Innovation, Science and Economic Development Canada
Innovation, Sciences et Développement économique Canada
Canada

STRATEGIC INNOVATION FUND

Impact Report

This report is a summary of investments made through the Strategic Innovation Fund (SIF), along with their economic, innovation and public benefits, during the program's first 5 years of operation.[1]

[1] The aggregated project results of this report are made of data collected up to March 31st, 2022. The report also contains more recent activities and developments, up to November 2023.

Strategic Innovation Fund Impact Report

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Minister's message

It is my pleasure to present this report on the Strategic Innovation Fund (SIF) and the program's achievements from its announcement in 2017 up to March 31, 2022.

Canada has a history of fostering world-class ideas. Canadian innovations like insulin, sonar and even the lightbulb have had an enduring and global impact. Despite these contributions, however, the country has struggled to retain and grow innovation domestically, causing Canada to lag behind its G7 peers on key metrics, such as productivity and business investment.

Recognizing the economic importance of a healthy innovation ecosystem, the Government of Canada announced the Innovation and Skills Plan in 2017. By leveraging Canada's many strengths, including abundant natural resources and a well-educated, creative and diverse population, the Plan aimed to make Canada a world-leading centre for innovation. The Government of Canada's intervention was, and remains, vital to achieving this goal, given the significant financial risks involved in developing new ideas and competing with other countries seeking to attract those ideas.

The Strategic Innovation Fund is one of many programs introduced to support and attract economy-shaping activities. SIF is a flexible, yet powerful, tool that was designed to set a foundation for our future economy by supporting significant innovative projects across the country. SIF has proven itself to be a valuable tool for creating, growing and attracting new ideas, with rigorous processes and guardrails to ensure that every decision is geared toward the best interests of Canadians.

Since this program's launch, the government has expanded and refined the ways in which it can support strategic projects in a range of industries, working alongside regional partners in order to build the enduring foundation for a growing, sustainable and innovation-based economy.

Underscoring almost all of our interventions is the existential threat of climate change and Canada's long-term competitiveness in the new economic era that's before us. SIF is one tool the government is using to drive urgent emission reductions and promote long-term sustainability across sectors to ensure that the livelihoods we enjoy today can be sustained for decades.

Looking forward, I know that Canada will continue to innovate as we grow a stable and sustainable economy and that government interventions will continue to be needed to ensure long-term prosperity and preserve Canada's global relevance. I am very proud of the progress achieved so far, and I am excited to keep moving forward and building a vibrant innovation ecosystem.

I invite you to read this report to learn more about how, through one project after another and alongside many of the government's complementary tools, we have built a program that is working with and for Canadians to position our great federation as a leader in the global economy.

François-Philippe Champagne
Minister of Innovation, Science and Industry

Executive summary

The Strategic Innovation Fund (SIF) is a program designed to encourage and de-risk private investments in large-scale transformative projects to help Canada prosper in a low-carbon and knowledge-based global economy. Since its launch in 2017, SIF has been used to support projects across the country through 2 primary categories. Projects funded under the Business Innovation and Growth category, also known as direct-to-business contributions, foster the development of for-profit businesses so that they can invest in innovation, grow and create jobs for the prosperity of Canadians. Projects funded under the Collaborations and Networks category foster large, collaborative, business-led projects and innovation networks in areas where Canada has a demonstrated or an emerging advantage. Through this, the program has enabled the Government of Canada to deliver significant benefits for the country.

As a result of significant interest from industry, SIF receives many project applications. Each one gets assessed via the program's rigorous and collaborative processes, with the goal of identifying those with the highest potential contributions to Canada's future economy. While SIF is only one part of Canada's broader ecosystem of federal support, funding delivered through the program has helped to advance a number of important initiatives across the country.

Within the automotive sector, SIF funding has been of strategic support in helping prepare the transition to electric vehicles, anchoring key activities such as battery manufacturing, resource processing, and electric vehicle assembly. Establishing an EV value chain within Canada is considered essential for the future of the automotive sector and is well aligned with Canada's climate goals.

Within the biomanufacturing and life sciences sector, SIF was leveraged to quickly respond to Canada's pandemic needs, which included projects on the development of vaccines and the manufacturing of personal protective equipment. Since then, SIF's role within the sector has remained important as Canada seeks to build renewed manufacturing, research and pandemic prevention capabilities.

These are just 2 examples of the impact being delivered through SIF. As a cross-sectoral, national, innovation-focused program, SIF is helping to build Canada's industrial future one project at a time. This, in turn, can deliver real benefits for Canadians, such as high-quality jobs, resilient value chains, strong economic prospects, and a healthier environment.

While this report uses some 2023 examples of SIF activities to illustrate its impact, the data collected and analyzed to provide aggregated results span the first 5 years of operation, up to March 31, 2022.

Below are a few key statistics that show the scope and scale of the program's impact:

- There are currently over 108 direct-to-business agreements, as well as 10 network agreements that have supported over 900 end-recipients.
- Together these agreements represent $8.2 billion in SIF contributions. The projects are expected to generate $72 billion of private sector investments in Canada. This suggests that every single dollar of SIF funding is linked to almost nine dollars of private investment in Canada. The commitments secured through SIF contribution agreements include the creation or maintenance of 113 thousand full-time-equivalent (FTE) jobs.
- While many SIF projects are still in their work phase, meaning they are building their factory or conducting research, a sizable portion have become operational and the results are already being felt. From 2017 to 2022, throughout economic turbulence, SIF funding supported innovation and research and development (R&D) investment. SIF funding spurred $700 million of R&D expenditure in Canada in 2020, or 4% of the nationwide total. In 2021, the amount was $1.2 billion, or 5% of the national total. In 2021 alone, SIF-supported activities accounted for over 4,600 full-time-equivalent (FTE) jobs.
- The activities resulting from these projects reach every Canadian province. They span many industrial sectors and technology areas, including agriculture, biomanufacturing, autos and batteries, and aerospace.
- SIF has also been used to help address 10 distinct Government priorities, including the COVID-19 pandemic response and the strategy to develop Canada's critical minerals assets.
- Through the Government of Canada's Net Zero Accelerator initiative to mitigate climate change, $8 billion is being deployed through SIF to help support emission reductions in both the short and long term.

SIF at a glance

Core purpose

The Strategic Innovation Fund (SIF) is an Innovation, Science and Economic Development Canada (ISED) program, with the goals of driving investment in research and development (R&D), growing leading Canadian firms, and improving economic resilience by fostering crucial industrial capabilities.

Support offered through SIF can help companies to go through the different stages of product innovation and production while remaining in Canada. It also attracts companies that can supplement Canada's industrial makeup.

The goal of these activities is to help Canada address its long-standing challenge of underinvestment in business innovation and scale-up. By doing this, Canada can take advantage of potential commercial opportunities and benefit the economy. This is linked to other economic challenges Canada faces, like a decline in some sectors with high economic value, lagging productivity in manufacturing, and low private-sector R&D investment compared to other G7 and OECD countries. The global economic situation can make these challenges worse and increase the need to take action.

By delivering support through SIF, the Government of Canada can help to address some of the historical and current market failures that created those challenges. Bridging the gap between research and commercialization, for instance, is an important step to ensuring that valuable ideas remain anchored to Canada as they are scaled up.

SIF is one of the Government of Canada's important business innovation programs. Others include the Industrial Research Assistance Program (IRAP) of the National Research Council (NRC), Regional Economic Growth through Innovation (REGI) of the regional development agencies, and the Global Innovation Clusters initiative. These complement business support programming delivered through other departments, such as Natural Resources Canada and Environment and Climate Change Canada. The Canada Growth Fund, announced in Budget 2022, recently joined this landscape. Even more recently, in Budget 2023, Canada announced a new set of investment tax credits, which will offer support for a range of investments alongside existing tax measures like the Scientific Research and Experimental Development incentives. Together, these levers help enable the Government of Canada to promote the long-term competitiveness of Canadian industry.

How SIF works

SIF is a grant and contributions program that funds projects based on their potential to deliver significant innovation, economic and public benefits. It has the flexibility of offering both direct-to-business and network-based support.

The program covers all sectors of the economy and is available to for-profit and not-for-profit organizations. The minimum SIF contribution amount is $10 million for projects of at least $20 million. The program works primarily on a repayable basis. But depending on the levels of benefits that a company is able to commit to, the program can provide partially or fully non-repayable contributions. SIF projects are split into 2 overarching categories: Business Innovation and Growth projects and Collaborations and Networks projects.

