2021–22
Departmental Results Report

Natural Resources Canada

Originally signed by

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Minister of Natural Resources

Natural Resources Canada

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From the Minister

In the wake of the global recovery from the COVID-19 pandemic, this past year was further dominated by the twin crises of climate change and Russia's illegal invasion of Ukraine—a conflict that disrupted global financial markets, exposed the vulnerability of global energy markets and impacted the supply chains for many other key commodities and industries.

In response to these pressures, Natural Resources Canada (NRCan) undertook initiatives to address climate change through the sustainable development of our resources, while supporting our workers and communities and Canada's long-term economic objectives. This report summarizes many of these initiatives, and highlights the Department's efforts to ensure economic growth, create good jobs, and improve the lives of all Canadians.

Throughout the year, we accelerated the adoption of clean technologies that will enable us to achieve net-zero emissions by 2050, including:

- Implemented Canada's Hydrogen Strategy, providing an investment framework to grow the production, distribution and use of clean hydrogen, both at home and abroad;
- Secured investments to build new materials production and battery recycling plants;
- Launched the $750-million Emissions Reduction Fund, to support oil and gas workers with investments that reduce or eliminate methane and other GHG emissions from oil and gas operations;
- Implemented the $1.5 billion Clean Fuels Fund to build new or expand existing clean fuel production facilities;
- Implemented the $2.6 billion Canada Greener Homes Grant to help Canadians make their homes more efficient and affordable and more resilient to climate change;
- Launched the $964 million Smart Renewables and Electrification Pathways Program to support electric modernization; and
- Secured $3.8 billion through Budget 2022 to support Canada's first Critical Minerals Strategy.

As our economy continued to recover from supply chain disruptions, NRCan expanded market access and competitiveness of Canada's natural resources sectors by engaging with G20 nations to address the stability of global energy and commodity markets, as well as investment opportunities for free trade agreements. The Department also launched the Critical Minerals

Centre of Excellence to develop and coordinate Canada's policies and programs and advance critical mineral value chains and we supported regulatory improvements, promoted innovation, and advanced pre-commercial technology.

To help mitigate the effects of climate change and protect Canadians from natural and human hazards, we supported regulatory improvements, promoted innovation, and advanced pre-commercial technology. The Department invested $460 million to deploy more than 25,000 new electric-vehicle charging stations throughout the country. We also launched a public engagement process to develop Canada's National Adaptation Strategy and undertook initiatives to enhance our understanding of the nature of risks posed by floods, wildfires, and earthquakes.

To advance reconciliation, equity, diversity and inclusion, we engaged with Indigenous partners to increase collaboration, we continued to implement the First Nations Land Management Program in partnership with Indigenous Services Canada, to increase economic opportunities for First Nations to develop their natural resources.

We also launched consultations informing the development of Just Transition legislation to support workers and communities in the transition to a low carbon future and promote a diverse and inclusive workforce through the Science and Technology Internship Program.

While the past year challenged all Canadians, NRCan can be proud of the difference it made. As we move through the energy transition, Canada will remain an economy in which natural resources continue to make an indispensable contribution to the national economy. This report is a testament to those efforts.

Navigating through challenges and new opportunities, NRCan continued to make a difference for Canadians. As we move towards the energy transition, Canada will remain an economy in which natural resources continue to make an indispensable contribution to the national economy. This report highlights our dedication to our mission.

Results at a glance

Natural Resources Canada (NRCan) works to improve the quality of life of Canadians by ensuring that our natural resources are developed sustainably, providing a source of jobs, prosperity, and opportunity, while preserving our environment and respecting and engaging Indigenous peoples across Canada.

Canada's vast natural resource sectors contribute significantly to economic growth across the country and play a vital role in creating jobs, fostering growth and prosperity for Canadians.

The Department contributed to leveraging technological innovation that provided solutions to support sustainable growth in the resource sectors. NRCan continued the pursuit of a transition to a low carbon future by being a leader in clean technologies and sustainable development practices. This included promoting a green, inclusive, and climate resilient economic recovery, to ensure that the energy transition does not leave any Canadian behind.

Russia's invasion of Ukraine in February 2022 has caused severe global impacts and disruptions, including access to natural resources, especially energy sources. NRCan was at the forefront of discussions with partner countries to help alleviate this disruption, while ensuring that our natural resource sectors could manage through such uncertainties. At the same time, the rapid rise of global energy and oil prices and supply chain disruptions, combined with a rising inflation and labor shortages across the country, which arose during the pandemic, have also adversely impacted the natural resource sectors. Throughout 2021-22 NRCan worked tirelessly to improve market access and competitiveness for Canada's resource sectors.

As Canada transitions to a low-carbon economy, NRCan ensures that its programs, policies and processes are inclusive by design and address systemic barriers. Inclusion, diversity, equity, and accessibility are key outcomes that NRCan strives to achieve within the delivery of its mandate. NRCan also prioritizes fostering inclusive growth in the natural resource sectors and remains fully committed to advancing reconciliation and partnerships with Indigenous Peoples.

In the midst of the economic fluctuations and uncertainties in 2021-22, NRCan continued to deliver results for Canadians while supporting ongoing stabilization and economic recovery in Canada's natural resource sectors. As such managing risks and uncertainties continues to be a priority for the Department which is committed to monitoring risks to inform decision-making and support Canadians and the natural resources sector in 2022 and beyond.

Our focus for 2021-22

In 2021-22, NRCan worked to advance five strategic priorities that assisted in Canada's economic recovery and climate action. These priorities were:

i) Accelerated development and adoption of clean technology and transition to a net-zero future in a post-pandemic economic recovery

NRCan's programs and initiatives are driving innovation, generating critical knowledge, providing scientific expertise, and advancing new technological solutions in the natural resource sectors to support net-zero emissions by 2050. Through initiatives such as the Energy Innovation Program (EIP)[i] and the Program of Energy Research and Development[ii], NRCan supported over 250 clean energy research, development and demonstration projects (RD&D) in 2021-22. The EIP launched $53M in new funding calls targeting Industrial Fuel Switching, Clean Fuels Production, and Hydrogen Codes and Standards to accelerate the development of emission-reducing technologies and create pathways for using cleaner fuels in hard-to-abate segments of industry. In 2021-22, EIP projects directly reduced 2.19 Mt of GHG emissions. In addition, the Clean Growth Program's[iii] 43 clean technology RD&D projects in the energy, mining and forestry sectors further reduced 14,131 tons of CO_2 in 2021-22.

As is laid out in the Hydrogen Strategy for Canada,[iv] developing hydrogen fuel will be essential for achieving net-zero emissions by 2050, and will position Canada as a global, industrial leader of clean renewable fuels. The Department established a high-level governance structure to oversee implementation of the Hydrogen Strategy, with representation from all levels of government, industry, and Indigenous businesses and communities. NRCan is also co-leading the Electric Vehicle Initiative, Hydrogen Initiative[v] and the Biofuture Platform Initiative[vi] under the Clean Energy Ministerial to deliver on clean fuels, including hydrogen, and the electrification of the transport sector.

Additionally, the $1.5B Clean Fuel Fund[vii] was launched to increase the production capacity of clean fuels in Canada, including at least 10 hydrogen projects. The fund will support sustainable biomass supply chains and developing essential codes and standards for the production, distribution, and use of clean fuels.

To help build Canada's battery supply chain, the Department worked with federal, provincial, territorial, and industry partners to secure large investments at each stage of the supply chain. As a result, BASF, a German company and the world's largest chemical company, confirmed Bécancour, Quebec, as the site of its new materials production and battery recycling plant. LGES, a South Korean company, and Stellantis, an American company, also announced a joint venture to build and operate a $4.4B lithium-ion battery cells manufacturing plant for electric vehicles in Windsor, Ontario.

In May 2021, NRCan launched the Canada Greener Homes Grant Initiative[viii] to support home owners in making energy efficient and climate resilient home retrofits. Since then, the program received over 171,000 applications and issued $38M in grants to 10,300 homeowners. Tens of thousands of additional applications are being processed by partner programs in Quebec and Nova Scotia. In addition, the program recruited and trained 446 new energy advisors for a total of 1,400 energy advisors across Canada and creating new green jobs in the energy sector.

Canada is on track to meeting 2030 targets of at least 90% of electricity being generated from non-greenhouse gas (GHG) emitting sources, achieving 83% in 2021-22. To advance the transition to clean electricity, NRCan launched the $964M Smart Renewables and Electrification Pathways Program (SREPs)[ix] to support established renewables, emerging technologies, grid modernization, and capacity building. The program has approved 14 projects that were majority Indigenous-owned, totaling $289M in program funds. An additional 8 projects that were 25% Indigenous-owned have been approved for $165M in program funds. The Emerging Renewable Power Program[x] is also investing $200M to expand the portfolio of commercially viable renewable energy sources available to provinces and territories to support electricity sector decarbonisation.

To support modernization of grid infrastructure, NRCan's $100M Smart Grid Program[xi] funded 22 projects for the demonstration of promising, near-commercial smart grid technologies and the deployment of smart grid integrated systems across Canada.

The Department also supported the Canada Infrastructure Bank (CIB)[xii] to implement the $2.5B Clean Power stream of its $10B Growth Plan to help connect surplus clean power to regions transitioning away from coal and help transform how Canada powers its economy and communities. Strategically aligning with the CIB and building on progress from the Clean Power Roadmap, the Atlantic Loop Backbone Project explores how regional electricity transmission projects would expand electrical interconnections and move clean power among the Atlantic Provinces, and Quebec. NRCan is also engaging with U.S. partners on emergency preparedness exercises to support the safe and secure deployment of Small Modular Reactors (SMRs).[xiii]

The $750M Emissions Reduction Fund (ERF)[xiv] is supporting eligible Canadian onshore (up to $675M) and offshore ($75M) oil and gas companies and Canadian innovators to invest in green

solutions to reduce GHG emissions and retain jobs in the sector. To date, the Onshore Deployment Program component of the ERF has funded 92 projects across Alberta, Saskatchewan, British Columbia, and Manitoba and are expected to achieve methane emission reductions of approximately 4 Mt of CO2e in the first twelve months following project completion. The Offshore Deployment component supported three projects from Newfoundland and Labrador's offshore service and supply sector, which collectively target offshore GHG emissions reductions and improving the environmental performance of oil spill related activities. The Offshore RD&D Program, through an agreement with Energy Research & Innovation Newfoundland & Labrador (ERI-NL), supported 18 projects in Newfoundland and Labrador that advance innovation in emissions reducing technology.

ii) Improved market access and competitiveness for Canada's resource sectors

Canada's mining sector is crucial to achieving net-zero emissions by 2050. The Department launched the Critical Minerals Centre of Excellence[xv] to lead the development and coordination of Canada's policies and programs on critical minerals, in collaboration with industry, provincial, territorial, Indigenous, non-governmental and international partners. The Centre will advance critical mineral resources and value chains, which are essential for a green and digital economy. The Centre also supported establishing the Mining Innovation Commercialization Accelerator (MICA)[xvi] Network in July 2021. MICA's objective is to accelerate the development and commercialization of innovative technologies to make the mining sector more productive and sustainable.

In 2021-22, The Department prepared to launch Canada's first Critical Minerals Strategy[xvii] that will lead to the creation of thousands of jobs, grow our economy and make Canada a vital player on the world stage. As part of Budget 2022, the Government provisioned $3.8 billion over the next eight years to implement the Strategy.

Under the Joint Action Plan on Critical Minerals, bilateral collaboration continued with the U.S., including through a series of focused webinars to highlight critical minerals opportunities across Canada. Further, the Department participated in several meetings across a number of key multilateral organizations, such as the G7,[xviii] G20,[xix] International Energy Agency (IEA),[xx] International Renewable Energy Agency (IRENA),[xxi] and Mission Innovation (MI)[xxii] to highlight investments and financing opportunities in Canada's clean energy transition.

NRCan also supported Global Affairs Canada (GAC) in new and ongoing Free Trade Agreement (FTA) negotiations with priority markets to preserve and advance natural resource trade interests. In addition, NRCan continued to support litigation under the World Trade Organization, the Canada-U.S.-Mexico Agreement (CUSMA), and the North American Free Trade Agreement (NAFTA) to defend the Canadian forest sector against unwarranted U.S. duties on softwood lumber.

Energy infrastructure is critical to ensuring Canadas' natural resource sectors access markets around the globe and remain competitive. NRCan supported businesses in the natural resource sectors that seek to export their goods and services to global markets by providing a stable regulatory environment.

Canada was the first country in the world to ban the import of Russian oil and petroleum products following Russia's invasion of Ukraine. In light of the situation, the Department engaged with officials from G7 nations to discuss energy supply chain security concerns and objectives. NRCan worked with Canadian oil and gas producers to shore up supplies to address the global shortage.

NRCan's investments in the Forest Innovation Program[cxciv] and collaboration with provincial and territorial partners under the Canadian Council of Forest Ministers Innovation Working Group helped innovation across the forest sector and advance the bioeconomy. The Investments in Forest Industry Transformation Program[cxcv] invested in 37 projects to support the competitiveness and the transformation of Canada's forest sector, supporting forest-reliant communities, low-carbon projects and providing quality jobs to Canadians across the country.

iii) Advanced reconciliation, built relationships and shared economic benefits with Indigenous peoples

During this year, the Department supported the Government of Canada's commitment to advance reconciliation by continuing to build relationships and foster trust with First Nations, Inuit and Métis Peoples. With a focus on natural resource sectors, this ongoing dialogue will help contribute to promote greater prosperity for Indigenous peoples and Canadians.

NRCan engaged with Indigenous partners to increase collaboration. Results stemming from this relationship include the establishment of an Indigenous Advisory Council for the Small Modular Reactor Action Plan to increase Indigenous participation in future nuclear non-emitting electricity and benefits sharing in Small Modular Reactors (SMRs)[xxiii]. The GEM-GeoNorth Program[xxiv] is also co-developing research priorities with 78 Indigenous governments and organizations as part of an ongoing process to expand the areas of common interest and to maximize benefits for Northern Canadians within the mandate of the program.

The Department is advancing commitments made by the Government of Canada to Indigenous communities during the re-initiated Phase III TMX consultation process. In 2021-22, NRCan worked with federal partner departments and 19 Indigenous communities, including three collectives[1], to implement ten unique commitments that address issues identified during TMX Phase III consultations. In collaboration with federal partner departments, NRCan also supported Canada's response to the Canada Energy Regulator's (CER) 16 recommendations to address potential impacts from marine shipping associated with the TMX project.

Indigenous Advisory and Monitoring Committees (IAMCs) for both the TMX and Line 3 Replacement Program[xxv] continue to build new relationships between regulators, the federal government, and Indigenous communities. To increase the participation of Indigenous communities and organizations in British Columbia and Alberta in economic opportunities in oil and gas infrastructure development, NRCan allocated $6M through the Indigenous Natural Resource Partnership Program (INRP)[xxvi] in 2021-22. The Department also began engaging with

[1] Stk'emlúpsemc te Secwepemc Nation (2 groups), Ts'elxweyeqw Tribal Council (7 groups), and Nlaka'pamux Nation Tribal Council (5 groups)

Indigenous and industry partners developing a National Benefits-Sharing Framework for major resource projects located on Indigenous territory.

To support the energy transition in rural, northern, remote, and Indigenous communities, the Clean Energy for Rural and Remote Communities[xxvii] program supported 115 contribution agreements to reduce reliance on diesel fuel for heat and power in these communities. Projects support community-driven clean energy solutions and create green jobs and opportunities. In 2021-22, the Indigenous Off-Diesel Initiative (IODI)[xxviii] also increased access to flexible funding for communities by issuing 14 prize grants of $1.6M to Indigenous Clean Energy Champions to continue implementing clean energy and energy efficiency projects in their communities.

iv) Promoted a diverse and inclusive workforce while supporting resource communities

NRCan launched consultations in July 2021 to inform the development of Just Transition legislation to support workers and communities in the transition to a low carbon future and creation of sustainable jobs. This aligns with the Paris Agreement's calls for countries to consider a just transition of the workforce. NRCan also worked closely with Employment and Social Development Canada (ESDC) to ensure skills and training programs target natural resource sector workers and those who could be affected by the transition to a low carbon economy. This strategy enables the transition to a net-zero future to serve as an opportunity to strengthen diversity and inclusion in the natural resource sectors.

In addition, the Science and Technology Internship Program (STIP – Green Jobs)[xxix] invested over $40M in 2021-22 and created 1700 green jobs and training opportunities for youth aged 15 to 30 in the natural resources sectors. This supported economic recovery, assisted workers and young people affected by rapidly transforming natural resource sectors, and helped build a skilled, diverse, and inclusive workforce to support a sustainable future. The Building Regional Adaptation Capacity and Expertise Program[xxx] also supported 21 regional cost-shared projects that build the skills and expertise that communities, businesses, and professionals (e.g. engineers, planners) need to apply climate change considerations in their decision-making.

NRCan also looked inward to build an inclusive, diverse, equitable, and accessible (IDEA) workplace for NRCan employees and stakeholders. Progress has been achieved in closing employment equity gaps across the organization, creating a culture of safety and inclusion, and updating policies and programs that reflect IDEA principles in an integrated way.

v) Protected Canadians from the impacts of natural and human-induced hazards and supported climate action

The Department's science and research activities helped reduce the impacts of climate change, mitigate risks from natural and human hazards, support regulatory improvements, promote innovation, and advance pre-commercial technology. In 2021-22, the Department published 76 geohazard knowledge products, increasing the understanding of earthquakes, landslides, tsunamis, volcanoes, and space weather in Canada. The 2020 National Building Code of Canada[xxxi] was also updated based on NRCan's recent seismic research. In addition, NRCan is

developing Canada's Earthquake Early Warning[xxxii] system and installing monitoring stations and infrastructure for national early earthquake warnings.

