

National Research Council Canada

2023–24

Departmental Plan

The Honourable François-Philippe Champagne, P.C., M.P.
Minister of Innovation, Science and Industry



National Research
Council Canada

Conseil national de
recherches Canada

Canada

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Table of contents

From the Minister	1
From the President	3
Plans at a glance	5
Core responsibility: planned results and resources, and key risks	7
Internal Services: planned results.....	24
Planned spending and human resources.....	29
Planned spending	29
Planned human resources.....	30
Estimates by vote	31
Future-oriented condensed statement of operations	31
Corporate information	33
Organizational profile.....	33
Raison d'être, mandate and role: who we are and what we do	33
Operating context	33
Reporting framework	34
Supporting information on the program inventory	36
Supplementary information tables.....	36
Federal tax expenditures	36
Organizational contact information.....	36
Appendix: definitions.....	37
Endnotes.....	41

From the Minister

In 2023–24, the National Research Council of Canada (NRC) will continue working with the Innovation, Science and Economic Development Portfolio and other federal partners to position Canada as a global innovation leader by fostering competitive, sustainable and inclusive growth. The 2023–24 Departmental Plan lays out the key priorities the NRC is working to advance for the benefit of all Canadians.

The NRC's rich history of scientific contributions, collaboration with key partners and support to industry will enable the organization to continue finding solutions for a better future. Through excellence in research and innovation, in 2023–24, the NRC will continue to advance work in priority areas for Canada, including the development of technologies and materials for a more sustainable economy, increasing domestic biomanufacturing capacity, and strengthening Canada's position in quantum and digital technologies.

As the NRC focuses on making progress on these key goals, its commitment to provide a safe, healthy, respectful and equitable workplace will remain a top priority. To ensure NRC programs and services are accessible to all groups, the NRC will continue to build a more diverse workforce that is balanced and representative of the Canadian population.

Together with Canadians of all backgrounds, generations, and in every corner of the country, we are building a strong culture of innovation to prepare Canada for the economy of the future.

To that end, I am pleased to present the 2023–24 Departmental Plan for the NRC.

The Honourable François-Philippe Champagne
Minister of Innovation, Science and Industry
[Minister of Innovation, Science and Industry Mandate Letterⁱ](#)



From the President

The NRC plays a leadership role within the Canadian science, technology and innovation (STI) ecosystem through our research and technology expertise and capacity, business innovation support and science-based policy solutions for government. Every day, teams of researchers, engineers, business experts, technical officers and advisors, and other dedicated professionals across the organization make ground-breaking science and innovation possible. Our ultimate goal is to advance knowledge to help address the pressing issues of our time—from climate change and the digital revolution to emerging health issues— and boost Canadian business innovation and productivity.



Budget 2022 highlighted the urgent need to address Canada’s innovation challenges and outlined the important investments required to achieve global innovation leadership. The Fall Economic Statement in November 2022 followed with an investment of \$962.2M over eight years to renew the NRC’s facilities and real property, with \$121.1M ongoing. This generational investment in research infrastructure will underpin innovation in government, academia and business in Canada for decades to come. The NRC’s new Office of Facilities Renewal Management will lead the prioritization of future facility recapitalization projects, allowing us to continue our transformational journey into a more advanced research and technology organization that can better invent, innovate and prosper.

In 2023–24, we will continue to advance creative, relevant and sustainable solutions to Canada's current and future economic, societal and environmental challenges. As we wrap up the final year of our 2019–2024 Strategic Plan, we look ahead to the 2024–2029 strategic planning process to chart our path to continued research and organizational excellence, and increased and sustained impact for Canada and Canadians. Through application of leading-edge research and technologies, and ongoing support to our partners, collaborators and clients, the NRC will remain well-positioned to advance knowledge, support government policy mandates and foster business innovation in support of the Minister of Innovation, Science and Industry's mandate letter commitments. In 2023–24, our focus on government priorities will deliver results for Canadians:

- **Climate action and sustainability:** We will support the reduction of Canada’s carbon emissions and transition to a green economy by, for example, advancing the deployment of technologies and materials needed to support critical mineral value chains, developing tools to reduce plastic waste and increase plastic circularity, collaborating on innovative construction materials, and revitalizing national housing and building standards to encourage low-carbon construction solutions.
- **Health and biomanufacturing:** We will continue helping Canadian industry develop biologics and therapeutics as we complete the operationalization of our Clinical Trial

Material Facility (CTMF) and the Biologics Manufacturing Centre (BMC), and the transition of the BMC into a not-for-profit corporation. We will also leverage our expertise in digital and nanotechnologies to advance solutions in health.

- **Quantum and digital technology solutions:** To maintain Canada’s strength in quantum and semiconductor photonics, we will further develop quantum technologies in sensing, imaging, computing and communications, and modernize our fabrication facilities to improve critical supply chains for photonics and electronics. We will continue to use digital technologies in a range of applications, including autonomous transportation, rail safety, language understanding, health care and advanced manufacturing.
- **Business innovation and growth:** To continue helping Canadian small and medium-sized enterprises (SMEs) develop and commercialize technologies, the National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) will enhance funding and advisory services by improving its tools to support program delivery and optimize the client journey.

As we are working on advancing knowledge and driving innovation, we will focus on:

- **Equity, diversity and inclusion (EDI):** Continued implementation of the NRC’s Workforce and Workplace EDI Strategy will allow us to increase representation across the organization and ensure equitable access to leadership opportunities and career development. The development of a new Strategic Human Resources Plan and Talent Attraction Strategy will help us build a more diverse and inclusive workforce by expanding our reach within the talent pipeline. We will also continue to integrate Gender-Based Analysis Plus into organizational planning and program design to help understand the impact of NRC programs on all populations, including diverse groups.
- **Collaboration and partnerships:** By working collaboratively with other federal departments, expanding NRC Challenge programs and strengthening our international relationships, we will explore and implement new ways to better integrate leading university researchers and business partners with NRC resources. We will also continue to work with industry and academic partners to advance transformative research in priority areas for Canadians, support Canada’s Global Innovation Clusters and make infrastructure more resilient.

I look forward to another successful year working with our partners and collaborators as we continue to help the Government of Canada address our country’s most pressing challenges and deliver impact and benefits for Canadians.

Iain Stewart
President, National Research Council Canada
[Mandate Letter for NRC Presidentⁱⁱ](#)

Plans at a glance

For more than a century, the NRC has evolved to build and maintain a leadership role in the Canadian science, technology and innovation (STI) ecosystem in three core areas: advancing scientific and technical knowledge, supporting business innovation and providing science-based policy solutions to government in priority areas.

In November 2022, the Government of Canada announced an investment of \$962.2M over eight years and \$121.1M ongoing to renew NRC facilities and real property. This significant investment will enable the NRC to better invent, innovate and prosper as it supports Canada's STI goals and delivers benefits for Canadians. The NRC will begin implementing high-priority facility projects in 2023–24, based on a 2017 to 2021 review of its research facilities and real property and a new approach for facility renewal.

In 2023–24, the NRC will complete the development of a refreshed five-year strategic plan. The planning process will help the NRC identify transformative facility investments, advance the digitalization of research and increase its impact through research and organizational excellence. Through a combination of front-line and external stakeholder engagement, the 2024–2029 NRC Strategic Plan will provide an integrated strategic framework that sets a clear path towards achievement of the NRC's long-term ambitions. In this final year of the NRC's [5-Year Strategic Plan 2019-2024](#),ⁱⁱⁱ key priorities in 2023–24 will include climate action and sustainability, health innovation and biomanufacturing, development and application of emerging digital and quantum technologies, and continued support for Canadian industries, SMEs and the national economy.

Scientific and technological knowledge advances

As one of Canada's leading federal research and development (R&D) organizations, the NRC helps tackle the world's most pressing challenges, such as climate change and health and economic crises, and capitalize on opportunities presented by the digital economy. To support the reduction of Canada's carbon emissions and the development of solutions that address the negative impacts of climate change, in 2023–24 the NRC will continue to focus on research in key areas such as critical minerals, fuel efficiency and decarbonization of transportation, renewable energy, sustainable agriculture and plastics reduction. To complement these efforts, the NRC will further develop digital technologies that contribute to a healthier, more sustainable future. The NRC is well-positioned to support the transition to a digital economy with research related to smart applications for safer and more autonomous transportation, advancements in microfluidics and nanomedicine, stronger measurement capabilities, and leadership in astronomy.

Innovative businesses grow

The NRC actively supports Canadian SMEs through NRC IRAP services, assistance from R&D programs, and access to top assets and state-of-the-art facilities, such as the NRC's photonics fabrication facility. With the ultimate goal of creating Canadian wealth through innovation, in

2023–24 the NRC will continue to help SMEs grow to scale, take ideas to market and increase their reach within Canada and abroad. In addition, the NRC will work with industry partners to increase health sector and biomanufacturing capacity in Canada, including the ongoing operationalization of the BMC and its transition to a not-for-profit governance model. Through its strengths in quantum and semiconductor photonics, the NRC will enable the photonic, electronic and semiconductor industries to commercialize innovations and help address supply chain vulnerabilities in Canada’s crucial supply of electronics and photonics chips. Finally, the NRC will encourage industry adoption of sustainable and low-carbon technologies by, for example, supporting SMEs in projects aimed at shifting to a low-carbon construction sector, clean and renewable energy, and smarter, sustainable transportation.

Evidence-based solutions inform decisions in government priority areas

The NRC plays a significant role in creating innovative, high-impact solutions for a more sustainable and prosperous future. It does so by contributing scientific and technical knowledge, expertise and resources, and by working closely with other innovators, including federal departments and agencies, Canadian academia and entrepreneurs, and scientists around the world. In 2023–24, the NRC will continue implementing collaborative R&D programming such as the NRC Challenge programs and Cluster Support programs, which bring together the best innovative minds from across the country to deliver transformative breakthroughs in key areas such as advanced manufacturing, artificial intelligence (AI) and digital technology, solutions for Canada’s aging population, clean fuels, quantum science applications, and secure communication networks for rural and remote communities. The NRC will also continue to collaborate with partners to advance more resilient infrastructure that addresses the effects of climate change, including decarbonization of the construction industry, reduction of transportation emissions, and revitalization of national codes and standards development systems.

Effective delivery of internal services

Every day, NRC researchers, engineers, business experts, technical officers and advisors make cutting-edge science and innovation possible. Through continued improvements to internal services, such as information technology infrastructure, security systems and communications tools, NRC corporate branches provide staff with access to the tools needed to deliver on the organization’s mandate and strategic goals. In 2023–24 the NRC will continue to develop and implement key initiatives to help it access and attract top talent, retain highly qualified employees, achieve an equitable and diverse workplace and make sure that all members of its workforce feel supported, nurtured and respected.

For more information on the NRC’s plans, see the “Core responsibility: planned results and resources, and key risks” section of this plan.

Core responsibility: planned results and resources, and key risks

This section contains information on the department’s planned results and resources for each of its core responsibilities. It also contains information on key risks related to achieving those results.

Science and Innovation

Description

Grow and enhance the prosperity of Canada through: undertaking, assisting and promoting innovation-driven R&D; advancing fundamental science and Canada's global research excellence; providing government, business and research communities with access to scientific and technological infrastructure, services and information; and supporting Canada's skilled workforce and capabilities in science and innovation.

The NRC has three departmental results for tracking and reporting against its core responsibility:

1. Scientific and technological knowledge advances;
2. Innovative businesses grow; and
3. Evidence-based solutions inform decisions in government priority areas.

Planning highlights

Departmental Result 1: Scientific and technological knowledge advances

The NRC undertakes research to make breakthroughs in response to some of the most important challenges and areas of opportunity for Canada and the world. The NRC stays at the forefront of Canada’s current and future needs by conducting key research and advancing technologies, enabling national and global cross-sector collaborations and providing partners with the R&D capabilities needed to advance their innovations.

Combating the effects of climate change

R&D plays a critical role in driving made-in-Canada solutions to tackle the effects of climate change and meet Canada’s climate change objectives. To help create a more sustainable and environmentally friendly future, the NRC will continue to dedicate research on new technologies and approaches in a range of areas such as critical minerals, clean energy, air and marine transportation, sustainable agriculture, and plastic waste reduction and circularity.

Critical minerals are pivotal for the green energy transition. The NRC will continue to conduct R&D and deploy the technologies and materials needed to stimulate critical mineral value chains in support of Canada’s first Critical Minerals Strategy, for example, commissioning a pilot-scale battery recycling facility in Ottawa and exploring new battery chemistries that can decrease demand for rare and expensive non-renewable critical minerals.

The NRC will also conduct life-cycle assessments to provide evidence-based decision-making tools to government in key areas of clean energy, including on critical minerals supply chains, to enable certification and traceability for batteries and hydrogen production pathways. The analysis of hydrogen production pathways and gaps in codes and standards, as well as the work with stakeholders such as the Canadian Standards Association, will support the development of Canadian hydrogen codes and standards.

Hydrogen is emerging as a leading contender in the search for environmentally friendly alternatives to conventional fuels in aircraft propulsion systems. To better understand its combustion behaviour, the NRC will participate in a four-year multinational research project with leading engine manufacturers and academic institutions to develop high-fidelity models for engine design. The NRC will also publish initial results of a multi-year research collaboration with academic partners to advance new designs and structural components that will improve fuel efficiency in future aircraft.

As part of a program investigating the impacts of human behaviour and environmental factors on airborne disease transmission during air travel, the NRC will partner with the Federal Aviation Administration and the US Centers for Disease Control to conduct observational studies on passenger behaviour in various phases of travel, e.g., boarding, in-flight. Findings will be applied as a model to determine effective risk mitigation protocols, solutions and strategies.

The NRC will continue to work with Transport Canada, Memorial University and industry partners to develop marine renewable energy technologies for Canada's harsh environments and Northern communities, as well as technologies to reduce ship emissions and mitigate the effects of ship underwater-radiated noise, including work under the multi-year propeller-induced noise and vibration project.

Building on recommendations from the [2021–22 evaluation of the NRC's Aquatic and Crop Resource Development Program](#),^{iv} the NRC will continue to expand collaborative projects in sustainable agriculture and increase expertise in the use of controlled and simulated environmental technologies to accelerate and optimize crop development for harsh and changing environments, including in Northern and isolated communities. Projects on advanced genomics and analytical technologies will accelerate protein crop design, improve the quality and safety of pulse crop products, and enhance sustainable protein processing and valorization technologies.

In support of the Zero Plastics initiative announced in Budget 2022, which aims to reduce plastic waste and increase plastic circularity, the NRC will:

- Leverage its multidisciplinary R&D in chemistry, physics, biology and engineering to develop a national program on environmental sensing technologies for greenhouse gases (GHGs) in air and micro/nanoplastics in water and Canadian waterways.
- Investigate a bench-scale novel system for the conversion of landfill-diverted plastic waste to fuel using solid carbon sequestration (trapping and isolating carbon in a storage area) in

support of sustainable waste management practices and clean energy production.

- Continue to develop advanced measurement capabilities for micro/nanoplastics and create plastics reference materials to allow for standardized research on plastics across government.
- Launch experimentation to understand biodegradability and performance of emerging sustainable food packaging formulations to contribute to the circular economy.