Business Innovation and Growth projects

Also known as direct-to-business projects, these investments support a variety of projects and companies. They are generally agreements through which a single business commits to delivering a project. SIF funding under this category can support:

Research & development (R&D) and commercialization

- Projects that contribute to the R&D and commercialization of new products, processes, and services. Innovations are expected to have a clear path to market, should the R&D prove successful.

Firm expansion & growth

- Projects that involve the expansion or material improvement of existing facilities, for proven or ready technologies.

Investment attraction & reinvestment

- Projects to establish new activities for Canada by securing production and/or R&D activities that either did not previously exist in Canada or that are being established for the first time anywhere.

Collaborations and Networks projects

Driving change at a national level can be done through a wider number of smaller strategic projects, including Collaborations and Networks projects. Each initiative under this category is led by a company or non-profit and involves creating or maintaining a national innovation network. These networks enable a range of industry entities, including corporations of all sizes, academic institutions, and not-for-profit organizations, to work toward common goals for national-level impact. Collaborations and Networks projects are expected to enhance Canada's supply chains; build ties between businesses, academia, and research bodies; and support the development of technologies for commercial applications.

Governance

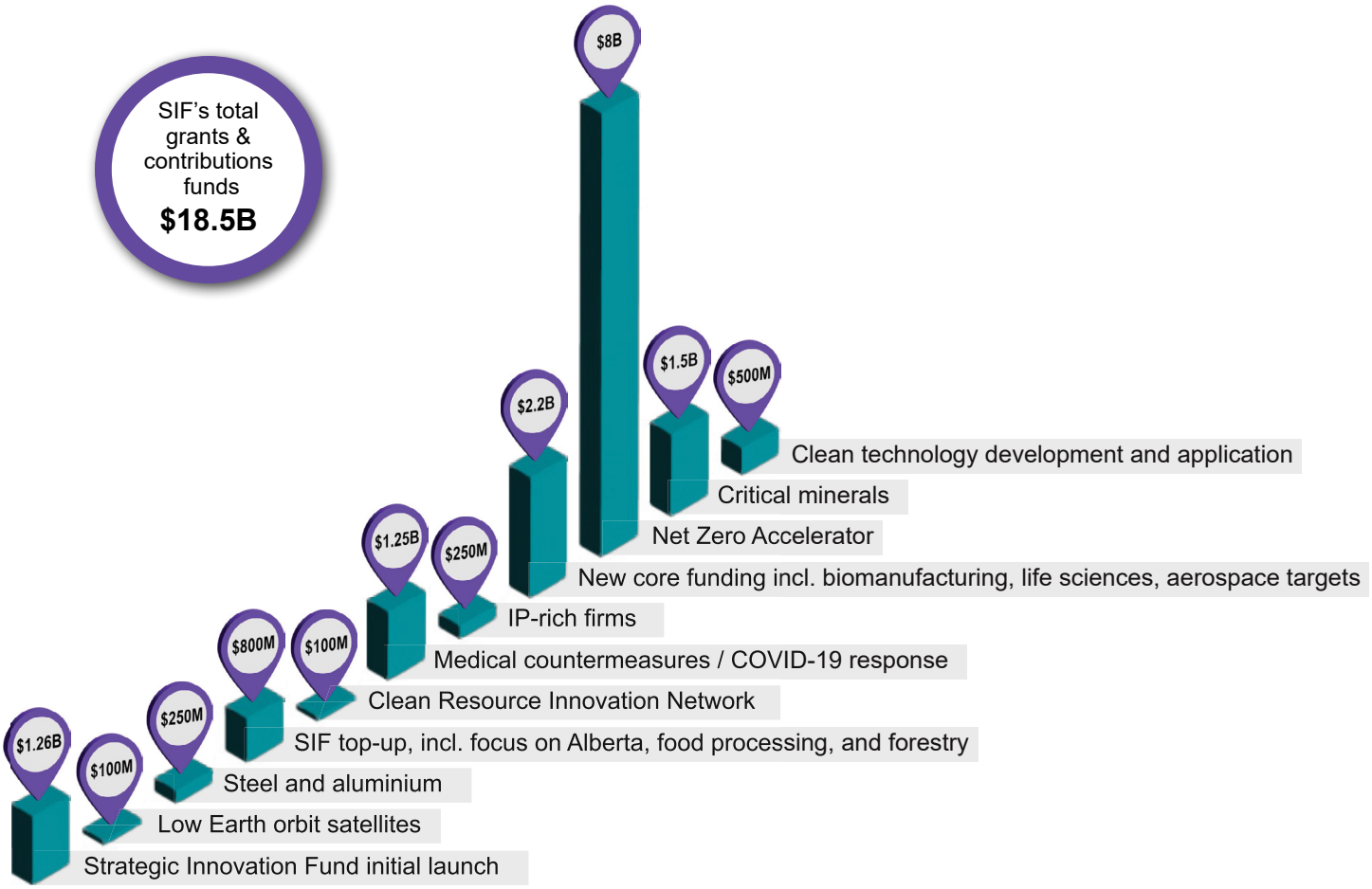
Governance for the SIF program involves several layers, from subject-matter experts to ministers. It also brings together up to 20 federal departments and agencies so that decisions are informed by all sources of federal expertise and are consistent with government-wide policies. Information may also be shared with provincial governments to support project due diligence and explore co-funding opportunities.

Priority driven

The programmatic flexibility of SIF enables it to be adapted to various federal initiatives. Since its launch in 2017, the program has helped with broad or specific initiatives on 10 separate occasions. The program started from a base of $1.2 billion in grants and contributions funding and accounts for $18.5 billion in funding as of December 31, 2023.[2] This funding is dedicated to federal initiatives such as the Net Zero Accelerator, biomanufacturing and life sciences, and critical minerals. SIF's investment priorities, discussed in the results section of this report, reflect those initiatives.

[2] Does not include operating funds, which are managed separately from grants & contributions funding.

Figure 1: Notable Government of Canada initiatives that have been funded through SIF since 2017 (non-exhaustive)



Results

Measuring project outcomes

Since its announcement in Budget 2017, the Government of Canada has used SIF to support innovative projects, help Canadian businesses grow and succeed, and help create and maintain good jobs for a strong economy.

There are currently over 108 direct-to-business agreements, as well as 10 network agreements that have helped extend support to over 900 end-recipients. Together these agreements represent $8.2 billion in SIF contributions. The projects resulting from these agreements are expected to generate $72 billion in private sector investments in Canada.

All SIF-supported projects are regularly monitored for contractual compliance. In addition, their wider performance is measured through the Annual Public Benefits Report (APBR), a survey that all SIF funding recipients must complete every year. The APBR collects a robust set of indicators, including detailed metrics on R&D, capital expenditures and employment as well as equity, diversity and inclusion (EDI). By comparing select aggregate metrics from APBR data to the averages found in Canada's national statistics, it is possible to observe the impact of projects supported through SIF.

The government assesses the performance of the program based largely on the objectives and results presented below. As an example, one of the original objectives set for SIF targeted a 3:1 ratio of private investments leveraged through public support. The above-mentioned results suggest that the actual ratio is closer to 9:1, which is significantly greater than the original objective. Another objective is that SIF-supported firms would grow faster than the national average. A third objective is that companies supported through SIF would increase their R&D spending by at least 25% on average. The following subsections show how these objectives are currently being met.

Data collected up to March 31, 2022, grouped by fiscal year where applicable, indicates that the activities resulting from SIF-backed projects reach every Canadian province and are producing tangible results. These results include near-term growth in employment and R&D spending. Additionally, SIF recipients adopt clean technology at higher rates. SIF-supported projects also have higher R&D spending, high levels of collaboration with universities and other partners, and higher education co-op (student) hiring. There have also been more intellectual property (IP) filings from active projects, which bodes well for the potential mid- to long-term impacts of ongoing innovation.

Active monitoring efforts included assessing how SIF funding has made a difference. This was done by comparing projects supported by SIF to projects that applied for SIF funding but did not receive it. Findings showed that 48% of the projects with unsuccessful SIF applications were never started, primarily due to the lack of funding. And projects that went ahead despite not receiving SIF support had more limited scope. They spent less money (83% of cases) and had fewer people working on the project (91% of cases). These results suggest SIF is a useful tool in addressing Canada's traditionally low level of business investment.

The following sections present a more in-depth view of the impacts of SIF support.

Fostering and scaling innovation

R&D spending

Governments can play an important role in de-risking early-stage technologies and helping to reach commercialization. Without appropriate support, many new firms or technologies can fail, or the companies may leave Canada for places that offer significantly higher levels of public incentives. SIF is an important tool for the Government of Canada to retain and scale Canada's technological innovations. So, one of SIF's key goals is to encourage businesses to invest in R&D activities that can lead to the commercialization of new products, processes and/or services. Over the past 5 years, throughout economic turbulence, SIF funding has supported innovation and R&D investment. This funding spurred $700 million of on-project R&D expenditure in Canada in 2020, or 4% of the national total. In 2021, the amount was $1.2 billion, or 5% of the national total.