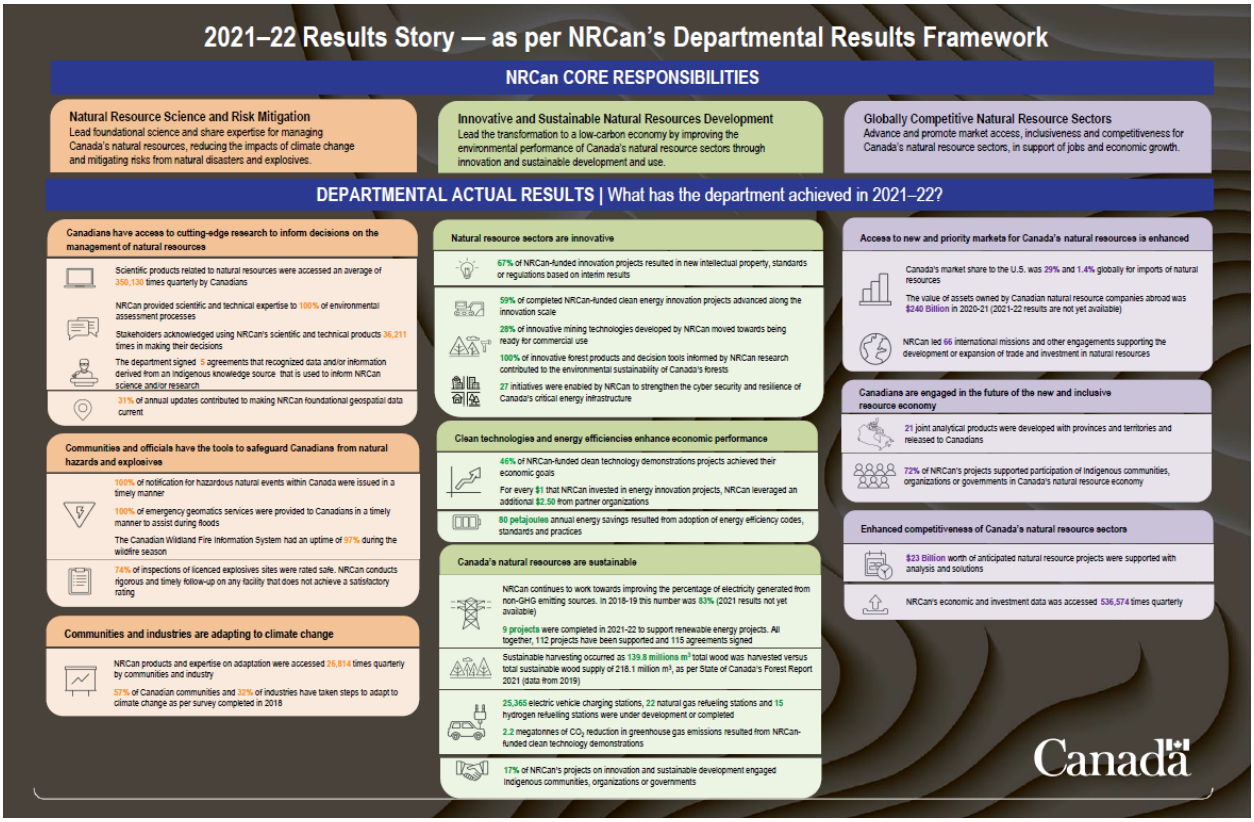
To support Canada's Emergency Management Strategy[xxxiii], NRCan is leading the $63.8M three-year Flood Hazard Identification and Mapping Program[xxxiv] with support from ECCC and Public Safety Canada. The program requires collaboration with all provinces and territories to create flood hazard maps for higher-risk areas and disseminate data and delivers on the 2021 Ministerial Mandate Letter Commitment to provide flood hazard mapping for higher risk areas. NRCan also developed a new open source flood risk assessment tool[xxxv] for practitioners to adapt using their own local data to evaluate annualized losses and compare flood scenarios and mitigation options.

To protect the sustainability of our forests and the forest bioeconomy, the Department in collaboration with provinces and territories operated the Canadian Wildland Fire Information System[xxxvi], playing a pivotal role during wildfires season by providing daily information on fire dangers and providing seasonal fire forecasting to the Canadian Interagency Forest Fire Centre[xxxvii] and situation-specific reports for the public and other federal departments

Along with other science-based departments and agencies, NRCan worked under the guidance and leadership of the Office of the Chief Science Advisor to increase transparency of science outputs by achieving 8 out of the 10 recommendations in the Roadmap for Open Science,[xxxviii] including finalizing NRCan's Open Science Action Plan[xxxix] in August 2021. In 2021-22, the Department built on the success of the Digital Accelerator[xl] initiative to support the use of AI and machine learning techniques. Strategic partnerships with non-traditional partners such as Microsoft were expended to include other NRCan sectors on 3 projects aimed to growing artificial intelligence related competencies: EV Grid Simulations, Mining Risk Mitigation, and Energy Star AI Detective.

In 2021-22, the Department worked towards delivering the commitments outlined in the Mandate Letter of the Minister of Natural Resources Canada.

For more information on NRCan's plans, priorities and results achieved, see the "Results: what we achieved" section of this report


2021–22 Results Story — as per NRCan's Departmental Results Framework
NRCan CORE RESPONSIBILITIES
Natural Resource Science and Risk Mitigation
Lead foundational science and share expertise for managing Canada's natural resources, reducing the impacts of climate change and mitigating risks from natural disasters and explosives.
Innovative and Sustainable Natural Resources Development
Lead the transformation to a low-carbon economy by improving the environmental performance of Canada's natural resource sectors through innovation and sustainable development and use.
Globally Competitive Natural Resource Sectors
Advance and promote market access, inclusiveness and competitiveness for Canada's natural resource sectors, in support of jobs and economic growth.
DEPARTMENTAL ACTUAL RESULTS | What has the department achieved in 2021–22?
Canadians have access to cutting-edge research to inform decisions on the management of natural resources
Scientific products related to natural resources were accessed an average of 358,130 times quarterly by Canadians
NRCan provided scientific and technical expertise to 100% of environmental assessment processes
Stakeholders acknowledged using NRCan's scientific and technical products 36,211 times in making their decisions
The department signed 5 agreements that recognized data and/or information derived from an indigenous knowledge source that is used to inform NRCan science and/or research
31% of annual updates contributed to making NRCan foundational geospatial data current
Communities and officials have the tools to safeguard Canadians from natural hazards and explosives
100% of notification for hazardous natural events within Canada were issued in a timely manner
100% of emergency geomatics services were provided to Canadians in a timely manner to assist during floods
The Canadian Wildland Fire Information System had an uptime of 97% during the wildfire season
74% of inspections of licenced explosives sites were rated safe. NRCan conducts rigorous and timely follow-up on any facility that does not achieve a satisfactory rating
Communities and industries are adapting to climate change
NRCan products and expertise on adaptation were accessed 26,814 times quarterly by communities and industry
57% of Canadian communities and 32% of industries have taken steps to adapt to climate change as per survey completed in 2018
Natural resource sectors are innovative
67% of NRCan-funded innovation projects resulted in new intellectual property, standards or regulations based on interim results
59% of completed NRCan-funded clean energy innovation projects advanced along the innovation scale
28% of innovative mining technologies developed by NRCan moved towards being ready for commercial use
100% of innovative forest products and decision tools informed by NRCan research contributed to the environmental sustainability of Canada's forests
27 initiatives were enabled by NRCan to strengthen the cyber security and resilience of Canada's critical energy infrastructure
Clean technologies and energy efficiencies enhance economic performance
46% of NRCan-funded clean technology demonstrations projects achieved their economic goals
For every $1 that NRCan invested in energy innovation projects, NRCan leveraged an additional $2.50 from partner organizations
80 petajoules annual energy savings resulted from adoption of energy efficiency codes, standards and practices
Canada's natural resources are sustainable
NRCan continues to work towards improving the percentage of electricity generated from non-GHG emitting sources. In 2018-19 this number was 83% (2021 results not yet available)
9 projects were completed in 2021-22 to support renewable energy projects. All together, 112 projects have been supported and 115 agreements signed
Sustainable harvesting occurred as 139.8 millions m³ total wood was harvested versus total sustainable wood supply of 218.1 million m³, as per State of Canada's Forest Report 2021 (data from 2019)
25,365 electric vehicle charging stations, 22 natural gas refueling stations and 15 hydrogen refueling stations were under development or completed
2.2 megatonnes of CO_2 reduction in greenhouse gas emissions resulted from NRCan-funded clean technology demonstrations
17% of NRCan's projects on innovation and sustainable development engaged Indigenous communities, organizations or governments
Access to new and priority markets for Canada's natural resources is enhanced
Canada's market share to the U.S. was 29% and 1.4% globally for imports of natural resources
The value of assets owned by Canadian natural resource companies abroad was $240 Billion in 2020-21 (2021-22 results are not yet available)
NRCan led 66 international missions and other engagements supporting the development or expansion of trade and investment in natural resources
Canadians are engaged in the future of the new and inclusive resource economy
21 joint analytical products were developed with provinces and territories and released to Canadians
72% of NRCan's projects supported participation of Indigenous communities, organizations or governments in Canada's natural resource economy
Enhanced competitiveness of Canada's natural resource sectors
$23 Billion worth of anticipated natural resource projects were supported with analysis and solutions
NRCan's economic and investment data was accessed 536,574 times quarterly
Canada

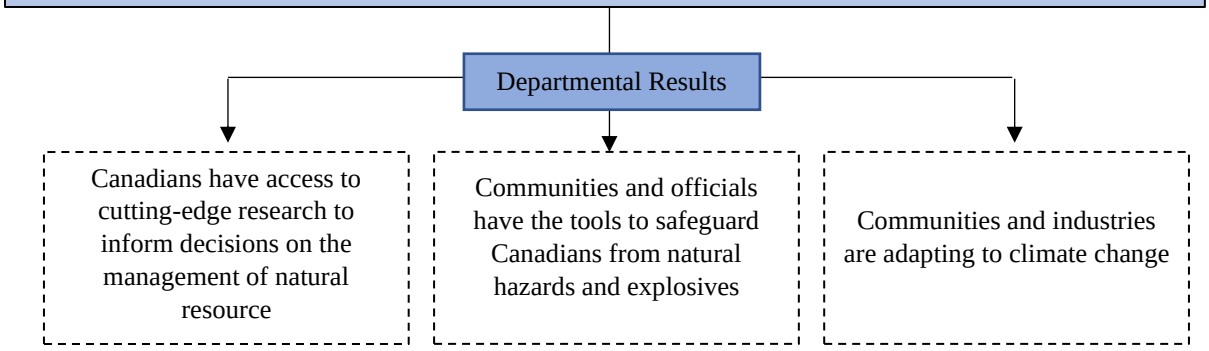
Results: What we achieved

Core Responsibilities

Natural Resources Science and Risk Mitigation

Core Responsibility Description

Lead foundational science and share expertise for managing Canada's natural resources, reducing the impacts of climate change and mitigating risks from natural disasters and explosives



Results

In 2021-22, approximately 60% of NRCan's expenditures were devoted to science and technology activities. The Department collaborated with other federal departments, provincial, territorial, and local governments, Indigenous Peoples, academic institutions, and industry to conduct science and research. These activities helped reduce the impacts of climate change, mitigate risks from natural and human hazards, support regulatory improvements, promote innovation, and advance pre-commercial technology. NRCan contributed to the development of standards to support industry and provided expert advice to decision makers. The Department grew its scientific knowledge and capacity and drew on multiple ways of learning, including Indigenous knowledge.

Canadians have access to cutting-edge research to inform decisions on the management of natural resources

This section highlights examples where NRCan made its science research available to others including all Canadians for their use or decision-making.

Spatially Enabling Canada

The Department invested in Light Detection and Ranging (LIDAR), a remote sensing technology to assist with geospatial imaging for monitoring and mapping an area's characteristics, such as elevation and vegetation coverage. This investment resulted in adding 91 of Canada's 100 largest cities to the High Resolution Digital Elevation Models[xli] database and integrating one million buildings to the Automatically Extracted Buildings[xlii] tool. These new building additions now result in a total of three million for use in government planning activities such as flood mapping, forest inventories, climate change monitoring, and urban management.

In collaboration with Indigenous partners, CIRNAC and ISC, the First Nations Land Management Program[xliii] completed 16 land descriptions and 71 comprehensive research reports of First Nations Lands to support the devolution of land management responsibilities from the federal government to First Nations under their Land Code. This work provides First Nations with increased certainty over the extent of lands under their governance. Indigenous communities received up to 12 weeks of training from land surveyors to build knowledge on legal land surveying, land management, and practical skill training through the Survey Capacity Development Program.[xliv] Three communities completed all 12 weeks of training in 2021-22.

Geological Knowledge for Canada's Onshore and Offshore Land

In 2021-22, the Geological Survey of Canada[xlv] worked with provinces and territories to complete the Pan-Canadian Geoscience Strategy,[xlvi] a key priority under the Canadian Minerals and Metals Plan (CMMP).[xlvii] The Strategy was endorsed by Mines Ministers and released in February 2022. Implementation of the Strategy is ongoing and will support a strong, coordinated, public geoscience ecosystem in Canada. This will help find future mines, lower exploration risks, boost competitiveness, support land-use decisions, reduce risks from natural hazards, and enhance public safety.

The Targeted Geoscience Initiative Program[xlviii] published reports of federally funded projects focused on critical minerals and mineral systems research and solutions for diversifying Canada's critical mineral production. The program also discussed collaborations with Geoscience Australia and the US Geological Survey under the Critical Mineral Mapping Initiative. These activities highlight federal efforts that are contributing to Canada's achievement of net-zero carbon emissions by 2050.

The GEM-GeoNorth Program[xlix] held dialogues for co-developing research priorities with 78 Indigenous governments and organizations as part of an ongoing process to expand the areas of common interest and to maximize benefits for Northern Canadians within the mandate of the program. The program also worked with Indigenous communities in the North to support

community-based mapping initiatives. A feasibility study was conducted by the Arctic Eider Society and options were assessed to incorporate geoscience into SIKU, the Inuit-developed web platform and mobile app that allowed Northerners to digitally document and share their observations on the land.

NRCan – Did you know?

Siku is an Inuktitut word meaning sea ice.

The Geoscience for New Energy Supply Program[l] consulted with Squamish First Nation to support fieldwork conducted in the Garibaldi Volcanic Belt to further assess the geothermal potential of that region. Results from this fieldwork indicate that these hydrothermal systems are much more active than realised.

The Department supported five agreements that recognized data and information derived from an Indigenous Knowledge source to inform NRCan science and research. Further, the Department established a foundation for an NRCan Indigenous Science Framework through key initiatives, such as:

- creating an Indigenous Syllabus for researchers;
- developing an inventory of science files affecting Indigenous Peoples;
- contributing to an interdepartmental working group focusing on Indigenous Science, Technology, Engineering and Math to ensure the Department can share and learn from Indigenous science priorities; and
- initiating development of a Research Ethics Policy for research involving Indigenous Peoples.

Core Geospatial Data

In 2021-22, NRCan supported the release of 210 new geospatial datasets, enabling improved responses to natural disasters and automating data access to federal regulatory registries, including the Impact Assessment Agency of Canada.[li] The Department also worked with the Open Science and Data Platform[lii] (OSDP) and Open Maps Portal[liii] to add 1,000 datasets from seven provincial and territorial jurisdictions to their databases, and also contributed over 117,000 records and publications to OSDP. The OSDP was launched in March 2021 and supports Impact Assessment processes while also providing free access to data that allows Canadians to better understand the cumulative effects of human activities and natural hazards.

The Department provided scientific and technical advice to support impact assessments for all 57 major projects across Canada undergoing impact assessment processes. The Department also responded to 100% of requests received concerning Regional Assessments of the Ring of Fire area, the St. Lawrence River, wind energy development Offshore of Newfoundland and Labrador and Nova Scotia, as well as for Strategic Assessments of thermal coal mining and climate change.

Through its satellite ground station, the Department collected and made near-real time geospatial data available to Canadians and foreign organizations daily, ensuring emergency responders could make informed decisions during disasters such as flooding and river ice monitoring events. In 2021-22, NRCan collected data on the status and trends of our changing lands, water, and infrastructure. This included national and regional scale projects related to land cover, vegetation parameters, permafrost, dynamic surface water and total water storage, surface reflectance and wetland classification.

The Department started a three-year project to develop a system to monitor Canada's volcanoes by constructing long-term time series images using RADARSAT[liv] technology. In addition, the ongoing Space Based Earth Observation[lv] project will add at least 22 Global Navigation Satellite System (GNSS) stations to Canada's inventory. GNSS ground stations provide information for global positioning system (GPS) navigation and timing services within Canada and contribute to weather forecasting.

NRCan Enhanced Data Quality Through AI

In collaboration with Canadian universities, NRCan developed and delivered the **GeoAI Data Pipeline** for extracting data from imagery using AI, resulting in the capability to offer AI as a service to deliver mapping information on demand. GeoAI brings significant improvements to the quality and accuracy of data extracted, deriving data in a fraction of the time required than other more traditional mapping methodologies. The GeoAI mapping on-demand service was used to derive and deliver over 1 million data features of building footprints to the Government of Quebec to support decision making.

The Department's research led to the procurement of two one-year subscriptions for high-resolution and high-frequency satellite imagery services. These subscriptions will result in 250 000-300 000 km2 of very high-resolution data and very high frequency data capture (daily imaging at medium resolution) across Canada for updating and delivering on-demand core geospatial data and maps.

Along with other science-based departments and agencies, NRCan worked under the guidance and leadership of the Office of the Chief Science Advisor to achieve 8 out of the 10 recommendations in the Roadmap for Open Science,[lvi] including finalizing NRCan's Open Science Action Plan[lvii] in August 2021. The Action Plan builds on NRCan's Open Science culture and aligns with the Government of Canada's approach to Open Government and Open Data by making the Department's science easily and freely accessible to Canadians. NRCan is committed to advancing the remaining two recommendations on open publications and open data, including contributing expertise to the development of the Federal Open Science Repository. The Department is also developing its own Open Institutional Repository to facilitate centralized discovery and access to NRCan's publications, to modernize the GEOSCAN[lviii] platform and to integrate with the new Federal Open Science Repository.

International cooperation in space weather forecasting will play a key role in enhancing our understanding of and resilience to space weather events. These events can interfere with critical systems such as radio and satellite communication, navigation and energy infrastructure and may therefore also result in human safety concerns. Closer scientific and technical interaction between Canadian Hazards Information Service[lix] and the National Institute of Information and Communications Technology in Japan is resulting in increased exchange of space weather data and modelling results to improve space weather forecast operations.

Pest Risk Management

Infested woodlot trees damaged by the emerald ash borer.

NRCan provided forest managers across Canada with foundational scientific information to support management of damaging pests in natural, rural and urban forests, such as the emerald ash borer,[lx] mountain pine beetle,[lxi] and spruce budworm.[lxii] The Department invested $11.9M and successfully delivered the second year of the Support for Mountain Pine Beetle Management program in Alberta, in collaboration with the Government of Alberta. In 2021-22, the program measured an 81% decline in the number of trees infested by mountain pine beetle in that province. Also, the Department invested $28.8M and successfully delivered the fourth year of the Spruce Budworm Early Intervention Strategy Phase II program. Spruce budworm populations remained below outbreak levels throughout Atlantic Canada, largely due to this innovative pest management strategy and NRCan's collaborations with provincial governments, industry, and academia.

Communities and industries are adapting to climate change

The Government is committed to taking action to address the climate change crisis, this includes a focus on mitigation and adaptation, which involves nature-based and other strategic solutions.

Forest Climate Change

The Department's work on helping Canada achieve its net zero objective by 2050 extended to natural climate solutions. In 2021-22, the 2 Billion Trees Program[lxiii] launched two Calls for Proposals (CFP). The first Call for Proposals, launched in February 2021, resulted in spending of over $59M to fund 72 projects. Approximately 28.9 million trees were planted in 2021-22 representing over 150 tree species planted in more than 500 sites across Canada. Funded projects ranged from restoration of habitat for species at risk, restoration of sites devastated by fire or insects, urban tree planting, genetic diversity, climate resiliency and capacity building. Of these projects, 18% were Indigenous-led and almost 40% were led by conservation authorities and not-for-profit organizations.

NRCan – Did you know?

The carbon sequestration and storage resulting from planting 2 billion trees will slow the rise of GHG emissions. As well, it will provide a host of co-benefits to communities and the environment, including:

- Improving air and water quality
- Restoring wildlife habitat
- Stabilizing soils
- Improving physical health and well-being of urban residents
- Fireproofing neighborhoods and communities
- Stimulating local economies

The second CFP, launched in December 2021, focused on large multi-year agreements that will fuel stable demand and investments in capacity expansion for tree nurseries and seed collection. Over 200 proposals for the program's tree planting and capacity building streams were received, with over $1B in funding requested for new projects, including multi-year projects (2022-2031). Of these proposals, 21% are Indigenous-led, and 26% are urban projects. Bilateral negotiations with provinces and territories are occurring in parallel. As part of the Natural Climate Solutions Fund horizontal initiative, the program worked with ECCC and Agriculture and Agri-Food Canada to ensure robust reporting of greenhouse gas emission reductions. Interdepartmental coordination facilitated the development of additional guidance for tree planting, habitat restoration for species at risk and species of interest.