Advancing digital technologies for smarter, more intuitive transportation systems

The transition to a low-carbon world presents opportunities for developing and enhancing new technologies to improve air, land and marine transportation.

- *Air transportation:* Building on the success of earlier prototypes, which enabled the first autonomous flight of a medium-lift helicopter in Canada, the NRC will conduct flight trials for its advanced autonomous flight technology on rotary wing aircraft. New features will then be introduced to enable autonomous flight in the presence of simulated obstacles and to detect and avoid other “co-operative” aircraft. The NRC will also deploy infrared sensors to help assess the efficacy of wildfire suppression with existing aircraft and remotely piloted aircraft systems for intelligence gathering during a wildfire. This work will inform future wildfire suppression strategies across Canada.
- *Land transportation:* In collaboration with VIA Rail, the NRC will improve rail transportation safety by evaluating the potential of unmanned aerial vehicles, satellites and vehicle-mounted systems designed to decrease the likelihood of trains colliding with vehicles at railway grade crossings. The NRC will also support regulators in evaluating new railway inspection technologies, such as machine vision tools, to replace some in-person inspections. Building on collaborative initiatives focused on the monitoring of track condition and ride quality using in-service locomotives, the NRC will also work with VIA Rail on the development and demonstration of an improved railcar fleet better adapted to Canadian weather.
- *Marine transportation:* To improve the prediction of harsh environments, such as ice conditions, in Canadian waters, the NRC will continue to develop and test novel sensors, control systems and autopilots for marine autonomous surface ships. It will also make and commission the Vertical Planar Motion Mechanism—a unique Canadian capability critical for advancing research in submersible vehicle technology to support current and future submarine fleets.

Applying emerging and disruptive technology solutions to real-world problems

The NRC will leverage its expertise in nanotechnologies, quantum technologies, big data analytics and AI-driven natural language understanding to address a range of emerging challenges. For example, the NRC will:

- Build synergies with biomedical nanotechnologies and microscopy to further bolster Canada’s impact in the emerging area of nanomedicine. This impact was previously illustrated by the NRC’s novel vaccine delivery platforms.
- Analyze ultrathin surface layers using super-resolution imaging mass spectrometry to build a 3D map of the chemical composition of samples, such as cells, which no other technique can currently do. Enhancing a fundamental understanding of cellular processes in biology will have implications for medicine and the treatment of diseases.
- Developing novel quantum imaging technologies with Canadian university partners to study fundamental aspects of coherent electronic dynamics in molecules. This work will help advance the development of next-generation artificial light harvesting—a critical green technology—and strengthen Canada’s leadership in ultrafast X-ray photonics.
- Further develop a fibre coupled single-photon source to produce a “plug-and-play” field-deployable device that targets commercialization-ready Quantum Key Distribution. This project builds on work with the Canadian Space Agency.
- Translate microfluidics-based diagnostics innovations for applications in space and commercial uptake with the Canadian Space Agency.
- Partner with international collaborators to explore how to improve 3D print fidelity and its impact on print quality.
- Collaborate with Indigenous communities and academia to develop speech generation tools for Indigenous languages to help teach and preserve their use.
- Conduct collaborative research with the Department of National Defence, Defence Research and Development Canada, and the Royal Canadian Mounted Police in the development of integrated virtual reality and stress biomonitoring for training scenarios.

The NRC is recognized internationally for its measurement research and metrological services, which benefit Canada’s society, economy and environment. The NRC will focus on initiatives such as the following:

- The first major acoustic gas thermometer measurement campaign to support the continued ability to achieve traceability to the international SI (system of units) for all NRC client thermometer calibration. The NRC built the next-generation thermometer to ensure independent Canadian realization of the redefined kelvin (unit of temperature) across a wide temperature range.
- Development of a portable optical clock, Canada’s most accurate clock and a key piece of infrastructure for international timekeeping. The clock will enable the NRC’s contribution to the international SI second redefinition campaign, which will impact all of measurement science. It will allow the NRC to realize the redefined SI second with high precision, maintain an accurate timescale for Canada, and support the development of state-of-the-art measurement capabilities and quantum standards.
- Building off an initial project on measurements of methane emissions from permafrost in the North, the NRC will expand its collaboration with the Geological Survey of Canada to

improve field-deployable methane sensors and develop temperature sensors for permafrost bore-holes.

Representing Canada on the world stage in astronomical ventures

The NRC manages ground-based observatories established or maintained by the Government of Canada for the benefit of the Canadian astronomy research community. In this ongoing role, the NRC will continue to support professional astronomers and university students, to access top observatories and participate in observatory boards to represent Canada's scientific and industrial interests, by:

- Commissioning the dish manufacturing facility at the Dominion Radio Astronomical Observatory in support of the Canadian Hydrogen Observatory and Radio-transient Detector (CHORD) project.
- Recording the first astronomical observations from the upgraded John A. Galt 26m Telescope and the upgraded 1.8m Plaskett Telescope, both located at the Dominion Astrophysical Observatory in Victoria, British Columbia.
- Delivering an initial correlator for the international Square Kilometre Array (SKA) project, which will consist of four SKA antennas, under the two-year Cooperation Agreement signed in 2021.
- Publishing the first results from the CANadian NIRISS Unbiased Cluster Survey (CANUCS)—a key science program of the James Webb Space Telescope (JWST), which studies clusters of galaxies in the distant universe. The JWST is the most complex and powerful space telescope ever built.

Leveraging collaborative platforms to foster Canada's next generation of diverse researchers

The NRC will continue to help boost the diversity of the talent pipeline for Canadian industry, academia and other Science, Technology, Engineering, and Mathematics (STEM) employers, ultimately enabling a more diverse and inclusive research landscape and improving the quality of scientific and technical outputs. Through the hiring and training of students, highly qualified personnel and early career professionals, the NRC will contribute to increasing the representation of equity deserving groups (e.g., women, Indigenous Peoples, racialized persons and persons with disabilities) in traditionally under-represented fields, such as the construction and automotive sectors, and the field of astronomy. The NRC will also leverage its STEM student programs to increase collaborative opportunities for students, post-doctoral fellows and research associates.

To inspire the next generation of researchers, the NRC will deliver its first cycle as administrator of the Killam program. The Killam Prizes uphold the vision of Dorothy Killam to build Canada's future through advanced study and the Dorothy Killam Fellowships are awarded to leading researchers whose superior, ground-breaking and transformative research will positively improve

the lives of Canadians. The program will continue to follow inclusive excellence practices and maintain equitable participation in Canada’s research mission. In 2023, the NRC will celebrate the first cohort of inspiring scholars and thought leaders through a series of communications and engagements, including the annual Killam Prize ceremony.

The NRC will continue to support collaborative research through its Collaboration Centres and Ideation Fund projects. Through these initiatives, the NRC partners with universities, SMEs and other government and research organizations to support the development of young talent by encouraging, testing and validating transformative research ideas. In 2023–24, a fifth round of projects will launch under the NRC’s two Ideation Fund Initiatives (New Beginnings and Small Teams) and refined project intake processes will be used to increase the quality of proposals and provide better expert panel feedback.

Departmental Result 2: Innovative businesses grow

The NRC supports the creation of innovation and wealth in Canada through its scientific, technical and industrial expertise. Through its advisory services, funding, R&D services and connections to Canadian SMEs, the NRC helps industry take ideas to market, build domestic capacity in priority areas and access global value chains to grow and expand to international markets. The NRC’s national funding program, NRC IRAP, helps SMEs identify business opportunities, understand innovation challenges, and access the most appropriate business and technical expertise.

Helping SMEs innovate and scale up

Regarded worldwide as one of the best programs of its kind, NRC IRAP is a cornerstone of Canada’s innovation system. It provides a wide range of technical and business advisory services and funding to SMEs to help build their innovation capacity and commercialize their ideas. NRC IRAP will continue to improve and expand its offerings by creating and refining tools to better support program delivery, exploring further use of digitalization, and advancing the Enterprise Roadmap to optimize the client journey. In particular, it will:

- Evolve its client-focused initiatives to remove growth barriers for firms led by members of equity deserving groups by providing curated support through Contribution to Organizations and Contribution to Firms funding mechanisms; developing tools to help SMEs progress on their EDI maturity journey; and amplifying recruitment activities to attract, retain and advance a more diverse workforce in an evolving innovation ecosystem.
- Refine its Large Value Contribution Framework, as recommended in the [NRC IRAP 2021–22 evaluation](#),^v which integrates robust selection criteria with an expanded approach to identify and develop value-added services that address gaps and challenges faced by SMEs during scale-up, including the economic impact of COVID-19.

- Support Employment and Social Development Canada's Youth Employment and Skills Strategy, through placing graduates within SMEs to improve their access to quality employment in their field of study, with a focus on opportunities for women in STEM and persons with disabilities.
- Increase SME awareness of the NRC IRAP Certificate Program, designed to help them access the NRC's technical and research services by connecting them to relevant R&D groups and offsetting a portion of the costs of R&D services.

The NRC also helps SMEs grow by providing technical and research services and access to its state-of-the-art facilities, including:

- Collaborating with SMEs to evaluate the effectiveness of innovative technologies to reduce airborne transmission of infectious diseases, leveraging a new facility in the NRC's Centre for Air Travel Research.
- Using purpose-built facilities designed to replicate the unsteady airflows found in urban environments to help SMEs characterize the performance of their remotely piloted aircraft systems in these unique conditions.
- Supporting SMEs in optimizing and scaling up processes for the development of bio-based products from agriculture and marine biomass through the NRC's atypical fermentation facility.
- Providing SMEs with expert advice and access to an anechoic chamber and custom-calibrated equipment, for the measurement of sound levels and distortion of acoustic signals, to demonstrate the effectiveness of products such as loudspeakers.

Intellectual Property (IP) plays a key role in research excellence and recognition of the commercial benefits of R&D efforts. NRC IRAP will continue to deliver IP Assist to SMEs to support the protection, monetization and commercialization of their IP. Leveraging IP Assist funding, NRC IRAP will continue to provide expert advisory services to enhance firms' cyber resiliency and protect shared investments from outside threats. The NRC will maintain a valuable IP portfolio to attract collaborators and protect its freedom to operate and secure competitive advantages for future users of the technology. Canadian SMEs will continue to benefit from reduced project fees, facilitating access to NRC facilities and expertise and increasing collaboration opportunities.

The NRC will enhance international relationships and networks to define key priorities to maximize opportunities for Canadian companies and help them grow, scale up and become more globally competitive through co-innovation. With full membership in Eureka—the largest public network for international cooperation in R&D and innovation—as of June 2022, Canada is in a favourable position to play a more significant leadership role in the network, drive future programming that benefits Canadian industry, and invite non-member countries to collaborate through the platform. Acting as Canada's national office, the NRC will work with government stakeholders, including Global Affairs Canada, Industry Science and Economic Development

Canada, and Innovation Canada, to define key priorities for international growth of Canadian SMEs through Eureka.

The NRC will also continue its delivery of joint programming with Global Affairs Canada, including calls for proposals and partnership development activities to facilitate Canadian SME access to complementary expertise, facilities and market access.

Supporting industry adoption of sustainable and low-carbon technologies

The NRC facilitates sustainable economic development and climate-resilient infrastructure by supporting Canadian SMEs in projects aimed at moving towards a low-carbon construction sector, clean and renewable energy, and smarter, sustainable transportation. Specifically, the NRC will:

- Develop a Centre of Excellence in Construction Life-Cycle Assessment to support industry development of low-carbon materials and solutions and help other government departments (OGDs) to create construction sector policies that involve life-cycle carbon.
- Develop and launch projects to advance digitalized construction tools to spur innovation and reduce construction costs, driving towards increased productivity in the sector.
- Conduct performance and safety evaluations of new batteries and battery innovations for SMEs through the Advanced Clean Energy Program.
- Support two Canadian firms with testing and validating natural graphite and moving new anode materials suitable for mobile applications towards commercialization, while ensuring green sources of materials for batteries.
- Expand licensing activities to Canadian SMEs for mining-related sensing technologies to make mineral processing more sustainable.
- Mobilize NRC subject matter experts through collaborative projects under the Strategic Innovation Fund to support industry partners in deploying propulsion electrification technology within their product offerings or across their operational fleets.
- Use national NRC facilities to evaluate new Canadian bus manufacturer designs through advanced aerodynamics testing for energy efficiency and climatic resiliency in extreme weather conditions.

Increasing health sector and biomanufacturing capacity and innovation

Throughout the pandemic, NRC IRAP's collaboration with Innovative Solutions Canada, Health Canada, Public Health Agency of Canada, Environment and Climate Change Canada, and Public Services and Procurement Canada (PSPC) was key in helping Canadian SMEs develop innovative solutions in response to COVID-19. NRC IRAP will continue to provide its support for innovative SMEs to bring novel technologies related to COVID-19 to market.

In addition to NRC IRAP's collaborative ongoing pandemic response, the NRC will continue to provide its unparalleled range of R&D services and expertise to SMEs developing health

technologies, biologics and therapeutics pivotal to Canada’s growing health sector. The NRC will strengthen connections with SMEs through translation projects in diagnostics and digital therapeutics, advance the development of its HEK293SF-3F6 platform to create scalable processes for viral vector production, and advance the development of the its CHO2353 platform to create a robust and rapid system to support the production of SARS-CoV2 antigens and achieve technology transfer for Good Manufacturing Practice (GMP) production in anticipation of use in Phase I and II clinical studies with industry partners. The NRC will also develop its proprietary adjuvant technology to enable licensing to partners, advance a number of biologics towards clinical studies with industry partners, validate methods for engineered cell therapy approaches, and complete the construction and operationalization of the Clinical Trial Material Facility (CTMF) through engagement with its first client.

Spotlight on the Biologics Manufacturing Centre

In 2023–24, the NRC will complete the operationalization of the Biologics Manufacturing Centre (BMC) to deliver end-to-end manufacturing, including production, purification and fill and finish of biopharmaceuticals, such as vaccines, from cell-based biologics production (e.g., viral vector, protein subunit, virus-like particle base). The BMC will also complete the technology transfer of a COVID-19 vaccine for its first client in preparation for commercial production, implement a not-for-profit governance model, and initiate the transition of its operations under the new not-for-profit organization. As a result, the NRC’s long-term role will be to provide effective oversight of the contribution and lease agreements between the new entity and the NRC, and to ensure the realization of the BMC’s objectives.

Enabling the photonic, electronic and semiconductor industries to commercialize innovations

The NRC’s Canadian Photonics Fabrication Centre (CPFC) provides advanced engineering and manufacturing services, commercial-grade prototyping and pilot-run production facilities to allow the Canadian photonics industry to take innovations from concept to market—work that is crucial to Canada’s supply of electronics and photonics chips. Using the CPFC, the NRC will continue to build on world-competitive strengths in academic research, prototyping and systems integration to help the industry carry out R&D in photonic and electronic components for sensing and semiconductor component fabrication processes to address societal needs in defence, safety and security, health and environmental monitoring.

In particular, the NRC will continue to modernize its fabrication facilities, including the CPFC and Advanced Technology Fabrication facility, to help address critical supply chain vulnerabilities and enable the NRC to maintain a strong position in the quantum and semiconductor photonics sectors. To further optimize its contribution to businesses, the CPFC will also become a separate business unit within the NRC.