Figure 2 shows that organizations supported through SIF were more likely to increase their R&D spending. It grew by an average of 45% in 2020 and 30% in 2021. This is much higher than the average growth for Canadian businesses over the same periods. For smaller businesses with fewer than 500 employees, the growth in R&D spending was even higher, reaching 84% in 2020 and 49% in 2021 (not shown in Figure). Activities funded through SIF's Collaborations and Networks projects had a similar impact: end-recipients, largely smaller businesses, have grown their annual R&D spending by 59% since 2017.

Figure 3 shows that companies spend twice as much per employee on R&D for their SIF projects as they do on R&D for the rest of their business.

The data shows that SIF recipients are actively investing in R&D activities, which can significantly benefit Canada's innovation landscape.

Figure 2: SIF recipients significantly increased their R&D spending, outpacing the Canadian average (year-over-year change in R&D spending, SIF recipients vs Canadian aggregate)

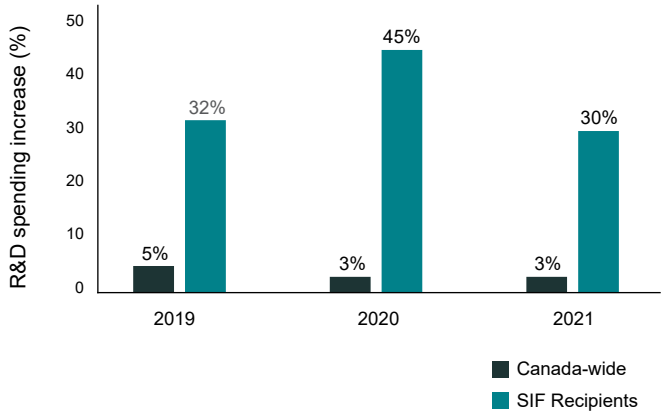
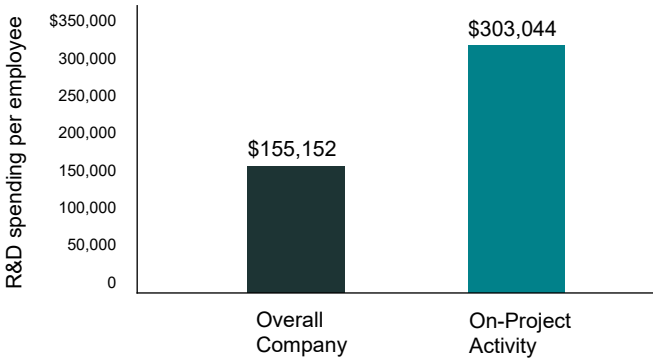


Figure 3: Companies spend almost twice as much per employee on R&D for SIF projects as they do on R&D for the rest of their business (R&D spend, per employee)



Collaboration

Another important goal of SIF is to advance collaboration between the private sector, research institutions and non-profit organizations in key emerging technology sectors, and in industrial R&D and commercialization. Collaborations can increase knowledge sharing between partners and ecosystems and enhance each partner's productivity. This can help accelerate innovation efforts across the country and promote the eventual commercialization of developed-in-Canada technologies.

As shown in Figure 4, a 2019 survey[3] found that only 18% of Canadian businesses reported innovation-related collaboration. Among SIF recipients, that number is 64%—a more than three-fold advantage. On average, collaborative SIF projects engaged in 8.8 distinct collaborations. From 2017 to 2021, SIF recipients reported a total of 538 collaborations, of which half were with Canadian universities. Furthermore, as Figure 5 shows, 46% of collaborators are located within 150 km of each other. This suggests that local clusters are forming and that geographic proximity may help facilitate knowledge transfers and economic activity.

SIF's Collaborations and Networks projects add to this effect: funding has reached over 900 organizations. As well, service-based support, such as training, mentorship and networking, has helped as many as 700 additional organizations.

SIF-supported projects have also created co-operative education (co-op) opportunities that provide practical work experience to students throughout Canada. Since 2017, with participation from nearly 100 post-secondary institutions, projects have made over 3,156 co-op placements possible. Of those, 1,110 have come from Collaborations and Networks projects.

[3] Survey of Innovation and Business Strategy

Figure 4: SIF Recipients are more likely to engage in collaboration than the average Canadian business (innovation-related collaboration rate amongst SIF recipients vs Canadian businesses in 2019 survey)

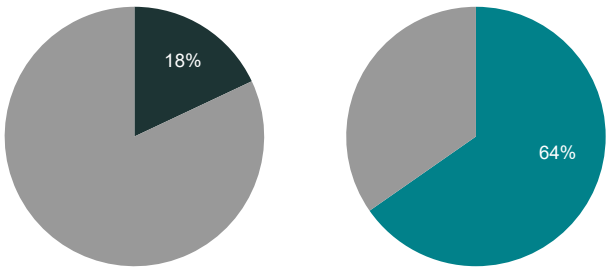
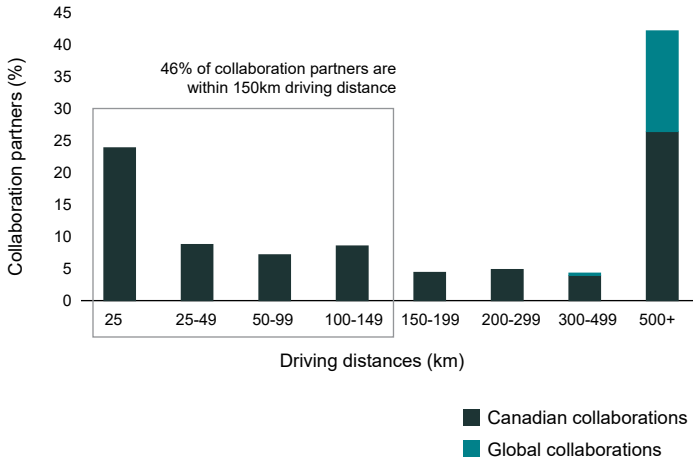


Figure 5: For SIF recipients, more than half of R&D collaboration partners are within driving distance (less than 500 km away) (SIF R&D collaborations, based on distance)

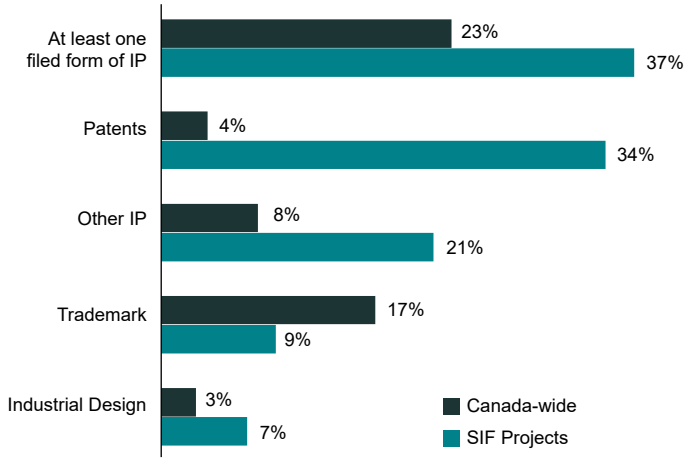


Intellectual property

Creating and making use of new intellectual property (IP) is considered a key aspect of innovation in most fields. It can be quantified by examining the number of patents filed. Although not all patents will result in commercial products, and not all innovations or improvements are patented, the number of patent filings is a good indicator of an R&D project's commercialization potential.

The rate of patent filings for SIF projects is nearly 10 times the rate observed nationwide. SIF projects have resulted in close to 1,000 patents being filed, and 1 in 5 of these are Patent Cooperation Treaty (PCT) filings. PCT filings are generally more complex and costly than regular patent filings, as they protect IP in 157 countries. 1 in 3 patent filings from SIF-supported projects were in the electrical engineering technology field.