Understanding forest carbon dynamics and the factors that affect the forest carbon stock is essential to mitigating and managing climate change. In 2021-2022, NRCan used National Forest Carbon Monitoring, Accounting and Reporting System (NFCMARS)[lxiv] data to develop forest-related greenhouse gas (GHG) emission and removal estimates for 1990-2020. These estimates were used for Canada's 2022 GHG National Inventory Report to the UN Framework Convention on Climate Change and forest carbon projections for Canada's GHG Air Pollutant Emissions Projections 2021 report. Both publications are produced by Environment and Climate Change Canada (ECCC) and cover emissions and removals in all sectors of Canada's economy.

Climate Change Adaptation

NRCan engaged with natural resources stakeholders from provinces, territories, academia and industry on Canada's National Adaptation Strategy[lxv] and the Climate Science 2050 Plan[lxvi] to examine how to make the Canadian economy and society more resilient and able to adapt to the impacts of climate change. The development of Canada's first National Adaptation Strategy was launched in June 2021. Five Strategic Advisory Tables delivered recommendations on long-term objectives and mid-term milestones to advance adaptation under five themes: health, ecosystems, infrastructure, disaster risks and the economy.

In collaboration with partner departments, NRCan delivered four reports and launched an interactive map of concrete adaptation examples under the National Assessment Process – Canada in a Changing Climate: Advancing our Knowledge for Action[lxvii] (see text box). The reports assessed how and why Canada's climate is changing; the impacts of these changes on our communities, environment, and economy; and how Canadians are adapting. Governments, Indigenous organizations, the private sector, and non-profits use this knowledge to inform projects, programs, policies, and initiatives.

Adaptation Reports Released under the National Assessment Process

1. **Canada in a Changing Climate: National Issues Report,** a synthesis of what we know about how climate change is affecting Canada and what we are doing to adapt.
2. The Atlantic Provinces chapter of the **Canada in a Changing Climate: Regional Perspectives Report**, discusses climate change impacts and approaches to adaptation across the Atlantic region.
3. **Health of Canadians in a Changing Climate** provides an assessment of the risks of climate change to the health of Canadians and to the health care system.
4. **Canada's Changing Climate Report in Light of the Latest Global Science Assessment**, provides some perspectives on the implications of the Intergovernmental Panel on Climate Change Working Group I report on the conclusions of the 2019 Canada's Changing Climate Report.

Under the Climate Change Geoscience Program[lxviii] and in partnership with the Inuit Hamlet of Grise Fiord, the Department studied glacier-ocean-ecosystem interactions through all seasons using ocean observations and experimental techniques to determine how glacier meltwater impacts ecosystem productivity and for predicting ecosystem response to climate change. Sea-level rise and other extreme high-water events resulting from our changing climate has increased the risk of flooding in coastal communities. To protect our coastal communities, the Department produced relative sea-level projections for Canada to support adaptation tools,[lxix] adaptation decisions, climate change assessments and decisions on standards and guidelines.

Other adaptation tools and datasets developed by the Department and made available to Canadians cover topics, including forest composition, productivity and regeneration, natural hazards and extreme weather, and adaptive silviculture. Collaborations between the Department and the Government of Northwest Territories, for example, led to a framework that will enable the Northwest Territories to monitor and anticipate how climate change will affect forests.

In addition, the Building Regional Adaptation Capacity and Expertise Program[lxx] supported 21 regional cost-shared projects that enhance the skills, knowledge and capacity that communities, businesses, and professionals (e.g. engineers, planners) need for applying climate change considerations in their decision-making. In 2021-22, investments in training and knowledge exchange activities increased the number of available workers with climate change adaptation skills. Examples include over 75 interns placed with communities and businesses in Alberta and Prince Edward Island to develop community adaptation plans and undertake risk assessments, and more than 70 funded courses developed to improve adaptation knowledge and skills. To increase access to these courses, many were offered virtually.

Communities and officials have the tools to safeguard Canadians from natural hazards and explosives

This section highlights where NRCan's science and research contributed to the ability to understand, predict and monitor natural and man-made hazards. This is key to developing and providing protective tools to communities at risk of recurrent or occasional hazards.

Explosives Safety and Security

NRCan has a mandate to ensure the safety of Canadians and those who work with explosives. With this aim, the Department launched a review of the *Explosives Regulations, 2013*[lxxi] with the goal of modernizing the Canadian explosives regulatory regime. This included a comprehensive engagement strategy to consult stakeholders and experts on proposed amendments and updating the existing list of restricted chemicals. In 2021-22, the percentage of inspections of explosives sites rated safe was 73.6%, exceeding the target of at least 70%. Additionally, NRCan supported other departments and law enforcement to conduct engineering analysis and peer reviews of structural vulnerability to blast assessments

Geoscience to Keep Canada Safe

In 2021-22, the Department published 76 geohazard knowledge products, increasing the understanding of earthquakes, landslides, tsunamis, volcanoes, and space weather in Canada. All this knowledge accumulation enabled the Department to issue notifications for hazardous natural events within Canada in a timely manner 100% of the time, surpassing the target of at least 90% of the time. NRCan also partnered with major international agencies and corporations in an Open Geospatial Consortium Disasters Pilot. The Pilot demonstrated how to use advanced geospatial standards to support first responders.

The Department undertook research in central Canada to better understand earthquakes. This work contributed to the assessment of safe and appropriate sites for nuclear waste repositories. Ongoing work in collaboration with the United States Geological Survey and other stakeholders will contribute to understanding the size and frequency of earthquakes in Canada. Further, NRCan compiled an overview of landslide hazards both above and underwater in Pangnirtung Fiord, along with tsunami modelling of a large submarine landslide that were translated into Inuktitut and shared with the community to enhance local disaster preparedness.

NRCan is developing Canada's Earthquake Early Warning[lxxii] system and installing monitoring stations and infrastructure for national early earthquake warnings. The system provides several seconds notice before strong shaking starts. This generates alerts for critical infrastructure, industry, and the public to help protect people, communities, infrastructure, and the environment during an event where every second counts. The system will become fully operational by 2024 to provide early earthquakes warnings to more than 10 million people living in the most earthquake-prone regions in Canada.

The 2020 National Building Code of Canada[lxxiii] was published in 2021, informed by the NRCan national seismic hazard model which was updated based on NRCan's recent seismic research. New analysis and assessment of seismic hazard for Canada used in the 2020 edition of the National Building Code will ensure that earthquake-resistant engineering is appropriately used across Canada, thus mitigating a future earthquake disaster.

The Department's Emergency Geomatics Service[lxxiv] team analyzed landslides and provided operational planning centres and flood responders with 209 map products describing the state of river ice and the extent of flooding in cities and surrounding areas. NRCan also developed a new open source flood risk assessment tool[lxxv] for practitioners to adapt using their own local data. This tool supports efforts to evaluate annual losses and to compare flood scenarios and mitigation options.

As part of the Wildfire and Flood Resilience initiative and in support of Canada's Emergency Management Strategy,[lxxvi] NRCan received approval to lead the $63.8M, three-year Flood Hazard Identification and Mapping Program.[lxxvii] NRCan, with support from ECCC and Public Safety Canada, is collaborating with all provinces and territories to create and share flood hazard maps for higher-risk areas. This program is delivering on the 2021 Ministerial Mandate Letter Commitment to provide flood hazard mapping for higher risk areas.

Wildfire Risk Management

Our forests remain the source of livelihood for many Canadians and an essential buffer against the effects of climate change. To protect the sustainability of our forests and the forest bioeconomy, the Department in collaboration with provinces and territories operated the Canadian Wildland Fire Information System.[lxxviii] The system played a pivotal role in situational awareness and operations during wildfires season by providing daily information on fire dangers. The Department also provided seasonal fire forecasting to the Canadian Interagency Forest Fire Centre[lxxix] and prepared a series of situation-specific reports for the public and other federal departments.

NRCan worked with Public Safety Canada and other partners to develop a wildland fire risk assessment for Canada as part of the first National Risk Profile.[lxxx] The National Risk Profile will improve Canada's ability to predict and respond to threats, including enhancing our understanding of the nature of risks posed by floods, wildfires, and earthquakes. The Department supported the Canadian Council of Forest Ministers[lxxxi] in convening the first-ever Canadian Dialogue on Wildland Fire and Forest Resilience, delivering on a commitment made by ministers to conduct a national conversation on wildland fire resilience. This discussion recognized that wildfire resilience is a shared responsibility that requires awareness, coordination, and shared responsibility between and among governments at all levels, Indigenous peoples, emergency management agencies, and the private sector.

Polar Continental Shelf Program

Established in 1958, the Polar Continental Shelf Program (PCSP)[lxxxii] has become Canada's centre of excellence for logistics, contributing to the advancement of scientific knowledge of the Canadian landmass and the exercise of Canadian sovereignty in Canada's North. In 2021-22, PCSP increased contracts awarded to small and medium-sized Inuit firms. This included procuring over $2.5M in goods and services from Indigenous firms and implementing a new modern client intake portal to improve service delivery. Also, the PCSP is replacing its field equipment inventory system and improving its logistics database. This work will help modernize PCSP's digital tools and databases, which will improve service delivery.

Gender-based analysis plus

NRCan uses gender-based analysis plus (GBA Plus) to assess all initiatives for potential impacts or implications on diverse populations of Canadians. Here are some examples where NRCan used GBA Plus under this Core Responsibility to address potential barriers, leading to more inclusive and equitable opportunities.

The Core Geospatial Data Program inspired girls in science, technology, engineering and mathematics and facilitated greater inclusion of Indigenous communities and partners in STEM fields.

Under the Geological Knowledge for Canada's Onshore and Offshore Land Program, the United Nations Convention on the Law of the Sea (UNCLOS) Program supported labour market opportunities for diverse groups of women, especially women in underrepresented groups (e.g.,

Indigenous peoples). Mapping and research activities undertaken by the UNCLOS Program continues to work towards providing direct benefits to Northerners by creating jobs and stimulating interest in higher education.

United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals

NRCan's planned activities under this Core Responsibility support Canada's efforts to address the United Nation 2030 Agenda and the achievement of several of the following Sustainable Development Goals (SDG).

In support of SDG 13- Climate Action, NRCan:

- Convened members of the Climate Change Adaptation Platform to exchange lessons learned in assessing and implementing actions that address the impacts of a changing climate.
- Released four reports from NRCan's National Knowledge Assessment that provided Canadians with an up-to-date synthesis of the latest knowledge about climate change impacts and adaptation action.
- Developed and improved adaptation tools for the Forest Climate Change Program,[lxxxiii] supported foundational research, co-created custom solutions for vulnerable regions and populations, and delivered carbon accounting analyses to help stakeholders to meet GHG reduction targets.
- Engaged with a broad audience of natural resource stakeholders from provinces, territories, academia and industry on the National Adaptation Strategy[lxxxiv] (NAS) and the Climate Science 2050 Plan (CS2050). Engagement was carried out through the Canadian Council of Forest Ministers (CCFM) as well as the Adaptation Platform working groups on forestry.

In support of SDG 11 – Sustainable Cities and Communities, NRCan:

- Modelled and published credible earthquake scenarios through the Geological Survey of Canada to help all levels of government understand the potential impacts of these events and plan to make their jurisdictions more resilient.
- Installed an early earthquake warning system, which will strengthen the resilience of both infrastructure and people to earthquakes.
- Advanced the Emergency Management Strategy[lxxxv] through research, development, and publication related to the Federal Flood Mapping Guidelines Series, the development and maintenance of the National Flood Hazard Data Layer, National Flood Susceptibility Layer, and Historic Flood Events Database, and two Standards Council of Canada (SCC) national flood mapping standards.

In support of SDG 14 – Life Below Water, particularly SDG 14c - Conservation and Sustainable Use of Oceans and their Resources, NRCan:

- Reinforced the United Nations Convention on the Law of the Sea[lxxxvi] (UNCLOS) Program by providing scientific and technical expertise to Global Affairs Canada on issues of Arctic sovereignty and seafloor governance to maximize Canada's entitlement in accordance with international law, position Canada for the successful defence of its Atlantic and Arctic ocean submissions, and future boundary negotiations with neighbouring states to resolve continental shelf overlaps.
- Collaborated with the international science community and contributed data sets to increase our understanding of the geology of continental margins.

Additional information about how NRCan activities support United Nations' 2030 Agenda and Sustainable Development Goals are reflected under the NRCan 2020-23 Departmental Sustainable Development Strategy.[lxxxvii]

Experimentation

NRCan collaborated with Privy Council Office and ECCC on the Program of Applied Research for Climate Action[lxxxviii] to identify and apply behavioural insights to make policies, programs and communications as effective as possible in encouraging climate action among Canadians. The first phase of this program was a public opinion research and monitoring study with a large and nationally representative sample of Canadians. This study gathered data about Canadians' perceptions of climate change, willingness to act to mitigate climate change, and engagement in a handful of pro-climate mitigation and adaptation behaviours. Preparations for the second phase of the program included outlining potential rapid online surveys or experiments to identify factors that can enable climate action and test the impacts of low-cost digital interventions on Canadians' behaviours related to climate change mitigation or adaptation.

Further, NRCan has been testing the use of tools like behavioural insights, foresight, and gamification (a strategy to make non-game activities more engaging and interactive) to examine how innovative approaches can inform policy and risk analysis. This work has been applied to topics ranging from urban forestry, species at risk and testing the role of narratives in encouraging action on climate change.

Key risks

At the outset of the fiscal year, NRCan identified risks related to the impact of climate change on the natural resources sector, the rapid pace of science and technological innovation and the increasing occurrence of natural and human-induced hazards and emergencies.

To address these risks, NRCan leveraged existing innovation resources to RD&D projects that advanced solutions to environmental challenges as evidenced by Canada's Climate Change Adaptation Platform,[lxxxix] which included new products that provided guidance to support the use of nature-based infrastructure, cost-benefit analysis to support business cases for action, and new guidance for the mining and electricity industries.

NRCan supported training and knowledge exchange activities to increase the capacity of organizations, professionals, and communities to undertake climate change adaptation action. For example, the Department maintained the Open Science and Data Platform initiative as part of the Government of Canada's approach to address impact assessment regime and cumulative effects. As another example, the Department implemented a new Open Institutional Repository to facilitate public discovery and access to NRCan`s science publications while also ensuring their long-term preservation.

NRCan also addressed needs of communities and critical infrastructure through pre-emptive and preventative, or responsive measures, using innovative science and technology, including a the development of an IT architecture for an enhanced Canadian Wildland Fire Information System and Canadian Wildland Fire Information Framework, the development of a Major Incident Management Plan (MIMP) to ensure quick answer and minimize impact when an incident happens and affects systems and a Cyber Security Event Management Plan to provide an operational framework for the management of cyber security events.

These responses allowed NRCan to support innovations, advance science and collaborate with partners and stakeholders.

Results achieved

The following table shows, for Natural Resource Science and Risk Mitigation, the results achieved, the performance indicators, the targets and the target dates for 2021–22, and the actual results for the three most recent fiscal years for which actual results are available.

Departmental results	Performance indicators	Target	Date to achieve target	2019–20 actual results	2020–21 actual results	2021–22 actual results
Canadians have access to cutting-edge research to inform decisions on the management of natural resources	Number of times scientific products related to natural resources are accessed by Canadians	At least 450,000 quarterly average	March 2022	504,242	365,935	350,130
	Percentage of environmental impact assessments demonstrating use of scientific and technical advice	Exactly 100%	March 2022	100%	100%	100%

	provided by NRCan					
	Number of times stakeholders acknowledge using NRCan's scientific and technical products in making their decisions	At least 30,250	March 2022	30,957	30,974	36,211
	Number of NRCan agreements that recognize data and/or information derived from an Indigenous Knowledge source and is used to inform NRCan science and/or research[2]	To be determined in 2022-23	To be determined in 2022-23	Not available	Not available	5
	Percentage of annual updates to make NRCan foundational geospatial data current	At least 20% average annual updates towards full refresh over 5 years	March 2022	Not available	21%	31%

[2] Since the 2021-22 Departmental Plan, NRCan has revised the methodology to more accurately count the number of training and development initiatives that enable NRCan to incorporate Indigenous Knowledge in conjunction with NRCan science. For this reason, historical information is not available.

Communities and officials have the tools to safeguard Canadians from natural hazards and explosives	Percentage of hazardous natural events within Canada for which a notification was issued in a timely manner	At least 90% (100% by March 2023)	March 2022	97 %	100%	100%
	Percentage of emergency geomatics services provided to Canadians in a timely manner to assist during floods	100%	March 2022	100%	100%	100%
	Percentage uptime of the Canadian Wildland Fire Information System during the wildfire season	At least 97%	March 2022	97%	97%	97%
	Percentage of inspections of explosives sites rated safe[3]	At least 70% (90% by March 2025)	March 2022	82%	73%	74%

[3] A 'safe' rating indicates an inspection rated "satisfactory or better." NRCan conducts rigorous and timely follow up on any facility that does not achieve a satisfactory rating.

Communities and industries are adapting to climate change	Number of times NRCan products and expertise on adaptation are accessed by Canadians	At least 34,000 quarterly average	March 2022	46,085	25,858	26,814
	Percentage of Canadian communities and industries that have taken steps to adapt to climate change	At least 60% for communities At least 40% for businesses	March 2023	57% for communities 32% for businesses (from 2018 survey)	57% for communities 32% for businesses (from 2018 survey)	57% for communities 32% for businesses (from 2018 survey)[4]

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[xc]

Budgetary financial resources (dollars)

The following table shows, for Natural Resource Science and Risk Mitigation, budgetary spending for 2021–22, as well as actual spending for that year.

2021–22 Main Estimates	2021–22 planned spending	2021–22 total authorities available for use	2021–22 actual spending (authorities used)	2021–22 difference (actual spending minus planned spending)
252,369,016	252,369,016	365,474,654	326,773,358	74,404,342

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[xci]

[4] The next survey will take place in fiscal year 2022-23

Human resources (full-time equivalents)

The following table shows, in full-time equivalents, the human resources the department needed to fulfill this core responsibility for 2021–22.

2021–22 planned full-time equivalents	2021–22 actual full-time equivalents	2021–22 difference (actual full-time equivalents minus planned full-time equivalents)
1,213	1,263	50

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[xcii]

Innovative and Sustainable Natural Resources Development

Core Responsibility Description

Lead the transformation to a low-carbon economy by improving the environmental performance of Canada's natural resource sectors through innovation and sustainable development and use of explosives

Departmental Results

- Natural resource sectors are innovative
- Clean technologies and energy efficiencies enhance economic performance
- Canada's natural resources are sustainable

Results

Transitioning to a net-zero emissions future by 2050 requires bold decisions and actions from Canada's natural resource sectors. Through innovation, clean technology programs and policies, the Department provided leadership for Canada's energy, mining, and forest sectors to transition affordably and sustainably. Following on recommendations from the Generation Energy Council Report[xciii] and to advance measures announced in Canada's Strengthened Climate Plan, A Healthy Environment and a Healthy Economy[xciv] NRCan also supported the energy efficiency efforts of Indigenous communities, Canadian businesses and industry, municipalities and homes. In 2021-22, the department achieved the following results.

Natural resource sectors are innovative

This section showcases examples of NRCan's programs and initiatives continued to propel innovation, generate critical knowledge, provide scientific expertise, and make advances in the development of new technological solutions in the natural resources sector as we transition to net-zero emissions by 2050.

Energy innovation and clean technology

In 2021-2022, the Clean Growth Hub (the Hub),[xcv] co-led by NRCan and Innovation, Science, and Economic Development Canada, supported 422 new clients through its single-window service to help stakeholders navigate federal programs that are most relevant to their needs. The Hub proactively engaged clean tech companies that are poised to be leaders in the clean technology sector and developed a new partnership with Employment and Social Development Canada, increasing its member departments and agencies from 16 to 17. Further, the Hub developed and began implementing a Reconciliation, Equity, Diversity, and Inclusion Action Plan to provide tailored advice to equity-seeking groups and increase opportunities for diverse stakeholders in the clean technology sector.