Based on a recommendation in its [2021–22 evaluation](#),^{vi} the NRC’s Nanotechnology Program will further engage with industry to increase the number of client agreements for collaborative research projects and access to NRC facilities and equipment. The NRC will transform its nanotechnology cleanroom into an industry-focused space to help serve Canada’s growing semiconductor industry by providing a private, secure location for companies to bring in the specialized equipment needed to take their technologies to market.

Departmental Result 3: Evidence-based solutions inform decisions in government priority areas

Collaboration with key federal and industrial partners, combined with testing of new approaches to strengthen research and technology development, allows the NRC to stay at the forefront of innovative solutions to everyday problems and areas of high importance for Canadians. Working with partners across the country, the NRC plays an important role in breakthroughs that will help address Canada’s greatest challenges and capitalize on emerging opportunities.

Leading collaborations to drive scientific breakthroughs in Canada’s priority areas

The NRC’s Challenge programs enable domestic and international collaboration by bringing together researchers, facilities and academic and industry partners to advance transformative research in priority areas for Canadians. These include Arctic and Northern issues, Aging in Place, AI for Design, Applied Quantum Computing, Disruptive Technology Solutions for Cell and Gene Therapy, High-Throughput and Secure Networks, the Internet of Things: Quantum Sensors, and Materials for Clean Fuels.

Plans for the Challenge programs in 2023–24 include the following:

- *Disruptive Technology Solutions for Cell and Gene Therapy*: The program will advance a made-in-Canada chimeric antigen receptor T-cell product to clinical trials and develop a scaled-up biomanufacturing process to enable new therapeutic candidates for improved health outcomes. Other plans include collaborating with OGDs to support the development of policies to improve the rare disease innovation ecosystem.
- *Applied Quantum Computing*: After completing its researcher hiring campaign, the program will build relationships with collaborators and launch its first wave of projects. The program will continue to align with the National Quantum Strategy to amplify Canada's significant strength in quantum research; grow the country’s quantum-ready technologies, firms and talent; and solidify Canada's global leadership.
- *Internet of Things: Quantum Sensors*: In response to a second round of funding announced in Budget 2021 and in line with the direction of the National Quantum Strategy, the program will launch a new phase of projects requiring the inclusion of a Canadian SME among the collaborators. As a first step, projects will be selected from a

2022–23 Canada-UK collaborative industrial research and development call for proposals.

- *Materials for Clean Fuels*: Collaborative research projects selected in the second call for proposals for the Materials for Clean Fuels Challenge program will support the discovery of advanced materials necessary for CO₂ conversion systems using Materials Acceleration Platforms. In partnership with OGDs, the NRC will develop a life-cycle and techno economic assessment framework and associated tools pertaining to new CO₂ conversion pathways to provide evidence-based decision-making tools for government in clean energy. The NRC will create collaborative research projects on CO₂ conversion involving Canadian SMEs to foster innovation and sustainable industrialization for more resilient infrastructure.

In support of the Government of Canada’s five Global Innovation Clusters, the NRC developed its Cluster Support programs to bring together its national network of researchers and facilities with collaborators from industry, academia and government to work on important scientific discoveries and technological breakthroughs. The NRC’s Advanced Manufacturing, AI for Logistics, Digital Health and Geospatial Analytics, Ocean, and Sustainable Protein Production programs will continue to advance projects and program objectives in key areas of importance for Canada.

Cluster Support Program Spotlight: Advanced Manufacturing

The NRC’s Advanced Manufacturing program will contribute to achieving Canada’s climate change-related targets through initiatives funded by Natural Resources Canada, such as the transition to zero-emission vehicles and light-weighting of ground transportation vehicles to help reduce fuel consumption. The program will launch new strategic initiatives in transportation vehicle manufacturing to create smarter, more complex, functional high-value products through advanced materials, processes and digitalization of manufacturing. The program will aim to increase environmental sustainability in NRC-led industrial R&D groups, METALtec, Surftec and SIGBLOW. SIGBLOW will help develop tank manufacturing methods for hydrogen as an alternative fuel. The NRC will launch a new industrial R&D group, STAMP Hybrid, to develop a cost-effective, one-step process for the fabrication of metal/thermoplastic composite hybrid components.

Developing more resilient infrastructure through collaboration

In Budget 2022, the Government of Canada tasked the NRC with conducting R&D on innovative construction materials and revitalizing national housing and building standards to encourage low-carbon construction solutions. In response, the NRC will leverage its research expertise in collaborations to advance designs and decision-making for the development of resilient infrastructure that addresses the impacts of climate change.

Research projects will be launched under the NRC Platform to Decarbonize Canada’s Construction Sector to reduce the carbon footprint of key structural materials and use innovative

components as alternatives for high embodied carbon materials with the aim of reducing the environmental footprint of buildings and infrastructure. The NRC will also initiate the development of guidelines for low-carbon federally funded projects for buildings and infrastructure.

The NRC will lead policy discussions with the provinces and territories to define the role of the National Model Codes in addressing durability and extreme weather events such as flooding, wildfire and extreme wind. It will also make future climate data available to the National Model Codes development system to enable building design for future climates.

The NRC will support innovative companies in the marine and coastal sectors by developing resilient infrastructure designs and decision-making tools to evaluate and forecast flooding risk and impact. Work in this area will include evaluating flood barriers to accelerate the development and certification of solutions and initiating a project to test and scale up natural infrastructure solutions.

Within the framework of an NRC-United Kingdom collaboration, the NRC will continue to work with Transport Canada to complete the Brigital project, including market access of a world-first decision-supporting tool for bridge monitoring and early detection of bridge displacement based on satellite imaging technology. Also in collaboration with Transport Canada, the NRC will investigate properties of non-volatile particulate matter (nvPM) emissions from aircraft engines. The NRC will lead measurement experiments for civil aviation gas turbine engine emissions to characterize nvPM emissions from conventional and sustainable aviation fuel combustion, support the nvPM mass instruments, and work with international teams to improve the reliability and consistency of nvPM measurements.

With support from the Greening Government Fund, the NRC will help reduce GHG emissions from government-owned aircraft by assessing retrofit solutions, such as propulsion electrification and low-drag coatings for external surfaces. The outcome of these assessments will inform planning within the Department of National Defence and Transport Canada for emissions reductions. The NRC will leverage its vehicle life-cycle analysis tool to help PSPC procure zero-emission fleets and help Natural Resources Canada provide public visibility on life-cycle emissions of different vehicle types. In addition, the NRC will help develop codes and standards for Hydrail (Hydrogen Fuel Cell Powered Rail) in collaboration with Transport Canada, University of British Columbia and Canadian Space Agency.

Gender-Based Analysis Plus (GBA Plus)

Diverse groups of people experience policies, programs and initiatives differently. GBA Plus is an analytical tool used to support the development of responsive and inclusive policies, programs and other initiatives. It involves intersectional analysis that considers many other factors in addition to sex and gender differences. Aligned with the Government of Canada's renewed commitment to GBA Plus, the NRC will further integrate GBA Plus into existing organizational

planning and program design, develop plans for data collection, and monitor and adopt a GBA Plus lens for evaluation activities key to measuring outcomes and impact, as well as informing further areas for continuous improvement. To ensure all populations, including diverse groups, can access its programming, the NRC will:

- Continue to factor GBA Plus considerations into the design of Collaborative Science, Technology and Innovation Program initiatives, project proposals and evaluations, and to collect EDI and GBA Plus data.
- Continue to develop and deliver NRC IRAP programs with an Inclusion, Diversity, Equity, and Accessibility (IDEA) lens to make them accessible to all innovative, growth-oriented SMEs, foster growth by enabling firms to develop plans for the adoption of EDI principles, promote the value of an inclusive culture both within the program and for firms, and fully represent the Canadian landscape. In response to a recommendation from [its 2021–22 evaluation](#),^v NRC IRAP will enhance the integration of GBA Plus considerations into all aspects of the program.
- Increase awareness of accessibility requirements for external and internal communications products and activities to ensure equitable access to all populations, including equity deserving group members such as persons with visual impairment.

The NRC is committed to building relationships with Indigenous researchers, innovators and communities to bridge Western and Indigenous knowledge systems to create new knowledge that can help Canada address the critical issues of our time.

Aligned with the Truth and Reconciliation Commission Calls to Action, the NRC will continue to build intercultural competency as a first step towards long-term relationships with First Nation, Inuit and Métis peoples. The NRC’s Indigenous Engagement Network, the key mobilizing body for this work, continues to grow in membership and prominence. The network will support the Indigenous Engagement Strategy and reconciliation with First Nations, Inuit and Métis rights holders.

United Nations’ 2030 Agenda for Sustainable Development and the UN Sustainable Development Goals (SDGs)

In 2023–24, the NRC will develop a new three-year [Departmental Sustainable Development Strategy \(DSDS\)](#).^{vii} The strategy will outline how the NRC will contribute to several long-term goals identified in the [Federal Sustainable Development Strategy](#)^{viii} and the UN SDGs. It will draw upon activities across the organization, including efforts in NRC labs and facilities, collaborations with OGDs, and fee-for-service research with industry partners. Planned activities for the coming year that will help the NRC contribute to UN SDGs include the following:

- **SDG 7: Ensure access to affordable, reliable, sustainable and modern energy:**^{ix} The NRC will help decrease diesel use in the North by commissioning and deploying a modified diesel genset¹ to allow for fuel-switching to biogas at the Canadian High Arctic Research Station.
- **SDG 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation:**^x NRC researchers will enhance the resilience of Canada's infrastructure to climate change and extreme weather events by partnering with experts and stakeholders across Canada to develop guidance for resilient dams and use nature-based solutions to mitigate the impact of heat waves (urban heat islanding) and urban flooding; continue to support uptake of climate change adaptation considerations in Canada's National Codes, including the Canadian Highway Bridge Design Code and the National Model Codes; and develop a new Canadian standard for wildland urban interface design.
- **SDG 11: Make cities inclusive, safe, resilient and sustainable:**^{xi} The NRC will advance the National Guide for Wildland Urban Interface (WUI) Fires to a standard for the design of WUI; map the WUI hazards; and develop climate-based design indices for buildings, including anticipated impacts of climate change.
- **SDG 12: Ensure sustainable consumption and production patterns:**^{xii} In collaboration with industry and OGDs, the NRC will develop guides, standards, data and decision support tools foundational to a low-carbon construction sector. These efforts will support government policy on green procurement and make federally developed materials and tools, particularly high-emission construction materials, available to private-sector early adopters.
- **SDG 13: Take urgent action to combat climate change and its impacts:**^{xiii} The NRC will continue to lower GHG emissions through completion of carbon-neutral plans for its Montreal Road South campus and Royalmount and Saskatoon facilities, management of electrical demand of loads for two NRC Ottawa campuses, and the building recommissioning program.

Innovation (formerly named Experimentation)

The Government of Canada has a long history of innovative policy-making informed by evidence. A key government priority is strengthening the culture of innovation by creating and maintaining a strong link between problem-solving, evidence generation and management decision-making. Rigorously testing innovations in real-world settings ensures departments continue to achieve value for money, while improving social, environmental and economic outcomes for Canadians and public servants.

To support this departmental practice of testing new approaches and methods for continual improvement by addressing significant problems and finding solutions with the potential for high impact, the NRC will:

¹ Genset: A genset is a combination of a prime mover (typically an engine) and an alternator; typically. A diesel genset is a combination of a diesel engine and an electric generator.

- Support the digital transformation of metrological services, including designing an e-commerce platform and metrological information databases to meet the diverse and unique needs of these services. This work will prepare Canada's measurement system for adopting mature digital standards and services.
- Continue to test and develop new links for NRC IRAP clients through an ongoing partnership with the Business Development Bank of Canada (BDC). NRC IRAP will support the BDC in sharing its programming with clients beyond the Ontario pilot and build on efforts to extend the reach of BDC/NRC IRAP interactions nationally.

Key risks

The NRC is exposed to a range of internal and external factors that may impact its ability to achieve results in support of its core responsibility. Internally, the NRC faces hazard and operational risks with the potential to disrupt business activities, such as damage to its buildings and research facilities, personal injury, liability claims, cybersecurity breaches, process or system failures, and infrastructure breakdowns. Externally, the NRC is subject to systemic risks that create uncertainty for the research it conducts and the businesses it supports. These risks include fluctuating GDP (gross domestic product), inflation, international relations and trade flows, commodity prices, pandemics and other health crises, regulatory changes and climate change. In most cases, the NRC has controls in place to mitigate these risks—either by reducing their likelihood or limiting their impact on the organization.

In 2023–24, the NRC will focus its attention on key risks driven by slowing economic conditions, increasing security threats, intensifying competition for STEM talent and aging critical infrastructure. The NRC will work to mitigate the risks of inflation and recession through continuous financial forecasting and planning and regular financial reporting through its governance mechanisms. It will mitigate the risks of a cyberattack and data/privacy breach through continued efforts to secure information assets in its Legacy network and increase employee awareness of potential cyber threats and how to avoid them. To mitigate the risk of a talent shortage, the NRC will implement its new Talent Attraction Strategy and employer value proposition. The risk of operating inadequate facilities and equipment will be mitigated by proceeding with several capital revitalization projects identified in the NRC's Facilities Renewal Plan led by the new Office of Facilities Renewal Management.

Planned results for Science and Innovation

The following table shows, for Science and Innovation, the planned results, the result indicators, the targets and the target dates for 2023–24, and the actual results for the three most recent fiscal years for which actual results are available.

Departmental Result	Performance Result Indicator	Targets ²	Date to achieve target	2019–20 Actual results	2020–21 Actual results	2021–22 Actual results
Scientific and technological knowledge advances	Citation score of NRC-generated publications relative to the world average	1.25	March 31, 2024	1.38	1.38	1.21
	Number of peer-reviewed publications generated by the NRC	1,050		1,003	1,090	1,187
	Number of patents issued to the NRC	90		173	118	99
	Number of licence agreements	35		37	54	30
	Ratio of the NRC's workforce made up of equity deserving groups relative to Canadian average labour market availability ³	Women		1.00	1.02	1.03
		Indigenous Peoples		0.90	0.93	0.94
		Racialized persons		0.50	0.52	0.60
		Persons with disabilities		0.40	0.43	0.45
Innovative businesses grow	Percentage of R&D clients who report positive benefits of working with the NRC	90%		92%	87%	93%
	Percentage revenue growth of firms engaged with the NRC (NRC IRAP-engaged firms) ⁴	20%		31%	32%	32%
	Percentage growth in Canada's science and technology related jobs through NRC supported firms (NRC IRAP-engaged firms) ⁴	10%		20%	20%	18%
	Revenue earned from clients and collaborators	\$80.0M		\$88.5M	\$65.1M	\$86.2M
Evidence-based solutions inform decisions in government priority areas	Revenue earned from other federal government departments	\$80.0M		\$77.7M	\$76.4M	\$79.6M
	Number of NRC peer-reviewed publications co-authored with other federal government departments	60		51	62	83

The financial, human resources and performance information for the NRC's program inventory is available on [GC InfoBase](#).^{xiv}

² Targets included in the table were set in 2022.

