to the central coordination function, the Province could create a robust performance management system to track the progress and outcomes of each function, focusing on specific metrics to drive execution. The success of the proactive investment attraction campaign would be measured on a variety of dimensions, including the total number of companies that invest in the Province, the value of joint ventures, the number of brownfield investments, the value of investments secured, the rate of follow-on investments, and the number of jobs created. End-to-end investment facilitation service would be assessed against investor satisfaction and the extent to which the investor's additional needs

were met throughout the process. This system would also monitor the extent to which each investment advances the Government's overall economic development objectives (employment, regional development, and diversification).

¹ "Inward Greenfield Foreign Direct Investment (FDI) Performance Index," The Conference Board of Canada, conferenceboard.ca

² "Annual Report 2016/17," Singapore Economic Development Board, edb.gov.sg.

³ Martin Shanahan, "Celebrating Foreign Direct Investment," IDA Ireland, September 2018, idaireland.com.

⁴ Charlie Taylor, "Ireland named best country for high-value FDI for sixth year in a row," *The Irish Times*, August 2017, irishtimes.com.

A photograph of a woman with blonde hair, wearing a white lab coat, looking down and writing in a notebook. In the background, another person wearing a white lab coat and safety glasses is blurred. The scene appears to be a laboratory or clinical setting.

Education, skills, and workforce
development

Enabler: Education, skills, and workforce development

Context

There is a growing mismatch between the needs of Newfoundland and Labrador's labour market and the available skills and qualifications of the Province's workforce.

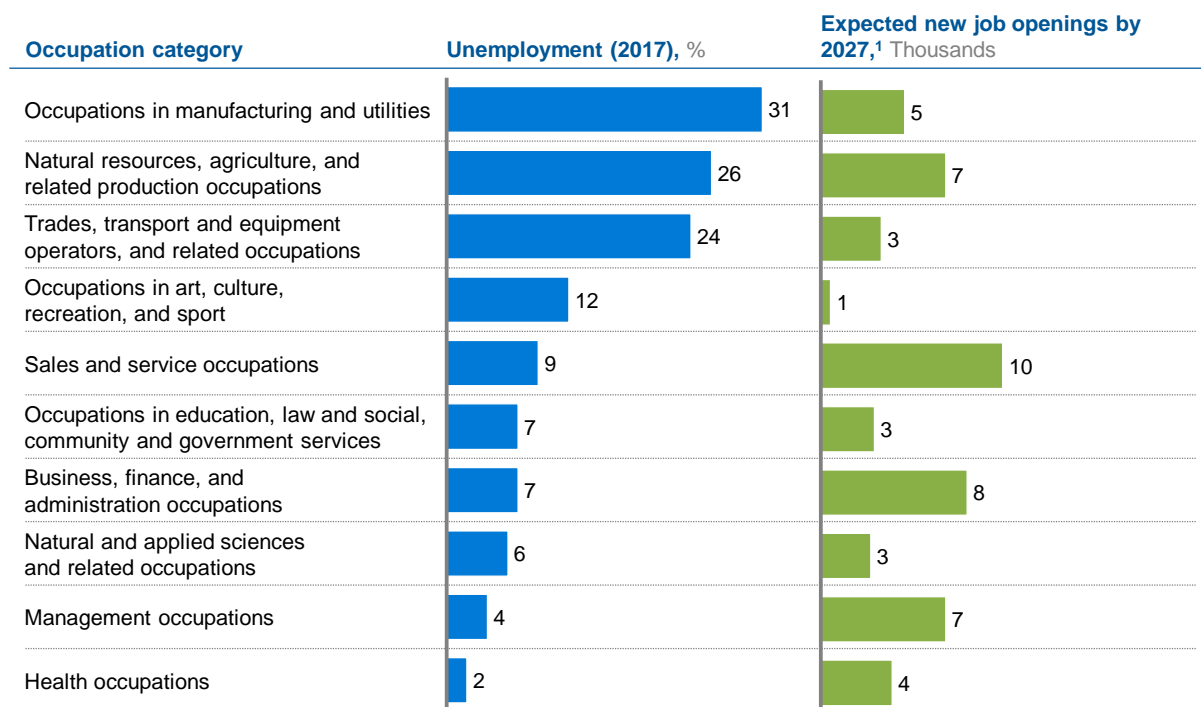
The Province faces a surplus of workers in production-related sectors, and a deficit in skilled services. In 2017, provincial unemployment among individuals with occupations in the trades, transport and equipment operators, and related areas was 24%, while the unemployment rates for those with expertise in natural resources and manufacturing were 26% and 31%, respectively, (Exhibit 17).¹ At the same time, the Province has experienced low unemployment coupled with a labour supply shortage in high-skill knowledge industries such as health services, management, sciences, business, and education.

According to the forecast in Newfoundland and Labrador's 2018-2027 Occupation Projections (2018-2027), the projected evolution of the labour market suggests that the Province's skills mismatch is likely to become even more pressing. Fields that require mid-to-high skills (e.g., sales and service; management; occupations in education, law and social, community and government services; business, finance, and administration; and natural and applied sciences) are expected to require considerably more employees by 2027, further exacerbating the skills gap.

As industries shift toward digitization and technology, digital and technical skills will increasingly be in high demand. At present, Newfoundland and Labrador has the second-lowest STEM (science, technology, engineering, and math) enrollment rate in Atlantic Canada,² while Memorial University's computer science program graduates fewer than 30 undergraduates a year.³ These trends are likely to be compounded by advances in technology and automation, leading to a fundamental transformation of the labour market over the next decade.

EXHIBIT 17

Evolving labour market needs suggest that Newfoundland and Labrador's skills mismatch is likely to become even more acute



¹ Based on Newfoundland and Labrador's *Occupation Projections 2018-2027*; figures do not include potential effects of recommendations included in this report

SOURCE: Statistics Canada; Government of Newfoundland and Labrador, NL Occupation Projections 2018-2027 (Department of Finance)

This does not mean that automation will eliminate jobs altogether; instead, it is likely that there will be a growing demand for jobs that complement the work of machines and require well-developed soft skills such as demonstrating emotional intelligence, interacting with diverse stakeholders, managing teams, and developing creative solutions. Such skills are critical for many occupations in healthcare, social care, and education – fields where the Province is likely to face a short supply of labour.

Beyond the structural challenges, Newfoundland and Labrador job seekers face information barriers as they navigate the labour market. A Canadian Centre for Policy Alternatives' report found that young people in Newfoundland and Labrador struggle to navigate pathways between higher education and career development.⁴ Career development support is perceived to be lacking. Young workers report insufficient clarity about their options in employment and training, and available guidance is not always relevant or accessible.

“Nearly half of the paid work currently performed in Canada could be automated by technology that already exists or is being developed. We expect that 10 percent to 12 percent of the workforce will face job loss and struggle to find new positions unless they acquire new formal qualifications.”