Through the Energy Innovation Program (EIP)[xcvi] and the Program of Energy Research and Development,[xcvii] the Department supported over 250 clean energy research, development and demonstration (RD&D) projects in 2021-22, carried out by innovative Canadian businesses, utilities, communities, and via world-class research in federal laboratories such as CanmetENERGY research centres.[xcviii] These projects contributed to advancements in energy efficiency, reducing emissions, improving environmental outcomes, modernizing electricity systems, and addressing barriers to the integration and adoption of clean energy solutions in industry, communities and transportation.

Overall, 60% of NRCan-funded energy RD&D projects resulted in new intellectual property or had an influence on codes, standards, or regulations, surpassing the target of at least 5% by project completion (typically 3-4 years). These initiatives resulted in the creation of 54 new patents; in addition, 39 projects directly improved codes or standards. The Department continued to advance pre-commercial energy technologies towards commercial readiness, with 59% advancing along the innovation scale, surpassing the target of at least 50%. Since technology readiness levels are assessed and reported at the end of the project and many projects are still ongoing, this result represents a fraction of the full program portfolio and serves as an indicator of progress to date.

Research conducted at the CanmetMATERIALS[xcix] lab led to three cutting-edge intellectual property opportunities: newly patented pipeline leak detection sensors; a new continuous casting and light rolling technology for the aluminum manufacturing industry; and a performance improving prototype for hybrid electric vehicle drive trains that recover heat waste with the use of thermoelectric materials. Under the Science and Technology Assistance for Cleantech initiative, researchers in federal labs worked collaboratively with innovators in 23 small-to-medium sized enterprises, providing technical expertise and access to resources at federal research centres to help overcome technical capacity gaps.

Under the EIP's Breakthrough Energy Solutions Canada (BESC)[c] initiative, NRCan provided support to proponents who participated in Tech-To-Market (T2M). These proponents also received BESC funding and participated in T2M sessions with experts to pitch their clean technologies to potential investors.

Projects funded under EIP Streams continue to advance clean energy technologies and support the clean energy transition. In 2021-22, these projects filed for 27 patents or other intellectual property (IP), created 9 platforms or software tools, influenced 28 codes, standards, or regulations, and directly reduced 2.19Mt of GHG emissions. In addition, projects have been successful in attracting investments, with every $1 of NRCan funding leveraged $2.5 in contributor funds.

The EIP launched $53M in new funding calls targeting Industrial Fuel Switching, Clean Fuels Production, and Hydrogen Codes and Standards to accelerate the development of emission reducing technologies and create pathways for the use of cleaner fuels in hard-to-abate segments of industry. These programs will help provide vital solutions to reduce emissions in heavy industry, which represented 11% of Canada's total emissions in 2019.

Excellence in Innovation: Impact Canada Women in Cleantech Challenge

In coordination with delivery partner MaRS Discovery District, the Impact Canada Women in Cleantech Challenge held its Finale event on November 30, 2021, where Amanda Hall (CEO, Summit Nanotech) was announced as the $1 million grand prize winner. Summit Nanotech developed an improved extraction process which has the potential to create an inexpensive and sustainable source of green lithium for batteries. All six women entrepreneurs made significant strides during the Challenge, raising $52.2 million in investments and increasing paid employment by the ventures by 725%.

Following extensive discussions with stakeholders in Canada and internationally, in collaboration with Impact Canada, the Department successfully launched the Oil Spill Response Challenge.[ci] The Challenge will widen the available oil spill response technologies for use in aquatic environments and advance innovative and rapidly deployable solutions to improve detection and recovery of oil spills in freshwater and marine systems.

Canada continued to play a leadership role in Mission Innovation,[cii] an international initiative to accelerate global clean energy innovation. In 2021-22, NRCan took on the role of Chair of the MI Steering Committee and, with the United States and Saudi Arabia, launched MI's Carbon Dioxide Removal Mission at the United Nations Climate Conference (COP 26)[ciii]. Also, the Department chaired the International Energy Agency's Committee on Energy Research and Technology and participated in 22 of the IEA's Technology Collaboration Programmes (TCPs). These TCPs supported the work of independent groups of experts around the world to lead programs and projects on a wide range of energy technologies and related issues.

Carbon capture, utilization, and storage (CCUS) and Carbon Dioxide Removal (CDR) play an essential role in the transition to a prosperous net-zero economy. Recognizing this, NRCan built on its leadership and expertise in this space by launching a new suite of activities to support the development and deployment of CCUS and CDR technologies in Canada. NRCan engaged nearly 1500 stakeholders to advance development of a CCUS Strategy for Canada and policy and technical support to other federal departments on CCUS and related initiatives, such as to Finance Canada on the development and implementation of the CCUS Investment Tax Credit[civ] announced in Budget 2022. As part of Budget 2021's $319M CCUS RD&D initiative, the EIP launched a first funding call that focused on CCUS Front-End Engineering and Design projects with the potential to significantly mitigate emissions. Eleven projects were selected for up to

$50M in funding. Additionally, EIP-CCUS invested $26.2M over two years for experts in federal labs to undertake critical applied CCUS research.

The Clean Growth Program[cv] funded 43 clean technology RD&D projects in the energy, mining and forestry sectors, with 30 successfully completed as of 2021-22. Projects were successful in leveraging $2.5 of contributor investments for every $1 of NRCan funding, surpassing the set target of 1:1. Among these projects were Canfor Pulp's FEED[cvi] study, which supports a commercial-scale demonstration plant that will produce advanced liquid biofuels for transportation. In 2021-22, projects led to reductions of 14,131 tons of CO2 emissions, reduced water used by 13,712,426 m3, and reduced waste by 70,896 tons; projects are on track to meet or surpass 2027 program targets.

In 2021-22, NRCan supported 37 projects through the Investments in Forest Industry Transformation (IFIT) Program[cvii] to facilitate the adoption of transformative technologies. For instance, the support provided to Haliburton Forest Biochar for the expansion of the Biochar Production Facility which has the potential to generate a net reduction of 4,200 tons per year of CO_2 equivalent emissions and offset more than 7,500 tons per year of CO_2 equivalent emissions. The biochar produced will be used to displace fossil fuel products in advanced manufacturing processes on a pound-for-pound basis.

Centre for Advanced Building Envelope Research

The Department, in collaboration with Carleton University, completed construction of North America's largest envelope research facility, the Centre for Advanced Building Envelope Research at NRCan's CanmetENERGY-Ottawa. The facility is a collaborative research project which seeks to advance the development of lower cost, low carbon building envelope solutions that can be used to decarbonize the building sector. These future solutions will help drive new cleaner technologies and efficiencies in the natural resources sector.

The Forest Innovation Program[cviii] funded multiple research in support of the forest sector's innovative agenda, including development and technology transfer. Assistance to FPInnovations supported research towards carbon/GHG reduction targets required for Sustainable Forest Management Certification for forest operations; the improvement of regulations and to develop new standards or regulations for new products. Further program investments contributed directly to developing a biodegradable surgical mask from Canadian wood fibre and pilot trials adding wood lignin in asphalt to displace bitumen and better store carbon.

Green mining innovation

Globally, the demand for ethically sourced and environmentally friendly natural resources is on the rise. For this reason, CanmetMINING advanced the Mining Value from Waste Program[cix] to generate value from mine waste and to enhance mine waste management for ecosystem restoration and mine closure. Results achieved in 2021-22 include processing solutions capable of recovering desired metals such as gold while removing undesired chemicals like sulfur as well as a database for capturing mine waste practices and technical recommendations.

Canada's mining sector is crucial in the net-zero transition, and NRCan provided leadership so that the sector can transition sustainably. In 2021-22, the Department prepared to launch

Canada's first Critical Minerals Strategy that will lead to the creation of thousands of jobs, grow our economy and make Canada a vital player on the world stage. As part of Budget 2022, the Government provisioned $3.8 billion over the next eight years to implement the Strategy.

The Department launched the Critical Minerals Centre of Excellence[cx] to lead the development and coordination of policies and programs on critical minerals, in collaboration with industry, provincial, territorial, Indigenous, non-governmental and international partners. As the hub for Canada's initiatives on critical minerals, the Centre will advance critical mineral resources and value chains, which are essential for a green and digital economy. The Centre supported establishing the Mining Innovation Commercialization Accelerator (MICA)[cxi] Network in July 2021. MICA's objective is to accelerate the development and commercialization of innovative technologies to make the mining sector more productive and sustainable. In addition, NRCan launched the Critical Minerals Research, Development and Demonstration Programs.[cxii] The program will advance the commercial readiness of emerging mineral processing unit operations or technologies that will support the development of zero-emission vehicle (ZEV) value chains in Canada by providing raw material inputs for use in batteries and permanent magnets.

Through CanmetMINING projects, the Department carried on advancing R&D on critical minerals, the building blocks for the low-carbon transition, under three research streams:

(i) battery minerals (such as lithium, nickel, cobalt, graphite, and vanadium),

(ii) mining value from waste, and

(iii) clean tech and other value chains (such as rare earth elements and niobium).

NRCan supported Canada in hosting the World Circular Economy Forum (WCEF)[cxiii] to highlight circularity in the natural resource sectors and explore ways to better understand the potential of a sustainable circular economy in Canada. The Forum included sessions on circularity in the mining sector, built environment, and battery value chains. The Forum brought together stakeholders to explore policy, investment, and market levers while aligning with net-zero goals and creating new economic and employment opportunities. In addition, NRCan released Circular Economy & the Built Environment Sector in Canada[cxiv] assessing the potential of the circular economy to improve construction techniques and building management strategies to reduce waste and GHG emissions in Canadian cities.

Clean technologies and energy efficiencies enhance economic performance

Energy efficiency plays an important role in reducing energy demand and supporting Canada's emissions reduction targets while helping individual Canadians and businesses save money on energy costs, improving competitiveness, and creating jobs. Canada's energy efficiency increased by more than 12% in 2018 compared to 2000, avoiding energy costs of $26.2B. While Canadian energy use rose by 19% during that same period, it would have risen by 31% without energy efficiency measures.

Energy efficiency

Since the launch of the Canada Greener Homes Grant Initiative[cxv] in May 2021, over 171,000 applications have been received, with tens of thousands of additional applications being processed by partner programs in Quebec and Nova Scotia. The Initiative issued $38M in grants to 10,300 homeowners. Additionally, 446 new energy advisors have been trained, making 1,400 energy advisors available across the country. A further 17 agreements have been signed to support the recruitment, training, and mentorship of new energy advisors.

To drive advancements in energy efficiency, the Energy-Efficient Buildings Research, Development and Demonstration Program[cxvi] completed its third call for proposals. As of 2021-22, 18 high-efficiency demonstration projects were supported, which helped accelerate the development and adoption of net-zero energy ready building codes and cleaner technologies. Projects announced last year include funding to Canada's Home Builders' Association[cxvii] for deep energy retrofits in houses and low-rise multi-unit residential buildings. These projects will assist Canadians in improving their home energy efficiency, while also contributing to our 2030 and 2050 climate objectives.

The EnergyGuide Rating System (ERS)[cxviii] provides a framework and tools for a detailed assessment of home energy use for both new and existing housing. Over 50 partners across Canada including provinces, territories, municipalities, and utilities use ERS as the basis for incentive programs, code compliance, and standards for new housing. Similarly, the Local Energy Efficiency Partnerships[cxix] initiative continued to foster the construction industry's capacity and confidence in net-zero-energy ready technologies, notably by producing training videos, developing industry tools and holding workshops.

Engagement with provinces and territories through the Federal Provincial Territorial Energy Codes Implementation Group continued, and in March 2022, the net-zero energy ready National Energy Code of Canada for Buildings 2020[cxx] was published for adoption by provinces and territories, and compliance tools to support implementation of the codes were developed.

NRCan administered the ENERGY STAR for Products Program,[cxxi] which encouraged and promoted consumer purchases of high-efficiency products. Since 2001, ENERGY STAR-certified products are estimated to have saved approximately 278 petajoules (PJ) of energy and avoided emissions of about 30 Mt of GHGs. In 2021-2022, the Program achieved an estimated 28.76 PJ of cumulative annual energy savings (about 3.04 Mt of GHG emissions avoided). Additionally, six ENERGY STAR product specifications were updated including, Heat-Energy-Recovery Ventilators, Pool Pumps, Electric Vehicle Supply Equipment, Imaging Equipment, Commercial Dishwashers and Residential Refrigerators and freezers.

The Department collaborated with the U.S. Environmental Protection Agency to expand the ENERGY STAR Portfolio Manager[cxxii] benchmarking tool and took steps to ensure that Canadian content in the tool will continue to be improved. Over 29,000 buildings and 346 million m2 of floor space are captured in the tool representing an approximately 10% increase over last year.

In 2021-22, Amendment 17 to Canada's Energy Efficiency Regulations,[cxxiii] which is proposing to update energy efficiency standards for air conditioners and heat pumps, was approved for prepublication, and the 2022-2024 forward regulatory plan was published. These Amendments and the forward regulatory plan will support energy efficiency improvement of residential, commercial, and industrial products over the next several years.

The Department provided federal partners with support to transition to low-carbon, climate-resilient, and green operations through provision of an enhanced suite of Greening Government[cxxiv] technical services. These services provided support for capacity building, benchmarking, strategic planning, project implementation, and performance tracking throughout federal operations. This support helped federal organizations design and implement energy saving and GHG emission reduction projects in their facilities and deploy low-emission vehicles and charging stations.

Through the Market Transformation Roadmap,[cxxv] the Department worked with provinces and territories to improve the energy efficiency of windows, space heating and water heating by addressing technical and market barriers to the adoption of new technologies, and by accelerating market uptake.

RETScreen's New Archetypes Supporting GHG Reductions

NRCan's RETScreen Clean Energy Management Software platform is used by many governments around the world, including Canada's Department of National Defence. RETScreen's Virtual Energy Analyzer provides 15 new full-facility archetypes focused on cost-effective energy efficiency measures and renewable energy technologies. These include classroom building, dining building, barrack, dormitory, office building, industrial and small workshop, sports centre, fire station, garage, hangar, storage facility and warehouse. These new military archetypes enable the sector to accelerate the deployment of low-carbon solutions to cost-effectively reduce greenhouse gas and advance more sustainable use of Canada's energy and natural resources.

In collaboration with ISED, NRCan is co-leading the Clean Technology Data Strategy,[cxxvi] which provided information to measure the economic, environmental and social contributions of the cleantech sector in Canada. This initiative provided up to date authoritative statistics, new information on our Canadian cleantech companies, and administrative data from federal programs that support them.

Artificial Intelligence is driving multiple research activities at NRCan as the natural resource sectors are potential end-users of various quantum technologies including sensors, materials, computing and communication. In 2021-22, the Department built on the success of the Digital Accelerator[cxxvii] initiative to support the use of AI and machine learning techniques. NRCan participated in the development of the National Quantum Strategy,[cxxviii] and engaged with other government departments and agencies to exchange knowledge, explore data-sharing and assess potential for alignment on shared priorities (see textbox).

Remote Communities Power Usage Forecasting

The Digital Accelerator explored and implemented numerous machine-learning techniques for forecasting the hourly power-usage of remote northern communities, where the only energy supply is from fossil fuel. The technique used historical power-consumption data and other factors such as temperature and population.

Access to independent and credible energy data can be crucial in helping both public and private sectors make informed decisions and formulate strategic plans. In 2021-22, NRCan worked with Statistics Canada and others to

improve the accessibility and overall quality of Canada's energy data, housing resources on energy-related information, including production, consumption, and international trade through collaboration on the Canadian Centre for Energy Information (CCEI).[cxxix] Building on a strong foundation established during its first year of operation, the CCEI expanded content on its one-stop website, developed new sources of data to address priority data gaps, and published new dashboards, infographics, and studies on a variety of energy topics.

Through the Green Municipal Fund (GMF),[cxxx] which is administered by the Federation of Canadian Municipalities, NRCan supported innovative and replicable municipal environmental projects through grants, loans, capacity building, and knowledge sharing. Since 2000, GMF activities have resulted in 882,531 GJ of energy saved per year, 2.82 Mt of GHG emissions avoided, 94 hectares of land reclaimed, in addition to economic and social benefits like contributing $1.14B to national GDP, 12,179 person-years of employment, and improved quality of life and reduced poverty.

In partnership with ECCC, the Department launched pre-engagement consultations in December 2021 on the proposed oil and gas emissions cap. At COP26 in November 2021, the Minister committed to ending new direct public support[cxxxi] for the international unabated fossil fuel energy sector by the end of 2022. Further, the Department worked with ECCC and Finance Canada to identify non tax measures that could be considered inefficient fossil fuel subsidies (subsidies that encourage wasteful consumption) and worked to shape the assessment framework used to assess all potential inefficient fossil fuel subsidies government wide.

With investments of $200M, the Emerging Renewable Power Program[cxxxii] is expanding the portfolio of commercially viable renewable energy source available to provinces and territories as they work to reduce GHG emissions from their electricity sectors. Initiatives include bi-facial solar, geothermal, and in-stream tidal projects.

Canada's natural resources are sustainable

As we build a country resilient to climate change, the Department played a pivotal role in launching programs to support Canada's Strengthened Climate Plan – A Healthy Environment and a Healthy Economy[cxxxiii] and continued to implement projects under the Pan-Canadian Framework on Clean Growth and Climate Change[cxxxiv].

Energy and climate change policy

The Department developed policy proposals and provided analysis to support the development of Canada's 2030 Emissions Reduction Plan,[cxxxv] which was announced on March 29, 2022. The Plan will achieve at least 40% lower emissions by 2030 compared to 2005 and put Canada on a path to net-zero by 2050.

The Department continued to implement the $750M Emissions Reduction Fund (ERF)[cxxxvi] to support capital investments, clean technology deployment, and research to reduce methane and

other GHG reductions from onshore and offshore oil and gas operations. The ERF has three streams:

- To date, the **Onshore Deployment Program** component of the ERF has funded 92 projects across Alberta, Saskatchewan, British Columbia, and Manitoba. Projects funded to date are anticipated to achieve methane emission reductions of approximately 4 Mt of CO2e in the first twelve months following project completion, which is equivalent to removing about 1 million passenger vehicles from our roads for one year. When amortized over 10 years these projects represent an average cost of less than $9 per ton of CO2e reduced.
- The **Offshore Deployment** component supported three projects from Newfoundland and Labrador's offshore service and supply sector. These projects collectively target offshore GHG emissions reductions and improving the environmental performance of oil spill related activities with promising results.
- The **Offshore RD&D Program,** through an agreement with Energy Research & Innovation Newfoundland & Labrador (ERI-NL), supports 18 projects in Newfoundland and Labrador that advance innovation in emissions reducing technology.

The Department worked with domestic and international partners to advocate for a green transition that focuses on people and communities and advances our climate targets. NRCan led the Equality in Energy Transitions Initiative's Equal by 30 Campaign,[cxxxvii] which is now in its fourth year. Through this, NRCan advocated for making gender equality central to the transition to a clean energy future by promoting concrete actions on equal pay, leadership, and opportunities for women by 2030. In May 2021, all G7 members agreed to enhanced commitments under the Equal by 30 Campaign[cxxxviii]. The Equal by 30 Campaign also released a report in July 2021 highlighting that it is not possible to advance gender equity without empowering racialized people, Indigenous communities, LGBTQQ2SIA+ individuals, persons with a disability, and other marginalized groups.