³ Indicator previously reported by the NRC focused on the workforce representation of women in STEM up to fiscal year-end 2022–23. However, results for representation from other equity deserving groups in STEM were reported through the Departmental Results Report footnotes. Results based on 2016 census data.

⁴ Measured over a period of two calendar years and lagging by two years.

Planned budgetary spending for Science and Innovation

The following table shows, for Science and Innovation, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

2023–24 budgetary spending (as indicated in Main Estimates)	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
1,388,919,204	1,388,919,204	1,305,366,917	1,254,606,712

Financial, human resources and performance information for the NRC’s program inventory is available on [GC InfoBase](#).^{xivxiv}

Planned human resources for Science and Innovation

The following table shows, in full-time equivalents, the human resources the department will need to fulfill this core responsibility for 2023–24 and for each of the next two fiscal years.

2023–24 planned full-time equivalents	2024–25 planned full-time equivalents	2025–26 planned full-time equivalents
3,302.8	3,315.8	3,322.8

Financial, human resources and performance information for the NRC’s program inventory is available on [GC InfoBase](#).^{xiv}

Internal Services: planned results

Description

Internal services are the services that are provided within a department so that it can meet its corporate obligations and deliver its programs. There are 10 categories of internal services:

- ▶ management and oversight
- ▶ communications
- ▶ legal
- ▶ human resources (HR) management
- ▶ financial management
- ▶ information management (IM)
- ▶ information technology (IT)
- ▶ real property management
- ▶ material management
- ▶ acquisition management

Planning highlights

The NRC's internal services provide the support, structure and tools required for employees to develop their skills, excel in their work and achieve organizational objectives effectively in a safe, respectful and equitable environment.

Following an in-depth review, the NRC's HR branch will launch a renewal of its program and service offerings to better enable the organization to achieve its strategic and operational objectives and truly be an employer of choice. By improving its HR offerings, the NRC will be able to continue putting HR strategies into action in 2023–24 to promote employee well-being and mental health, EDI, and talent attraction and development.

- In tandem with its strategic planning process, the NRC will develop a new Strategic HR Plan to support the attraction, development and retention of a talented and diverse workforce and maintain a healthy, respectful and inclusive workplace. To complement efforts included in the Strategic HR Plan's talent attraction theme, the NRC will implement a new Talent Attraction Strategy and build capacity in talent outreach through increased partnerships to better reach the talent pipeline, enhanced presence at key events and promotion of the employer value proposition.
- The NRC will support talent management and enhance leadership capacity across the organization by strengthening its processes for workforce and succession planning, supporting the identification and development of high potential employees, and equipping supervisors in key HR management areas such as effective team leadership, labour relations, EDI and official languages. As a result of its Review of Retirement Options for Continued Engagement, the NRC will continue to raise awareness and increase participation in

retirement options, use workforce planning tools to ensure that retirement options are considered, and discuss retirement options in retirement courses.

- Under the NRC’s five-year Strategic HR Plan ending March 2023, the NRC will continue to implement its Workforce and Workplace EDI Strategy to help increase representation of equity deserving group members, implement a management sponsorship program for racialized persons and Indigenous Peoples, deliver on the NRC Accessibility Strategy developed in 2022–23, and enhance measurement capacity to drive EDI programming and monitor progress. The NRC will also conduct an employment systems review to inform a refreshed EDI strategy and lead the consultative process for the development of its pay equity plan.
- The NRC will continue to implement its Wellness Strategy including wellness and mental health training, events, tools and resources; engagement of the Wellness Ambassador Network to promote wellness initiatives across the organization; and continued monitoring and reporting on wellness performance indicators and programming.

Building on past successes such as the roll-out of the NRC’s Conflict of Interest program, the organization will continue to ensure that staff feel safe to address issues in the workplace, such as conflicts and harassment. It will do so by continuing to deliver conflict resolution services to employees and managers; raising systemic issues that the organization should address; and offering tools and training in support of the *Public Servants Disclosure Protection Act* and several NRC codes and policies including the Code of Conduct, Workplace Harassment and Violence Prevention and Resolution, Research Ethics and Integrity, and Conflict of Interest.

In 2023–24, the NRC will continue to modernize its services and systems to equip staff to work in an evolving IT environment. Specifically, the NRC will:

- Continue to play a leadership role in convening the Chief Information Officer community of science-based departments and agencies for a co-ordinated and collective approach to identifying and addressing digital requirements for researchers.
- Lead three projects, working with PSPC’s Labs Canada, to evaluate outcomes from innovative approach pilots for modernized IM/IT science solutions.
- Build on best practices by leveraging existing tools and strengthening client relationships to lay the groundwork for a mature service management approach to internal IM/IT delivery.
- Continue to leverage cloud environments as a potential source of storage and compute solutions in support of digital research requirements, and leverage cloud-based software solutions to modernize the NRC’s corporate application landscape. In addition, investments in talent, technology and more efficiently structured processes will help increase the NRC’s cybersecurity capabilities.

In the evolution to a digital workspace, security and IT must work hand-in-hand. In 2023–24, the NRC will increase its security awareness programs, including the integration of required IT infrastructure and the transition to a fully digitized security screening process. Specific plans

include the creation of a robust Cyber Security Awareness Training and Education program for employees with elevated network privileges; delivery of a security module tailored to the specific security roles and responsibilities of NRC managers, including identification, reporting and management of security events; and enhanced Open Source Intelligence capability to support due diligence processes prior to major contract awards and the signing of contribution agreements.

Using digital communications tools such as social media channels and its external website, the NRC will continue to increase awareness of how its research programs and NRC IRAP support key government priorities, including health innovation and biomanufacturing, the ongoing COVID-19 pandemic response, advancement of quantum and digital sciences, and climate change and sustainability. A major communications strategy for 2023–24 will be the modernization of the NRC and the reinvigoration of its advanced research and development that supports Canada's science, technology and innovation ecosystem.

Following the Government of Canada's announcement in November 2022 of an investment of \$962.2M over eight years and \$121.1M ongoing to renew the NRC's facilities and real property, the NRC's new Office of Facilities Renewal Management (OFRM) will lead the prioritization of future NRC facility recapitalization projects and work with programs and branches through the 2024-2029 strategic planning process to identify transformative facility investments that will advance the NRC's digitalization of research ambitions.

Building on the creation of the OFRM, the NRC will continue to implement recommendations identified in the 2020 audit of its real property management. These include developing a strategy to expand real property information management capacity by addressing critical gaps and existing data quality challenges and continuing to ensure sound stewardship in the management of the NRC's real property portfolio through updates to building condition assessments, functionality assessments and integration of facilities review findings into portfolio planning.

Planning for Contracts Awarded to Indigenous Businesses

The NRC's target is to award a minimum of three percent of the total value of its contracts to Indigenous businesses by the end of 2023–24. This is part of Phase three onboarding for the Government of Canada Indigenous Procurement Strategy to award a minimum of five percent of the total value of contracts to Indigenous businesses by March 31, 2025. The NRC will leverage the enhanced tools developed by PSPC such as supply arrangements and standing offers with Indigenous organizations. It will also leverage information shared and OGD best practices through the Treasury Board Secretariat Senior Designated Officials for Procurement community and the Chief Procurement Officer Council.

Goods:

- The opportunity for goods is mainly for computer hardware where set-asides can be requested from Shared Services Canada for Indigenous vendors, for goods such as furniture

where there are Indigenous vendors and standing offers established by PSPC.

- The main challenge for the NRC, a primary purchaser of scientific equipment and supplies, is that there are no known sources of Indigenous vendors in the scientific equipment category.

Construction:

- There is an opportunity for Indigenous participation in construction contracting, which can be incorporated under four categories as part of the Indigenous Participation Plan: 1) Subcontracting, 2) Skills Development, 3) Human Resources and 4) Innovative Approaches and other measures. PSPC is using this format, which the NRC can implement as mandatory, for large construction projects.

Services:

- There is an opportunity for services in the categories of professional services, temporary help services and translation services.
- The main challenge is that most services that the NRC requires are related to specialized needs that only a handful of vendors can provide.

5% reporting field description	2021-22 actual % achieved	2022-23 forecasted % target	2023-24 planned % target
Total percentage of contracts with Indigenous businesses	2.5%	3%	3%

Planned budgetary spending for internal services

The following table shows, for internal services, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

2023–24 budgetary spending (as indicated in Main Estimates)	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
159,510,996	159,510,996	163,909,564	163,656,234

Planned human resources for internal services

The following table shows, in fulltime equivalents, the human resources the department will need to carry out its internal services for 2023–24 and for each of the next two fiscal years.

2023–24 planned full-time equivalents	2024–25 planned full-time equivalents	2025–26 planned full-time equivalents
1,007.6	1,007.6	1,007.6

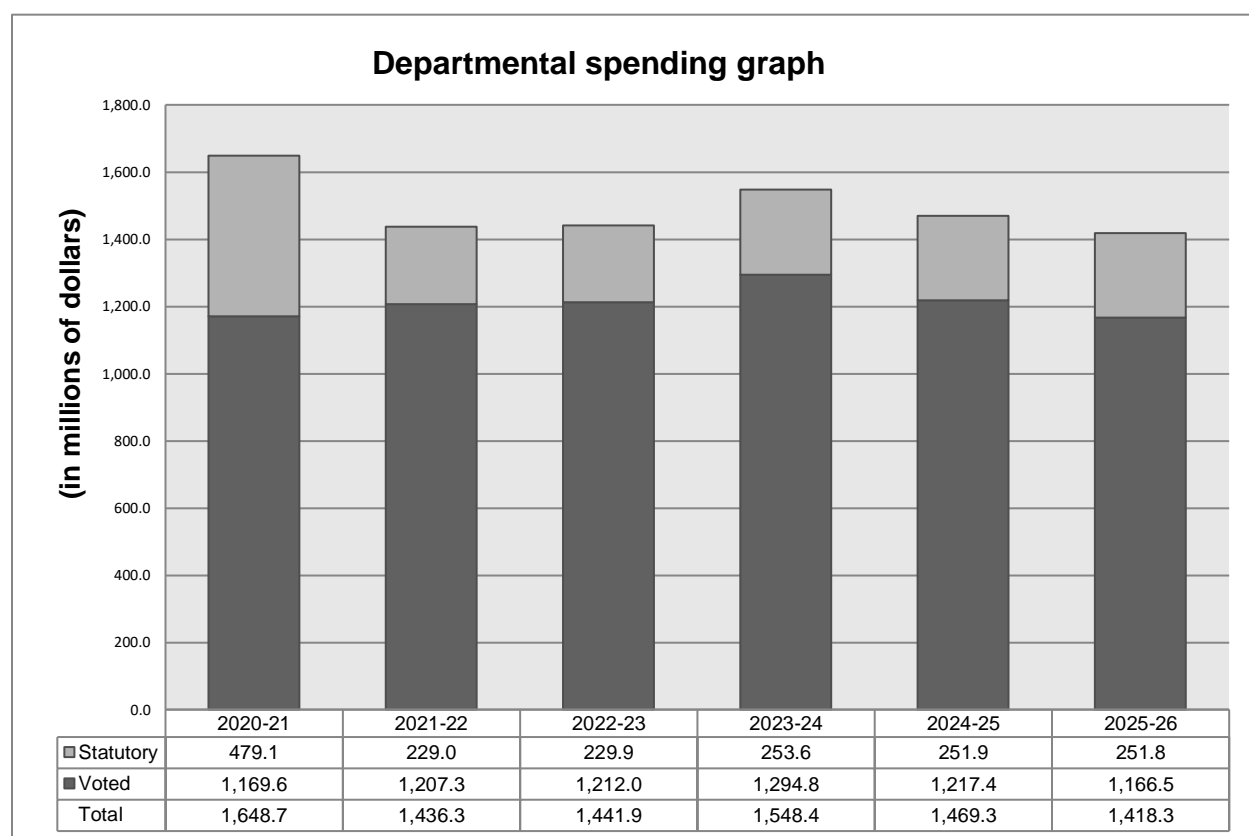
Planned spending and human resources

This section provides an overview of the department’s planned spending and human resources for the next three fiscal years and compares planned spending for 2023–24 with actual spending for the current year and the previous year.

Planned spending

Departmental spending 2020–21 to 2025–26

The following graph presents planned spending (voted and statutory expenditures) over time.



2022–23 forecast spending of \$1,441.9M represents an increase of \$5.6M compared to 2021–22 (\$1,436.3M). The increase in total planned spending in 2023–24 and 2024–25 is due to new funding for R&D infrastructure and decarbonisation of construction, offset by sunsetting funding. The decrease in 2025–26 is also due to sunsetting funding.

The following table summarizes the primary year-over year funding variances contributing to changes in planned spending for each fiscal year.

<i>(in millions of dollars)</i>			
Items	2023–24	2024–25	2025–26
Total Planned Spending	1,548.4	1,469.3	1,418.3
Variance over prior year	106.5	(79.1)	(51.0)
Primary Funding Variances			
R&D Infrastructure	71.7	49.3	24.7
Decarbonisation of Construction Sector	25.2	4.1	2.6
NRC IRAP Grants & Contributions	(32.6)	(58.1)	(17.3)
TRIUMF	(0.8)	(2.7)	(38.8)
Total Funding Variance	72.4	(75.6)	(50.6)

Budgetary planning summary for core responsibility and internal services (dollars)

The following table shows information on spending for the NRC’s core responsibility and for its internal services for 2023–24 and other relevant fiscal years.

Core responsibility and Internal Services	2020–21 actual expenditures	2021–22 actual expenditures	2022–23 forecast spending	2023–24 budgetary spending (as indicated in Main Estimates)	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Science and Innovation	1,503,588,404	1,285,688,819	1,291,387,884	1,388,919,204	1,388,919,204	1,305,366,917	1,254,606,712
Internal Services	145,066,909	150,620,495	150,524,867	159,510,996	159,510,996	163,909,564	163,656,234
Total	1,648,655,313	1,436,309,314	1,441,912,751	1,548,430,200	1,548,430,200	1,469,276,481	1,418,262,946

The increase in total planned spending in 2023–24 and 2024–25 is due to new funding for R&D infrastructure and decarbonisation of construction, offset by sunseting funding. The decrease in 2025–26 is also due to sunseting funding.

Planned human resources

The following table shows information on human resources, in full-time equivalents (FTEs), for the NRC’s core responsibility and for its internal services for 2023–24 and the other relevant years.

Human resources planning summary for core responsibility and internal services

Core responsibility and Internal Services	2020–21 actual fulltime equivalents	2021–22 actual fulltime equivalents	2022–23 forecast fulltime equivalents	2023–24 planned fulltime equivalents	2024–25 planned fulltime equivalents	2025–26 planned fulltime equivalents
Science and Innovation	3,270.3	3,307.7	3,297.8	3,302.8	3,315.8	3,322.8
Internal Services	991.0	978.2	967.6	1,007.6	1,007.6	1,007.6
Total	4,261.3	4,285.9	4,265.4	4,310.4	4,323.4	4,330.4

The NRC's forecast FTEs of 4,265.4 in 2022–23 is expected to increase slightly over the following three years. These increases are primarily due to new FTEs being hired as part of the Decarbonisation of Construction initiative, as well as new funding for investing in the NRC’s R&D infrastructure.