Figure 6: SIF projects generate many more IP filings than the Canadian average (IP filing rates by type, for SIF recipients compared to Canadian aggregate)

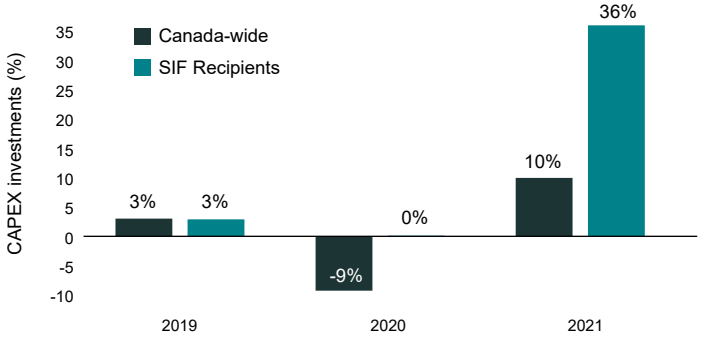


Capital expenditure investments

Capital expenditure (CAPEX) represents the investments required for a new project to reach its operational phase. Direct public support, such as that delivered through SIF, can be an effective tool to attract investments. Those investments can lead to significant long-term benefits, such as high-quality jobs, supply-chain resiliency and economic growth. Interventions can be tailored to an opportunity or a risk, such as shifting to a low-carbon economy. Interventions can sometimes respond to a specific external event. For example, during and after the COVID-19 pandemic, SIF support helped to stabilize and grow sectors directly related to Canada's efforts to find solutions and shore up Canada's preparedness for a future similar event, as well as sectors significantly affected by the economic challenges brought on by the pandemic.

The year-over-year change in CAPEX investments for larger SIF-supported companies (500+ employees) was significantly stronger than for the broader Canadian economy in 2020 (0.2% vs –9.1%). This is shown in Figure 7. Coming out of the pandemic, SIF recipients' CAPEX investments accelerated, with an average reported growth of 36% in 2021, far outpacing Canada's growth of 10% during that year. Smaller firms were excluded from this analysis, as their relatively smaller size compared to their SIF projects would have inflated the result to 52%.

Figure 7: Large companies supported by the SIF outperformed during the pandemic's economic bounce back, in terms of year-over-year changes in CAPEX investments (change in CAPEX investments by year, for SIF recipients vs Canadian aggregate)



Creating jobs for all Canadians

Employment and the workforce of the future

To help deliver strong benefits to Canadians, SIF support is directed toward projects that create or retain jobs, with a view to developing a highly skilled national workforce.

In 2021, SIF direct-to-business projects employed over **4,600 full-time equivalents (up from 3,900 in 2020).** Of these, **40% (up from 29% in 2020) were newly hired** for the specific project. Furthermore, 80% of the jobs created through SIF projects to-date have been positions in the fields of science, technology, engineering and math, compared to 9% of jobs in the broader Canadian economy. Such roles help to build Canadian expertise and capabilities in advanced fields, such as clean technology, pharmaceutical research and artificial intelligence (AI).

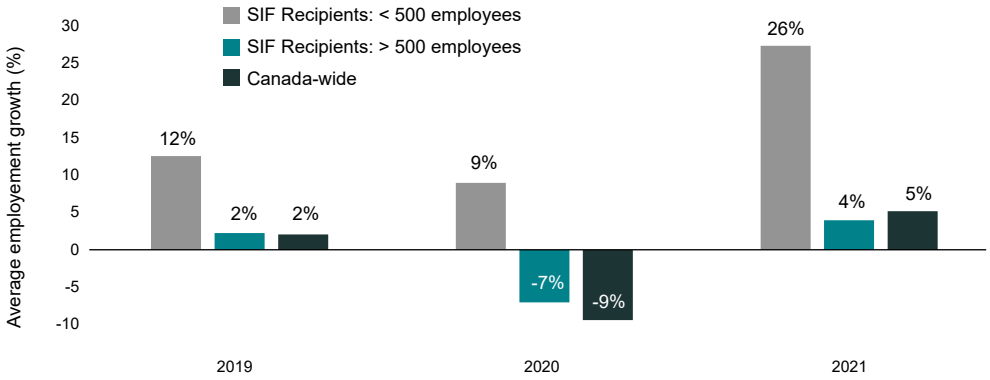
SIF's Collaborations and Networks projects also had a substantial effect on employment. Since 2017, these projects reported an average employment increase of 22% per year, with over 1,100 full-time equivalents working on the projects in 2021.

Figure 8 shows how SIF recipients are creating and maintaining job opportunities relative to the Canadian average. In 2020, SIF recipients reported 1.7% employment growth, compared to a 9.1% decline in Canada overall. In 2021, as Canada recovered from the pandemic impact, employment growth across SIF projects rose higher, reaching an average of 17.4%, compared to 5.75% for Canada.

Within SIF-supported projects, smaller recipients (fewer than 500 employees) saw higher growth rates—9% and 26% for 2020 and 2021 respectively—while larger recipients (more than 500 employees) saw a decline in 2020 (-6.7%) and more modest growth in 2021 (3.8%). But although smaller SIF recipients grew much faster, larger recipients supported 60% more employees per project.

In addition to creating jobs, many of the larger SIF-supported projects also helped prevent the closure of active facilities. It is likely that those projects maintained positions that would have otherwise disappeared from the Canadian economy.

Figure 8: SIF recipients have more stable workforces during economic uncertainty (year-to-year average employment growth for SIF recipients vs. Canadian aggregate)



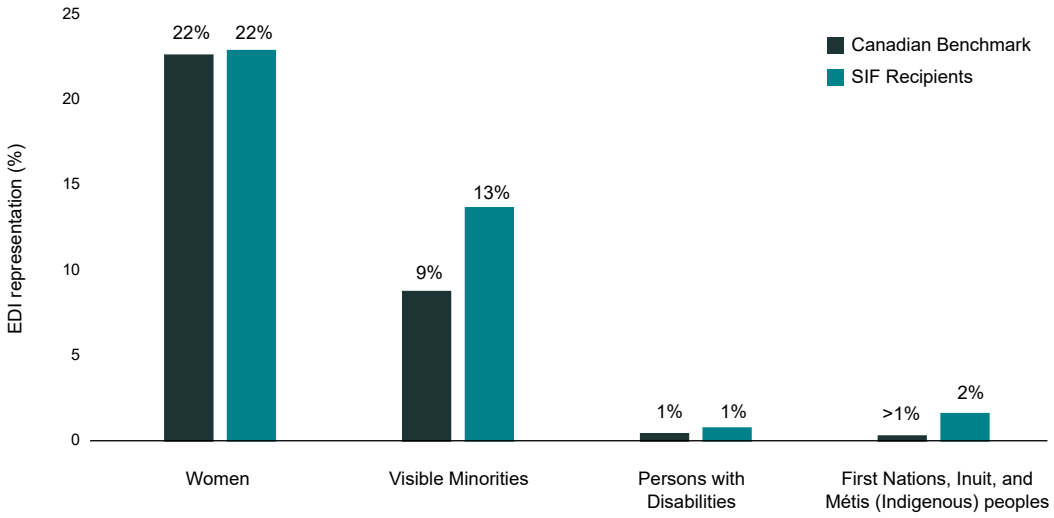
Equity, diversity and inclusion

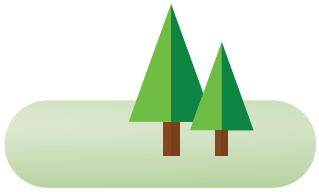
The Government of Canada is committed to fostering positive change and addressing the under-representation in industry of women, Indigenous people, and other equity-seeking groups. In December 2020, the Government of Canada launched the 50 – 30 Challenge, which sets a representation target of 50% women and/or non-binary people, and 30% other equity-seeking groups in Canadian boards and/or senior management.

On average, though they exceed Canadian benchmarks, SIF-supported organizations still have room to grow before they collectively reach the 50 – 30 Challenge targets. On average, recipients currently report that 22% of senior management identify as women and that 15% of senior management identify as a member of other equity-seeking groups.

Within SIF, a standardized process is used to assess how the proposed activities will address inclusion barriers. Multiple aspects are considered, such as hiring practices and Indigenous consultations. Applicants receiving SIF support must complete a comprehensive equity, diversity and inclusion (EDI) plan as part of their signed agreement. Each plan must include concrete targets that the organization commits to reaching and reporting on annually. These progress reports provide a basis for measuring outcomes and may help show which measures are closing gaps. Figure 9 shows EDI data for SIF recipients versus Canadian benchmarks.