– Federal Government’s Advisory Council on Economic Growth (“Learning Nation: Equipping Canada’s Workforce with Skills for the Future”)

Although multiple resources are available to Newfoundland and Labrador residents and businesses for skills and workforce development, they are dispersed and difficult to find.⁵ For example, the Advanced Education, Skills and Labour website features a library of job-readiness training modules, but they are not systematically organized and can be difficult to find, resulting in low adoption. (There are fewer than 2,500 users on the whole platform.) Improving the website’s user experience could drive further adoption and effectiveness.

Newfoundland and Labrador is embarking on a post-secondary education review, aimed at ensuring that the Province’s educational institutions are prepared to meet the needs of a changing labour market. Newfoundland and Labrador’s Government is also committed to developing a comprehensive human resource plan, in collaboration with sector associations and industry groups, to forecast future job opportunities and assist workforce planning for individuals and the private sector.

As the Province undertakes these reviews, it could explore two general pathways for improving the workforce’s readiness to meet the needs of the labour market of the future.

Deep employer engagement in workforce development

To close the skills gap and prepare talent for the constantly evolving needs of the workforce, the Province could continue to consistently and systematically foster deep employer collaboration through curriculum design, work-integrated learning, and on-the-job reskilling.

Joint curriculum design

Employer collaboration with post-secondary institutions is critical in shaping programs and curricula to meet their future workforce needs. Depending on the industry, the Province could leverage different approaches and stakeholders to encourage such collaboration.

Offshore oil. Companies could work together with Newfoundland and Labrador's post-secondary institutions to develop curricula that will prepare the workforce for the evolving needs of a fast-changing industry. Industry involvement could ensure that relevant college and apprenticeship programs (e.g., Industrial Electrician, Chemical Process Engineering, Heavy Duty Equipment Technician) are prioritizing the skills that are most needed on current and future production sites.

Aerospace. Aircraft service companies, like PAL, could co-develop new programs suited to their operational requirements. Currently, the Province's sole aircraft training program is offered in Gander, a considerable distance from St. John's International Airport, the Province's busiest, and it does not produce a sufficient number of aircraft mechanics to meet market demand. This skill shortage requires Newfoundland and Labrador's aerospace companies to hire out-of-province mechanics at significant extra cost.

Aquaculture. Aquaculture companies could invest in educational programs that support their businesses along the entire value chain, building on the Province's investments to support the future of recruitment and retention in the sector.⁶

Technology, such as sensors and advanced analytics, plays an increasingly important role in the aquaculture industry. Therefore, education programs should integrate new knowledge and skills that are required to meet future demand. The entry of Greig and Marine Harvest into the local market will present significant new opportunities for employment in fish production and the attendant supply and services sector.

Aquaculture science programs could be tailored to the exact needs of commercial production within Newfoundland's operating environment and designed to match the specific demands of salmon farming.

To best target its efforts, the Government of Newfoundland and Labrador could continue to engage and survey employers in priority sectors about the most significant labour gaps they face and anticipate in the future. Once these gaps are identified, employers could be grouped in sectors, forming industry councils that help design the exact model of employer-education collaboration in each area. Such collaboration would also provide a natural mechanism for negotiating financial partnerships as necessary.

Examples of initiatives to enhance collaboration between employers and educational institutions

New York City launched the **NYC Tech Talent Pipeline** in partnership with 150+ firms and 16 colleges, building a network of employers to define employment needs, develop training and education solutions, and elucidate barriers to scale and sustainability.

The **Advanced Manufacturing Technical Education Collaborative (AMTEC)** is a collective of 30 community colleges and 34 auto-related plants in 12 American states working to strengthen the competency and global competitiveness of the automotive industry. Through this initiative, employers have identified a set of 110 competencies common to all plants and crafted curricula in partnership with local community colleges to develop them.

Work-integrated learning

Newfoundland and Labrador could work with educational institutions and employers to encourage more work-integrated learning, embedding practical training opportunities into curricula and creating new co-op programs.

Memorial University has been an early pioneer in co-op programs. It developed one of Canada's first three programs, and today offers placements across Canada and even internationally. The Province could consider work-integrated learning options beyond co-ops, such as apprenticeships, field experience, clinical rotations, internships, applied research projects, and service learning. Such offerings with different lengths and designed for different stages of students' training could enrich and enhance the range of industry options available. Expanding work-integrated learning programs, especially if materially different from traditional co-ops, would require close coordination with Memorial University, which needs to approve all new programs and set academic regulations.⁷

For specific industries or occupations where there is clear evidence of a significant increase in demand (e.g., healthcare assistants), and where current training programs cannot cope with the growing demand, short reskilling programs focusing on essential skills could be created. One example of this strategy can be witnessed in the Generation Initiative,⁸ a non-profit global youth employment program that works directly with employers to develop curricula based on the requirements for high-demand jobs. Generation trains its learners through 4- to 12-week boot camps that focus on the most important activities within a given occupation and are designed to ensure that graduates can perform them at the highest level, starting on Day 1.

The aforementioned survey of employers could provide more granular data on those occupational categories that face the most significant challenges in job readiness. Combined with data about the backgrounds of underprepared employees, the Government of Newfoundland and Labrador could identify the most salient gaps in existing training approaches. In addition, working together with employers could reveal opportunities within organizations to develop new forms of work-integrated learning that would prepare students for the demands of the modern workplace as well as providing companies with a ready pipeline of job-ready candidates.

The Siemens Canada Engineering and Technology Academy (SCETA)

SCETA provides a useful case study of how industry and education have collaborated in the Canadian context. Siemens works directly with five Canadian institutes of higher education (Waterloo, McMaster, Mohawk College, University of Alberta, and the Northern Alberta Institute of Technology). Students enrol in SCETA during the second year of their studies and receive engineering or other technical training through a combination of Siemens' global program and curricula with partner educational institutions. The program also offers ongoing mentorship and guaranteed employment after the program.

With tuition fully covered by Siemens, students spend 8 months in the university or college classroom and 4 months at Siemens. This is a win-win approach for students and industry: students get a robust training and education (including classroom and industry-specific components) without incurring any debt, and Siemens builds a committed group of new, well-trained, adaptable, and innovative team members.

Industry-led reskilling

Newfoundland and Labrador could promote industry-led reskilling aligned with future labour-market needs. For example, when new companies enter industries that operate in remote or rural regions (e.g., mining, aquaculture), they are likely to encounter labour shortages in the local workforce. Though short timelines may necessitate initially hiring outside the Province, Newfoundland and Labrador should encourage industries to invest in the local workforce, reskilling residents in line with labour needs. This would be a win-win solution, saving companies from paying for costly outsourced labour and invigorating local economies.