Estimates by vote

Information on the NRC’s organizational appropriations is available in the [2023–24 Main Estimates](#).^{xv}

Future-oriented condensed statement of operations

The future-oriented condensed statement of operations provides an overview of the NRC’s operations for 2022–23 to 2023–24.

The forecast and planned amounts in this statement of operations were prepared on an accrual basis. The forecast and planned amounts presented in other sections of the Departmental Plan were prepared on an expenditure basis. Amounts may therefore differ.

A more detailed future-oriented statement of operations and associated notes, including a reconciliation of the net cost of operations with the requested authorities, are available on the [National Research Council website’s Financial and Performance Reporting page](#).^{xvi}

Future-oriented condensed statement of operations for the year ending
March 31, 2024 (dollars)

Financial information	2022–23 forecast results	2023–24 planned results	Difference (2023–24 planned results minus 2022–23 forecast results)
Total expenses	1,465,202,000	1,557,149,000	91,947,000
Total revenues	179,559,000	184,369,000	4,810,000
Net cost of operations before government funding and transfers	1,285,643,000	1,372,780,000	87,137,000

The NRC's 2023–24 planned expenses and revenues are based on the Annual Reference Level Update (ARLU). They include the NRC's portion of the expenses accounts of the Canada-France-Hawaii Telescope Corporation (CFHT) (\$1.1M) and TMT International Observatory LLC (TIO) (\$3.9M). Revenues are composed of research services (\$75M), technical services (\$87.7M), intellectual property, royalties and fees (\$6.7M), sale of goods and information products (\$3.3M), rentals (\$7.9M), grants & contribution (\$1.5M). Also included is \$2.4M of accrued adjustments mainly from lease inducement (\$2.1M).

The 2022–23 forecast includes funding related to COVID-19 initiatives. This includes \$66.2M in grants and contributions, \$25.3M in operating expenditures and \$36.0M in capital expenditures. Grants and contributions is composed of \$57.5M for Vaccine Therapeutics and \$8.7M for Innovative Solutions Canada. Operating expenditures include \$22.2M for the BMC, \$1.6M for the CTMF and \$1.5M for the Pandemic Response Challenge program. Capital expenditures include \$26.7M for the CTMF and \$9.3M for the BMC.

Corporate information

Organizational profile

Appropriate minister: The Honourable François-Philippe Champagne, P.C., M.P., Minister of Innovation, Science and Industry

Institutional head: Iain Stewart, President

Ministerial portfolio: Innovation, Science and Economic Development

Enabling instrument(s): *National Research Council Act*,^{xvii} R.S.C. 1985, c. N-15

Year of incorporation / commencement: 1916

Other: The NRC is a departmental corporation of the Government of Canada, reporting to Parliament through the Minister of Innovation, Science and Industry. The NRC works in partnership with members of the Innovation, Science and Economic Development Portfolio to leverage complementary resources to promote science and research and integrated innovation, to exploit synergies in key areas of science and technology, to promote the growth of small and medium-sized enterprises and to contribute to Canadian economic growth. The NRC's Council provides independent strategic advice to the NRC President and it reviews organizational performance. The President provides leadership and strategic management and is responsible for the achievement of the NRC's long-range goals and plans in alignment with government priorities. Each of the NRC's Vice-Presidents is responsible for a number of areas composed of programs and research initiatives, research centres, the NRC Industrial Research Assistance Program and/or a corporate branch. Vice-Presidents and NRC managers are responsible for executing plans and priorities to ensure successful achievement of objectives.

Raison d'être, mandate and role: who we are and what we do

Information on National Research Council's raison d'être, mandate and role is available on the [NRC website's Corporate page](#).^{xviii}

Information on National Research Council's mandate letter commitments is available in [Minister's mandate letter](#).ⁱ

Operating context

Information on the operating context is available on the [NRC website's Financial and Performance Reporting page](#).^{xvi}

Reporting framework

The NRC's approved departmental results framework and program inventory for 2023–24 are as follows.

Core Responsibility: Science and Innovation			Departmental Results Framework	Internal Services
Departmental Result: Scientific and technological knowledge advances	I1. Citation score of NRC-generated publications relative to the world average			
	I2. Number of peer-reviewed publications generated by the NRC			
	I3. Number of patents issued to the NRC			
	I4. Number of licence agreements			
	I5. Ratio of the NRC's workforce made up of 1) women 2) Indigenous Peoples 3) racialized persons 4) persons with disabilities relative to Canadian average labour market availability			
Departmental Result: Innovative businesses grow	I6. Percentage of R&D clients who report positive benefits of working with the NRC			
	I7. Percentage revenue growth of firms engaged with the NRC (IRAP-engaged firms)			
	I8. Percentage growth in Canada's science and technology related jobs through NRC supported firms (IRAP-engaged firms)			
	I9. Revenue earned from clients and collaborators			
Departmental Result: Evidence-based solutions inform decisions in Government priority areas	I10. Revenue earned from other federal government departments			
	I11. Number of NRC peer-reviewed publications co-authored with other federal government departments			
Program Inventory	Advanced Electronics and Photonics			
	Aerospace			
	Aquatic and Crop Resource Development			
	Automotive and Surface Transportation			
	Biologics Manufacturing Centre			
	Business Management Support (Enabling)			
	Collaborative Science, Technology and Innovation Program			
	Construction			
	Design & Fabrication Services (Enabling)			
	Digital Technologies			
	Energy, Mining and Environment			
	Genomics Research & Development Initiative Shared Priority Projects			
	Herzberg Astronomy & Astrophysics			
	Human Health Therapeutics			
	Industrial Research Assistance Program			
	International Affiliations			
	Medical Devices			
	Metrology			
	Nanotechnology			
	National Science Library			
	Ocean, Coastal and River Engineering			
	Research Information Technology Platforms (Enabling)			
	Security and Disruptive Technologies			
	Special Purpose Real Property (Enabling)			
	TRIUMF			

Changes to the approved reporting framework since 2022–23

Structure		2023–24	2022–23	Change	Reason for change
CORE RESPONSIBILITY		Science and Innovation	Science and Innovation	No change	Not applicable
	PROGRAM	Advanced Electronics and Photonics	Advanced Electronics and Photonics	No change	Not applicable
	PROGRAM	Aerospace	Aerospace	No change	Not applicable
	PROGRAM	Aquatic and Crop Resource Development	Aquatic and Crop Resource Development	No change	Not applicable
	PROGRAM	Automotive and Surface Transportation	Automotive and Surface Transportation	No change	Not applicable
	PROGRAM	Biologics Manufacturing Centre	Not applicable	New program	Added to Program Inventory as part of 2023–24 amendment process
	PROGRAM	Business Management Support	Business Management Support	No change	Not applicable
	PROGRAM	Collaborative Science, Technology and Innovation Program	Collaborative Science, Technology and Innovation Program	No change	Not applicable
	PROGRAM	Construction	Construction	No change	Not applicable
	PROGRAM	Design & Fabrication Services	Design & Fabrication Services	No change	Not applicable
	PROGRAM	Digital Technologies	Digital Technologies	No change	Not applicable
	PROGRAM	Energy, Mining and Environment	Energy, Mining and Environment	No change	Not applicable
	PROGRAM	Genomics Research & Development Initiative Shared Priority Projects	Genomics Research & Development Initiative Shared Priority Projects	No change	Not applicable
	PROGRAM	Herzberg Astronomy & Astrophysics	Herzberg Astronomy & Astrophysics	No change	Not applicable
	PROGRAM	Human Health Therapeutics	Human Health Therapeutics	No change	Not applicable
	PROGRAM	Industrial Research Assistance Program	Industrial Research Assistance Program	No change	Not applicable
	PROGRAM	International Affiliations	International Affiliations	No change	Not applicable
	PROGRAM	Metrology	Metrology	No change	Not applicable
	PROGRAM	Medical Devices	Medical Devices	No change	Not applicable
	PROGRAM	Nanotechnology	Nanotechnology	No change	Not applicable
	PROGRAM	National Science Library	National Science Library	No change	Not applicable
	PROGRAM	Ocean, Coastal and River Engineering	Ocean, Coastal and River Engineering	No change	Not applicable
	PROGRAM	Research Information Technology Platforms	Research Information Technology Platforms	No change	Not applicable
	PROGRAM	Security and Disruptive Technologies	Security and Disruptive Technologies	No change	Not applicable
	PROGRAM	Special Purpose Real Property	Special Purpose Real Property	No change	Not applicable
	PROGRAM	TRIUMF	TRIUMF	No change	Not applicable

Supporting information on the program inventory

Supporting information on planned expenditures, human resources, and results related to the NRC's program inventory is available on [GC InfoBase](#).^{xiv}

Supplementary information tables

The following supplementary information tables are available on the [NRC website's Financial and Performance Reporting page](#):^{xvi}

- ▶ Details on transfer payment programs
- ▶ Gender-based analysis plus

Federal tax expenditures

The NRC's Departmental Plan does not include information on tax expenditures.

Tax expenditures are the responsibility of the Minister of Finance. The Department of Finance Canada publishes cost estimates and projections for government-wide tax expenditures each year in the [Report on Federal Tax Expenditures](#).^{xix} This report provides detailed information on tax expenditures, including objectives, historical background and references to related federal spending programs, as well as evaluations, research papers and gender-based analysis plus.

Organizational contact information

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Appendix: definitions

appropriation (crédit)

Any authority of Parliament to pay money out of the Consolidated Revenue Fund.

budgetary expenditures (dépenses budgétaires)

Operating and capital expenditures; transfer payments to other levels of government, organizations or individuals; and payments to Crown corporations.

core responsibility (responsabilité essentielle)

An enduring function or role performed by a department. The intentions of the department with respect to a core responsibility are reflected in one or more related departmental results that the department seeks to contribute to or influence.

Departmental Plan (plan ministériel)

A document that sets out a department's priorities, programs, expected results and associated resource requirements, covering a three-year period beginning with the year indicated in the title of the report. Departmental Plans are tabled in Parliament each spring.

departmental result (résultat ministériel)

A change that a department seeks to influence. A departmental result is often outside departments' immediate control, but it should be influenced by program-level outcomes.

departmental result indicator (indicateur de résultat ministériel)

A factor or variable that provides a valid and reliable means to measure or describe progress on a departmental result.

departmental results framework (cadre ministériel des résultats)

A framework that consists of the department's core responsibilities, departmental results and departmental result indicators.

Departmental Results Report (rapport sur les résultats ministériels)

A report on a department's actual performance in a fiscal year against its plans, priorities and expected results set out in its Departmental Plan for that year. Departmental Results Reports are usually tabled in Parliament each fall.

fulltime equivalent (équivalent temps plein-)

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. Fulltime equivalents are calculated as a ratio of assigned hours of work to scheduled hours of work. Scheduled hours of work are set out in collective agreements.

gender-based analysis plus (GBA Plus) (analyse comparative entre les sexes plus [ACS Plus])

An analytical tool used to support the development of responsive and inclusive policies, programs and other initiatives. GBA Plus is a process for understanding who is impacted by the issue or opportunity being addressed by the initiative; identifying how the initiative could be tailored to meet diverse needs of the people most impacted; and anticipating and mitigating any barriers to accessing or benefitting from the initiative. GBA Plus is an intersectional analysis that goes beyond biological (sex) and socio-cultural (gender) differences to consider other factors, such as age, disability, education, ethnicity, economic status, geography, language, race, religion, and sexual orientation.

government-wide priorities (priorités pangouvernementales)

For the purpose of the 2023–24 Departmental Plan, government-wide priorities are the high-level themes outlining the Government’s agenda in the 2021 Speech from the Throne: building a healthier today and tomorrow; growing a more resilient economy; bolder climate action; fighter harder for safer communities; standing up for diversity and inclusion; moving faster on the path to reconciliation and fighting for a secure, just, and equitable world.

high impact innovation (innovation à impact élevé)

High impact innovation varies per organizational context. In some cases, it could mean trying something significantly new or different from the status quo. In other cases, it might mean making incremental improvements that relate to a high-spending area or addressing problems faced by a significant number of Canadians or public servants.

horizontal initiative (initiative horizontale)

An initiative in which two or more federal organizations are given funding to pursue a shared outcome, often linked to a government priority.

nonbudgetary expenditures- (dépenses non budgétaires)

Net outlays and receipts related to loans, investments and advances, which change the composition of the financial assets of the Government of Canada.

performance (rendement)

What an organization did with its resources to achieve its results, how well those results compare to what the organization intended to achieve, and how well lessons learned have been identified.

plan (plan)

The articulation of strategic choices, which provides information on how an organization intends to achieve its priorities and associated results. Generally, a plan will explain the logic behind the strategies chosen and tend to focus on actions that lead up to the expected result.

planned spending (dépenses prévues)

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in the Main Estimates.

A department is expected to be aware of the authorities that it has sought and received. The determination of planned spending is a departmental responsibility, and departments must be able to defend the expenditure and accrual numbers presented in their Departmental Plans and Departmental Results Reports.

program (programme)

Individual or groups of services, activities or combinations thereof that are managed together within a department and that focus on a specific set of outputs, outcomes or service levels.

program inventory (répertoire des programmes)

An inventory of a department's programs that describes how resources are organized to carry out the department's core responsibilities and achieve its planned results.

result (résultat)

An external consequence attributed, in part, to an organization, policy, program or initiative. Results are not within the control of a single organization, policy, program or initiative; instead, they are within the area of the organization's influence.

statutory expenditures (dépenses législatives)

Expenditures that Parliament has approved through legislation other than appropriation acts. The legislation sets out the purpose of the expenditures and the terms and conditions under which they may be made.

target (cible)

A measurable performance or success level that an organization, program or initiative plans to achieve within a specified time period. Targets can be either quantitative or qualitative.

voted expenditures (dépenses votées)

Expenditures that Parliament approves annually through an Appropriation Act. The vote wording becomes the governing conditions under which these expenditures may be made.