Figure 9: SIF recipients are exceeding Canadian benchmarks for the inclusion of under-represented groups in senior management (EDI for SIF recipients, compared to Canadian benchmarks)





THE GREEN IMPERATIVE

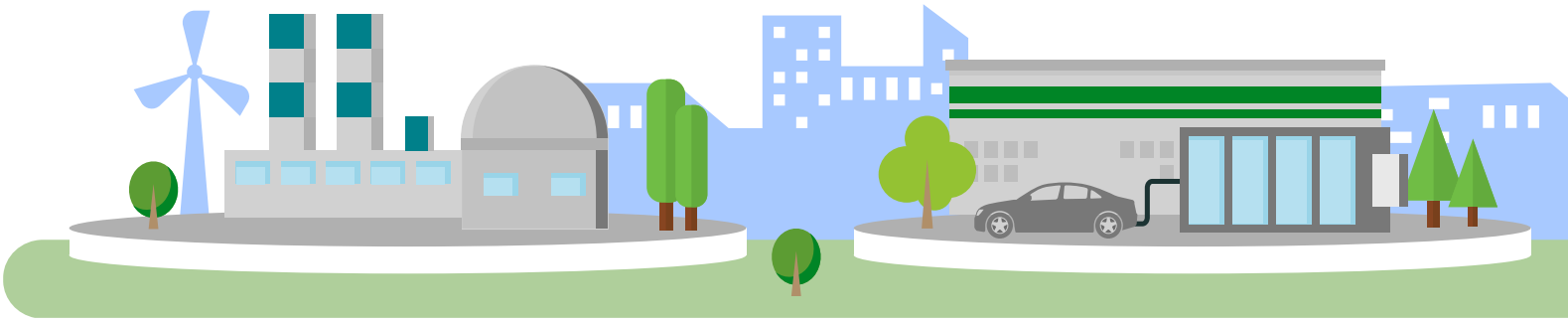
In 2021, the Government of Canada enhanced its commitment to mitigating climate change impacts. The near-term emissions reductions target is 40–45% by 2030, with the long-term goal of a net-zero economy by 2050. As part of its 2020 Strengthened Climate Plan, completed in Budget 2021, the government created the $8 billion Net Zero Accelerator (NZA) initiative, delivered through SIF, to help reach Canada's near- and long-term climate goals. In March 2022, the government released the 2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy. The direction and actions of the NZA are well aligned with that plan. Projects supported through the NZA are also aligned with Canada's plan for a clean economy, as outlined in Budget 2023.

The goal of the NZA initiative is to help speed up activities to reduce greenhouse gas (GHG) emissions, unlock investments from companies, and promote sustainable growth and stability for the Canadian economy. In doing so, NZA funding deployed through SIF will help support Canada's 2030 greenhouse gas emissions reduction targets and its 2050 net-zero emissions goal.

The NZA, like other initiatives that support project-level GHG emission reductions, has targets that are related to, but not the same as, the data in Canada's National Greenhouse Gas Inventory. Similarly, the NZA targets are distinct from projections based on modelling, such as those included in Canada's 2023 Progress Report on the 2030 Emissions Reduction Plan. This is largely due to the complexity of economy-wide modelling, which requires the best available data and must account for the interaction effects between various climate change–related initiatives. Project-level methodologies are, however, useful for comparing projects between each other and for comparing projects to business-as-usual scenarios (i.e., what would have happened in the absence of a given project). It's also important to note that many of the projects funded through the NZA initiative are not expected to deliver direct GHG reductions and would therefore not systematically contribute to reaching the NZA's GHG emission reductions target. Nevertheless, those projects are necessary to enable deeper reductions and unlock pathways to further decarbonize the economy. An example of this would be investments in the manufacturing of battery components for use in electric vehicles. Electric vehicles can then reduce GHG emissions when used instead of internal combustion engine vehicles powered by fossil fuels.

Preliminary NZA results delivered through SIF, including 17 agreements representing $3.2 billion in funding, can be examined through the lens of the 3 NZA pillars: decarbonization of large emitters, industrial transformation, and clean technology and battery ecosystem development. More broadly, since 2017, more than $5 billion has been invested across 50 SIF projects with clean technology components.

On average, SIF recipients have invested nearly twice as much in clean technology for their projects, compared to business-as-usual operations.



PILLAR 1

Decarbonization of large emitters

The first pillar targets near-term emissions reductions through decarbonizing high-emitting sectors.

Under this pillar, the Government of Canada, through SIF, is helping some of the largest emitting industrial sectors, such as oil and gas and heavy industry (e.g., steel, aluminum, cement, mining, mineral processing, chemicals), substantially reduce their domestic GHG footprint faster and with acceptable financial risk.

In July 2021, the government announced 2 SIF-supported steel electrification projects, one by Algoma and one by ArcelorMittal Dofasco. Through these projects, the companies have committed to reducing a combined 6 million tonnes in annual GHG emissions by 2030. They will do this by drastically reducing both the onsite emissions and the emissions intensity of local steel production.

In 2022, the government launched a call to action (CTA) to encourage the industry to approach SIF in greater number with project proposals. The CTA attracted around 40 SIF applications. In collaboration with Environment and Climate Change Canada, Natural Resources Canada, and Transport Canada, ISED selected a shortlist of the most promising projects. These were announced by the Minister of Innovation, Science and Industry in November 2022.

Most of the projects are currently undergoing SIF's full due diligence process, which includes being assessed by an interdepartmental panel of experts. If all 10 announced projects were to lead to signed SIF contribution agreements, the combined impact would be roughly equivalent to taking 3 million cars off the road (10 million tonnes per year of GHG reductions)[4] by 2030.

PILLAR 2

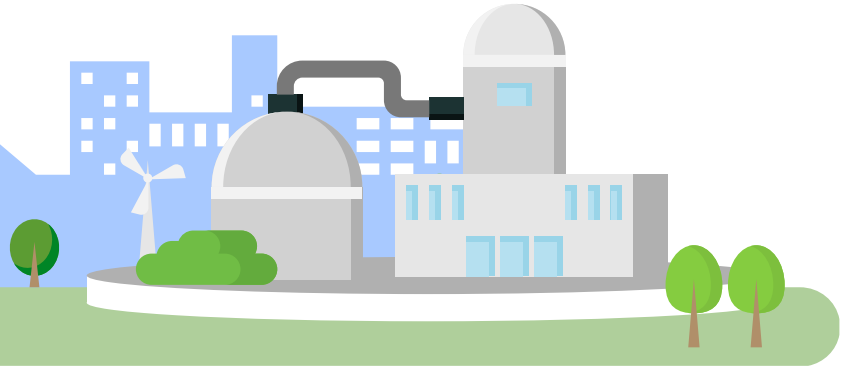
Industrial transformation

The goal of the second pillar is to help established industries transition to the net-zero economy.

Investments made under this pillar aim to ensure that established industrial sectors remain successful and competitive in the net-zero global economy of the future. As an example, in 2021, transportation accounted for 22% of Canada's total GHG emissions, making it the second largest source of GHG emissions and an important area of opportunity for long-term emissions reductions.

Transitioning from internal combustion engine vehicles to electric vehicles (EVs) will improve Canada's ability to reach net zero by 2050. It also represents an important economic opportunity. To that end, SIF-supported activities such as battery cell manufacturing, for example the Volkswagen PowerCo project in St. Thomas, Ontario, and electric vehicle manufacturing, such as GM's project in Ingersoll, Ontario, are helping to build a Canadian EV ecosystem. SIF is also supporting aerospace projects with similar goals, such as the recently announced Initiative for Sustainable Aviation Technology, an industry-led aerospace network focused on accelerating the aerospace industry's green transformation.

[4] Natural Resources Canada Greenhouse Gas Equivalencies Calculator



PILLAR 3

Clean technology and battery ecosystem development

The goal of the third NZA pillar is to capitalize on net-zero opportunities by fostering emerging sectors.

Under this pillar, investments are aimed at seizing emerging clean economy opportunities and promoting the development of clean technologies. Generating electricity from clean sources, for example, will help ensure that the electrification of other industrial sectors produces the desired GHG emissions reductions. Small modular reactors are a notable area of interest, as these projects build on Canadian strengths in nuclear energy. The support provided through SIF and the Atlantic Canada Opportunities Agency to New Brunswick's Moltex, for example, is to help advance a $98 million project to develop a small stable salt nuclear reactor that would produce electricity by recycling used nuclear fuel. This could be a first-in-kind non-emitting-energy system for Canada and the world. The long-term portfolio of SIF projects also includes higher-risk projects with enormous potential. Notable among those is the SIF support provided to General Fusion, a company developing a first-of-a-kind nuclear fusion technology with commercial applications and the potential to deeply change the generation and availability of energy.

Investment priorities overview

This section examines results delivered through SIF in 10 areas: aerospace, agriculture, automotive and batteries, biomanufacturing and life sciences, clean technologies, critical minerals, digital industries, heavy industry, industry 4.0, and natural resources.