To encourage such investment, the Government could offer incentives or otherwise seek commitments from industry to integrate local reskilling and hiring schemes as part of licensing requirements.

Encouraging industry-led reskilling

An example of such an initiative is the 2017 tripartite agreement between the Danish government, employers, and unions toward “stronger and more flexible adult education and continuing adult training”. It sets aside public and employer funds to support increased participation in high-quality adult vocational programs, helping the Danish workforce keep its skills up to date.

Source: EU Education and Training Monitor 2018: Denmark.

Often, employers are interested in offering vocational training, but lack experience in setting up such programs. Apprenticeship Carolina, a program run by the South Carolina Technical College System, provides consulting services to businesses setting up their apprenticeship programs (e.g., helping them identify suitable training courses or registering their apprenticeships), while also offering a \$1,000 annual grant for each apprentice.

Source: Apprenticeship Carolina.

Companies witnessing substantial shifts in their industry could also leverage reskilling to enable their existing workforces to cope with changing market dynamics. For example, as offshore operations become increasingly automated, companies could reskill manual labourers to perform machine maintenance tasks or to monitor and control autonomous devices or vehicles.

AT&T is up- and reskilling its 270,000 employees into software experts using a blended approach

AT&T, traditionally seen as a telecommunications company, is transforming itself into a software company and sending its network to the cloud. Given this change in business, the company is training its employees to become software experts, data analysts, etc.

To prepare for the change, AT&T offers reduced tuition fees at more than 30 partner universities like Georgia Tech, as well as a range of online courses through Udacity. It also offers an internal job marketplace for employees to understand the demand for various jobs and the skills they require, so they can select the most relevant training programs.

A reskilling strategy would need to begin with a Province-specific analysis of the industries likely to see the largest displacement of jobs in the coming years, as well as those sectors poised for significant growth. This analysis could take place within the Government's comprehensive human resource plan.

Based on this analysis, the Government could work with relevant partners, like the Newfoundland and Labrador Workforce Innovation Centre, to design strategies that will support employees in adapting to the rapid changes in both legacy and emerging industries.

The nature of reskilling initiatives would vary accordingly, depending on better understanding of who will need to be retrained and the time constraints involved. The Government could work with industry and educational stakeholders to identify the best model for reskilling.

One benefit of these industry-led collaborations is the potential for the Province's post-secondary institutions to develop new non-tuition revenue streams. Cooperating with industry, potentially via contract training programs, could both provide an essential mechanism for reskilling the labour force while creating new sources of revenue for Newfoundland and Labrador's postsecondary institutions. This in turn would allow for enriched programming, improved facilities and equipment, and new technology to better serve students across the Province.

Countries around the world are confronting the changing nature of work and trying different approaches to increase participation in reskilling and lifelong learning. Singapore offers its citizens lifelong learning credits to be used for a range of accredited courses. Germany's Ministry of the Interior is spearheading a program focused on reskilling nearly 5 million public servants. Austria introduced a comprehensive Strategy on Lifelong Learning relying on access, funding, competency recognition, guidance, and promotion, leading to a 10% increase in lifelong learning participation between 2011 and 2016. The Province could study such experiments and borrow initiatives that would be suitable for the local labour market and fiscal conditions.

High-quality and easily accessible information and services for job seekers

The Province could ensure seamless access to labour market support services through a blend of well-designed self-serve online options and in-person counselling. Providing labour market information (LMI) aligned with the Government's "digital by design" commitment would create a seamless and more accessible way for job seekers to interact with the Province's employment services.

Collecting labour market demand information

Historically, the Province has faced many challenges in collecting timely labour supply demand data given its smaller population and issues with statistical validity. The Government could continue to work closely with employers to overcome these challenges, aggregate and centralize labour supply demand data, and provide up-to-date insights into the requirements of local industry. In 2018, the Government engaged in an outreach exercise to understand the private sector's future labour needs. It could formalize the process and monitor these trends on a frequent basis to inform its services.

Disseminating LMI

Newfoundland and Labrador could also enhance access to up-to-date forward-looking LMI to enable job seekers to make informed decisions about education, training, and employment. Though some LMI is available through the Government of Newfoundland and Labrador website, it is largely contained in hard-to-read PDFs and written in technical language (e.g., NOC occupation codes, skill codes), generally inaccessible to the public. The Province's LMI dashboard provides relatively limited information that job seekers may find difficult to turn into actionable insights.⁹

To improve its effectiveness, LMI could be presented in easy-to-understand and highly directive formats, enabling job seekers to begin shaping their career choices with a robust understanding of the market dynamics at play. Existing in-person counselling programs could adapt to provide personalized advice tailored to the individual and local labour market. Digitally-enabled services can assist in the broad dissemination of employment opportunities, even in remote or rural regions.

In addition to improving user experience, the Province has already identified an opportunity to better integrate LMI in the Career Development 2201 course in Newfoundland and Labrador's high school curriculum. Providing educators and students with up-to-date and easily understandable labour market information, accompanied by corresponding career suggestions, could enable Newfoundlanders to begin considering their career and education options with an informed view of the economy's future state.

Supporting job seekers throughout the employment journey

A better understanding of a job seeker's employment journey will offer additional insights on support opportunities. The Government can initiate a revised job information program by undertaking an analysis of the job seeker's end-to-end journey starting from researching job opportunities. The Province could identify the stages at which its intervention would be most helpful (e.g., seeking information, preparing for interviews), as well as the various needs of different categories of job seekers (e.g., high-school students deciding on next steps, recent post-secondary graduates, employees making career transitions).

Germany's lifelong learning counselling program

Germany's new program for lifelong learning offers a best-in-class example of how governments can provide employment services at scale through a high-quality blended experience. The country's Federal Employment Agency recently introduced a lifelong employment counselling program aimed at supporting workers at every key decision point from secondary school onward. The system uses a combination of face-to-face consultations and a digital self-exploration tool. Resources are particularly targeted at students pursuing degrees with a high drop-out rate and workers at the greatest risk of losing their jobs because of automation.

During the first 6 months of the program, the digital service was taken up by more than 300,000 users per month. Small and medium-sized enterprises that usually lack resources to invest in reskilling and employees of these enterprises have shown considerable interest in the counselling program.

This program could survey and interview those who have recently experienced this journey and identify pain points that the Government can address. Insights from different journeys could serve as guidance on how to improve current platforms, tools, and support programs to better assist job seekers.

¹ "Labour force characteristics by industry, annual," Statistics Canada.

² "The Perceived Digital Skills Gap in Canada: A Background Review," Tacit Elements, March 2018, digitalskillsatlantic.com.

³ Memorial University Department of Computer Science, mun.ca.

⁴ Deatra Walsh, with Mary-Dan Johnston, and Christine Saulnier, "Great Expectations: Opportunities and Challenges for Young Workers in Newfoundland and Labrador," Canadian Centre for Policy Alternatives, January 2015, policyalternatives.ca.