Endnotes

- i. Minister of Innovation, Science and Industry Mandate Letter, <https://pm.gc.ca/en/mandate-letters/2021/12/16/minister-innovation-science-and-industry-mandate-letter>
- ii. Mandate Letter for NRC President, <https://nrc.canada.ca/en/corporate/about-nrc/mandate-letter-mr-iain-stewart-september-6-2018>
- iii. NRC's Strategic Plan 2019-2024, <https://nrc.canada.ca/en/corporate/planning-reporting/nrc-strategic-plan-2019-2024>
- iv. Evaluation of NRC's Aquatic and Crop Resource Development Research Centre, <https://nrc.canada.ca/en/corporate/planning-reporting/evaluation-nrcs-aquatic-crop-resource-development-research-centre>
- v. Evaluation of the NRC's Industrial Research Assistance Program, <https://nrc.canada.ca/en/corporate/planning-reporting/evaluation-nrcs-industrial-research-assistance-program>
- vi. Evaluation of the NRC's Nanotechnology Program, <https://nrc.canada.ca/en/corporate/planning-reporting/evaluation-nanotechnology-research-centre>
- vii. NRC Departmental Sustainable Development Strategy 2020 to 2023, <https://nrc.canada.ca/en/corporate/planning-reporting/departamental-sustainable-development-strategy-2020-2023>
- viii. Federal Sustainable Development Strategy, <https://www.fdsd-sfdd.ca/en#/en/goals/>
- ix. Sustainable Development Goal 7, <https://www.un.org/sustainabledevelopment/energy/>
- x. Sustainable Development Goal 9, <https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>
- xi. Sustainable Development Goal 11, <https://www.un.org/sustainabledevelopment/cities/>
- xii. Sustainable Development Goal 12, <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>
- xiii. Sustainable Development Goal 13, <https://www.un.org/sustainabledevelopment/climate-change/>
- xiv. GC InfoBase, <https://www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start>
- xv. 2023–24 Main Estimates, <https://www.canada.ca/en/treasury-board-secretariat/services/planned-government-spending/government-expenditure-plan-main-estimates.html>
- xvi. National Research Council Financial and Performance Reporting webpage, <https://nrc.canada.ca/en/corporate/planning-reporting/financial-performance-reporting>
- xvii. *National Research Council Act*, <https://laws-lois.justice.gc.ca/eng/acts/N-15/>
- xviii. National Research Council Corporate page, <https://nrc.canada.ca/en/corporate>
- xix. Report on Federal Tax Expenditures, <https://www.canada.ca/en/departement-finance/services/publications/federal-tax-expenditures.html>
- xx. NRC website, <https://nrc.canada.ca/en/>

Supplementary Information Tables: 2023–24 Departmental Plan

National Research Council Canada

List of supplementary information tables for the 2023–24 Departmental Plan

Details on transfer payment programs	1
Assessed Contribution to the Bureau International des Poids et Mesures ..	1
Biologics Manufacturing Centre	3
Collaborative Science, Technology and Innovation Program	5
NRC Industrial Research Assistance Program	7
Innovative Solutions Canada.....	9
International Affiliations Program	11
International Astronomical Observatories Program	13
TRIUMF	15
Gender-based analysis (GBA) plus	18

Details on transfer payment programs

Assessed Contribution to the Bureau International des Poids et Mesures (BIPM)

Start date	Canada signed the Metre Convention and became a member state of BIPM in 1907
End date	Ongoing
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2018–19
Link to departmental results	Scientific and technological knowledge advances Innovative businesses grow Evidence-based solutions inform decisions in Government priority areas
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: Metrology
Purpose and objectives of transfer payment program	The assessed contribution to the BIPM is an obligation accepted by Canada as a signatory to the international treaty known as the Metre Convention. By representing Canada on the international metrology stage through its affiliation with the BIPM and associated regional metrology organization <i>Sistema Interamericana de Metrologia</i> (SIM), the NRC can more effectively and efficiently respond to its mandated responsibility for maintenance of national measurement standards, as articulated in the <i>NRC Act</i> and the <i>Weights and Measures Act</i> .
Expected results	By maintaining international recognition in measurement science through its interactions with the BIPM and SIM, the NRC can continue to provide metrology research and services that help transform ideas into market-ready technologies that benefit Canadian society, the economy and the environment.
Fiscal year of last completed evaluation	2021–22
Decision following the results of last evaluation	Continuation
Fiscal year of next planned evaluation	2026–27
General targeted recipient groups	International organizations and foreign countries. BIPM is an annual assessed contribution reflecting Canada's status as a State Party to the Metre Convention Treaty since 1907.

Initiatives to engage applicants and recipients	<p>The NRC participates in the activities and meetings relative to the BIPM and associated regional metrology organization SIM. In 2022–23 the NRC was elected to the International Committee for Weights and Measures where it will play an important role in promoting worldwide uniformity in units of measurement.</p> <p>The NRC provides professional expertise and laboratory facilities required to deliver its Metrology Program to achieve socio-economic impact for Canadian citizens and businesses.</p>
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Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	-	-	-	-
Total contributions	659,000	659,000	659,000	659,000
Total Transfer Payments	659,000	659,000	659,000	659,000

Biologics Manufacturing Centre (BMC)

Start date	April 1, 2023
End date	March 31, 2033
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2022–23
Link to departmental results	Innovative businesses grow Evidence-based solutions inform decisions in Government priority areas
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: Biologics Manufacturing Centre
Purpose and objectives of transfer payment program	<p>The objective of the contribution program is to support the operations of the not-for-profit that will:</p> <ul style="list-style-type: none"> • Maintain and operate the BMC facility in a constant Good Manufacturing Practice (GMP)-readiness state to respond to pandemic and other health emergencies, ensuring surety of domestic vaccines and other biologics for Canadians; • Operate the BMC facility in a safe and secure manner; • In non-emergency periods, focus on maintaining pandemic and other health emergency preparedness, supporting public interest projects not otherwise available and contributing to the domestic biomanufacturing sector's GMP production knowledge and capacity. • Serve as a foundational element for a broader system of federal capabilities and assets to respond to future pandemics or other health emergencies.
Expected results	<ul style="list-style-type: none"> • Canada's biomanufacturing and life science Research Systems and Talent Pipeline is strengthened by the BMC; • The BMC's operations, management and governance reflects gender parity and labour market availability of other under-represented groups; • The biopharmaceutical industry and academia have opportunities to access a GMP certified installation to produce and scale-up vaccines and other cell based biologic products; and • The BMC contributes to Canada's domestic supply of publicly available COVID-19 vaccines.
Fiscal year of last completed evaluation	N/A
Decision following the results of last evaluation	N/A

Fiscal year of next planned evaluation	Timing of the first evaluation will be confirmed in the NRC 2023–28 departmental evaluation plan (DEP). DEP planning is currently underway.
General targeted recipient groups	The sole recipient of this contribution is a not-for-profit corporation, Biologics Manufacturing Centre Inc., co-founded by the NRC and the Centre for Commercialization of Regenerative Medicine in December 2022.
Initiatives to engage applicants and recipients	<p>The NRC engaged applicants to cofound the not-for-profit through a transparent process that included launching a call for proposals and establishing a selection committee to review and make a recommendation on the best suited organization. The eligible recipient was selected through that process.</p> <p>An interim board of directors was appointed in 2022–23 to establish the corporate structure and systems of the new corporation, including appointing officers and establishing the permanent board of directors, which will oversee the corporation and its public-good mandate supporting the growth of Canada's biomanufacturing capacity. This will allow BMC Inc. to start conducting activities as a corporate body, transition BMC operational staff and records from the NRC to the new corporation, establish the necessary systems independent from the NRC, and solidify operations under a stand-alone structure. The NRC's long-term role will be to provide effective oversight of the contribution and lease agreements between BMC Inc. and the NRC, and to ensure the realization of the BMC's objectives.</p>

Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending ¹	2024–25 planned spending	2025–26 planned spending
Total grants	-	-	-	-
Total contributions	975,300	-	17,000,000	17,000,000
Total Transfer Payments	975,300	-	17,000,000	17,000,000

¹ Funding for the BMC in 2023–24 appears as Vote 1 (Operating) in the NRC's Main Estimates and as such are not reported in this table. During 2023–24 the NRC will convert this Vote 1 funding of \$17M to Vote 10 (Grants and Contributions) to provide funding for the operations of this not-for-profit.

Collaborative Science, Technology and Innovation Program (CSTIP)

Start date	April 1, 2018
End date	Ongoing
Type of transfer payment	Grants & Contributions
Type of appropriation	Estimates
Fiscal year for terms and conditions	2018–19
Link to departmental results	Scientific and technological knowledge advances Innovative businesses grow Evidence-based solutions inform decisions in Government priority areas
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: Collaborative Science, Technology and Innovation Program
Purpose and objectives of transfer payment program	<p>The NRC will initiate the development of the next set of Challenge programs (round 3) with the selection of programs based on consultation with stakeholders and through peer review.</p> <p>In 2023–24, the NRC will continue to support the five Cluster Support programs, and will launch two new Green Construction Challenge programs, delivering on Budget 2022 commitments.</p> <p>In 2023–24, the NRC will continue to strengthen collaborations and advance its eight Challenge programs and five Cluster Support programs across industry, academia and governmental levels to address issues of national importance related to the Canadian economy and quality of life, and to find solutions to some of Canada's important public policy challenges.</p>
Expected results	<p>Enable new and potentially disruptive technologies to be developed with targeted collaborative groups.</p> <p>Strengthen collaborations across industry, academia and governmental levels to address issues of national importance related to the Canadian economy and quality of life, and to find solutions to some of Canada's serious public policy challenges.</p> <p>Create stronger innovation ecosystems in specific sectors currently experiencing gaps.</p>
Fiscal year of last completed evaluation	Not applicable (underway in 2022–23)
Decision following the	Not applicable

results of last evaluation	
Fiscal year of next planned evaluation	
General targeted recipient groups	Academic organizations, small and medium-sized enterprises (SMEs); Not-for-Profits; Canadian government departments, agencies, crown corporations, research technology organizations; international organizations; social enterprises; Indigenous governments; individuals; non-Canadian recipients.
Initiatives to engage applicants and recipients	<p>For Collaborative R&D Initiatives, potential collaborators, stakeholders and eligible recipients are invited by the NRC to participate in designing the R&D focus as well as proposed projects intended to achieve outcomes for each specific initiative. External researchers are invited to work with the NRC's researchers through a mix of directed and open calls where applicants will develop team proposals to compete for project funding. Projects are selected against criteria such as research excellence, impact, collaborations, and feasibility/probability of success.</p> <p>For the Ideation Fund, annual open calls within the NRC are launched for individuals or small teams to submit proposals to conduct exploratory research with collaborators. Projects are selected against criteria such as: research excellence, innovation/creativity, deliverables, collaboration and feasibility. The streamlining of process will allow for a higher success rate for projects that make it to the full application phase of the selection process.</p> <p>The NRC Outreach Initiative provides non-recurring grant funding to support a variety of outreach science or innovation-based events, conferences or symposia. As of 2021, the program was updated to be more transparent and accessible for applicants. Applications are now accepted on a semi-annual basis and details of the program can be found online. Projects are selected against criteria such as: research excellence and advancing science policy, NRC strategic alignment and reach of the initiative, STEM talent development and inclusion of under-represented groups, value and impact.</p>

Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	30,829,779	34,010,000	32,950,000	37,050,000
Total contributions	10,070,433	2,800,000	3,000,000	3,000,000
Total Transfer Payments	40,900,212	36,810,000	35,950,000	40,050,000

NRC Industrial Research Assistance Program (NRC IRAP)

Start date	Current terms and conditions effective as of May 31, 2019 (original program start date: April 1, 1965)
End date	Ongoing
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2019–20
Link to departmental results	Scientific and technological knowledge advances Innovative businesses grow Evidence-based solutions inform decisions in Government priority areas
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: NRC Industrial Research Assistance Program (NRC IRAP)
Purpose and objectives of transfer payment program	<p>The program contributes to the growth and prosperity of Canadian SMEs by stimulating innovation, adoption and/or commercialization of technology-based products, services, or processes in Canada. This is done through: 1) technical and related business advice and networking facilitated by a cross-Canada network of field professional staff; 2) cost-shared merit-based contributions; and 3) contributions supporting employment of post-secondary graduates. (This program has the following streams: Contributions to Firms; Contributions to Organizations; and Youth Employment Program).</p> <p>NRC IRAP supports the placement of graduates in SMEs through its participation in the delivery of the Youth Employment Program sponsored by Employment and Social Development Canada's Youth Employment and Skills Strategy.</p> <p>At the onset of the COVID-19 pandemic, NRC IRAP established a suite of ten temporary Subject Expert Teams to coordinate and accelerate support to Canadian SMEs who presented viable solutions to detect, prevent and treat COVID-19. Two Teams continue to support projects to further technology development, capacity building and manufacturing scale-up in response to COVID-19.</p> <p>The program aims to contain broad flexibilities to reflect the different needs and realities of a variety of recipients from various industry sectors. This includes the possibility of non-repayable contributions under appropriate circumstances where the benefits to Canada would be significant, and in keeping with international obligations.</p>
Expected results	<ul style="list-style-type: none"> • Stimulation of innovation in SMEs in Canada. • Increased growth of innovative SMEs and creation of wealth for Canada. <p>See the Main portion of the NRC's Departmental Plan for additional plans pertaining to NRC IRAP.</p>

Fiscal year of last completed evaluation	2021–22
Decision following the results of last evaluation	Continuation
Fiscal year of next planned evaluation	2026–27
General targeted recipient groups	Industry-related — For-profit businesses (SMEs) and Non-profit Organizations
Initiatives to engage applicants and recipients	<p>NRC IRAP is a national program managed on a regional basis delivered by a network of over 260 Industrial Technology Advisors (ITAs) located in approximately 105 communities across the country, who provide customized advice to growth oriented technologically innovative SMEs. ITAs engage with client SMEs throughout the entire contribution management process, from building project proposals through to project completion.</p> <p>At the end of their funded project, recipients are required to complete an online Post-Project Report. This assessment captures information on the recipient's experience with NRC IRAP and, along with published service standards, is used by the program to develop continuous program improvements.</p> <p>NRC IRAP has an Advisory Board composed of between 8 and 15 members, with executive-level representation from across NRC IRAP's stakeholder community. This Board provides advice to NRC IRAP management and brings an external perspective on the strategic directions and management of the program.</p>

Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	-	-	-	-
Total contributions	439,385,320	468,703,684	410,614,000	394,514,000
Total Transfer Payments	439,385,320	468,703,684	410,614,000	394,514,000

Innovative Solutions Canada (ISC)

Start date	2017–18 The first NRC challenge posted in December 2017, to coincide with the program launch.
End date	On-going
Type of transfer payment	Grant and Procurement
Type of appropriation	Estimates
Fiscal year for terms and conditions	The NRC received authority for the Innovation, Science and Economic Development (ISED)-led terms & conditions for Innovative Solutions Canada (ISC) grants in 2017–18 (January 2018).
Link to departmental results	ISC is an ISED-led program, with the NRC as one of 21 federal departments mandated to participate. Program results will be reported by ISED.
Link to the NRC's Program Inventory	Within the NRC, this ISED-led program is administered by NRC IRAP.
Purpose and objectives of transfer payment program	<p>ISC is a grant and procurement program that enables participating departments and agencies to support the scale-up of Canadian small and medium-sized businesses through early-stage, pre-commercial R&D. The program allocates a portion of departmental funding to:</p> <ul style="list-style-type: none"> • Fuel the development and adoption of technological innovation in Canada. • Grow Canadian companies through direct funding to support early stage, pre-commercial R&D, late-stage prototypes, and to accelerate commercialization. • Encourage procurement from companies led by equity deserving groups, such as women, Indigenous Peoples, youth, racialized persons, persons with disabilities, 2SLGBTQ+ and others. • Foster greater industry-research collaboration through the release of challenges for solutions that address key Government of Canada priorities. • Provide federal departments and agencies with opportunities to develop new capabilities to meet their R&D needs and thereby advance government priorities.
Expected results	<p>The expected results of the ISC program are aligned with the priorities of the Innovation and Skills Plan (ISP) to grow domestic small businesses in the innovation economy and deliver on three key areas for action:</p> <p><u>People and Skills</u>: The ISC program will help increase the number of science and technology-related jobs in the Canadian economy by allowing small Canadian businesses greater access to government procurement.</p> <p><u>Research, Technology, Commercialization</u>: The ISC will support the ISP by increasing the value spent on business-led R&D, and increasing the number of research collaborations between industry and research institutes.</p>

	<u>Companies, Investment, Scale-Up and Clean Growth</u> : The ISC program will offer opportunities for Canadian companies to grow domestically, provide wins, and gain experience to compete internationally.
Fiscal year of last completed evaluation	Not applicable
Decision following the results of last evaluation	Not applicable
Fiscal year of next planned evaluation	Not applicable – this is an ISED-led program
General targeted recipient groups	SMEs
Initiatives to engage applicants and recipients	<p>As one of 21 participating federal government departments, the NRC submits challenges to ISED for posting. NRC IRAP works with NRC research, branch and NRC IRAP leads to:</p> <ul style="list-style-type: none"> Assess and select proposals for funding. Engage clients by developing and managing grants or contracts for proof of feasibility to prototype development.

Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	14,254,568	8,500,000	5,500,000	5,500,000
Total contributions	-	-	-	-
Total Transfer Payments	14,254,568	8,500,000	5,500,000	5,500,000

International Affiliations Program

Start date	1958
End date	Ongoing
Type of transfer payment	Grant
Type of appropriation	Estimates
Fiscal year for terms and conditions	2011–12
Link to departmental results	Scientific and technological knowledge advances
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: International Affiliations
Purpose and objectives of transfer payment program	Canada's membership in international science and technology (S&T) organizations promotes international research and innovation, networking, advocacy, leadership opportunities as well as access to benchmarking possibilities, enabling Canadian science, technology, and industry to remain competitive.
Expected results	<p>Strengthen the NRC's International profile and Canada's role as a global leader in science, technology and innovation (STI).</p> <p>Reinforce Canada's position as a global leader in integrative science-based policymaking.</p> <p>Nourish Canadian innovation and competitiveness by expanding market-oriented innovation possibilities for Canadian SMEs via international value chains.</p> <p>Contribute to Canadian STI leaders' development via various opportunity channels and collaborations under the International Science Council's umbrella. Reinforce inclusive approaches following the principles of Equity, Diversity and Inclusion (EDI) strategy.</p>
Fiscal year of last completed evaluation	2019–20
Decision following the results of last evaluation	Continuation
Fiscal year of next planned evaluation	Not applicable
General targeted recipient groups	International organizations and foreign countries (foreign recipients which are international S&T organizations having two or more states as members. As well, non-foreign recipients are non-governmental Canadian delegates who attend related meetings hosted by these foreign recipients).

Initiatives to engage applicants and recipients	<p>Maintain continuing dialogue with representatives of each Canadian National Committee (CNC) in order to access ongoing priorities, benefits of the program and objectives for each international affiliation's CNC.</p> <p>The standardized annual program evaluation will keep track of Canadian participation in international affiliation events and membership on international affiliation committees, using developed program indicators.</p> <p>Regular semi-annual Advisory Committee meetings guarantee continuous engagement and coordination from other government science departments and agencies. Ad-hoc Membership Committee developed evaluation criteria for the membership and management of the International Affiliations funding Program. The EDI sub-committee ensures approach and decisions taken by the Advisory Committee respect the principles of Equity, Diversity and Inclusion.</p> <p>Continue elevating Canada's profile through engagement with international affiliations management and other countries' international programs.</p>
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Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	625,000	560,000	560,000	560,000
Total contributions	-	-	-	-
Total Transfer Payments	625,000	560,000	560,000	560,000

International Astronomical Observatories Program

Start date	1978
End date	Ongoing
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2015–16
Link to departmental results	Scientific and technological knowledge advances Innovative businesses grow Evidence-based solutions inform decisions in Government priority areas
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: Herzberg Astronomy & Astrophysics
Purpose and objectives of transfer payment program	<p>Astronomy is a global science. The increasing cost of leading-edge observatories and the scarcity of ideal observation sites have led to a greater focus on international collaboration for large-scale astronomy projects which lead to advances in our knowledge and understanding of the universe.</p> <p>The NRC, in collaboration with other international bodies, provides financial contributions to support the management and operations of offshore ground-based observatories and their related facilities, including the Canada-France-Hawaii Telescope (CFHT), the twin telescopes of the Gemini Observatory and the Atacama Large Millimetre-submillimetre Array (ALMA). The NRC participates in the oversight and direction of these facilities and their research capabilities. The NRC also represented Canada in the Square Kilometre Array (SKA) consortium for the pre-construction phase of the telescope and signed a cooperation agreement in November 2021 to continue Canada's participation in the Square Kilometer Array Observatory (SKOA). In 2015, Canada joined the international partnership to participate in the Thirty Meter Telescope (TMT).</p> <p>International agreements governing these observatories are long-term commitments that specify contributions to support preconstruction design and development, construction, operation and maintenance, capital improvements (e.g., development of new astronomical instruments and other facility upgrades) and decommissioning of the international ground-based observatories and their related facilities. These agreements also include commitments to support the university-based user communities to ensure a fair and progressive use of these observatories. The NRC participates in the governance of these international facilities on behalf of the Canadian astronomy research community and provides appropriate support, including advanced data management services and instrumentation. Through the NRC's financial and in-kind contributions, the Canadian astronomy community is assured merit-based access to these facilities with appropriate support.</p> <p>Recipients are not required to repay funds obtained under this transfer payment program.</p>
Expected results	<ul style="list-style-type: none"> Canadian astronomers have access to leading-edge facilities and technology.

	<ul style="list-style-type: none"> • Qualified students and post-doctoral researchers have access to facilities to advance their training. • Canada plays a prominent role in international scientific endeavours. • Scientific benefit of telescopes to the Canadian and the global community is maximized through progressive science programs using leading-edge instrumentation. • Canadian industry has opportunities to participate in advanced scientific projects and opportunities to benefit from contracts and technology development.
Fiscal year of last completed evaluation	Evaluation of NRC Herzberg Astronomy and Astrophysics (HAA) Portfolio completed in 2021–22.
Decision following the results of last evaluation	Continuation
Fiscal year of next planned evaluation	2026–27
General targeted recipient groups	Foreign States, intergovernmental organizations or corporations that operate international observatories that have entered into agreements with Canada (NRC) to support costs related to ground-based astronomical observatories. In the case of intergovernmental organizations, Canada and one or more foreign states are members. An eligible recipient can be a Canadian Crown Corporation or other delivery partner.
Initiatives to engage applicants and recipients	<p>The NRC manages ground-based observatories established or maintained by the Government of Canada for the benefit of the Canadian astronomy research community, aligning its contributions to the priorities of the community's Long Range Plan for Astronomy and Astrophysics. The NRC participates on the Boards which oversee the observatories to ensure that the science directions and programs of the facilities reflect Canadian strengths and interests. In addition, the NRC ensures these activities increase opportunities for Canadian researchers and firms to develop relevant instrumentation for the observatories.</p> <p>To carry out its roles effectively, the NRC provides current information about each observatory to research community-based committees of scientists which provide expert advice on observatory operations and development. The NRC provides extensive support to the user community through numerous services extending from administering the time allocation process for Canadian researchers through to delivery of science-ready data (through its Canadian Astronomy Data Centre).</p>

Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	-	-	-	-
Total contributions	27,472,120	75,272,512	10,000,000	10,000,000
Total Transfer Payments	27,472,120	75,272,512	10,000,000	10,000,000

TRIUMF

Start date	April 1, 1977
End date	Ongoing
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2020–21
Link to departmental results	Scientific and technological knowledge advances Innovative businesses grow Evidence-based solutions inform decisions in Government priority areas
Link to the NRC's Program Inventory	Core Responsibility: Science and Innovation Program: TRIUMF
Purpose and objectives of transfer payment program	<p>TRIUMF is Canada's particle accelerator centre. The laboratory is one of Canada's key investments in large-scale research infrastructure. It provides world-class facilities for research in sub-atomic physics, accelerator science, life sciences, and materials science. An incorporated non-profit with charitable status, TRIUMF Inc. is owned and operated by a consortium of Canadian universities, with its core operations funded through five-year contribution agreements. TRIUMF Inc. has its own governance and management team who operate and manage TRIUMF Inc. The NRC plays an important oversight and stewardship role for TRIUMF Inc. on behalf of the Government of Canada. The NRC, however, is not directly involved in designing and running the organization's operations.</p> <p>Recipients are not required to repay funds obtained under this transfer payment program.</p>
Expected results	<p>TRIUMF Inc. will continue to support the Canadian and international particle and nuclear physics communities in alignment with the 2022–2026 Canadian Subatomic Physics Long Range Plan, and the laboratory's own 20-Year Vision and Five-Year Plan (2020–2025).</p> <p>In the fourth year of the current Five-Year Plan, TRIUMF Inc. will deliver impact across the three dimensions of Science and Technology, People and Skills, and Innovation and Collaboration. TRIUMF Inc., in close cooperation with its Member Universities, expects to:</p> <ul style="list-style-type: none"> • Conduct world-class science across TRIUMF's core programs; • Continue to make advancements towards the completion of major infrastructure projects, specifically the Advanced Rare Isotope Laboratory (ARIEL) and the Institute for Advanced Medical Isotopes (IAMI); • Drive Canadian contributions in leading international research areas and major collaborations; • Enable the training of students and early career researchers, as well as supporting the flow and exchange of global talent; • Support the development of new industry and community partnerships in the pursuit of economic and societal benefits for Canada; and • Continue the pursuit of operational excellence across the laboratory.

Fiscal year of last completed evaluation	2022–23
Decision following the results of last evaluation	Continuation
Fiscal year of next planned evaluation	2027–28
General targeted recipient groups	Non-profit organizations (TRIUMF)
Initiatives to engage applicants and recipients	<p>The NRC chairs the Agency Committee on TRIUMF (ACT), which includes the federal agencies that fund and oversee activities at TRIUMF Inc., providing TRIUMF management the opportunity to present progress and discuss future directions for the facility.</p> <p>The NRC also convenes the Advisory Committee on TRIUMF (ACOT), composed of international experts within disciplines that span the research and technology activities of TRIUMF Inc. ACOT meets biannually and reports to the NRC. ACOT makes recommendations to the NRC and TRIUMF Inc. on programs and management, and reports on the scientific, technological and commercial achievements of the organization's programs and facilities, helping to ensure TRIUMF Inc. discharges its responsibilities under the Contribution Agreement. Observer representatives from the Natural Sciences and Engineering Research Council of Canada, the Canada Foundation for Innovation, and TRIUMF's user communities ensure TRIUMF's directions are well aligned with the researcher needs, and that the organization is working with all its constituencies across Canada. The Committee considers all aspects of the TRIUMF Inc. program, with a particular emphasis on science, technology and commercialization, to ensure the relevance, impact, and world-class standing of its activities.</p> <p>Through oversight committees such as ACT, ACOT and quarterly reporting, the NRC maintains a close relationship with TRIUMF Inc. The NRC also maintains observer status on the TRIUMF Board of Governors and on its supporting bodies. These engagements ensure the NRC investments to the TRIUMF Inc. are optimal and the NRC has an appropriate mechanism to oversee the various aspects of the transfer payment to TRIUMF Inc.</p> <p>TRIUMF Inc. has approximately 410 staff and students supported via the NRC's contribution agreement. An additional 138 positions are supported through other sources for specific designated purposes, including temporary funds to operate new capital infrastructure. In a typical year, the TRIUMF organization provides training for more than 200 undergraduate, graduate students, and postdoctoral fellows. The TRIUMF organization has numerous programs aimed at young people, students, teachers, and the public to ensure as many people as possible share the wonder of discovery and experience the excitement generated by the laboratory. TRIUMF Inc. also offers a suite of programs to aid in the growth and development of professional skills for its graduate students and postdocs.</p>

Financial information (dollars)

Type of transfer payment	2022–23 forecast spending	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
Total grants	-	-	-	-
Total contributions	59,325,000	60,646,436	58,026,205	19,277,000
Total Transfer Payments	59,325,000	60,646,436	58,026,205	19,277,000

Gender-based analysis (GBA) Plus

General information

Institutional GBA Plus Capacity

The NRC's research benefits all Canadians, including multiple gender and demographic groups with intersecting characteristics. The NRC is using a GBA Plus lens to make its research more inclusive of equity deserving groups and to improve how the NRC's research helps the lives of all Canadians. Aligned with the Government of Canada's renewed commitment to GBA Plus, the NRC will further integrate its use across existing organizational planning and program design, develop plans for data collection, and apply a GBA Plus lens for evaluation activities that are important to measuring outcomes and impact and informing further areas for continuous improvement.

As part of the GBA Plus governance structure, the NRC's Secretary General is fulfilling the role of GBA Plus champion for the organization and undertaking specific initiatives including continued representation on the Government of Canada's Interdepartmental Working Group for GBA Plus and the GBA Plus Focal Point Network. Further, the Secretary General division will continue to develop and provide guidance to build awareness and knowledge for GBA Plus integration into program design, delivery and performance reporting.

In 2023–24, the organization will continue to build GBA Plus organizational capacity and sustain the practice of GBA Plus at the NRC by implementing initiatives in three areas:

NRC research

- Integrate GBA Plus principles into research activities, programs and operations to build and expand diverse Canadian STEM capacity in the various scientific fields and industry sectors the organization works with and supports, for example, conducting GBA Plus analysis as part of the design of new programs, and requiring applicants to include information on GBA Plus and EDI considerations in funding proposals.
- Efforts to integrate GBA Plus in NRC research programs will be directed at three levels: 1) program participation (ensure diversity among internal teams and external collaborators); 2) priority setting of research projects and activities (consider the expected impact on various groups), and 3) program development and evaluation (identify the social, cultural, and economic environment in which the program's outputs are intended to achieve impact).
- As part of the work to develop data collection plans, indicator options will be reviewed to determine the most appropriate measures to assess the impacts on gender and diversity, for example: market analysis (socio-economic impacts, access to technologies, regional impacts, including on Northern and Indigenous communities), stakeholder analysis and evaluations, team composition and selection, and client engagement strategies. In addition, university enrollment statistics and employer EDI data may yield insight into whether or not the participation of vulnerable groups in STEM disciplines is increasing. This data collection will be based on secondary sources at the national level, since any changes would be the result of efforts by all of government, not just one program or department.
- Ensure the NRC's Research Advisory Boards are as balanced and representative of the Canadian population as possible to ensure that diverse views are considered in research planning. Composed of representatives balanced across industry (including not-for-profit), academia and government, advisory boards provide strategic and independent advice on the overall strategic direction and priorities of each of the research programs. Representation of research advisory boards will continue to be monitored and adjusted as membership changes.

NRC funding for innovative small and medium-sized businesses (SMEs)

- NRC's Industrial Research Assistance Program (NRC IRAP) has made efforts to diversify participation in its programs and build on work already underway to provide support to firms

owned or led by women, Indigenous Peoples, racialized persons and persons with disabilities through a number of agreements with not-for-profit organizations. NRC IRAP uses an EDI lens when building its programs and policies for clients. NRC IRAP has a voluntary data collection process for clients to self-declare Employment Equity (EE) information about their business ownership, leadership and board composition. In 2023–24, NRC IRAP will continue collecting and analyzing data to understand how equity deserving groups are experiencing unintended barriers to NRC IRAP support, and to develop mitigation strategies to address these barriers.