Aerospace

Canada is a global leader in the production of civil flight simulators (first in the world), civil engines (third in the world), and civil aircraft (fourth in the world). It is home to a diverse set of aircraft original equipment manufacturers and suppliers. In 2022, the aerospace sector contributed close to $27 billion to Canada's GDP and over 212,000 jobs to the Canadian economy. It is the number one R&D investor across all manufacturing industries and is a top exporter.

The COVID-19 pandemic has had a significant and lasting impact on the aerospace industry. As a result, in 2022, the sector's contributions to the Canadian economy remained below pre-pandemic levels.

Budget 2021, in recognition of the impacts of COVID-19 on the sector, allocated $1.75 billion to SIF in support of aerospace projects. That targeted funding is supporting the future global competitiveness and sustainability of the sector, which has been identified as an important focus for industrial transformation in Canada's strengthened climate plan.

Notable SIF-supported aerospace projects include:

- Pratt & Whitney's $163 million project to develop all necessary components for the world's first hybrid electric propulsion demonstrator plane
- CAE's $834 million digital intelligence project to develop the next generation of flight simulation and training products
- Bell Textron Canada and its 18 industry and academic partners' $125 million project to develop innovative technologies to be integrated into next-generation helicopters and fully autonomous aerial systems

INVESTMENT SPOTLIGHT

Pratt & Whitney

Pratt & Whitney is working to develop a hybrid-electric propulsion system and integrate it into a regional aircraft to demonstrate the technology in flight as a proof of concept. Should the project prove successful, the resulting hybrid-electric propulsion system would optimize performance across different phases of flight, an expected 30% improvement in fuel efficiency and CO2 emissions compared to today's most advanced regional turboprops.

Key Facts

- Main project location: Greater Montréal area, Quebec
- SIF contribution of $61 million toward a $192 million project (as of Dec. 7th, 2023 amendment)
- 150 jobs created and 5,000 maintained, (once project work phase is completed)
- Project is driving collaborative innovation within the aerospace sector
- Advanced R&D activities are fostering significant expertise development within Canada through the creation of high-quality, skilled jobs

Key Benefits

- Sector future-proofing
- Cutting-edge R&D
- Mitigating climate change

Agriculture and agri-food

Food is a fundamental human need, and Canada's agricultural industry is one of the largest in the world. Canada's abundant arable land and water resources, access to international markets, and agricultural science capabilities have made it the fifth largest exporter of agricultural products in the world. Canada's agri-food system employs 2.3 million people, accounting for 1 in 9 jobs in Canada, and generates 7% of the country's GDP.[5]

Technological adoption across Canada's nearly 8,000 food manufacturing establishments and 200,000 farms would help drive the continued growth of this sector. SIF-supported projects that are helping accelerate the adoption of modern tools and the development of new ones are helping to maintain Canada's current and future place as a global leader in the agriculture sector. The program has thus far supported over 150 end-recipients in the agri-food sector.

Notable SIF-supported agriculture and agri-food projects include:

- The Canadian Agri-Food Automation and Intelligence Network's $134 million network project to advance automation and robotics in the agriculture and agri-food sectors
- The Canadian Food Innovation Network's $52 million network project to support the building of industrial capabilities and integration of supply chains for the food and beverage sector
- Maple Leaf Foods' $744 million project to advance automation and robotics used in poultry processing

INVESTMENT SPOTLIGHT

Canadian Agri-Food Automation and Intelligence Network (CAAIN)

CAAIN brings together leaders from the private sector, academia and research institutions. The project builds on Canada's strengths and capabilities to develop exportable farming solutions enabled by artificial intelligence, robotics and precision tools.

Key Facts

- Location of lead recipient: Edmonton, Alberta; end-recipients are located all across Canada
- SIF contribution of $49.5 million toward a $134 million project
- 49 direct jobs created and 222 additional jobs created through end-recipients
- Accelerating the automation and digitization of the agricultural sector
- Using a smart farm to demonstrate technology development
- Optimizing current agricultural operations can enable downstream GHG emission reductions and decrease the use of inputs such as land, water and pesticides

Key Benefits

- Mitigating climate change
- National economic impact
- Transforming a sector

[5] Overview of Canada's agriculture and agri-food sector

Automotive and batteries

The automotive sector is a cornerstone of Canada's industrial economy, providing 500,000 jobs and contributing $16 billion to the economy.[6] Key to this sector are the Canadian operations of 5 of the world's largest vehicle manufacturers (Ford, General Motors, Honda, Stellantis and Toyota). Together, these companies operate 8 assembly plants that produce a combined 1.4 million vehicles annually. As the global and Canadian automotive industry undergoes unprecedented transformations, notably due to the transition toward electric vehicles (EV), investment decisions are being made that will define part of the sector's footprint in this new era.

The Government of Canada's Mines to Mobility initiative seeks to build up Canada's EV supply chain. The value-chain inputs will come from many corners of the country and create opportunities for both rural and urban regions. SIF-supported projects are contributing to Canada's economic development through projects that span the entire automotive value chain, from critical minerals extraction, to battery manufacturing, to EV production. Recently announced EV battery manufacturing projects—including the $7 billion facility by Northvolt, which SIF supported—also contribute towards this overarching vision.

Notable SIF-supported automotive and batteries projects include:

- Honda Canada's nearly $1.4 billion project to retool its manufacturing operations in Ontario and launch the next generation of hybrid-electric vehicles
- Stellantis' $5 billion project to establish an EV battery manufacturing plant in Windsor, Ontario
- PowerCo's (Volkswagen's) $7 billion project to establish an EV battery manufacturing plant in St. Thomas, Ontario

INVESTMENT SPOTLIGHT

Honda Canada

Through this project, Honda is retooling its manufacturing operations, which is enabling it to launch a new generation of hybrid-electric vehicles. These vehicles will emit 30% less GHGs than traditional gas-powered vehicles.

Key Facts

- Main Project Location: Alliston, Ontario
- SIF contribution of $132 million toward a $1.358 billion project
- 3,750 jobs maintained
- Secures long-term Canadian activities for one of the world's largest automotive manufacturers
- Will help to reduce GHG emissions as vehicles are sold in Canada

Key Benefits

- Securing supply chains
- Mitigating climate change
- Transforming a sector

[6] Investing in Canada's auto sector, its workers, and our clean future

Biomanufacturing and life sciences

Canada has a long-standing history in the life sciences and biomanufacturing sector, playing an essential role in the development and global production of life-saving biopharmaceuticals. Canada's many notable contributions to the field include the discovery of insulin (1921), the polio vaccine (1955), the discovery of stem cells (1961), and contribution to HIV antivirals (1989).[7] Canada also has robust scientific foundations with global leading academic institutions and researchers that have led to remarkable discoveries (e.g., lipid nanoparticles used in current mRNA vaccines against COVID-19).

Over the past 4 decades, however, the sector experienced a decline in investment and capabilities. This contributed to Canada not having the large scale biomanufacturing capacity and expertise needed to quickly produce a COVID-19 vaccine in response to the pandemic.

The COVID-19 pandemic marked a shift in Canada's approach to this highly innovative and high-risk sector. SIF was rapidly deployed as the government programming tool and tasked with directing $1.2 billion in support of the Medical Countermeasures Initiative. This initiative was Canada's first multipronged effort to support clinical trials for COVID-19 vaccines and therapies, expand domestic bio-manufacturing capacity, and produce personal protective equipment to protect health workers from the virus.

Investments made through SIF have also been prioritized to support Canada's longer-term pandemic preparedness strategy. Budget 2021 allocated $2.2 billion to support the implementation of Canada's Biomanufacturing and Life Sciences Strategy. This included, $1 billion through SIF towards enhancing industrial and innovative technology capabilities.

Notable SIF-supported biomanufacturing and life science projects include:

- AbCellera's $287 million project toward an antibody therapy research platform and the construction of an antibody production facility
- Biovectra's $80 million project to build a state-of-the-art facility to boost Canada's domestic supply of vaccines and therapeutics
- Sanofi Pasteur's $925 million project to help strengthen Canada's domestic influenza vaccine manufacturing capacity

INVESTMENT SPOTLIGHT

AbCellera Biologics Inc.

AbCellera's project supported Canada's fight against COVID-19 by expanding infrastructure and capabilities in pandemic response and by discovering the first monoclonal antibody medicine to be authorized by Health Canada for the treatment of COVID-19. AbCellera is building an engine that can repeatedly generate new antibody treatments to address unmet medical needs and emerging health threats. When complete, AbCellera's engine will provide a way to translate scientific breakthroughs into medicines, including the capability to discover, develop, manufacture, and deliver innovative antibody medicines to patients in Canada.