The Minister of Natural Resources launched the Empowering People Initiative with Chile and the U.S. at the Clean Energy Ministerial in June 2021. This initiative seeks to share lessons learned on needed and successful policies that support just clean energy transitions and highlight different policy mixes to support workers and communities with models that meet the unique needs and circumstances of different member countries, industrial sectors and stakeholder communities. The Department supported the Minister's active involvement in the IEA's Global Commissions on People-Centred Energy Transitions and its October 2021 final report. NRCan launched consultations in July 2021 to inform the development of just transition legislation to support workers and communities in the transition to a low carbon future. This is in line with the Paris Agreement which calls on countries to consider a just transition of the workforce.

NRCan developed a publication "Spotlight on Mining" launched at the 2022 Prospectors & Developers Association of Canada[cxxxix] in collaboration with Invest in Canada.[cxl] Spotlight on Mining highlights Canada's mineral endowment, including a focus on battery metals and capabilities in processing in order to attract both upstream and downstream investors to invest in the Canadian mining sector.

Lower Carbon transportation

Investing in zero-emission vehicle (ZEV) infrastructure is key to enhancing Canadians' confidence in the availability and convenience of refueling stations. For this reason, the Department delivered $460M in programming to support the deployment of more than 34,500 new electric vehicle chargers along highways and targeted locations, 22 natural gas stations along key freight routes and 25 hydrogen stations in metropolitan areas. In addition, NRCan supported the establishment of new ambitious mandatory sales targets of at least 20% new light duty vehicle sales being ZEV by 2026, 60% by 2030 and 100% by 2035.

The Electric Vehicle Infrastructure Demonstration (EVID) Program[cxli] continued to support the demonstration of innovative next-generation electric vehicle charging and hydrogen refueling infrastructure in Canada. In 2021-22, EVID supported over 20 projects, including novel charging technologies and business models for multi-unit residential buildings and workplaces, transit electrification and battery repurposing. Ten projects were announced, including funding to the Alberta Motor Transport Association for the Alberta Zero Emissions Truck Electrification Collaboration project, which will develop and demonstrate a hydrogen fueling station for highway capable, heavy-duty commercial fleet vehicles.

In 2021-22, the Department took a comprehensive and inclusive approach to implementing the Hydrogen Strategy for Canada,[cxlii] including establishing a high-level governance structure led by a Strategic Steering Committee with representatives from governments at all levels, the private sector, and Indigenous businesses and communities, and supported by 16 thematic working groups discussing all aspects of the hydrogen value-chain. Additionally, the $1.5B Clean Fuel Fund[cxliii] was launched to support the construction of new domestic clean fuel production capacity (including at least 10 hydrogen projects). This will contribute to the establishment of sustainable biomass supply chains, and the development of essential codes and standards for the production, distribution, and use of clean fuels.

Under the Hydrogen Codes and Standards Research and Development[cxliv] stream of the EIP, 11 projects were selected for funding using federal laboratories to undertake R&D related to risk assessment, life cycle assessment and codes and standards gap analysis for hydrogen. A call for proposals was also completed that will provide funding for the next four years to 11 additional collaborative projects across federal laboratories on hydrogen production, transportation, storage, end use and codes and standards (see textbox).

Enabling a Canadian Hydrogen Economy

"How much hydrogen (H_2) you put in that pipeline?" Without updated codes and standards, industry would have to undertake a lengthy and expensive engineering assessment every time they planned to blend H_2 in existing natural gas pipelines. To support rapid adoption of H_2 in Canada, CanmetMATERIALS is undertaking a research program with multiple projects to update relevant codes and standards by measuring and modeling the behaviour of H_2 in representative Canadian pipeline materials and conditions. This program has yielded valuable information to make sustainable and cleaner energy sources more readily available.

Budget 2021 allocated a portion of the $8B on Net-Zero Accelerator to build Canada's battery supply chain. The Department co-led federal engagement with provincial and territorial partners and foreign and domestic companies to secure large investments at each stage of Canada's

battery supply chain. As a result, various important announcements for Canada's battery supply chain were made, including BASF (Germany), the world's largest chemical company, confirmed Bécancour, Quebec, as the site of its new cathode active materials production and battery recycling plant; and LGES (South Korea) and Stellantis (US) announced a joint venture to build and operate a $4.4B lithium-ion battery cells manufacturing plant for EVs in Windsor. Under the Joint Action Plan on Critical Minerals,[cxlv] bilateral collaboration continued with the U.S., including through a series of regionally-focused webinars (Atlantic Canada, Manitoba, Quebec, and Ontario) to highlight critical minerals opportunities across Canada.

In support of the Strategic Innovation Fund Net Zero Accelerator (NZA)[cxlvi] Initiative aimed at decarbonization and sustainable growing Canada's largest industrial emitters, NRCan worked with ISED to facilitate the inclusion of large oil sands emitters and an LNG project for funding consideration under in the Net-Zero Accelerator Fund, providing technical analysis of industry proposals. As many of the projects funded by the NZA are related to energy and natural resources, NRCan provided expert analysis of NZA projects and policy support to the Program.

Energy solutions

On March 11, 2022, the Government of Canada released the Clean Power Roadmap for Atlantic Canada,[cxlvii] which outlined a vision for an interconnected clean power grid that would serve as the foundation for a competitive, electrified, net zero economy across the Atlantic region. NRCan and other federal departments continued working with the Atlantic provinces and Quebec, and their respective utilities on the Atlantic Loop Backbone Project; a proposed regional electricity transmission project that would expand electrical interconnections and move clean power among the Atlantic Provinces, and Quebec.

Further, NRCan launched the Strategic Interties Predevelopment Program to support technical, community engagement, and environmental assessment and regulatory study activities.

To advance Canada's transition to clean electricity, the Department successfully launched the Smart Renewables and Electrification Pathways Program (SREPs).[cxlviii] The Program includes established renewables, emerging technologies, and gird modernization projects as well as a capacity building stream and prioritizes Indigenous-owned projects. In Budget 2022, the Government announced an additional $600M for SREPs. At the end of 2021-22, 95 deployment and capacity building projects have been approved and the Program is on track to spend all of the initial $964M funds committed by the end of fiscal year 2024-25.

Through the $100M Smart Grid Program,[cxlix] NRCan promoted the modernization of grid infrastructure by funding the demonstration of

Canadian project wins International Smart Grid Action Network Award of Excellence

Saint John Energy won the International Smart Grid Action Network Award of Excellence in 2021 for its Smart Energy Project (supported by NRCan's Smart Grid Program). The award attracted international investment from Norway to secure new partnerships with Saint John Energy to deploy leading smart water heating technology and energy forecasting techniques. This international and private sector investment marks an important step which could lead to further jobs and growth for the region. It also leverages a legacy of patient innovation capital from NRCan since before 2010 through to the current Smart Grid Program project.

promising, near-commercial smart grid technologies and the deployment of smart grid integrated systems across Canada. NRCan supported the Canada Infrastructure Bank[cl] to implement the $2.5B Clean Power stream of its $10B Growth Plan to help connect surplus clean power to regions transitioning away from coal and help transform how Canada powers its economy and communities. In 2021-22, the percentage of Canadian electricity generated from non-GHG emitting sources was 82.6%, on track to meet the target of at least 90% by 2030.

From November 2020 until May 2021, NRCan, with the support of other federal departments with responsibilities for radioactive waste undertook an inclusive engagement process with over 150 meetings, 70 online forum posts and more than 600 written submissions to solicit views on how to modernize Canada's radioactive waste policy. This work culminated in the release of NRCan's draft Policy for Radioactive Waste Management and Decommissioning on February 1, 2022, for a public comment period which closed on April 2, 2022. The modernized policy is expected for release in 2022.

To help guide Indigenous participation in future nuclear non-emitting electricity and benefits sharing in Small Modular Reactors (SMRs),[cli] the Department established an Indigenous Advisory Council for the Small Modular Reactor Action Plan. NRCan continued to engage with U.S. partners to develop and participate in emergency preparedness exercises to support the safe and secure deployment of SMRs.

The Impact Canada Initiative Clean Tech Stream, which used innovative funding mechanisms such as prizes and challenges, sunset in 2022. The initiative's six Challenges accelerated the development of 28 innovative clean growth technologies, solutions and processes. These have helped to build Canada's clean energy ecosystems, laid the foundations for new supply chains, and supported the growth of new enterprises. The initiative built critical skills and capacity and generated at least $78M of investments in clean growth projects. Final prizes were announced for all six Challenges, including $5M under The Sky's the Limit Challenge to Enerkem for producing sustainable aviation fuel project with the best GHG reduction, the lowest production cost, and the greatest potential for commercial scale-up: $5M under the Crush It! Challenge to the Canadian Mining Innovation Council for their CanMicro solution that achieved 35% energy savings for mining comminution (crushing and grinding of a material/ore to reduce it to smaller or finer particles); and $1M under the Power Forward Challenge, co-delivered with the United Kingdom government, to Equilibrium Engineering for their Alba Nova project, which used an innovative artificial intelligence platform to predict solar and wind energy generation and demand of customers.

The Clean Energy for Rural and Remote Communities (CERRC) [clii] program funded projects that helped rural and remote communities, including Indigenous communities, reduce their reliance on diesel fuel for heat and power, to support community-driven clean energy solutions and to create green jobs and opportunities. The program has 115 contribution agreements signed: 41 under the Bioheat stream, 12 for Deployment, 16 for Demonstration, and 46 for Capacity Building. To date, 26 projects have been completed. NRCan worked with partner departments to develop a new federal single-window access point for communities transitioning to clean energy, which will be used to disburse the $300M in new funding announced in Budget 2021.

The Impact Canada Indigenous Off-Diesel Initiative (IODI)[cliii] increased access to flexible funding for communities by issuing 14 prize grants of $1.6M to Indigenous Clean Energy Champions to continue implementing clean energy and energy efficiency projects in their communities. The Initiative also supported networking and learning among Indigenous proponents by co-hosting five webinars and launched the Clean Energy Circle, a new networking series for IODI and CERRC proponents, with three virtual events.

Forestry solutions

The Green Construction through Wood Program[cliv] continued its efforts to mitigate climate change through demonstration, promotion and education about mass timber as an innovative low-carbon building material. In 2021-22, four tall-wood, 10 low-rise non-residential and two bridge demonstration projects were completed or underway. During the year, 16 education, training or research projects were completed or ongoing. In addition, mandatory wood design and construction courses were introduced into curricula at 16 Canadian accredited civil engineering, architectural and construction management programs in Canada. The 2020 edition of the National Building Code of Canada[clv] was updated and published to allow mass timber construction up to 12 storeys, and this code change was adopted by 21 jurisdictions across the country. Based on most current available data, in 2019, Canada harvested 139.8 million m3 of wood, well below the estimated sustainable wood supply level of 218.1 million m3.

Innovative advancement in mass timber building technology

Intelligent City's Platform for Life (P4L) project, supported by funding from **Breakthrough Energy Solutions Canada** successfully developed a first-of-its-kind prefabricated mass timber building solution for high-rise residential and commercial buildings. The system integrates novel design software with automated manufacturing, prefabrication, and on-site assembly of standardized building components to produce high-quality buildings efficiently and affordably. P4L achieves Passive House performance levels, that have been tested for structural, seismic, fire, and acoustic performance, and surpasses Encapsulated Mass Timber Construction code and International Building Code requirements. The company is now coordinating with over 30 prospective clients across North America to launch P4L at full scale and expects to sign contracts worth over $100 million in revenue for the next 24 months.

Gender-based analysis plus

Under this core responsibility, NRCan’s applied GBA Plus to support the development of inclusive policies and programs in the following ways:

- The Energy Efficiency Program completed a report which defined intersectional gender-based barriers in the energy efficiency sector in Canada. Findings from the report will assist in filling data gaps in support of developing more inclusive policies and programs that better consider the specific needs and circumstances of diverse populations in Canada, are more inclusive and equitable, and enable all Canadians to participate fully in energy efficiency.

- The Canada Greener Homes Grant initiative collected data on engagement and participation in program activities, including support under the Energy Advisor Training, Recruitment, and Mentoring Campaign. The initiative includes recruitment and training of Indigenous energy advisors to build local capacity, improve access in rural, northern, and remote communities, and reduce barriers to participation in the energy efficiency workforce. In this campaign, data

is collected by contribution agreements, via quarterly progress reports, which is disaggregated by gender and Indigenous/Non-Indigenous status

- NRCan anticipates recruiting, training, and mentoring up to 850 new energy advisors from under-represented groups and/or for underserved areas through contribution agreements with governments and organizations across Canada.
- NRCan continued to advance the government's commitment to reduce reliance on diesel and other fossil fuels for heat and power in Canada's rural and remote communities by supporting community-led renewable energy projects. The CERRC Program has incorporated flexibilities to support increased participation and inclusion of groups underrepresented in the clean energy sector. These flexibilities include ensuring Indigenous and female representation on project selection and review committees, encouraging the participation of youth in projects, and including translation of project materials and honoraria for Indigenous Elders to participate in their communities' projects as an eligible cost.
- The Smart Renewables and Electrification Pathways program implemented a GBA Framework throughout program design, delivery and operation. As a result, the program requires all applicants to include an Equity, Diversity and Inclusion plan or sign onto a relevant public commitment. The program also includes a capacity building stream to fund projects that will enable communities and individuals to participate in the electricity sector. The stream will fund projects that build knowledge and skills related to renewable energy and grid modernization technologies.

United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals

NRCan's planned activities under this Core Responsibility support Canada's efforts to address the United Nation 2030 Agenda and the achievement of several of the following Sustainable Development Goals (SDG).

In support of **SDG 7 - Affordable and Clean Energy**, **Target 7.1:** by 2030 ensure universal access to affordable, reliable and modern energy services, and **Target 7.2:** by 2030 increase substantially the share of renewable energy in the global energy mix, NRCan:

- Worked through the Clean Energy for Rural and Remote Communities Program to transition Indigenous, rural, and remote communities off diesel to clean energy. The program has 115 agreements in place supporting a variety of capacity building initiatives and renewable energy projects. In 2020, the Strengthened Climate Plan announced an additional $300 million over five years to support federal efforts in this space.
- Continued the **Smart Grid Program** that supported 22 projects[5] that promote the modernization of grid infrastructure by funding the demonstration of promising, near-

[5] These 22 projects stem from 28 Contribution Agreements.

commercial smart grid technologies and the deployment of smart grid integrated systems across Canada. The Smart Grid Program also supports **SDG 9 - Industry, Innovation and Infrastructure**.

- Launched the Smart Renewables and Electrification Pathways Program (SREPs) to support smart renewable energy and electrical grid modernization projects aiming to reduce greenhouse gas emissions by encouraging the replacement of fossil-fuel generated electricity.

Target 7.3: By 2030, double the global rate of improvement in energy efficiency, NRCan:

- Facilitated collaboration with international partners through The International Energy Efficiency Hub (EE Hub) to increase energy efficiency and accelerate the clean energy transition. The EE Hub is an independent organization with a broad membership that includes G20 members and IEA members and associates. NRCan is a Vice-Chair of the EE Hub, a position that allows Canada to demonstrate leadership and influence the global energy efficiency collaboration agenda.

- Invested in research, development and demonstration of clean energy technologies through the **Energy Innovation Program** that will help Canada meet its climate change targets, while supporting the transition to a low-carbon economy. This program also supports **SDG 9 - Industry, Innovation and Infrastructure, SDG 12 – Responsible Consumption and Production, and SDG 8 – Decent Work and Economic Growth.**

In support of **SDG 15 – Life on Land,** NRCan:

- Supported the Forest Management Program to research forest ecosystems to help ensure that Canada's forests remain healthy and productive, now and for generations to come. This work provides knowledge and tools to inform sustainable forest management practices, and for protection of biodiversity. In 2021-22, the Ecological Management Emulating Natural Disturbance Project published research about rove beetle biodiversity to provide directions to the industry on biodiversity conservation and forest recovery. In addition, maps of potential biodiversity corridors in the urbanized areas of southern Quebec were completed, aiming to better understand the cumulative role of climate change and human-induced disturbances on species at risk and their habitats to develop recovery plans.

Additional information about how NRCan activities support United Nations' 2030 Agenda and Sustainable Development Goals are reflected under the NRCan 2020-23 Departmental Sustainable Development Strategy.[clvi]

Experimentation

This year, various NRCan teams embarked on a new approach to experimentation with a partnership with PCO and ECCC on the Program of Applied Research for Climate Action which sought to identify behavioural insights and apply them to make programs, communications, and policies as effective as possible to encourage climate action amongst Canadians. Please see the experimentation section under Core Responsibility 1 for more details.

Key risks

At the start of the fiscal year, NRCan identified several risks under this Core Responsibility, including those related to the impact of climate change and keeping abreast of the rapid pace of science and technological innovation. To address these risks, NRCan:

- Provided federal leadership and scientific expertise to support the advancement of sustainable energy technologies and solutions by leveraging existing innovation resources. Highlights include:
    - Ongoing support for the implementation of the Arctic and Northern Policy Framework for sustainable, diversified, and inclusive local and regional economies and advancing Indigenous reconciliation and the co-management of natural resources.
    - Launched of the Smart Renewables and Electrification Pathways Program to support renewables, including funding emerging technologies, grid modernization projects and capacity building.
    - Support for Canada Infrastructure Bank to implement the $2.5 billion Clean Power stream of its $10 billion Growth Plan to help connect surplus clean power to regions transitioning away from coal and help transform how Canada powers its economy and communities.
- Continued to make investments in and work collaboratively with different levels of government and Indigenous peoples to reduce GHG emissions through inclusive and diverse initiatives
    - Supporting the development of Canada's 2030 Emissions Reduction Plan to achieve at least 40% lower emissions by 2030 compared to 2005 and put Canada on a path to net-zero by 2050.
    - Establishing an Indigenous Advisory Council for the Small Modular Reactor (SMR) Action Plan to help guide Indigenous participation and benefits sharing in future nuclear non-emitting electricity and technology, as well as a SMR Leadership Table with interested provincial and territorial governments, industry, and Indigenous organizations to provide strategic direction.

These responses allowed NRCan to pursue and support climate change initiatives while keeping abreast of the rapid pace of science and technological innovation. The Department will continue to pursue initiatives to mitigate identified risks effectively, while delivering on its mandate.

Results achieved

The following table shows, for Innovative and Sustainable Natural Resources Development, the results achieved, the performance indicators, the targets and the target dates for 2021–22, and the actual results for the three most recent fiscal years for which actual results are available.

Departmental results	Performance indicators	Target	Date to achieve target	2019–20 actual results	2020–21 actual results	2021–22 actual results
Natural resource sectors are innovative	Percentage of NRCan-funded innovation projects that result in new intellectual property, codes, standards or regulations[6]	At least 5% of projects will have IP or an impact on codes, standards or regulations by project completion (typically 3-4 years)	March 2022	30%	69%	67%
	Percentage of innovative forest products and decision tools informed by NRCan research that contribute to the environmental sustainability of Canada's forests	At least 95%	March 2022	Not available[7]	100%	100%
	Percentage of NRCan-funded clean energy innovation projects	At least 50% of research, development and demonstration	March 2024	77%	37%	59%

[6] This indicator tracks progress on results at the completion of NRCan-funded projects. As many projects are still ongoing, the figures serve only as an indication of progress to date. Results fluctuate based on program funding cohorts.
[7] Historical information is not available for all previous years given that the indicator and its methodology were amended starting in 2020-21.

	advancing along the innovation scale[8]	projects advance one level on the technological readiness scale by project completion (typically 3-4 years)				
	Percentage of innovative mining technologies developed by NRCan that move towards being ready for commercial use	At least 25%	March 2022	Not available	22%	28%
	Number of initiatives enabled by NRCan to strengthen the security and resilience of Canada's critical energy infrastructure[9]	At least 18	March 2022	Not available	Not available	27

[8] This indicator tracks progress on results at the completion of NRCan-funded projects. As many projects are still ongoing, the results do not represent the full program portfolio and serves only as an indication of progress to date. Results fluctuate based on program funding cohorts.
[9] Historical information is not available for all previous years for this indicator newly added to Natural Resource Canada's Departmental Results Framework starting in 2020-21.