⁵ Ibid.

⁶ "Provincial Government and Aquaculture Industry Take Action to Support Sustainable Aquaculture Growth," Advanced Education, Skills and Labour, Fisheries and Land Resources, Government of Newfoundland and Labrador, September 2018, releases.gov.nl.ca.

⁷ "s.56(e), Memorial University Act," assembly.nl.ca.

⁸ Generation is an independent non-profit organization founded by McKinsey & Company in 2014.

⁹ "Labour Market Dashboard," Advanced Education, Skills and Labour, Government of Newfoundland and Labrador, gov.nl.ca.



Digitalization

Enabler: Digitalization

Context

In *The Way Forward*, the Government of Newfoundland and Labrador identified several priority sectors as key drivers of economic development for the Province. As it looks towards implementation, the Provincial Government has collaborated with industry to develop sector work plans, which include targeted actions designed to accelerate economic growth. To date, work plans have been released for the oil and gas, mining, agriculture, aquaculture, technology, and forestry sectors. These plans have been discussed throughout this report.

Common across the work plans is the importance of leveraging new technologies, which bring with them the potential to significantly improve the competitiveness of both traditional and emerging industries while creating new opportunities for growth.

Like all jurisdictions, Newfoundland and Labrador seeks to diversify its economy, which will involve, in part, creating and scaling companies in advanced industries, including information and communication technology, biotechnology, and biomedical and advanced manufacturing. Already, many of the elements that support these sectors exist in the Newfoundland and Labrador innovation ecosystem, for example, the Genesis Centre and the Memorial University Centre for Entrepreneurship. But achieving significant and rapid change in this broad range of industries will require the Province to considerably advance its digital capabilities, beyond even what exists today.

Focusing the Province's Digital Efforts

While Newfoundland and Labrador is home to a small number of successful technology firms (e.g. Verafin), the Province's GDP is likely to be driven by resource-based industries for the foreseeable future. As described in previous chapters, focusing technological developments in these areas is likely to offer the most productive path to economic growth.

One growth opportunity could involve launching a digital innovation centre focused on companies in the resource sector and their solution providers (e.g. ocean technology firms). This kind of centre would set a strategic focus for growing the Province's technology capabilities and bring with it the potential to generate immediate impact. As discussed in a previous chapter, focusing on a sector like Ocean Technology could provide momentum for growth and leverage existing expertise.

A key role for this centre would be convening stakeholders of various sizes. Bringing together large resource firms, small and medium-sized enterprises (SMEs) and academia in a digital innovation centre could benefit all parties – offering SMEs opportunities for growth, international resource firms access to local expertise and academic institutions new options for academic programs alongside a strategic focus for basic and applied research. Altogether, this

collaboration could simultaneously enhance the availability of highly qualified professionals in the province.

The spillover effects of developing new digital platforms are significant. For resource industries, new technologies could reduce operating costs and increase the competitiveness of the Province's international position. In parallel, broader adoption of technologies developed by local SMEs into the international supply chain of large resource firms could create new and lucrative export opportunities.

Digital innovation centres often form part of clusters

Globally, digital innovation centres have often formed part of larger sectoral clusters. In terms of physical infrastructure, a digital innovation centre could be linked with new office spaces and co-working facilities, allowing both entrepreneurs and established companies to work together in close proximity. Major natural resources operators and related industry groups could also be given space to co-locate, encouraging closer collaboration between SMEs, startups and large industry, while opening new lines of communication between advocacy groups and the members they serve.

Canadian examples point to the potential for these clusters to drive substantial economic growth. Peterborough, Ontario, a city slightly smaller than St. John's, has launched a digital innovation cluster to considerable success. The cluster focuses on four sectors: cleantech, agtech, healthcare, and digital, and operates in collaboration with a variety of stakeholders, including local post-secondary institutions (Trent University, Fleming College), investor groups, municipal governments, industry representatives, professional service providers, and others.

Physically, the Peterborough cluster operates The Cube, a set of two full-service incubators located at Trent University and downtown Peterborough. At these sites, the cluster offers a variety of complimentary services to its members, including business support, IP advice, marketing strategy, and others.¹

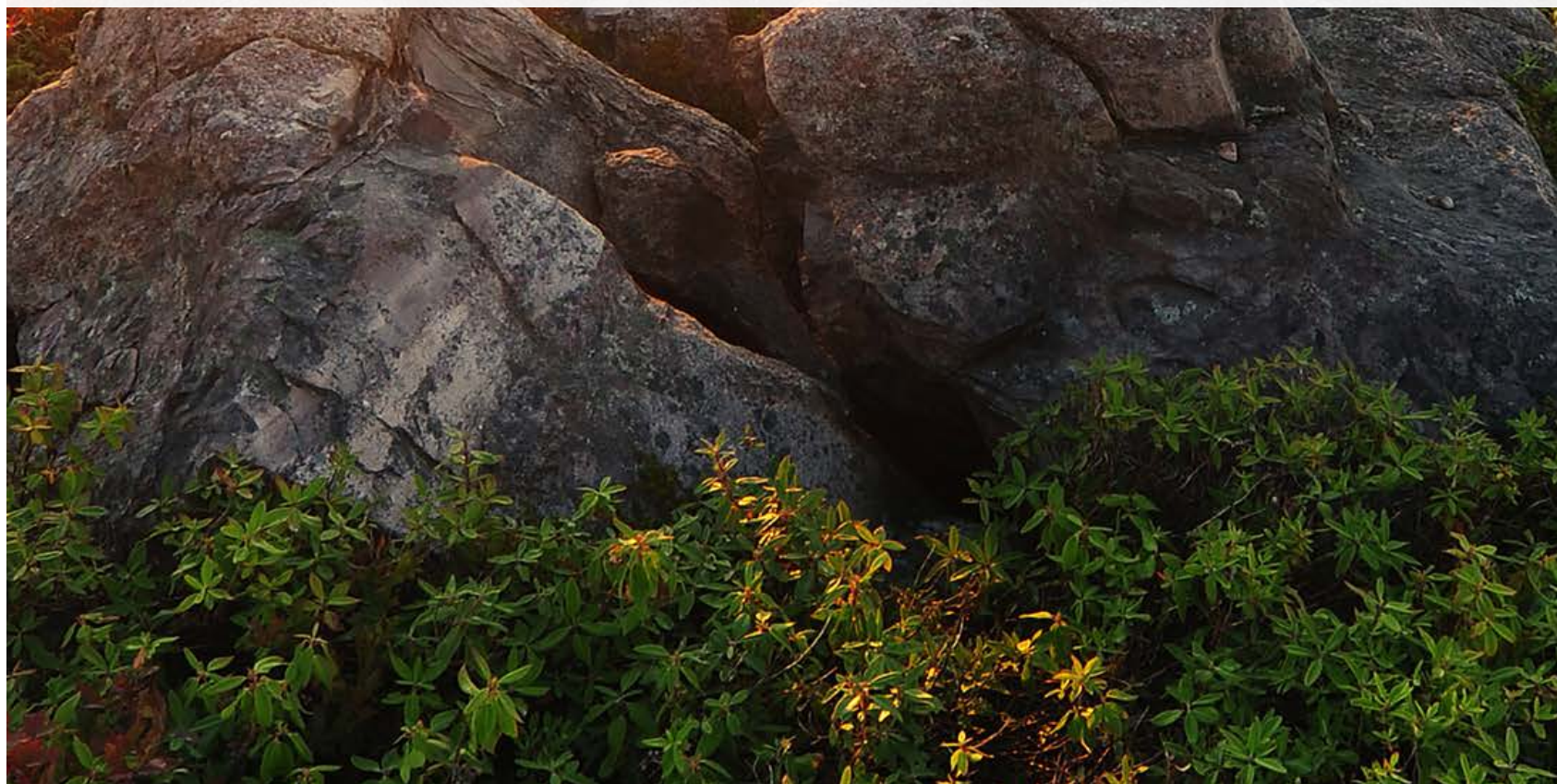
The economic impact of Peterborough's innovation cluster has been profound. In 2018, the cluster generated nearly \$15.5 million, supporting 86 startups and creating 171 jobs.²