Key Facts

- Main Project location: Vancouver, British Columbia
- SIF contribution of $176 million toward a $287 million project
- Supporting Canada's pandemic preparedness and improving access to advanced medicines
- Establishing a good manufacturing practice facility for antibody production

Key Benefits

- Pandemic preparedness
- Addressing sectoral weakness
- Developing innovative technologies

[7] History of biomanufacturing and life sciences in Canada

Clean technologies

Clean technologies are products and processes that help to prevent or reduce the environmental impact of industrial activities by improving efficiency, using sustainable resources, and implementing sustainability measures.

As more countries turn their focus toward climate change mitigation and sustainable practices, clean technology is projected to grow into one of Canada's top 5 exporting industries.[8] The cleantech sector in Canada grew 20% from 2012 to 2021, and employment expanded by 18% within the same period. In 2021, the sector contributed $28 billion to Canada's GDP, provided 200,000 jobs and exported $9 billion worth of products.

Clean technology projects funded through SIF fall into 2 categories: projects that develop clean technologies or projects that adopt clean technologies. Both types of projects are essential to helping Canada achieve its emissions reduction targets of 40–45% below 2005 levels by 2030 and net-zero emissions by 2050. In particular, carbon capture, utilization and storage (CCUS); hydrogen; electrification; and clean fuels represent some of the technological pathways toward decarbonization.

Notable SIF-supported clean technology projects include:

- Svante's $97 million project to develop new CCUS technologies for the energy storage sectors
- Westinghouse Electric's $57 million project to further develop its next-generation small modular reactor, the eVinci micro-reactor, for use in Canada
- Air Products' $1.3 billion project to establish a major new blue hydrogen production and liquefaction complex in Edmonton, Alberta. "Blue" hydrogen means that the CO_2 emissions generated from natural-gas-based hydrogen production will be captured and stored

INVESTMENT SPOTLIGHT

Svante Technologies Inc.

Svante is working to industrialize a novel carbon capture process for mass-market deployment in Canada. The project's goal is to commercialize a proprietary filter for industrial carbon capture and carbon removal applications.

Key Facts

- Main Project location: Burnaby, British Columbia
- SIF contribution of $25 million toward a $97.2 million project
- 53 jobs created, 72 jobs maintained
- Over 700,000 tonnes per year of CO_2 capture potential
- Could help decarbonize Canada's cement production activities
- Will help anchor CCUS intellectual property in Canada

Key Benefits

- Mitigating climate change
- Cleantech R&D
- Creating highly skilled jobs

[8] Report from Canada's Economic Strategy Tables: Clean Technology

Critical minerals

Critical minerals carry immense strategic value for the Canadian economy, particularly in the transition toward clean technologies. They are an indispensable input into many modern technologies such as solar panels and EV batteries. Sources of critical minerals tend to be concentrated in a few countries, and Canada has one of the largest and most diverse supplies among Western countries. From the mining activities that extract the ore to the processing activities that transform it into products, strengthening domestic critical mineral capabilities can address supply chain vulnerabilities, create jobs and contribute to long-term growth.

Through the Canadian Critical Minerals Strategy (CCMS), launched in 2022, the Government of Canada has committed to building a strong domestic critical minerals ecosystem, including responsibly sourced minerals and innovative clean technologies. The CCMS identifies 31 minerals and metals considered essential for Canada's sustainable economic success, of which only 21 are currently domestically produced.[9] The government identified SIF as a support for the CCMS and directed it to prioritize the manufacturing, processing and recycling of critical minerals.

Notable SIF-supported critical minerals projects include:

- Rio Tinto Fer et Titane's $511 million project to increase the production of key critical minerals such as scandium
- E3 Lithium's $87 million project to build a specialized lithium production facility

INVESTMENT SPOTLIGHT

Rio Tinto Fer et Titane Inc. (RTFT)

Through this project, RTFT will increase its production capacity for scandium, aim at demonstrating production technology for lithium and titanium metal products, create an innovation incubator, and reduce GHG emissions at its existing Sorel-Tracy complex.

Key Facts

- Main Project location: Sorel-Tracy, Quebec
- SIF contribution of $222 million toward a $511 million project
- 150 jobs created
- Opportunity to strengthen Canadian EV supply chains using Canadian resources
- Will reduce environmental impact of high-emitting activities

Key Benefits

- Sector future-proofing
- Mitigating climate change
- Stabilizing supply chains

[9] Critical minerals: an opportunity for Canada

Digital industries (information and communication technologies – ICT)

Information and communication technologies (ICT) is a rapidly growing sector and a key enabler for the modernization of the Canadian economy. The ICT sector contributes over 5% of Canada's total GDP, over $100 billion. The sector grew by 7.9% in 2022, more than twice as fast as Canada's total GDP, which saw 3.6% growth. That rapid growth is creating jobs for Canadians. Employment in the ICT sector rose by 5.7% in 2021, compared to an average 4.4% for Canada.[10]

While ICT underpins most projects to some degree, the SIF portfolio includes several projects that focus specifically on ICT innovation. In addition to supporting the adoption of existing digital tools by other sectors, the investments made through SIF are helping to develop new and cutting-edge digital technologies within Canada's ICT sector.

Notable SIF-supported digital industries projects include:

- Ranovus' $50 million project to develop next-generation data centre infrastructure that will double processing capacity and reduce environmental impact
- BlackBerry's $311 million project to develop a safe and secure software for the next generation of automated vehicles
- D-Wave Systems' $120 million project to develop new quantum processors to increase the range of commercial applications

INVESTMENT SPOTLIGHT

Ranovus Inc.

Ranovus has created a new facility in Ottawa, to perform advanced manufacturing and testing of its semiconductor and compound semiconductor products. The project also supports the company's efforts to develop next-generation infrastructure that will enable data centres to double processing capacity and reduce the environmental impact of supporting the emerging AI workloads.

Key Facts

- Main Project location: Ottawa, Ontario
- SIF contribution of $20 million toward a $50 million project
- 566 jobs to be created
- Anchors a technology company's advanced manufacturing capabilities in Canada and inserts the country into the global semiconductor supply chain
- Supports disruptive R&D and the creation of high-skill jobs and increases the global competitiveness of a Canadian firm

Key Benefits

- Building a sector's national ecosystem
- Creating highly skilled jobs
- Strong innovative potential

[10] Canadian ICT Sector Profile 2021

Heavy industry

Heavy industry produces the inputs essential to numerous sectors, including manufacturing and construction, and is critical to a goods-producing economy. Communities rely on heavy manufacturing as a source of jobs and prosperity. The sector accounts for 11% of Canada's total GHG emissions, presenting an opportunity for decarbonization.

As is common in the manufacturing sector, adopting clean technologies and practices is critical to preserving heavy industry's competitiveness. It provides inputs to nearly every sector, so decarbonizing it is a necessity on the road to net zero.

In a rapidly evolving global economic landscape, supporting innovation and reducing heavy industries' environmental footprint was necessary. To do so, the Government used SIF to invest up to $250 million to ensure that producers could undertake innovative projects to improve productivity and reduce their environmental footprint, thereby supporting the sector's competitiveness.

Notable SIF-supported heavy industry projects include:

- Elysis' $644 million project to further develop a process to make aluminum that produces oxygen and eliminates all greenhouse gas emissions from the traditional smelting process
- Stelco's $412 million project to upgrade its Hamilton and Lake Erie, Ontario, facilities and modernize its steel production lines
- Algoma's $703 million project to install an electric arc furnace to replace carbon-intensive blast furnaces for reduced GHG emissions in the steelmaking process

INVESTMENT SPOTLIGHT

Elysis

Though this project, Elysis, a joint venture formed by Alcoa and Rio Tinto Alcan, will advance its revolutionary zero-carbon aluminum smelting technology towards commercial applications.

Key Facts

- Main Project location: Saguenay–Lac-Saint-Jean, Québec
- SIF contribution of $80 million toward a $644 million project
- The zero-carbon aluminum smelting technology would be a global first-in-kind
- The technology has the potential to virtually eliminate the aluminum industry's carbon footprint, reducing annual GHG emissions by about 6.5 million metric tonnes—equivalent to taking 2 million light vehicles off the road

Key Benefits

- Sector future-proofing
- Mitigating climate change
- Developing innovative technologies

Industry 4.0 / Advanced manufacturing

The world is experiencing an industrial manufacturing revolution. The emergence of new technologies to digitize manufacturing has resulted in a transition known as the fourth Industrial Revolution or Industry 4.0. The automation of production and supply chain management, the use of advanced networking and sensor technologies, as well as emerging applications of artificial intelligence, are revolutionizing how products are made and distributed.