Clean technologies and energy efficiencies enhance economic performance	Percentage of NRCan-funded clean technology demonstration projects achieving their economic goals	At least 50% success rate measured by project completion (typically 3-4 years)	March 2026	Not available[10]	Not available[11]	46%[12]
	Ratio of partner investment to government spending in NRCan-funded energy innovation projects	At least 1:1 ratio of partner investment to NRCan investment	March 2022	3:1	2:1	2.5: 1
	Total annual energy savings resulting from adoption of energy efficiency codes, standards and practices	Annual savings of at least 600 petajoules (PJ)	March 2030	35.6PJ	66.7PJ	80.0PJ
Canada's natural	Percentage of Canadian electricity	At least 90%[13]	March 2030	82%[14]	83%[14]	Not available[14]

[10] This indicator tracks progress on results at the completion of NRCan-funded projects. Not enough projects with economic goals were completed in 2019-20 to meaningfully report on this indicator.
[11] This indicator tracks progress on results at the completion of NRCan-funded projects. As the program was extended through 2021-22 due to the COVID-19 pandemic, not enough projects that report on this indicator were completed in 2020-21 to meaningfully report.
[12] This indicator tracks progress on results at the completion of NRCan-funded projects. This is the first year that NRCan has reported on this indicator. As many projects are still ongoing, the figure represents a fraction of the full program portfolio and serves only as an indicator of progress to date.
[13] Based on aggregated microdata on electricity generation from Statistics Canada and NRCan adjusted to reflect wind and solar data. Also, the 90% target is to be reached by March 2030. The program is not able to set an annual target.
[14] Data for Fiscal Years 2019-2020 and 2020-21 is not available as electricity statistics are only available on a calendar year-basis. On December 31, 2019, the percentage of non-emitting electricity was 82%. On December 31, 2019, the percentage of non-emitting electricity was 83%. There is no data available yet for calendar year 2020. The next data update is expected to be available by the second half of 2022. Additionally, reporting has been impacted due to the delayed availability of statistics amid the COVID-19 pandemic.

resources are sustainable	generated from non-GHG emitting sources					
	Number of renewable energy projects in remote communities and off-grid industrial operations	At least 100	March 2027	1[15]	21[16]	9[17]
	Amount of wood harvested compared to the sustainable supply	Harvest is less than sustainable supply	March 2022	155 million m^3 total harvest versus total wood supply of 220 million m^3 (SoF, 2019 – data from 2017)	156.2 million m^3 total harvest versus total wood supply of 217.9 million m^3. (SoF 2020 – data from 2018)	139.8 million m^3 total harvest versus total wood supply of 218.1 million m^3. (SoF 2021 - Data from 2019)

[15] This indicator measures the number of completed renewable energy projects in remote communities and off-grid industrial operations in 2019-20. While one project was completed in 2019-20, NRCan supported 35 additional projects for funding in the Clean Energy for Rural and Remote Communities Program towards the 2027 target.
[16] This indicator measures the number of completed renewable energy projects in remote communities and off-grid industrial operations in 2020-21. While 21 projects were completed in 2020-21, 93 projects are being supported through the Clean Energy for Rural and Remote Communities Program towards the 2027 target.
[17] This indicator measures the number of completed renewable energy projects in remote communities and off-grid industrial operations in 2021-22. After two rounds of intake, program funding is fully allocated, with 111 projects supported and 115 agreements signed: 41 for the BioHeat stream, 17 for Demonstration, and 57 for Deployment and Capacity Building. 31 of these projects are now complete to date.

	Reduction in greenhouse gas emissions resulting from NRCan-funded clean technology demonstrations	Clean Growth Program: Between 0.3 - 0.7 megatons (Mt) of direct annual GHG reduction, dependent on projects received, success of projects and on-going operation at full production capacity Energy Innovation Program: Between 4.25 Mt of direct annual GHG reductions and a combined total 10-16 Mt of GHG direct and indirect reductions per year	March 2026 (Clean Growth Program) March 2030 (Energy Innovation Program)	Clean Growth Program: Not available[18] Energy Innovation Program: 1.61 Mt/ year[19]	Clean Growth Program: Not available[20] Energy Innovation Program: 1.85 Mt/year[21]	Clean Growth Program: 0.014 Mt/ year[22] Energy Innovation Program: 2.19 Mt/ year[21]

[18] Results are only reported once GHG emission reduction estimates have been assessed and validated at project completion and/or during the five-year project outcomes reporting period. Some projects experienced delays in 2019-20 due to the COVID-19 pandemic.

[19] On track for 2030 target. Projects are underway. Results are only reported once GHG emission reduction estimates have been assessed and validated at project completion and/or during the five-year project outcomes reporting period.

[20] Results are only reported once GHG emission reduction estimates have been assessed and validated at project completion and/or during the five-year outcomes reporting period. Program duration was extended through 2021-22 due to the COVID-19 pandemic.

[21] On track for 2030 target. Results are only reported once GHG emission reduction estimates have been assessed and validated at project completion and/or five-year project outcomes reporting. As GHG reductions for demonstration projects are only realized from the implementation, operation, replication of technologies or solutions, it may take several years for environmental outcomes to accrue.

[22] On track for 2027 target. Results are only reported once GHG emission reduction estimates have been assessed and validated at project completion and/or five-year project outcomes reporting. As GHG reductions for demonstration projects are

	Number of low-carbon recharging and refueling stations under development or completed	At least 1000[23] electric vehicle charging stations At least 22 natural gas refuelling stations At least 15 hydrogen refuelling stations	March 2024	Electric vehicle charging stations = 837 Natural gas refuelling stations = 21 Hydrogen refuelling stations = 8	Electric Vehicle charging stations = 1,089 Natural gas refuelling stations = 22 Hydrogen refuelling stations = 15	Electric Vehicle charging stations = 25,365 Natural gas refuelling stations = 22 Hydrogen refuelling stations = 15
	Percentage of NRCan's projects on innovation and sustainable development that engage Indigenous communities, organizations or governments	To be determined[24]	March 2022	Not available[25]	8.3%	17.17%

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[clvii]

only realized from the implementation, operation, replication of technologies or solutions, it may take several years for environmental outcomes to accrue.

[23] In 2019 and 2020, NRCan received new funding for zero-emission infrastructure and revised the targets of EV chargers from 1,000 to 34, 500 and of hydrogen refuelling stations from 15 to 25. The target for natural gas refuelling stations was not affected as the new funding excluded natural gas refuelling infrastructure. These targets are made up of the Zero-Emission Vehicle Infrastructure Program (ZEVIP) and Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative (EVAFIDI) programs.

[24] A target has been set in the 2022-23 Departmental Plan and the target will be reflected in the 2022-23 DRR

[25] Historical information is not available for all previous years for this indicator given that the indicator and its methodology were amended starting in 2020-21.

Budgetary financial resources (dollars)

The following table shows, for Innovative and Sustainable Natural Resources Development, budgetary spending for 2021–22, as well as actual spending for that year.

2021–22 Main Estimates	2021–22 planned spending	2021–22 total authorities available for use	2021–22 actual spending (authorities used)	2021–22 difference (actual spending minus planned spending)
1,400,422,672	1,400,422,672	1,768,896,953	833,168,889	(567,253,783)

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[clviii]

Human resources (full-time equivalents)

The following table shows, in full-time equivalents, the human resources the department needed to fulfill this core responsibility for 2021–22.

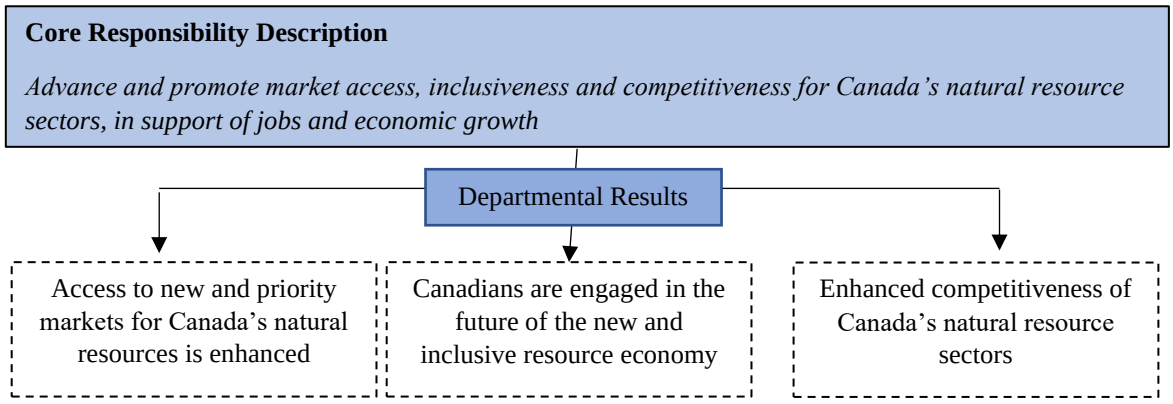
2021–22 planned full-time equivalents	2021–22 actual full-time equivalents	2021–22 difference (actual full-time equivalents minus planned full-time equivalents)
1,582	1,735	153

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[clix]

Globally Competitive Natural Resource Sectors

Results

As the economy recovers from the pandemic, it is important to support the competitiveness of Canada's natural resource sectors. This includes developing new markets for our products and working to expand our presence in existing markets. It also means building resilience across our supply and value chains to withstand the effects of climate change, fluctuations in global markets, and cyber security risks.



Access to new and priority markets for Canada's natural resources is enhanced

International Energy Engagement

To further advance international collaboration and create new market opportunities for Canadian goods, services, and technologies, NRCan participated in several meetings across a number of key multilateral organizations addressing energy issues, including G7,[clx] G20,[clxi] IRENA, IEA, CEM, MI, Nuclear Energy Agency and Asia-Pacific Economic Co-operation,[clxii] Through these fora, NRCan continued to highlight the importance of energy efficiency, renewables, technology and innovation, CCUS, nuclear, hydrogen, investment and financing in a clean energy transition. NRCan also promoted a green, inclusive, and climate resilient economic recovery, ensuring that the energy transition does not leave any Canadian behind. Canada's co-leadership of CEM

initiatives played a critical role by supporting the competitiveness of Canada's clean technologies and natural resource sectors. It also promoted Canada's leadership in sustainable development practices and role as a reliable and preferred partner for energy trade, investment, and collaboration.

To support Canada's relations with its North American partners, NRCan engaged with other government departments to ensure a natural resource focus within Canada-U.S. supply chain initiatives that support critical industries, improve emergency preparedness, and ensure cross-border energy security. Other actions included the Canada-U.S.-Mexico Agreement Competitiveness Committee, North American Leaders Summit, and the Canada-U.S. Supply Chain Working Group. In July 2021, Canada and the U.S. jointly released the North American Renewable Integration Study, which found a strong foundation for the expansion of renewable energy technology in both countries and highlighted pathways that can lead to 80% electricity-sector carbon reduction continent-wide by 2050.

The Department supported Global Affairs Canada (GAC) in new and ongoing Free Trade Agreement (FTA) negotiations with priority markets to preserve and advance natural resource trade interests. This included contributing to exploratory talks and negotiating rounds for four FTAs: Canada-U.K., Canada-Indonesia, Canada-Mercosur (Argentina, Brazil, Paraguay, and Uruguay), and Canada-India. NRCan also supported GAC to increase cooperation on international standards, including highlighting Canada's leadership on critical minerals and hydrogen. In addition, NRCan supported litigation under the World Trade Organization, and Canada-United States-Mexico Agreement (CUSMA) to defend the Canadian forest sector against unwarranted U.S. duties on softwood lumber.

The Department contributed to the ongoing implementation of Canada's National Cyber Security Strategy in collaboration with federal provincial, and industry partners. This included administering the Cyber Security and Critical Energy Infrastructure Program, which provides funding to enhance the cyber security and resilience of domestic and cross-border energy infrastructure. In September 2021, NRCan and the U.S. Department of Energy finalized the "Canada-U.S. Framework for Collaboration on Cybersecurity in the Energy Sector", fulfilling a commitment to enhance the security and resilience of our cross-border critical energy infrastructure. Furthermore, NRCan engaged with Canadian and U.S. partners to develop and participate in emergency preparedness exercises that will strengthen resilience to cyber and physical attacks on energy infrastructure.

In response to **Russia's illegal invasion of Ukraine**, Canada was the first country in the world to ban the import of Russian oil and petroleum products. Following calls by the IEA to increase global oil supply, NRCan worked with Canadian oil and gas producers to identify up to 300,000 barrels per day of oil equivalent that could be brought online by the end of 2022 to address the global shortage. Production is expected to flow to international markets and will be accommodated within Canada's existing climate commitments. Further, NRCan engaged with officials from G7 nations to discuss energy supply chain security concerns in light of the situation in Ukraine. This included developing a Canada-European Commission Energy Security Working Group to advance collaboration on LNG, hydrogen, renewables, nuclear energy, and critical minerals.

Further, the Department continued to co-lead the Hydrogen Initiative[clxiii] under the Clean Energy Ministerial, bringing together representatives from more than 24 countries around the world. Existing Memorandums of Understanding (MOUs) with Japan, the EU, Germany, UK, and the U.S. were delivered on, relating to clean fuel, including hydrogen, as well as the electrification of transport. In addition, a new MOU with the Netherlands on hydrogen was negotiated. These global collaborations will help solidify clean fuels as part of domestic and global energy transition, spur investment and partnership, and establish Canada as a leading global supplier of hydrogen to transform our national energy sector. Also, the Department supported the establishment of the Canada - Germany Working Group on Hydrogen, with government and industry, under the Canada/Germany Energy Partnership. At the 26th Canada-Germany Joint Science and Technology Cooperation Committee meeting (May 6, 2021), NRCan raised awareness and emphasized the importance of the German-Canadian Material Acceleration Centre (GC MAC) and Canada's hydrogen strategy.

Internationally, the Department advanced **bilateral and multilateral engagements** with foreign partners to promote Canada's sustainable resource development, and clean technology markets to open trade opportunities. The Department supported Ministerial participation in several key virtual events, including the G7 Climate and Energy Ministerial, the IEA Net Zero Summit and Global Commission on People-Centered Clean Energy Transitions, and the Clean Energy Ministerial. During these events the Minister emphasized Canada's strong commitment to accelerating the clean energy transition, both domestically and globally, and ensuring that workers and communities are not left behind. Additionally, NRCan participated in collaborative meetings across a number of key committees and working groups of multilateral organizations addressing energy issues, including the G7,[clxiv] G20,[clxv],Clean Energy Ministerial and Mission Innovation,[clxvi] International Renewable Energy Agency, [clxvii] Asia-Pacific Economic Co-operation and Expert Group on New and Renewable Energy.[clxviii]

NRCan demonstrated global leadership on the energy transition in advance of the February 2022 IEA Ministerial. At the meeting, the IEA launched its in-depth review of Canada's energy policies, showcasing Canada's progress over the last five years on advancing sustainable and inclusive energy policies, including Canada's new climate plan. The gathering provided opportunity for the Department to outline key clean energy and net zero priorities, focused on a just and inclusive transition while maintaining Canada's important role in global energy security.

In addition, the Minister signed the NRCan-Department of Energy Memorandum of Understanding[clxix] on Energy Cooperation in June 2021 that renews a framework for cooperation between Canada and the U.S. on the energy transition and clean energy technologies. NRCan participated in CERA Week[clxx] (March 7 to 9, 2022), which brought together over 5,000 delegates from 87 countries and 900 speakers. In meetings with U.S. officials, Minister Wilkinson championed Canadian solutions in the transition to clean energy, including ways to further share information and collaborate on critical minerals. Alongside the U.S., the Minister launched the Net Zero Producer's Forum, and discussed net-zero strategies to advance collaboration with other member states. At CERA Week, the Department engaged representatives from companies to discuss investment in Canada, including at the Oil Sands Pathways Event. These engagements position NRCan for success at COP27, the United Nations

Climate Change Conference,[clxxi] where the Minister co-presented the Climate Finance Delivery Plan with Germany to demonstrate how developed countries can meet the climate finance goal of $100B per year.

Canadians are engaged in the future of the new and inclusive resource economy

NRCan's Nòkwewashk

In 2021-22, NRCan transformed its Major Project Management Office, Indigenous Affairs and Reconciliation Sector, and the Indigenous Partnerships Office-West into a new Sector focused on advancing Indigenous reconciliation in the natural resource sector and enhancing regulatory coordination on major resource projects.

The Indigenous Natural Resource Partnership Program (INRP),[clxxii] administered by Nòkwewashk, helped increase the participation of Indigenous communities and organizations in British Columbia and Alberta in economic opportunities in oil and gas infrastructure development. This enhanced the capacity and readiness of Indigenous communities to capitalize on business opportunities, facilitated access to resources, and supported community and regional engagement related to oil and gas infrastructure projects.

Throughout 2021-22, NRCan continued to build relationships with several Indigenous organizations. This included holding over 70 meetings with Metis, Inuit, and First Nation organizations, such as the Metis National Council, Assembly of First Nations, Inuit Tapiriit Kanatami, Pauktuutit, Les Femmes Michif Otipemisiwak and Native Women's Association of Canada. To further enable engagement on key natural resource activities, NRCan supported three contribution agreements with the Assembly of First Nations, Métis National Council, the Dene Nation, and the First Nations Major Projects Coalition. The Department also began engaging with Indigenous and industry partners on developing a National Benefits-Sharing Framework for major resource projects located on Indigenous territory.

NRCan continued to deliver the Indigenous Forestry Initiative (IFI)[clxxiii] to support Indigenous-led economic development projects as a means to promote Indigenous inclusion in the forest sector. In 2021-22, IFI supported 26 new or ongoing contribution agreements with Indigenous recipients. The projects under the IFI contribute to a more environmentally and commercially sustainable natural resource sector and advance reconciliation with Indigenous Peoples.

The Resource Partnerships Sector

Recognizing the need for increased expertise and diversity in the natural resource sectors, NRCan's Building Regional Adaptation Capacity and Expertise (BRACE)[clxxiv] Program supported the development of training, networks, and professional resources to help increase the number of workers in professions related to climate resilient infrastructure development, such as engineers and planners. The Forest Innovation Program also continued to deliver the Canadian Forest Sector Workforce Diversity undergraduate supplements in collaboration with the Natural

Sciences and Engineering Research Council to encourage undergraduate students to pursue graduate studies in forest sector-related fields.

To contribute to economic recovery and sustain jobs within the oil and gas sector, NRCan, in collaboration with other federal departments, provided provincial governments with $1.7B to remediate orphan and inactive oil and gas wells. Well clean-up efforts have helped get displaced oilfield services employees back to work quickly and helped to mitigate the impact of oil price uncertainty on Western Canada and the national economy.

Youth Employment and Skills Strategy – Science and Technology Internship Program (Green Jobs)

The Science and Technology Internship Program (STIP – Green Jobs),[clxxv] which is part of Canada's Youth Employment and Skills Strategy,[clxxvi] also supported economic recovery and assisted workers and young people affected by rapidly transforming natural resource sectors. In 2021-22, STIP – Green Jobs created 1,697 green jobs and training opportunities for youth aged 15 to 30 in the natural resources sectors. With 64% participation from Employment Equity groups, and 79% of positions in clean technology, STIP – Green Jobs contributed to building a skilled and diverse workforce required to maintain a competitive advantage and support the transformation to an inclusive by design low carbon and sustainable future.