¹ "Vision, Mission, Values" Innovation Cluster Peterborough and The Kawarthas. Innovationcluster.ca

² "Peterborough's Innovation Cluster Creates Whopping \$15 Million Regional Economic Impact in 2018", PTBO Canada, ptbocanada.com



Conclusion



Conclusion

As Newfoundland and Labrador continues to develop strategies for economic growth, it is useful to recall the five themes identified at the outset of this report (focus, ambition, external orientation, collaboration, and execution). These themes can help point the way on the ‘how to’ of execution, as the Province considers implementing these strategies.

Ambition

Catalyzing change in Newfoundland and Labrador’s economy could start by setting high targets for priority sectors. Several could lead the way.

Offshore oil

Already, Newfoundland and Labrador has set ambitious objectives for offshore oil production – *Advance 2030* targets 650,000 barrels a day of oil production by 2030. Achieving this high bar for production would require substantive efforts to stimulate new investment and accelerate the pace of existing projects.

This would mean setting ambitious development timelines for extant discoveries, accelerating activity by operators with future work commitments, and attracting new exploration. If executed successfully, the offshore oil industry could nearly triple in size by 2030.¹

Aquaculture

In aquaculture, promising market conditions, coupled with the entry of major international players, position Newfoundland and Labrador to significantly exceed the 2023 production target set in *The Way Forward on Aquaculture* (50,000 metric tons). The industry’s substantial momentum, combined with opportunities to capture value in the supply and service sector, offer the potential to substantially raise ambitions. All told, Newfoundland and Labrador could produce more than five times current volumes by 2030, exceeding 100,000 metric tons annually.

Tourism

Though Newfoundland and Labrador enjoys high levels of public awareness as a tourist destination, its growth rate lags both the Canadian and the global average. As the Province sets its sights on the coming years, its attractive natural endowments, diverse range of visitor attractions, and geographic position at the nexus of North America and Europe offer the potential to match the Canadian target growth rate of 6.4%.

Adopting a tourism cluster strategy, focused on developing enhanced visitor infrastructure around Newfoundland and Labrador’s world-class destinations, could unlock even greater economic opportunity.

External orientation

Transformational economic growth will require Newfoundland and Labrador to look outwards and seek growth opportunities globally. This would be a particular priority in a selected number of the Province's sectors.

Fully developed, the **ocean technology challenge** could act as a mechanism for connecting the provincial economy to the global technology market, enabling local players to compete successfully in export markets. As the challenge grows, it could play an instrumental role in drawing the world's most promising entrepreneurs and a range of outside capital to identify and advance high-potential ideas. Executed successfully, Newfoundland and Labrador could establish a distinctive identity as a global centre for ocean innovation, becoming the go-to geography for companies acquiring new technologies in ocean operations, and a hub for innovators hoping to launch new businesses.

Expanding the Province's international education ambitions could both drive increased tuition revenues and inject crucial foreign talent into the local economy. A growing student population would deliver substantial benefits to the Province's educational institutions and local businesses, while developing a group of young people who benefit from a high standard of training and an affinity for Newfoundland and Labrador.

Streamlining regulations for oil and gas operators could simplify processes for international companies that want to do business in the Province, making Newfoundland and Labrador a more business-friendly environment for foreign operators. Securing regulatory equivalency in the rig intake process, for example, would allow foreign companies to import rigs from other jurisdictions and begin production quickly, without the overhead currently associated with Transport Canada certification.

Developing a globally competitive aerospace sector would enable the Province's local players to serve foreign markets in intelligence, surveillance, and reconnaissance (ISR), and maintenance, repair and overhaul (MRO). As domestic ISR capabilities scale, local champions like Provincial Airlines could further develop their existing export businesses, bringing advanced capabilities to countries and industries seeking ways of pairing aerial surveillance with digital analysis. In MRO, expanded training programs would open up the possibility of expanding existing capacity to service a wider range of aircraft, with the potential to unlock new avenues of business.

Collaboration

Achieving substantial economic growth would require several types of collaboration. For one, the Province would want to work closely with the Federal Government to ensure that federal-provincial shared-cost benefit funding opportunities are tailored to address the Province's unique structural economic challenges, including high reliance on extractive sectors, demographic headwinds, location and geography. The Province would also want to work closely

with the Federal Government to encourage and enable substantive changes to the regulatory regimes that unnecessarily impede the Province's ability to overcome its more structural economic challenges. But collaboration would need to occur within the Province as well, bringing private companies together to collaborate across sectors and industries.

Collaboration with the Federal Government

Collaboration with the Government of Canada (and its agencies) can be grouped into several areas.

Existing programs and funding

Many of the recommendations to stimulate Newfoundland and Labrador's growth would benefit from existing federal programs or sources of funding dedicated to similar projects. The ocean technology innovation challenge, for example, would require close collaboration with the Ocean Supercluster, ensuring that any activity is aligned with the broader goals of the Supercluster and that, where possible, the Federal Government could help provide funding for the competition and its corresponding activities.

Similarly, the Province could work closely with Natural Resources Canada to seek funding for innovations related to the Offshore Operations Centre of Excellence or to consider whether biofuel production could be supported by federal grants focused on sustainable energy production. Other grants that support innovation could be tied in with federal funding for universities, leveraging existing mechanisms for academic research support.