- NRC IRAP will also continue to provide support to Employment and Social Development Canada's Youth Employment and Skills Strategy, through placing graduates within SMEs to improve young professionals' access to quality employment in their field of study. NRC IRAP will continue to focus on providing quality employment opportunities to women in STEM, as well as recent graduates with disabilities.

The NRC workplace

- Strengthen the pipeline for Canadian industry, academia and other STEM employers and improve the workforce representation within traditionally under-represented fields by hiring and training students, highly qualified personnel and early career STEM professionals from equity deserving groups in order to improve the quality of scientific and technical outputs produced by a diverse workforce.
- Continue to collect, measure and monitor NRC representation compared to Canadian Labour Market Availability (LMA) estimates for each of the four designated equity deserving groups as well as specific EE Occupational Groups. Continue to prioritize the identification of high potential employees from designated groups to help address gaps and enable the advancement of equity deserving group members.
- Continue to implement the NRC's current Workforce and Workplace EDI Strategy to increase representation of equity deserving group members, implement a management sponsorship program for racialized and Indigenous Peoples, deliver the NRC Accessibility Strategy developed in 2022–23, and enhance the measurement capacity to drive EDI programming and monitor progress. The NRC will also conduct an employment systems review to inform a refreshed EDI strategy, and develop an approach and lead the consultative process for the development of its pay equity plan.
- Conduct a review of NRC employment systems with a view to identifying systemic barriers. The results of this review will inform the development of a refreshed NRC EDI Workforce and Workplace Strategy for implementation beginning in 2024–25. Through a suite of initiatives, the refreshed strategy will aim to build a diverse and representative NRC workforce, and foster an open, accessible, inclusive, and anti-racist work environment and culture across NRC workplaces.
- Consult diverse groups and networks to ensure that their needs and views are considered, and that potential impacts are assessed in the development and improvement of NRC strategies, processes, programs and policies, including the development of the new NRC Strategic Plan and the refreshed NRC EDI Strategy.
- Promote internal tools and resources to increase awareness and understanding. Encourage staff participation in equity and diversity training, including courses on respect in the workplace and unconscious bias to help foster an inclusive and respectful environment.

Highlights of GBA Plus Results Reporting Capacity by Program

Targeted initiatives for GBA Plus data collection

The NRC will continue to work with the Treasury Board of Canada Secretariat (TBS) in 2023–24 to leverage their collaborative statistical program on Business Innovation and Growth Support (BIGS) with Statistics Canada. The BIGS database covers government support to enterprises linked to the Linkable File Environment (LFE) of Statistics Canada to better understand performance and conduct impact assessments for growth and innovation-related programs. The NRC will be part of TBS' ongoing research project of "Understanding BIGS

	<p>beneficiaries". The project will allow NRC access to aggregate data to improve the understanding of the business ownership and workforce composition (e.g. majority women-owned enterprises and proportion of female employees) of enterprises supported by specific NRC programs. This information will enable programs to understand how certain equity deserving groups based on gender, age and immigrant status may be disproportionately impacted, and to determine strategies to mitigate these impacts.</p> <p>Given that data collection for NRC IRAP firms is currently a non-mandatory, self-declaration model, gender and diversity data that is statistically significant for reporting on the program's impacts is not readily available. The collection and reporting of client information is dependent upon the client's access to information about the diversity of their companies, their leadership and executive teams and staff. NRC IRAP will take action to assist clients in developing an EDI plan which will empower clients to better understand their EDI footprint and in turn enable NRC IRAP to measure program impact on equity deserving groups.</p> <p>The NRC's evaluations of programs scheduled to be initiated in 2023–24 will include an examination of EDI populations within the specific research centre/program workforce as well as distribution across the various employee subgroups (researcher, management, administrative) and levels. Further, to ensure the perspectives of diverse populations are heard, the evaluation projects will also include diverse populations in key informant interviews, peer review committees, and surveys. GBA Plus success stories, if identified, could also be included as case studies.</p> <p>GBA Plus data collection will remain a priority for NRC's research projects by trying to identify the key challenges in collecting data and strategies to overcome them. A specific example is the NRC's Aerospace Program work, along with the University of Ottawa, Carleton University, Transport Canada and the Canadian Transportation Agency, to conduct participatory and human-centered research designed to support a more inclusive and usable door-through-door travel experience for Canadian seniors. As Canadians age, the frequency with which they use transportation, including air travel, decreases. It is imperative to understand what barriers this demographic faces and how to remove them. The team will focus on gathering and analyzing extensive data on user requirements to provide evidence-based innovative design (e.g., technology, tools, products), policy, and regulatory recommendations focusing on those with a wide and significant impact. Another example is the NRC's Metrology Program which will focus on GBA Plus training for its project managers to ensure that barriers in research outcomes are identified and addressed. The program will focus on GBA Plus analysis of the three priority areas of health, climate and quantum/digital technologies to ensure the research work in those areas consider the full impact of those who will benefit from its outcomes.</p>
Collaborative Programming (i.e., Challenge and Cluster Support programs)	<p>The NRC's National Program Office (NPO) will continue to work to improve GBA Plus data collection and encourage self-declaration of researchers participating in projects under the Collaborative Science, Technology and Innovation Program (CSTIP) and peer reviewers evaluating projects. All CSTIP challenge programs will continue to be co-developed through significant stakeholder engagement with GBA Plus considerations factored into program design. Furthermore, all CSTIP proposal templates will continue to request information on GBA Plus considerations and recipients will be asked to report back on their GBA Plus strategies. The NRC's NPO is currently collecting information on the EE representation of NRC employees working on a subset of CSTIP programs and is working on an underlying system that can expand to all CSTIP programs while also finding a secure way to collect data on NRC-funded collaborators in 2023–</p>

	<p>24. The NPO will conduct analysis with available data to look for insight into areas which are disproportionately underrepresented in order to proactively seek out means for filling these gaps. Small Teams Initiatives and Ideation Fund proposals will continue to be reviewed to ensure GBA Plus considerations have been properly addressed and included in the proposal design.</p> <p>Specific GBA Plus initiatives that will be implemented by collaborative programs in 2023–24 include:</p> <ul style="list-style-type: none"> • The Advanced Manufacturing Cluster Support program has integrated GBA Plus into two collaborative projects within the METALTec industrial R&D group to build and expand diverse Canadian STEM capacity. The program will monitor the progress of more than 15 students participating in the projects with the objective to training highly qualified personnel and improving the quality of scientific and technical outputs produced by a diverse workforce. The students are under guidance of the universities and co-supervised by the NRC. • Initiatives under the Aging in Place Challenge program will continue to focus on enhancing safety and facilitating the inclusion of persons with disabilities and older Canadians in public transportation systems and to maintain their mobility in general. • The Cell and Gene Therapy Solutions Challenge program will use a GBA Plus lens in the development of a universal cell product which could be the basis for generating cell therapy products for broad use. The project will aim to collect multiple donor samples and collect information about sex and ethnicity such that results obtained from different cell sources can be studied, and the impact in designing a universal cell product can be understood from the lens of differences in ethnic and genetic backgrounds. • Over its 7-year timeframe, the Ocean program led by OCRE will compile available data on identity factors across internal research teams within the NRC, within collaborator teams applying for funding for contributions to the program, and in the management framework providing governance and oversight of the program. The OCRE program will continue monitoring participant data to uncover equity-deserving groups over the life of the program, and on a regular frequency, to identify opportunities and strategies to enhance participation more broadly as needed. These monitoring and gap assessment activities will be extended to include highly qualified personnel (students, postdoctoral fellows) working within the NRC, within collaborating centers, and recipients of grant funding awards through the Ocean program's grants and contributions mechanism.
Indigenous Engagement	<p>The NRC is committed to building relationships with Indigenous researchers, innovators, and communities to bridge western and Indigenous knowledge systems, and to create new knowledge that can be brought to bear on the critical issues of our time. Aligned with the Truth and Reconciliation Commission Calls to Action, the NRC will continue to build intercultural competency as a first step towards long-term relationships with First Nation, Inuit and Métis peoples. The key mobilizing body for this work is the NRC's Indigenous Engagement Network, which continues to grow in membership and prominence. The network will be supporting the Indigenous Engagement strategy and reconciliation with First Nations, Inuit and Métis rights holders.</p> <p>As part of Phase 3 onboarding for the Government of Canada Indigenous Procurement Strategy to award a minimum of five percent of the total value of contracts to Indigenous businesses by March 31, 2025, the NRC is targeting a</p>

	<p>minimum of three percent of the total value of its contracts to Indigenous businesses by the end of 2023–24.</p> <p>Building on recommendations included in 2021–22 evaluations of several NRC research programs, efforts focused on Indigenous engagement include:</p> <ul style="list-style-type: none"> • The Herzberg Astronomy and Astrophysics Program will move from consultation to empowerment for local Indigenous communities, and actively work with local First Nations communities in British Columbia to include Indigenous knowledge and training opportunities for students. • The Ocean, Coastal and River Engineering Program will implement actions as part of its new engagement strategy that includes a section specific to Indigenous right holders. • The Aquatic and Crop Resource Development Program will define the aspects of sustainability in the marine and agri-food sectors where its best positioned to have an impact, and will integrate the needs of remote, northern and Indigenous communities in its strategic plan. <p>Led by the NRC's Digital Technologies (DT) Program, the Canadian Indigenous Languages Technology (ILT) project has collaborated with Indigenous communities and language experts to develop technologies that contribute to revitalization of Indigenous languages. A subproject under the ILT, the Speech Generation for Indigenous Language Education actively recruited a diverse, representative project composition and was successful in hiring 4 Indigenous team members. Following this success, the program's model of building trust with Indigenous collaborators to attract talented Indigenous recruits will continue in 2023–24, and DT will continue to actively highlight its success on Indigenous languages via media communications and external talks, to help highlight the whole NRC as a choice employer for EDI candidates.</p> <p>The NRC's Energy, Mining and Environment Program (EME) will participate in the Indigenous Recruitment Initiative, led by the Engineering division, and ensure that all EME hiring posters include specific information for the recruitment of Indigenous Peoples with corresponding data tracked in collaboration with corporate HR.</p>
Accessibility	<p>The NRC National Science Library (NSL) offers a range of information-related services to the public and other libraries. Services include online access to digital content through NRC's publicly available repositories (i.e., NRC Publications Archive and the Digital Repository), a searchable catalogue and information discovery platform, and reference/interlibrary loan services with other libraries. The NSL is committed to open science and open government principles in making its research outputs accessible through its repositories. The NSL will continue to implement its GBA Plus data collection plan in 2023–24 to ensure participation of equity deserving groups and to understand the benefits to diverse groups. Data will be collected on specific GBA Plus initiatives in the form of qualitative evidence of NSL's accomplishments and impacts on diverse groups. The NSL will undertake the following efforts to increase accessibility and inclusion in its systems and portals:</p> <ul style="list-style-type: none"> • Add land acknowledgements on the Federal Science Libraries Network portal. • Digitize NRC annual reports going back to 1917 and ensure all reports going forward are made available in digital format. • Surface the digital repository items in Summon (Search discovery) to make them more widely accessible.

	<ul style="list-style-type: none"> • Participate in the Canadian Shared Print Network's federal documents print preservation program. • Enhance accessibility within the Library Portal.
Outreach and Engagement	<p>The Grants for International Affiliations (GIA) program, managed by NRC's International Affiliations Program, has a target of 100% of funded organizations that have programs to support equity, diversity and inclusion. The Program engages with representatives of each Canadian National Committee (CNC) responsible for specific international affiliations to assess evolving priorities, most valued benefits of the program to participants and understand the needs of each CNC. To facilitate evaluation, each CNC submits a mandatory annual performance review questionnaire that includes requests for input on efforts to follow EDI principles. The input covers information on the creation of opportunities for women, young researchers and/or equity deserving groups. The Program will continue to engage with the CNCs managing international affiliations to better gauge impacts and plans, and ensure continued recipient engagement in the program. This will inform the Canadian STI management community of the science diplomacy needs of Canadian practitioners in light of track records of international affiliations, and the associated level of required support. The International Affiliations Program will also continue to track and monitor representation of diverse views in its advisory committee and selection process, and its next evaluation scheduled for 2025–26 will provide further insights on the benefits experienced by equity deserving groups.</p> <p>The NRC's Aerospace Program is a founding member and supporter of the Canadian Advanced Air Mobility (CAAM) consortium, a not-for-profit organization which promotes collaborative innovation to accelerate growth of the Canadian ecosystem for air mobility. As part of its activities, the CAAM consortium runs annual events to promote the participation of diverse groups, including women, 2SLGBTQ2+, and Indigenous Peoples in this rapidly-growing field. The Aerospace program will continue participation in these events. Using its own internal and external communications platforms, such as the NRC website and social media, the Aerospace Program will continue to publish profiles of the talented women in its workforce as part of its overall effort to promote more diverse participation in the STEM disciplines that are central to its research and technical activities.</p> <p>The NRC's Advanced Electronics and Photonics Program will continue to participate in career fairs targeting equity deserving groups, send young and female researchers to fairs, and ensure panels for events are diverse and/or include a member of the targeted equity deserving group.</p> <p>The Digital Technologies Program will continue to increase its participation in outreach activities (e.g., the Canadian Institute for Advanced Research (CIFAR), Vector Institute, and Canadian AI job fairs) that are focused on recruitment, especially in fields like AI where attracting sufficiently diverse pool of candidates is challenging.</p>
Developing Canadian STEM Capacity	<p>The NRC has integrated GBA Plus into its operations through the training of students and highly qualified personnel, in order to improve the quality of scientific and technical outputs produced by a diverse workforce. By hiring students and early career STEM professionals from equity deserving groups and providing them with practical training opportunities, the NRC is helping to strengthen the pipeline for Canadian industry, academia and other STEM employers and improve the workforce representation within traditionally under-represented fields.</p>

	<p>NRC's programs will continue efforts to develop equity in workforce representation and will continue to collect data on the composition of its workforce with regard to the four equity deserving groups. Data on representation rates is more accurate if all employees self-identify, therefore programs will continue to promote and encourage the use of self-identification for existing staff and new hires.</p> <p>The NRC will continue to pursue new hires with an EDI lens, working with HR to advertise both broadly and at targeted populations, implementing its hiring targets for equity deserving groups, and collecting data to measure the proportion of newly hired staff from the four designated groups.</p> <p>Across NRC programs, EDI considerations will be applied in hiring practices to reduce unconscious biases and increase representation such as:</p> <ul style="list-style-type: none"> • Establishing diverse hiring committees to ensure NRC research programs have diverse input in the hiring process, for example adding representation of at least one designated group member on all hiring boards; • Using the Inclusive Hiring Checklist for hiring actions; • Working with HR to target diverse groups in hiring actions; • Adding text in hiring posters to encourage applications from equity deserving groups; • Ensuring job postings are bias free and mention flexible work arrangements where feasible; • Sending direct notifications of job openings to specific groups and associations (i.e., Women in STEM, Indigenous student groups, LinkedIn groups such as Women of Color); and • Giving preference in hiring to candidates that self-declare as belonging to one or more equity deserving groups.
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