NRCan worked closely with Employment and Social Development Canada to ensure skills and training programs target natural resource sector workers and those who could be affected by the transition to a low carbon economy. This included the Sectoral Workforce Solutions Program and the Community Workforce Development Program.

Enhanced competitiveness of Canada's natural resource sectors

As the economy recovers from the pandemic, it is important to support the competitiveness of Canada's natural resource sectors. This includes developing new markets for our products and working to expand our presence in existing markets. It also means building resilience across our supply and value chains to withstand the effects of climate change, fluctuations in global markets, and cyber security risks.

Regulatory certainty is a major factor in attracting investment in Canada's natural resource sectors, particularly for large and emerging sector projects. NRCan continues to coordinate the advancement of natural resource projects through Canada's regulatory processes and facilitate Indigenous involvement in oversight through the two Indigenous Advisory and Monitoring Committees on the Trans Mountain Expansion and Enbridge Line 3 projects. The Government of Canada is committed to ensuring the regulatory system supports investment for clean growth to meet our Net-Zero commitments for 2050. NRCan continues to implement Canada's Small Modular Reactor Action Plan and support the Canadian Nuclear Safety Commission's Strategy for Readiness to Regulate Advanced Reactor Technologies. NRCan is also supporting the

modernization of existing codes and standards for hydrogen infrastructure development. Finally, NRCan also worked to ensure that upcoming amendments to Canada's Energy Efficiency Regulations remain aligned with U.S. regulations to support bilateral trade for energy efficient appliances and equipment.

Forest Sector Competitiveness

The Department advanced the Forest Bio-economy Framework to maintain competitiveness in Canada's forest sector, including supporting the renewal of the Framework to address challenges facing the growth of Canada's forest bioeconomy. NRCan's investments in the Forest Innovation Program[clxxvii] and collaboration with provincial and territorial partners under the Canadian Council of Forest Ministers Innovation Working Group helped innovation across the forest sector and advance the bioeconomy. NRCan supported a Fiber Futures Project to evaluate and prioritize market development opportunities that can enhance wood fiber utilization in Canada and identify innovative policies that could support these opportunities.

The Investments in Forest Industry Transformation Program[clxxviii] invested in 37 projects to support the competitiveness and the transformation of Canada's forest sector. For instance, IFIT funded Haliburton Forest Biochar for the expansion of the Biochar Production Facility which has the potential to generate a net reduction of 4,200 tonnes per year of CO_2. This work also supports forest-reliant communities and provides quality jobs to Canadians across the country. Also, the Department worked with federal, provincial, territorial, and industry partners to reduce trade irritants associated with new legislation or regulations, administrative requirements and policy measures introduced in key markets.

Provision of Federal Leadership in the Minerals and Metals Sector

For the mining sector, the Canadian Minerals and Metals Plan[clxxix] (CMMP) Action Plan 2021 included concrete action to operationalize the CMMP. The Department built mineral literacy through holding webinars for stakeholders, developing resources for industry and communities, and further building out the Mineral Literacy Hub on the CMMP website.

NRCan worked closely with Invest in Canada, other government departments and provincial partners to support efforts to establish an EV battery value chain. NRCan provided information on Canadian minerals that could be used along the EV value chain. The Department also updated its 2016 Investor's Brief to create a new investor-targeted document called "Spotlight on Mining" to highlight Canada's mineral wealth across the country and provide information on:

- incentives, such as the mineral exploration tax credit;
- innovation and adoption of technologies that 'green mineral production'; and
- continued engagement with Indigenous Partners for their expertise and to generate economic wealth for remote and Indigenous communities where mining takes place.

Energy Safety and Security, and Petroleum Resources

The TMX Project supports diversification of Canada's energy export. Throughout 2021-22, NRCan worked with federal and provincial partners and regulators, Indigenous communities, and the Trans Mountain Corporation to support the timely completion of regulatory reviews required for construction of TMX. As of March 31, 2022, over 95% of federal and provincial permits required for construction to proceed have been issued, and construction of pipeline was over 50% complete. In addition, Enbridge Line 3 Replacement Project (Line 3)[clxxx] entered into service. Line 3 increases Canada's oil export to 370,000 barrels per day. Also, the Department collaborated with partners in supporting resolution of operational issues that affected construction, including the COVID-19 pandemic and extreme weather events in BC, such as wildfires and flooding.

Partner departments, including NRCan, have allocated $92.8M in funding to 117 Indigenous groups across the eight accommodation measures. This represents 27% of the available grants and contributions funding envelope, of which $54.2M (16%) has been disbursed.

The Department advanced commitments made by the Government of Canada to Indigenous communities during the re-initiated Phase III consultation process. This year, NRCan worked with federal partner departments and 19 Indigenous communities, including three collectives, to implement ten unique commitments that address issues identified during Phase III consultations. In collaboration with other government departments, NRCan supported Canada's responses to the Canada Energy Regulator's (CER) 16 recommendations to address potential impacts from marine shipping associated with the project.

The Indigenous Advisory and Monitoring Committees (IAMCs) for both the TMX and Line 3 Replacement Program[clxxxi] are building new relationships between regulators, the federal government, and Indigenous communities. In 2021-22:

- The IAMC-TMX provided financial support through 178 Contribution Agreements to increase Indigenous participation in the TMX Project which included 126 of 129 Indigenous groups that had been engaged in two-way dialogue and;
- The IAMC-Line 3 also advanced dialogue to define Indigenous participation in lifecycle oversight of energy infrastructure projects.

NRCan worked with other government departments, industry and provincial governments to align proposed liquefied natural gas (LNG) projects with Canada's climate objectives. NRCan supported the development of LNG Canada and the Coastal GasLink pipeline, with project completion and operation expected by 2025. The Department implemented activities under the Canada-E.U. High Level Energy Dialogue and delivered on clean energy initiatives with the U.S., Mexico, European countries, China, India, Japan, and others. NRCan also worked with its German counterparts to establish the Canada-Germany Energy Partnership, including deliverables on hydrogen, energy security, natural gas, and LNG.

Gender-based analysis plus

NRCan continued to support the engagement of Indigenous communities through a renewed, nation-to-nation, government-to-government, and Inuit-Crown relationship based on recognition of rights, respect, co-operation, and partnership as the foundation for transformative change.

The Department utilized a distinction-based approach with respect to ongoing engagement activities that recognized First Nations, the Métis Nation, and Inuit as the Indigenous peoples of Canada. In this regard, the Indigenous Natural Resources Partnerships Program[clxxxii] included assessment criteria that supported the increased and preferential participation of underrepresented groups including Indigenous women.

The department recognizes the intersectional challenges faced by Indigenous women and has established ongoing relationships with national Indigenous women's organizations to ensure that these perspectives are represented. NRCan works closely with Indigenous women's organizations to identify where the department can make the most significant impact on improving conditions for Indigenous women and girls in the natural resource sectors. NRCan is working towards co-development of policies and programming with Indigenous women's organizations and partnership agreements through a distinctions – based approach following respective Indigenous guiding principles with the shared goal of reconciliation.

The Indigenous Forestry Initiative[clxxxiii] supported Indigenous-led economic development projects within the forest sector, with the objective of increasing Indigenous participation in forestry-related opportunities, businesses, careers and governance. Program recipients other than self-determining Indigenous governments were required to either have a diversity plan in place prior to funding or to develop such a plan during the first year of their project. Participants were encouraged to consider identity, gender, and multi-generation participation targets in their plans.

NRCan, in partnership with provinces, territories, Indigenous groups and industry, developed the CMMP. The CMMP highlights the need to take action on gender equality, establishing a target to increase the representation of women in the industry's workforce to 30% by 2030, and it identifies strategies to increase the number of women and visible minorities in the mining sector and advance Indigenous participation, particularly of Indigenous women.

Through the Science and Technology Internship Program (STIP) - Green Jobs,[clxxxiv] NRCan contributed to building a skilled and diverse workforce to advance transformation to a low carbon, and inclusive economy that supports improved environmental outcomes. In 2021-22, STIP – Green Jobs created 1697 green jobs for youth in STEM and other related fields, including 280 (17%) jobs and training opportunities for Indigenous youth. In addition, the Program had 64% participation from Employment Equity groups.

United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals

NRCan's planned activities under this Core Responsibility support Canada's efforts to address the United Nation 2030 Agenda and the achievement of several of the following Sustainable Development Goals (SDG).

In support of **SDG 17 – Partnerships for the Goals, and SDG 14 – Life Below Water,** NRCan:

- Amended the Accord Acts to ensure that oil and gas activities will not occur in marine protected areas (MPAs), which will allow MPAs to meet the oceans protection standards. Provinces are supportive of using the Accord Acts as the legislative vehicle to prohibit oil and gas in MPAs in Accord Act areas. This respects the joint management framework of both offshore areas and ensures that provinces share decision-making authority related to offshore oil and gas.

- Completed economic assessments for five sites and have two more underway. Petroleum, mineral, and economic assessments are underway to inform management decisions on the establishment of marine conservation areas proposed by DFO, ECCC or Parks Canada. Ongoing assessment requirements exist for a number of other sites and are tracked with completion date goals of 2023 or later.

- Submitted three manuscripts for publication. Publication of a book that includes a chapter on biodegradation of petroleum in aqueous environments is also completed.

In support of **SDG 17 – Partnerships for the Goals, and SDG 7 - Affordable and Clean Energy**, NRCan:

- Supported the Minister's participation in several key virtual events, including the 2021 G7 Climate and Environment Ministerial and the ad hoc 2022 G7 meeting of energy ministers to discuss the impact of the Russian invasion of Ukraine on energy markets. During these events, the Minister emphasized Canada's strong commitment to accelerating the clean energy transition both domestically and globally and ensuring that workers and communities are not left behind. At the 2022 G7 Meeting, the Minister also emphasized the importance of energy transition and security being mutually compatible and reinforcing. In addition, the Minister announced $8 million for the IEA's Clean Energy Transition Programme (CETP), to help emerging economies accelerate their energy transitions while meeting their energy needs.

- Co-led, along with Sweden and Italy, the Equality in Energy Transitions Initiative (formerly C3E International) to advance women's participation globally in clean energy by fostering opportunities and closing the gender gap. At COP26, Canada signed on to the Gender and Energy Compact, a multi-stakeholder Energy Compact under the UN High Level Dialogue on Energy (UN HLDE), to accelerate efforts to enhance gender equality and women's empowerment to achieve a just and inclusive energy transition.

In support of **SDG 13 – Climate Action,** NRCan:

- Administered the $750M Emissions Reduction Fund to fund eligible Canadian onshore and offshore oil and gas companies and Canadian innovators to invest in green solutions to reduce GHG emissions and retain jobs in the sector. The Program is collecting and aggregating employment-related data, including workforce gender and diversity data where applicable, through its application and reporting process which will be made public upon completion of projects as early as March 2023.

Additional information about how NRCan activities support United Nations' 2030 Agenda and Sustainable Development Goals are reflected under the NRCan 2020-23 Departmental Sustainable Development Strategy.[clxxxv]

Experimentation

To accelerate the adoption of clean technologies and transition to a net-zero future, NRCan began experimentation activities to support the adoption and uptake of several technologies and practices, including energy efficient technologies for homes and zero-emission vehicles.

Key risks

The pandemic created a changing global trade context which has impacted market access for Canada's natural resources. Key risks addressed are challenges to competitiveness for the natural resource sectors, opportunities for workers affected by rapidly transforming natural resource sectors, public confidence, and engagement, including of Indigenous peoples, in natural resources development. To address the risks, NRCan:

- Contributed to the diversification of Canada's market for natural resources, which include strategies on addressing trade barriers and infrastructure capacity, such as:
    - The Expanding Markets Opportunities Program support of 178 projects aimed at market development, branding, demonstration of Canadian-style use of wood, technical support to address market access and regulatory issues, quality assurance, technology development and technical information service activities.
- Supported improve competitiveness through actions such as regulatory reform, trade missions and international engagement, as evidenced by:
    - Continued collaboration with provinces and territories to improve the competitiveness of the minerals and metals sector under the Canadian Minerals and Metals Plan.
- Contributed to the Government of Canada's efforts to support workers and communities to foster future skills, create inclusive cultures, provide tools and training to be full participants in a clean-growth economy. Highlights include:
    - Collaboration with ESDC in completing three stakeholder roundtables with experts, unions, and industry on proposed Just Transition Legislation and a proposed Just Transition advisory body.

- Through STIP, created 1697 green jobs for youth (ages 15-30) in the natural resources sectors. In 2021-22, 85% of youth participants were employed following their participation in STIP – Green Jobs.

These responses allowed NRCan to improve competitiveness and opportunities for workers affected by rapidly transforming natural resource sectors. The Department will continue to pursue initiatives, enabling effective mitigation of risks in support of delivery of its mandate. NRCan monitors its risks on an ongoing basis to ensure it can effectively deliver its mandate

Results achieved

The following table shows, for Globally Competitive Natural Resource Sectors, the results achieved, the performance indicators, the targets and the target dates for 2021–22, and the actual results for the three most recent fiscal years for which actual results are available.

Departmental results	Performance indicators	Target	Date to achieve target	2019–20 actual results	2020–21 actual results	2021–22 actual results
Access to new and priority markets for Canada's natural resources is enhanced	Canada's share of U.S. and global imports of natural resources	Canada's market share in the U.S. = At least 25.2% of total U.S. imports (in value) Canada's market share in the world (non-U.S.) = At least 1.4 of the total world imports (in value)	December 2021	26.8 % (U.S.) 1.5% (global imports)	24.6% (U.S.) 1.5% (global imports)	28.4% (U.S.) 1.4% (global imports)
	Increase in value of assets abroad owned by Canadian natural	At least $229.0 billion	December 2021	$231B	Not available[26]	$240 billion

[26] Data not available until the second half of 2022.

	resource companies					
	Number of NRCan international engagements that support the development or expansion of trade and investment in natural resources	At least 40	March 2022	42	59	66
Canadians are engaged in the future of the new and inclusive resource economy	Number of joint products developed in collaboration with provinces and territories and released to Canadians	At least 12	March 2022	15	21	21
	Percentage of NRCan's projects that support participation of Indigenous communities, organizations or governments in Canada's natural resource economy	To be determined[27]	March 2022	Not available[28]	63.27%	72.44%

[27] A target has been set in the 2022-23 Departmental Plan and the target will be reflected in the 2022-23 DRR.
[28] Historical information is not available for all previous years for this indicator given that the indicator and its methodology were amended starting in 2020-21.

Enhanced competitiveness of Canada's natural resource sectors	Economic value of anticipated natural resource projects supported by analysis and solutions[29]	At least $2.2 billion	March 2022	Not available	Not available	$22.7B[30]
	Number of times NRCan's economic and investment data are accessed	At least 400,000 quarterly average	March 2022	379,032	420,835	536,574

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[clxxxvi]

Budgetary financial resources (dollars)

The following table shows, for Globally Competitive Natural Resource Sectors, budgetary spending for 2021–22, as well as actual spending for that year.

2021–22 Main Estimates	2021–22 planned spending	2021–22 total authorities available for use	2021–22 actual spending (authorities used)	2021–22 difference (actual spending minus planned spending)
435,880,248	435,880,248	858,444,563	802,059,928	366,179,680

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[clxxxvii]

[29] Historical information is not available for all previous years given that the indicator and its methodology were amended starting in 2021-22.
[30] A more inclusive and comprehensive approach was taken when assessing natural resource projects in 2021-22. This included projects tracked by the Impact Assessment Agency of Canada's Assistant Deputy Minister Impact Assessment Secretariat for which NRCan contributed analysis and/or solutions.

Human resources (full-time equivalents)

The following table shows, in full-time equivalents, the human resources the department needed to fulfill this core responsibility for 2021–22.

2021–22 planned full-time equivalents	2021–22 actual full-time equivalents	2021–22 difference (actual full-time equivalents minus planned full-time equivalents)
479	465	(14)

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[clxxxviii]

Internal services

Description

Internal services are those groups of related activities and resources that the federal government considers to be services in support of programs and/or required to meet corporate obligations of an organization. Internal services refers to the activities and resources of the 10 distinct service categories that support program delivery in the organization, regardless of the internal services delivery model in a department. The 10 service categories are:

- acquisition management services
- communication services
- financial management services
- human resources management services
- information management services
- information technology services
- legal services
- material management services
- management and oversight services
- real property management services

In 2021-22, NRCan Internal Services ensured corporate resources were in place to advance the Minister's Mandate Letter commitments and the Government of Canada priorities. The Department supported the safety of employees as the COVID-19 pandemic persisted with no workplace transmission in Canada and only one case overseas.

Management and Oversight

Underpinning the rigour of science are integrity and excellence. For this reason, the Department continued implementation of its Scientific Integrity Policy,[clxxxix] and approved guidelines for science and technology publications and communications. NRCan reported compliance with 12 of 14 measures on the 2020 Compliance Measurement Survey,[cxc] administered by the Office of the Chief Science Advisor of Canada – an increase of 2 measures from 2020.

NRCan used several data and dissemination portals, including the Government of Canada's Open Maps,[cxci] Open Science and Data Platform,[cxcii] GEO.ca,[cxciii] and the open source development websites such as GitHub[cxciv] (for collaborative and open code development) to make its geospatial data and imagery available to Canadians for cumulative effects assessments and decision making. In addition, earth observation data from Canadian and international satellite missions, including digitized historical Canadian aerial photography were made accessible to Canadians through the Earth Observation Data Management System,[cxcv] a platform providing data services, cataloguing and archiving.

Working with partners, the Department ensured the **Open Government Consultation Registry** remained open, transparent, and up-to-date on a quarterly basis, reflecting the variety of major and/or crosscutting initiatives led by NRCan. Further, the Department improved accessibility of

scientific publications by reducing costs for Open Access publishing via new agreements with scientific publishers. Reducing this barrier will make it easier for NRCan authors to publish Open Access articles as per the goals of NRCan's Open Science Action Plan.[cxcvi] Additionally, NRCan responded to requests for 58 environmental assessment (i.e., project-level, strategic, and regional) processes, all of which demonstrated the use of NRCan's advice. Notably, 7 of the 58 were Decision Statements.

Human Resources

The Department implemented the Policy on COVID-19 Vaccination[cxcvii]. Approximately 98% of NRCan's employees are fully vaccinated. An audit was carried out with a 99% confidence interval and to date, no employees to have violated the policy. Departmental facilities upgraded ventilation standards, implemented rapid testing, passive screening at security checkpoints and enforced basic infection prevention measures to support a safe and healthy workplace post-COVID and to ensure reliable science delivery and operations.

The Department held staff engagement sessions as employees returned to the workplace to establish its Future of Work roadmap, leading to the participation of 1,481 employees in the National Capital Region in two Employee Engagement Sessions. The sessions included Digital Enablement, People and Culture, Transformation of Science, Transformation of Space, and Inclusion, Diversity, Equity and Accessibility. In line with Public Services and Procurement Canada's portfolio modernization initiative, NRCan's headquarters at 580 Booth Street is being renovated to support hybrid and unassigned seating by default as per the "GC Workplace Fit-Up Standards"[cxcviii] and to mitigate additional pressures on office space. As a result, NRCan is vacating a lease in Ottawa and consolidating it into its National Capital Region headquarters in 580 and 588 Booth Streets.