Elsewhere, the Province could identify where provincial tax credits could be aligned with or supported by incentives that exist at the federal level. This is particularly crucial in areas where Newfoundland and Labrador would hope to provide incentives for foreign investment – for example, new tax credits to encourage continued oil exploration. Given that foreign operators will face both federal and provincial taxation, the Government of Newfoundland and Labrador may wish to investigate how it would work with the Federal Government to make its overall value proposition attractive.

On the skills-building front, the Province could leverage federal funding earmarked for the Future Skills Centre, an initiative of Employment and Social Development Canada. The Future Skills Centre and Council are tasked with creating new approaches to skills development, while identifying skills gaps and undertaking information sharing.

This national initiative would be a natural complement to Newfoundland and Labrador's efforts to investigate and develop new and enhanced labour market information; national datasets can inform the Province's approach to developing better local resources and forecasting the future needs of employers. Pilot programs dedicated to reskilling the Province's workforce (e.g., new initiatives in aquaculture, digital capabilities, remote operations) may also benefit from federal funding related to the Future Skills Centre.

Ability to convene stakeholders

The Federal Government is uniquely positioned to convene provinces and other players from across the country in ways that could benefit Newfoundland and Labrador's economy. Programs that exist elsewhere in Canada could be adopted and adapted to Newfoundland and Labrador's economy, while new investments that benefit multiple provinces could be overseen and coordinated by the Federal Government.

Another place where the convening power of the Federal Government could prove instrumental is in launching renewed geophysical survey activity. The Labrador Trough, for example, is a mineral-rich geologic belt that stretches through both Quebec and Labrador. Given that both would benefit from mineral discoveries in this region, the Federal Government could play an important role in facilitating interprovincial investment and collaboration to kickstart these efforts.

Funding for new investments

Investments that do not fit under any existing federal programs could still benefit from federal resourcing. One promising avenue is the Industrial and Technological Benefits Policy (ITB), a set of regulations that ensures that contracts granted to foreign companies (typically in defence) deliver economic value to Canada. Under the ITB, companies awarded procurement contracts are required to undertake business activities in Canada that are equal to the value of the contract.

Investments subject to this policy provide especially attractive opportunities for provincial companies. As foreign contractors seek ways to fulfill their obligations under this policy, Newfoundland and Labrador's existing and proposed capabilities in ocean and aerospace technologies could benefit from these mandatory investments.

Aerospace defence contractors, for example, may be able to meet their ITB investment commitments by sourcing parts and capabilities from Newfoundland and Labrador-based companies that specialize in intelligence, surveillance, and reconnaissance (ISR) technologies. In much the same way, naval contractors could benefit from the capabilities of local ocean technology companies, who could provide Canadian-based services and solutions that would fulfill the obligations required under ITB.

Close collaboration with the Federal Government could prepare the Province's technology companies for ITB opportunities in advance of procurement. This would enable Newfoundland and Labrador's aerospace and ocean technology players to target their marketing strategies at contractors who seek Canadian business partners. Given a longer timeframe, entrepreneurs or existing companies may even create new service lines or capabilities specifically tailored to the needs of these foreign contractors.

Regulatory support

Finally, several of the proposed recommendations would require support from the federal government in streamlining regulations and improving the ease of doing business in Newfoundland and Labrador. Many of the relevant laws and regulations lie outside the Province's power and would consequently require close collaboration to revise in line with the imperatives of economic development.

As identified in the offshore oil chapter, working to streamline regulations for oil companies would require making approval processes more predictable, transparent, and responsive. Some of these changes would have to happen at the federal level – for example, securing environmental impact assessments for wider ocean areas and achieving jurisdictional equivalency in the rig-intake process. These would require the relevant federal agencies to reconsider and/or revise regulations accordingly, in close cooperation with the Province's experts and in consultation with industry representatives.

Expansion of the Province's agricultural assets may also require a range of new initiatives that will necessitate corresponding regulatory changes, for example, building new facilities for shared cold storage, developing shared farm equipment banks, and building federally-certified food processing plants. These too, will require working with the federal government to secure the relevant regulatory approvals.

The Province may also want to consider how it could collaborate with the federal government to improve the visa application journey for inbound international students. Already, substantial work has been undertaken at the federal level to facilitate international study in Canada. However, tighter integration with the 'one-stop shop' described in the International Education chapter offers the potential to provide a more seamless application process, with fewer points of confusion for prospective students, and a substantially enhanced support function tailored to the requirements of the province's post-secondary institutions.

Intraprovincial and cross-sector collaboration

In addition to close collaboration with the Federal Government and related agencies, Newfoundland and Labrador's local industries would benefit substantially from closer intraprovincial collaboration across sectors. Several key opportunities stand out:

Ocean technology

Newfoundland and Labrador is home to a number of commercially successful technology companies that supply leading solutions to ocean industry players around the world (e.g., Kraken Robotics). The combination of the offshore oil and aquaculture industries, unique ocean resources, and a complement of leading marine programs and research facilities, positions Newfoundland and Labrador as an ideal location for the development of ocean technology.

To reach the next level of innovation and growth, the Province could convene industries, institutions, and entrepreneurs from a range of sectors to develop technological solutions to the

principal challenges facing the ocean industries. These might include capabilities for modern ocean observation, data collection and analysis, marine education, environmental stewardship, and remote operations.

Previous sections identified several technologies that are common enablers of multiple ocean industries. For example, both the offshore oil and aquaculture industries are increasingly leveraging sensors, autonomous systems, and advanced analytics to conduct remote and unmanned operations.

Developing these fast-growing technologies could enable the Province's companies to explore new business models (e.g., open-ocean farming, integrated ocean data platform, disease prevention and treatment, advanced automated fish processing) while driving increasing cost-competitiveness.

Agri-tourism

The development of the tourism sector is reliant on collaboration with many other industries, including transportation, aerospace, and retail. The recommendation to develop innovative agricultural assets and niche food products in Newfoundland and Labrador is particularly well aligned with a strategy to diversify the Province's range of tourism attractions.

As the two industries grow, the Province should identify opportunities to develop agri-tourism products and unique culinary experiences. The agri-tourism industry benefits from growing interest in immersive experiences that take advantage of local culture. Developing such attractions could offer opportunities for rural and undeveloped destinations in Newfoundland and Labrador to compete for international tourists.

Aerospace and extractive industries

The aerospace industry plays a vital role across multiple sectors, including transportation, defense, extractive industries, and tourism. In addition to traditional functions like passenger transport, and aircraft and aircraft parts manufacturing and MRO, the rapid growth in the adoption of unmanned aerial vehicle (drones) gives rise to new cross-sectoral opportunities.

In offshore oil, drones play an important role in offshore operations, performing surveillance, inspecting platform, monitoring of gas emissions, and detecting oil spills. Drones equipped with sensors and video cameras can also be deployed to conduct airborne geophysical surveys to increase the richness of Newfoundland and Labrador's geological dataset, enabling and attracting new investments in mining. Increasing automation in future processes will only amplify the need for autonomous or remote flight technologies.