Advanced manufacturing offers the opportunity for Canada to harness economic gains by adopting new technologies. Economic sectors adopting digital technologies have an average growth rate 3 times higher than sectors where the use of digital technologies is less intensive.

Advances in material sciences, such as automotive and aerospace light-weighting, are also increasing the competitiveness of several manufacturing segments. 3D printing of parts and components is a technology that could become an economically viable alternative to traditional machining. SIF's advanced manufacturing investments support the R&D and adoption of new manufacturing technologies.

Notable SIF-supported industry 4.0 / advanced manufacturing projects include:

- CBN Nano Technologies' $219 million project to undertake atomically precise manufacturing on a commercial scale.
- Burloak Technologies' $105 million project to open a new, world-class additive manufacturing (3D printing) technology centre in Burlington, Ontario
- Attabotics' $73 million project to further develop its robotics warehouse technologies

INVESTMENT SPOTLIGHT

CBN Nano Technologies

The project is helping CBN Nano Technologies be the first in the world to undertake atomically precise manufacturing on a commercial scale. Fabricating products with every atom in the right place could revolutionize manufacturing.

Key Facts

- Main Project location: Ottawa, Ontario
- SIF contribution of $40 million toward a $219 million project
- 469 jobs created; 998 jobs maintained
- Atomic precision could revolutionize manufacturing globally and establish Canada as a global leader in the sector
- The proposed activities will create highly skilled jobs as well as co-op positions for students. The company will also drive collaboration with post-secondary institutions

Key Benefits

- Transforming a sector
- Creating skilled jobs
- Developing innovative technologies

Natural resources

Canada's abundant natural resources have been an ongoing benefit to the national economy. The sector accounts for 15.5% of Canada's GDP and provides nearly 1.9 million jobs. Natural resource exports are estimated at $224 billion, accounting for 47% of the value of Canada's total merchandise exports. The sector includes mining, forestry, and oil and gas activities.

With the global economy shifting to cleaner energies, the oil and gas sector is expected to face continued disruptions. The natural resources sector is also well positioned to enable a wide range of new activities and sustainably grow. These dynamics are expected to bring a fundamental shift in the makeup of this broad sector over the coming decades.

Within the mining, logging, and oil and gas industries, support deployed through SIF has been aimed at helping the industries adapt to a net-zero economy. Sustainable operations, including the recycling of waste products, have been and remain a key avenue to attaining sustainability goals while preserving economic outcomes and seizing opportunities.

Notable SIF-supported natural resource projects include:

- BHP Canada's $7.5 billion project to develop a world-leading low-emissions potash mine
- The Centre for Excellence in Mining Innovation's $113 million network project to support the development and commercialization of innovative and low-emission technologies across Canada's mining sector
- Inter Pipeline's $1.45 billion project to produce a highly durable and recyclable plastic using propane

INVESTMENT SPOTLIGHT

BHP Canada Inc

Through this project, BHP will advance the development of a world-class, low greenhouse gas emissions potash mine. Innovative implementations will include efficient mining equipment and electric underground vehicles.

Key Facts

- Main Project location: Jansen, Saskatchewan
- SIF contribution of $100 million towards activities to reduce the carbon footprint and improve worker safety within BHP's total $7.5 billion Jansen Stage 1 investment
- 600 jobs secured for Jansen Stage 1
- This project is tied to the creation of one of the world's largest potash mines by production capacity, and its technology innovations will further establish Canada as a global leader in both potash production and sustainable mining
- The project will help prove that the new mining equipment and technologies can be applied on a commercial scale

Key Benefits

- Mitigating climate change
- National economic impact
- Early adoption of innovative technologies

Looking forward

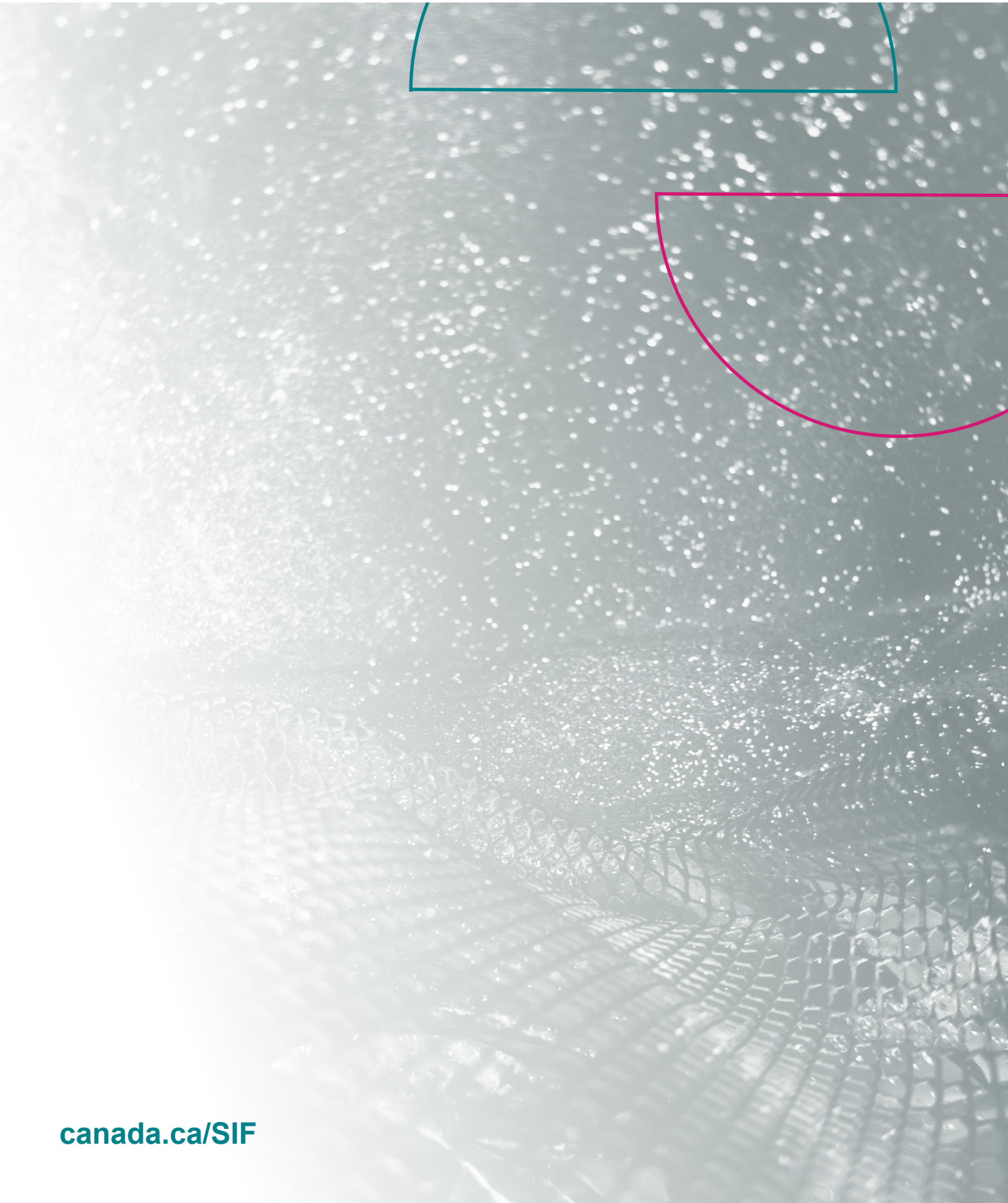
Since 2017–18, the Government of Canada has released key objectives for several sectors, through formal strategies, plans and other policy-setting documents such as federal budgets. Private sector and non-profit organizations have aligned their initiatives to such goals, and federal business support programs can be a significant factor in deciding whether to undertake projects, notably those that aim to develop or implement new technologies.

Business support programming helps to secure important and long-term investments by helping to make Canada a competitive market for world-class projects and companies. The economic activity and expertise resulting from those projects can help transform Canada's economy and communities, notably by furthering innovation, sustainability and inclusion.

SIF focuses on large-scale activities, and it continues to be an important part of the Government of Canada's suite of programs to support strategic projects, promote long-term prosperity and help secure the greatest benefits for future generations of Canadians.

SIF will continue to seek maximum value for every dollar of support, helping to maintain fiscal responsibility. Further, project support will continue to be carefully coordinated with policies and partners at the federal and provincial levels.

The current SIF project pipeline includes a number of impactful projects expected to result in signed contribution agreements in 2024. These projects include activities that support active federal priorities, such as the Biomanufacturing and Life Sciences Strategy, the climate plan, or the Canadian Critical Minerals Strategy, and should deliver decades of impact for Canadians.



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