Digitalization as a growth driver for all sectors

Every sector included in this report could benefit from close collaboration with the technology sector.

The process of digitalization focuses on technological development, and on how advances in technology can enable value creation through new ways of doing businesses, engaging customers, and building capabilities. For example, it is projected that the development of artificial intelligence will have the potential to create an additional \$13 trillion in global economic activity by 2030, amounting to 1.2% in additional global GDP growth per year.²

The tourism sector could apply digitalization to reshape the way operators and service providers interact with and serve tourists. Mobile devices are now an integral part of the way that many global tourists travel, penetrating every stage of the visitor journey – from research to purchase and from navigation to posting reviews about their experiences. This presents innumerable opportunities for tourism operators and service providers to curate customized and seamless journeys through digital platforms and tourist data.

In extractive industries, advances in remote operation technologies present an opportunity for Newfoundland and Labrador's offshore oil sector to bring down the costs associated with harsh operating conditions. Increasingly sophisticated advanced analytics models offer novel opportunities to identify new mining targets based on geological data.

Unlocking the potential of digitalization in these sectors would require a talented and well-educated workforce that can bring a range of digital capabilities to bear on the problems of the future, including experience designers, engineers, data scientists, developers, and industry experts. Developing a critical mass of people with these capabilities would involve new approaches to education, skills and workforce development, infrastructure, and talent attraction.

Execution

Many governments attempt to undertake transformations, but successfully implementing change is difficult. A report by McKinsey & Company highlights common features of the 20% of global government transformations that meet their objectives.³ The research indicates that five disciplines are crucial to achieving success in government. These themes could serve as guideposts as Newfoundland and Labrador embarks on a new campaign of economic development.

Committed leadership. Transformation leaders take personal responsibility for success or failure, lead by example to facilitate change, and challenge long-established conventions.

Clear purpose and priorities. Successful transformations paint a compelling picture of their destinations and make it crystal clear, to public servants and citizens alike, why change is necessary. In setting objectives, less is more: successful efforts keep targets few, specific, and outcome based.

Cadence and coordination in delivery. Transformations require: a fast yet steady pace; a flatter hierarchy, with close collaboration among different agencies and functions; and

flexibility, so problems are solved as they arise. They also require an empowered, focused transformation team to drive and track progress.

Compelling communication. Transformations need well-planned, in-depth, and genuine two-way communication with all the groups affected by change – especially the employees of the organization undergoing the transformation.

Capability for change. Reliance on business-as-usual capabilities is a major contributor to the high failure rate of government transformations. Three sets of skills are particularly important: the ability to run complex, large-scale service-delivery organizations; project- and program-management smarts; and digital and analytics capabilities.

Focus

The strategies identified in the preceding chapters include strategies that span Newfoundland and Labrador's most economically promising sectors, coupled with opportunities targeting specific economic development priorities of the Province. The resulting list of recommendations is the product of a rigorous prioritization process that identifies the areas of opportunity with the greatest potential to unlock growth in Newfoundland and Labrador's economy.

Even so, as the Province turns to implementation, it would need to make important choices about how to prioritize its actions. Appendix A contains a full list of the recommendations proposed, with illustrative target timeframes. The actual sequencing of the initiatives would be at the discretion of the Government of Newfoundland and Labrador.

Many factors can intervene in implementation planning – some are within the control of the Government, many not. Consequently, taking a disciplined approach to prioritization is crucial: the range and diversity of the Province's options could prove overwhelming without a sharp focus on how to sequence its initiatives. Several key factors should be considered when the Province begins to execute on these plans:

Resources

The recommendations outlined in this report would require a range of resources, contingent on the current state of the sector in question, the scale of the relevant strategy, and the number and diversity of stakeholders.

Given that the Province's resources are limited, it may want to focus first on strategies that could leverage existing capacity or build on initiatives that are already in progress. For example, the upcoming provincial Comprehensive Human Resource Plan process will lend itself neatly to a broader analysis of Newfoundland and Labrador's talent gaps.

On the fiscal side, the Province could consider focusing first on the initiatives expected to generate quick economic returns to secure funding for subsequent strategies. Executed

judiciously, economic growth in one sector of the economy could enable initiatives that stimulate growth in another – resulting in a self-sustaining model of development. For example, certifying new water areas for aquaculture could quickly draw in new industry players, in turn driving tax revenues and stimulating local economies. The ensuing growth could be used to fund more costly initiatives with relatively deferred payoffs – for example, the aerial geophysical surveys required to enhance the Province’s attractiveness as a mining site.

Synergies

As mentioned throughout the report, the sectoral recommendations do not exist in silos. Many of the proposed interventions cut across industries and functions, with advances in one area of the economy leading naturally to improvements in another.

Where synergies between recommendations exist, the Province could phase its execution model to take advantage these opportunities. Supporting the growth of intelligence, surveillance, and reconnaissance aircraft technology, for example, may enable the Province to use homegrown technologies as it conducts its aerial geophysical surveys. Likewise, implementing a performance management system to track the success of investment attraction could provide future lessons for how to assess performance in other areas of government.

Interdependencies

Many of the recommendations are enabled or underpinned by other strategies, and the order of implementation of how planned initiatives should be carefully considered. For example, developing a renewed investment attraction infrastructure would need to precede many of the actions that call for outside capital. Some dependencies may be less apparent – though the links can still be important. Providing better labour market information to job seekers, for example, may be a prerequisite to filling gaps in talent-constrained areas. Other recommendations, like developing a new branding strategy for the Province’s salmon, will have relatively few implications for other initiatives.

Time to impact

As indicated in Appendix A, the recommendations would have considerably variable timeframes to achieve impact. Some would deliver benefits soon after implementation, whereas others would take longer to realize results. With this in mind, the Province could take a variety of approaches. One option would be to target quick wins immediately which would have the benefit of generating economic growth quickly, enabling subsequent initiatives.

The Government could also consider investing in long-term plays early, given that they would take longer to come to fruition. Developing physical tourism assets, like enhanced accommodation and transportation links, may require substantial construction time, involved approval processes, and complex regulatory hurdles. The more quickly these processes are begun, the faster they would begin to pay dividends for the Province’s economy.

¹ Assumes \$55/barrel crude prices.

² Jacques Bughin, Jeongmin Seong, James Manyika, Michael Chui, and Raoul Joshi, “Notes from the AI Frontier: Modeling the Impact of AI on the World Economy,” McKinsey Global Institute, September 2018, [mckinsey.com](https://www.mckinsey.com).

³ “Delivery for Citizens: How to Triple the Success Rate of Government Transformations,” McKinsey Center for Government, June 2018, [mckinsey.com](https://www.mckinsey.com).

Appendix A: Recommendation roadmap

		<div> <div>Completion target</div> <div>Expected impact</div> </div>		
	Key recommendations	Short-term	Medium-term	Long-term
Ocean technology	Enhance the Province's innovation infrastructure to encourage entrepreneurship and cement a reputation as a world-class ocean technology cluster			
	Offer streamlined and improved support services to grow high-potential ocean technology firms at different stages of commercialization			
	Launch a local innovation competition in ocean technology to identify and advance high-potential local companies that focus on the unique challenges of the Province's ocean sector			
Off-shore oil	Employ incentives to stimulate and accelerate exploration ; e.g., incentives to encourage exploration in "frontier" offshore areas			
	Work with the Federal Government to reduce the regulatory burden , with a focus on securing environmental impact assessments for wider areas and achieving jurisdictional equivalency in the rig-intake process			
	Accelerate the development of an Offshore Operations Centre of Excellence (CoE) to convene industry and entrepreneurs with the aim of developing solutions to make local offshore oil production more cost-competitive (e.g., digital solutions, subsea technologies)			
Mining	Launch targeted airborne geophysical surveys focused on high-potential areas , collaborating with the Federal Government and industry partners to secure necessary funding			
	Leverage advanced analytics to make the best use of available geological data to better target mining exploration efforts			
	Adopt a one-team approach to promote the Province's mineral potential , enlisting both geologists and investment attraction professionals in pursuing more investment in exploration			
	Adapt the Junior Exploration Assistance Program , encouraging exploration activity focused specifically on high-potential areas targeted by the Geological Survey			
Aqua-culture & Fisheries	Continue to expand aquaculture production by ensuring already licensed sites are optimally utilized			
	Work with the Federal Government to certify new water areas for aquaculture			
	Secure new investment commitments for additional Atlantic salmon farms from outside industry through coordinated investment attraction and Government support			
	Develop and market premium salmon associated with a distinctive brand , leveraging Canada's reputation for high-quality and sustainable production to capture higher margins			
	Develop a robust aquaculture supply and service sector to capture additional opportunities along the value chain (e.g., building domestic capabilities in feed production, equipment maintenance, smolt hatching, and fish processing)			
	Examine how changes to CETA may open up additional export opportunities for the Province's fish products			
Tourism	Select high-potential destinations for targeted growth initiatives . This should build on the existing regional destination development plans, coupled with proactive attraction of external capital and expertise			
	Attract foreign investment and private sector interest into the tourism sector to enable the Province to develop new properties, attractions, and tourism infrastructure as sites become more popular			
	Improve tourism infrastructure to reduce capacity constraints , especially in terms of accommodation, local transportation links, and non-stop air links with major North American hubs			
Agri-culture	Market and promote local specialty agricultural products that could be exported , as identified in <i>The Way Forward</i> , including honey, berries, and lamb			

		— Completion target — Expected impact		
Key recommendations		Short-term	Medium-term	Long-term
Agriculture	Expand and develop a range of innovative agriculture assets , including shared cold storage (especially to support vegetable production), farm equipment banks, and federally certified food processing plants , increasing the range of products that can be supplied locally		<div><div></div></div>	
	Explore commercial links between agriculture and tourism to increase consumer demand for local and sustainable food and attract tourists with authentic culinary experiences		<div><div></div></div>	<div><div></div></div>
Forestry	Diversify pulp and paper production toward new paper products with stronger global demand (e.g., linerboard, Kraft paper)	<div><div></div></div>		
	Grow production of construction materials for the local and export markets , substituting for softwood lumber imports domestically, and manufacturing advanced materials for export		<div><div></div></div>	
	Explore biofuel technology which could support reductions in greenhouse gas emissions and enhance use of local sawmill byproducts		<div><div></div></div>	
International education	Attract greater numbers of international students through a range of levers, including creating a one-stop shop to make the application journey easier for prospective students; considering a partnership with educational institutions in target countries to advertise Newfoundland's post-secondary options to foreign students; and working with industry to create a funnel between post-secondary institutions and post-graduate employers		<div><div></div></div>	<div><div></div></div>
	Align fees for international students with peer institutions in Atlantic Canada		<div><div></div></div>	
Aero-space	Attract investment in a commercial aircraft MRO (maintenance, repair, and overhaul) facility focusing on outsourced heavy checks for the North American market		<div><div></div></div>	
	Collaborate with industry and post-secondary institutions to open a new aircraft mechanics training facility in St. John's		<div><div></div></div>	
Investment attraction	Articulate a Provincial strategy for external investment attraction based on identified sector needs, guiding the work of all stakeholders and codifying objectives and expected outcomes	<div><div></div></div>	<div><div></div></div>	
	Embark on a proactive attraction campaign targeting high-potential investors , employing a multi-channel approach and sector-specific efforts led by subject matter experts	<div><div></div></div>	<div><div></div></div>	
	Provide an end-to-end investment facilitation service , complete with aftercare, offering a seamless process between the decision to invest and the start of production	<div><div></div></div>	<div><div></div></div>	
	Introduce a robust performance management system to track the progress and outcomes of investment attraction efforts	<div><div></div></div>	<div><div></div></div>	
Digitalization	Consider launching a digital innovation centre, with the aim of enhancing collaboration among technology companies and improving the Province's innovation infrastructure	<div><div></div></div>	<div><div></div></div>	
Skills	Leverage the ongoing post-secondary education review and the development of the Comprehensive Human Resource Plan to assess the nature of the Province's current skill readiness and advance the capabilities of its work-force	<div><div></div></div>		
	Encourage employers to take a more active role in skills development by co-developing job-ready curricula with post-secondary educational institutions, offering a broader range of work-integrated learning opportunities, and launching on-the-job reskilling programs		<div><div></div></div>	
	Provide high-quality and easily accessible information to job seekers , facilitating the job search through enhanced digital services coupled with in-person counselling	<div><div></div></div>		

Appendix B: Impact Summary

Regional and rural development: more than half of the new jobs are expected to be created outside the St. John's area

Opportunity	Incremental GDP (2030) ¹ , \$ Millions		Incremental employment (2030) ¹ , Number of jobs	
	St. John's CMA	Rest of NL	St. John's CMA	Rest of NL
Aquaculture & Fisheries	-	580	-	7,800
Ocean technology	270	-	3,100	-
Tourism	130	300	1,900	4,400
Offshore oil	2,470	7,400	6,000	2,000
Mining	-	960	-	2,900
Other targeted opportunities ²	130	120	750	2,000
Total	3,000	9,360	11,650	19,000

¹ Potential impact varies significantly with oil price; charts indicate expected impact at US \$55/barrel Brent crude with 650,000 barrels per day production level

² Includes agriculture, forestry, aerospace, and international education

SOURCE: Statistics Canada; Government of Newfoundland and Labrador