PARDP: New Indigenous Stream

The new Indigenous stream was co-created through engagement with numerous partners, including NRCan's Elder in-residence and reference group members. The stream addresses a gap in representation within the policy analyst community. It has helped to increase representation of Indigenous employees from 2% in 2021 to 21% in 2022. Through an innovative approach to the recruitment process, it serves as a promising practice of how Indigenous voices can be included to co-create change.

The Department continued to use innovate ways to recruit high caliber Master's or PhD level graduates to grow its workforce, including through the Policy Analyst Recruitment and Development Program (PARDP).[cxcix] To strengthen the Indigenous focus of the program, the Department developed a Talent Acquisition Strategy and made design changes to increase recruitment of First Nations, Métis and Inuit candidates, as well as representation of other designated employment equity groups.

Optimized PARDP recruitment and selection led to the following results:

- Ove 80% identify as belonging to at least one employment equity (EE) group;
- 67% identified as women or other gender;
- 50% identified as visible minorities;
- 9% identified as having a disability; and
- 21% identified as Indigenous

A PARDP from the Indigenous stream

The Program has engaged in experimentation for the last two years. The Program continued to scale up the self-identification experiment in 2021-22, embedding the questions into the virtual recruitment platform (Vidcruiter). The response rate to the self-identification questions in 2021-22 was 98.9%, up from 93% last year and 44% in 2019.

The Program team also applied behavioral economics principles in updating the language around diversity, inclusivity, and accessibility without conducting a formal experiment. In addition, representative promotional material, commitment to diversity statement, and efforts to keep a personal touch in the recruitment process contributed to strong representation in this cohort (of 129 qualified candidates, more than 80% identify as belonging to at least one EE group; 9% Persons with Disabilities (compared to 2% last year); 54% racialized groups (compared to ~40% last year); 67% women (compared to ~60% last year); and, 21% Indigenous (compared to 2% last year).

To provide greater insight into the make-up of our workforce, the Department launched an employee self-ID between June 14 and July 2, 2021. NRCan was one of the first departments to pilot the new Census form with TBS. This included updating the form to include new questions and modern terminology. NRCan's set targets for the campaign (self-identification data collection) were 60% by 2023-24 and 80% by 2024-25. The Department's completion rate was around 42% at the end of the campaign's first phase. A second campaign is planned for May-June 2022 with the aim of increasing completion rates to at least 60%. Alongside the self-ID campaign, EE data reporting was also expanded to facilitate better HR decision making at the sector and branch levels.

Also in 2021-22, an Equity, Diversity, and Inclusion Talent Acquisition Strategy was implemented with several targeted recruitment initiatives launched. Within the Strategy, NRCan set clear employment equity representation targets and committed to reduce representation gaps by 50% in 2022-23 and eliminate the gaps by 2024-25. Based on the most recent data (September 31, 2021), representation gaps at the departmental level for visible minorities and persons with disabilities have reduced by more than 50% (ahead of target) and the representation

gaps for Women and Indigenous People have been eliminated. The Department is working to eliminate gaps at all levels within the organization.

Pathways to Reconciliation

The Department created a new sector, **Nòkwewashk** (the Algonquin word for Sweetgrass) to advance Indigenous reconciliation in the natural resource sector and to renew and maintain the relationship with Indigenous peoples, based on recognition of rights, respect, cooperation, and partnership. The namesake of the Sector was conferred to the Department through a process supported by resident Elders who worked with staff, language experts and Fire Keepers of Kitigan Zibi Anishnabeg, an Algonquin community north of the National Capital Region.

The Department took steps to ensure its leadership is as representative of the Canadian population as the rest of its workforce. Thus, when reviewing candidates for leadership development programs, considerations were given to those who self-identify as belonging to an EE group. Also, EE status were considered when selecting departmental Champions for various roles and initiatives. During the EX Talent-Mobility exercise for vacant EX-02 and EX-03 positions, employees in the talent pool belonging to an EE group were identified. This allowed for discussion on potential successors to be examined through a more inclusive lens. Further, the Department launched its first Sponsorship Program, aimed at equity-seeking groups at the EX minus 1 level looking to develop the skills for progression to executive leadership positions. Eight successful applicants were matched with a senior executive for a period of 12 months, starting April 1, 2022.

The Department approved its Employment Equity and Accessibility Action Plan (EEAAP) 2022-2025. As a requirement under the Employment Equity Act,[cc] the EEAAP builds on initiatives currently underway, and integrates change management approaches to support organizational readiness, culture change and sustainable results. As an evergreen document, the EEAAP will undergo regular updates to ensure accuracy, serving as the springboard to the development of NRCan's accessibility plan, a requirement of the Accessible Canada Act.[cci] New Employee Networks were established (Community for the Practice of Allyship, NRCan Jewish Community Network, and the Veteran's Group), and others were re-launched (Managers Community, and Administrative Professionals Network) to provide safe and supportive places for employees who identify with particular EE groups or community.

On the mental and physical health of NRCan's workforce, the Department's Wellness Team and Mental Health Champions worked on establishing a framework for Mental Health Ambassador Leads to be aligned with the pillars of the Mental Health and Wellness.[ccii] The framework when completed will serve as a basis to monitor the initiatives and actions that are taken across the Department to support psychological health and safety in the workplace.

Building on the internal reflective process known as "Pathways to Reconciliation" first initiated in 2020-21, the Department created a space to advance the development of a reconciliation framework through a Pathways to Reconciliation Sharing Circle process, guided by an Indigenous Elder. Participants engaged in collaborative dialogue to build a foundation of healing, sharing viewpoints, fostering respect for differences and histories, and working to identify paths forward for the Department.

Throughout 2021-22, work continued with The Circle of Nations to support the department in building a foundation of cultural awareness and safety through educational initiatives, resources, and training. The Circle of Nation supported 78 distinct learning activities in the past year, open to all public servants, and saw nearly 5000 participants. In addition, the Circle of Nations led and organized the Advancing Reconciliation Awards. After the discovery of unmarked graves, the Circle of Nations organized a department-wide Town Hall and arranged a flag lowering ceremony in honour of the National Day for Truth and Reconciliation. These events were attended by over 1,500 NRCan staff. In recognition of Truth and Reconciliation and Orange Shirt Day, the Circle of Nations hosted an online teaching session with an Elder on the history of Orange Shirt Day and commemoration of residential school survivors.

Information Technology

NRCan worked with Shared Services Canada[cciii] to prioritize all IT requirements related to return to the workplace. In addition, the Department procured IT equipment for workstations and enabled boardrooms and collaboration spaces with teleconferencing equipment at 580 and 588 Booth Streets. On fixed phone lines, NRCan collaborated with Shared Services Canada on the Fixed Line Rationalization project to replace desk phones with mobile phones and to reduce the number of printers, switching to swipe card printing as per the Directive on Service and Digital.[cciv] Also, the Department continued the roll out of technology solutions to support remote workers: successfully migrated our email system onto the M365 protected b platform; implemented multiple M365 tools (Team Sites, One Drive, Planner, To Do, Delve, etc.); completed our laptop roll-out; increased bandwidth in the NCR and in Fredericton; introduced GC Wi-Fi in Varennes.

Real Property

To advance government science and plan for future co-location of Terra Canada laboratories, the Department participated in virtual science events focused on collaborative science with TerraCanada partners. The National Capital Region project on Terra Canada completed its functional programming phase, which defined collaborations with other federal science partners for the future design of the Terra Canada laboratories. Also, NRCan contributed to drafting and advancing the Operating Framework, Science Standards of Accommodation, Repeatable Lab Design Framework, and the Assurance Strategy for government science

NRCan Laboratory Infrastructure is continuously being renewed by way of planning future LabsCanada Projects. In 2021-22, the collaborative NRCan/NRC Projects[ccv] in Hamilton achieved completion. As well, the project in Mississauga is under construction and upon completion, it will provide the opportunity for scientific investments and modernization to meet future deliverables.

Budgetary financial resources (dollars)

The following table shows, for internal services, budgetary spending for 2021–22, as well as spending for that year.

2021–22 Main Estimates	2021–22 planned spending	2021–22 total authorities available for use	2021–22 actual spending (authorities used)	2021–22 difference (actual spending minus planned spending)
149,532,723	149,532,723	192,936,825	159,209,251	9,676,528

Human resources (full-time equivalents)

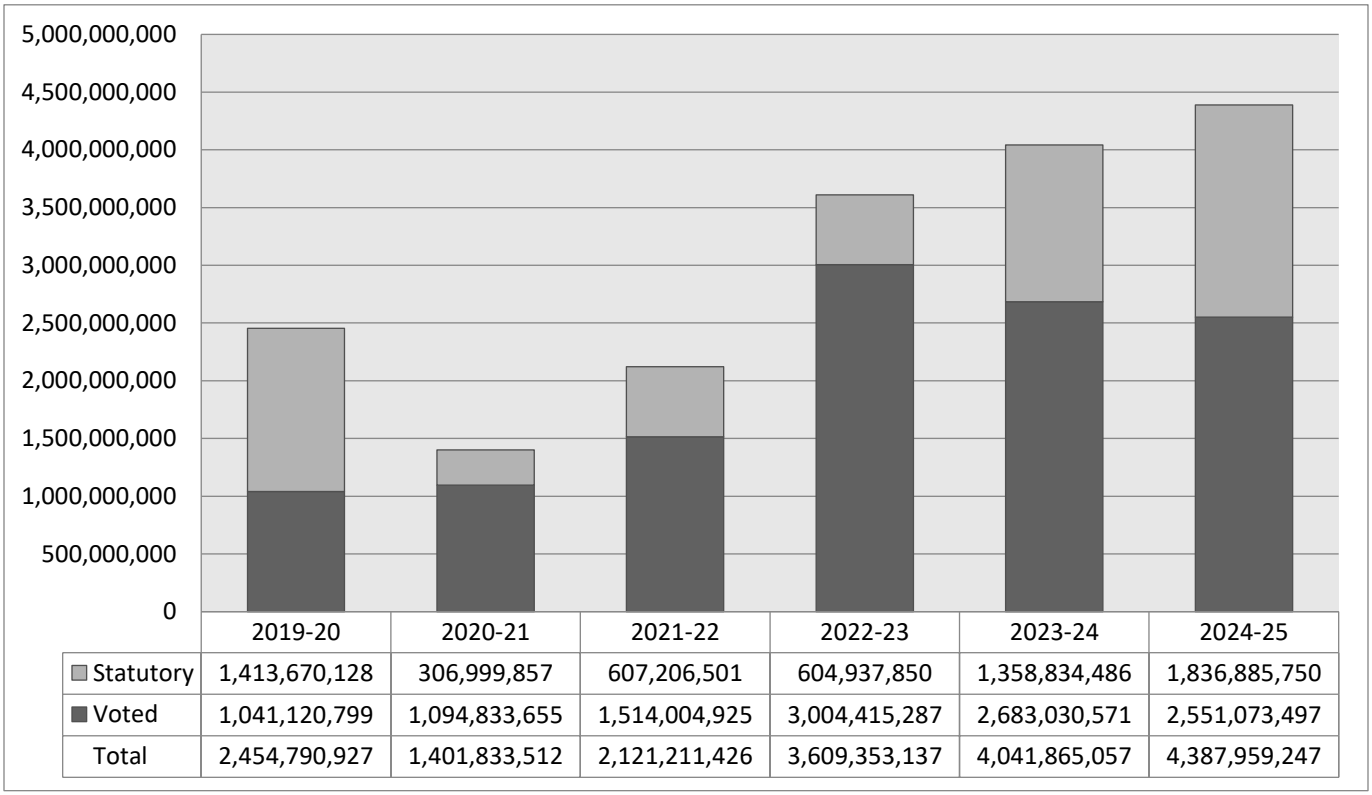
The following table shows, in full-time equivalents, the human resources the department needed to carry out its internal services for 2021–22.

2021–22 planned full-time equivalents	2021–22 actual full-time equivalents	2021–22 difference (actual full-time equivalents minus planned full-time equivalents)
989	1,007	18

Spending and human resources

Spending 2019–20 to 2024–25

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



	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Statutory	1,413,670,128	306,999,857	607,206,501	604,937,850	1,358,834,486	1,836,885,750
Voted	1,041,120,799	1,094,833,655	1,514,004,925	3,004,415,287	2,683,030,571	2,551,073,497
Total	2,454,790,927	1,401,833,512	2,121,211,426	3,609,353,137	4,041,865,057	4,387,959,247

Planned spending in Voted authorities from 2022-23 to 2024-25 is declining, mainly as a result of reduced funding profiles for major initiatives and sunsetting programs such as: Investments in Forest Industry Transformation (IFIT), Forest Innovation Program (FIP) and Expanding Market Opportunities. Sunsetting programs could be renewed pending future budgetary decisions. Outcomes of such decisions will be reflected in the Department’s future budget exercises and Estimates documents.

Planned spending in Statutory authorities is increasing from 2022-23 to 2024-25, mainly as a result of the Atlantic Offshore Accounts. Statutory payment obligations under these accords are largely driven by oil and gas prices, production levels and anticipated corporate income taxes related to offshore operations. The planned spending is based on the Department's economic modeling forecasts prepared in the fall of 2021.

Budgetary performance summary for core responsibilities and internal services (dollars)

The "Budgetary performance summary for core responsibilities and internal services" table presents the budgetary financial resources allocated for Natural Resources Canada's core responsibilities and for internal services.

Core responsibilities and internal services	2021–22 Main Estimates	2021–22 planned spending	2022–23 planned spending	2023–24 planned spending	2021–22 total authorities available for use	2019–20 actual spending (authorities used)	2020–21 actual spending (authorities used)	2021–22 actual spending (authorities used)
1. Natural Resources Science and Risk Mitigation	252,369,016	252,369,016	475,466,366	525,666,133	365,474,654	207,688,086	207,697,165	326,773,358
2. Innovative and Sustainable Natural Resources Development	1,400,422,672	1,400,422,672	2,178,334,701	1,984,366,574	1,768,896,953	1,498,877,063	560,924,909	833,168,889
3. Globally Competitive Natural Resource Sectors	435,880,248	435,880,248	778,394,348	1,364,831,323	858,444,563	595,634,877	470,921,143	802,059,928
Subtotal	**2,088,671,936**	**2,088,671,936**	**3,432,195,414**	**3,874,864,029**	**2,992,816,170**	**2,302,200,026**	**1,239,543,217**	**1,962,002,175**
Internal services	149,532,723	149,532,723	177,157,722	167,001,028	192,936,825	152,590,901	162,290,295	159,209,251
Total	**2,238,204,659**	**2,238,204,659**	**3,609,353,137**	**4,041,865,057**	**3,185,752,995**	**2,454,790,927**	**1,401,833,512**	**2,121,211,426**

The budgetary performance summary table above provides for the following:

- Main Estimates for 2021-22;

- Planned Spending for 2021-22, as reported in NRCan's 2021-22 Departmental Plan;
- Planned Spending for 2022-23 to 2023-24, as reported in NRCan's 2022-23 Departmental Plan;
- Total authorities available for use in 2021-22, reflects the authorities received including in-year funding; and
- Actual expenditures 2019-20 to 2021-22, as reported in the Public Accounts of Canada.

Actual spending for 2020-21 was $1.40 billion, a year-over-year decrease of $1.05 billion (43%) when compared to 2019-20 actual spending. This decrease is mainly attributed to:

- a one-time payment made in 2019-20 to the Federation of Canadian Municipalities for the Green Municipal Fund; and reduced spending as a result of the winding down of the ecoENERGY for Renewable Power Program and TMX Consultations, as well as a decrease in the Atlantic Offshore Accounts.

These reductions in spending were offset by an increase in spending as a result of new or incremental funding for various programs such as the Safety Measures in Forest Sector Operations, the Emissions Reduction Fund (ERF), the Zero Emission Vehicle Infrastructure Program, the Energy Innovation Program, and the Mountain Pine Beetle Program.

Actual spending for 2021-22 was $2.12 billion, a year-over-year increase of $719 million (51%) from 2020-21 actual spending. This increase is mainly due to:

- incremental spending of $376 million in grants and contributions programs such as Emissions Reduction Fund (ERF), planting 2 billion trees by 2031, improving efficiency in homes, Smart Renewables and Electrification Pathways (SREPs), supporting young people to gain the skills and work experience for a successful transition into the labour market; and
- increased spending of $315 million in statutory transfer payments related to Offshore statutory programs, in particular for the Newfoundland Offshore Petroleum Resource Revenue Fund largely attributed to a higher royalty rate for the Hibernia field. Royalty amounts vary as a result of fluctuations in the price of oil, exchange rates, changes in production and timing of sales.

These increases in spending were offset by reduced spending due to the sunset of programs such as Clean Energy – ecoEnergy Renewable Power, Covid-19 Safety Measures in Forest Sector Operations.

The variance of $948 million between planned spending of $2,238 million and total authorities of $3,186 million in 2021-22 is attributed to supplementary funding received as per the 2020 Speech from the Throne and the 2021 Fall Economic Statement announcements, in support of the following initiatives, to assist Canada's green recovery and climate action plan:

- ERF, planting of 2 billion trees, improving energy efficiency in homes, SREPs, Clean Fuels Fund to transition to clean energy, and use of Carbon Capture, Utilization and Storage Technologies.

Of the $3,186 million total authorities in 2021-22, NRCan spent $2,121 million. The $1,065 million in unspent funding relates to a number of programs and is mostly attributable to overall disruption in supply chains, ongoing labour shortages, delays in signing contribution agreements and project execution, and due to receiving late notification from stakeholders of inability to spend. To mitigate the impact on program delivery, much of the unspent funding was carried forward or reprofiled into future years to ensure that funding will continue to be available to support the projects.

Human resources

The "Human resources summary for core responsibilities and internal services" table presents the full-time equivalents (FTEs) allocated to each of Natural Resources Canada's core responsibilities and to internal services.

Human resources summary for core responsibilities and internal services.

Core responsibilities and internal services	2019–20 actual full-time equivalents	2020–21 actual full-time equivalents	2021–22 planned full-time equivalents	2021–22 actual full-time equivalents	2022–23 planned full-time equivalents	2023–24 planned full-time equivalents
1. Natural Resources Science and Risk Mitigation	1,274	1,206	1,213	1,263	1,339	1,266
2. Innovative and Sustainable Natural Resources Development	1,645	1,650	1,582	1,735	1,874	1,767
3. Globally Competitive Natural Resource Sectors	469	494	479	465	482	421
Subtotal	**3,388**	**3,350**	**3,274**	**3,463**	**3,695**	**3,454**
Internal services	993	975	989	1,007	1,052	1,029
Total	**4,381**	**4,325**	**4,263**	**4,470**	**4,747**	**4,484**

For 2019-20 to 2021-22, the figures represent actual FTEs as reported in the Departmental Results Reports. The planned FTEs in all years align with figures identified in the 2022-23 Departmental Plan.

The decrease of 56 FTEs in 2019-20 to 2020-21 is attributable to reduced funding related to the PERD, Geo-Mapping for Energy and Minerals program, and Indigenous Consultations for TMX. These reductions in FTEs are offset by funding for new programs such as the Emissions Reduction Fund, Indigenous Resource Partnership Initiatives and incremental funding to support the TMX Accommodation Measures, Energy Innovation program and Energy Efficiency and Alternative Fuels program.

The increase of FTEs from 2020-21 to 2022-23 is due mostly to the new programs such as: Greener Homes, Carbon Capture Utilization and Storage (CCUS), Smart Renewable and Electrification Pathways (SREP), Growing Canada's Forests (2 Billion Trees) and Critical Minerals.

The decline in FTEs from 2022-23 to 2023-24 relates mostly to the reduction of funding profiles and the sunsetting of major initiatives such as: Cumulative Effects and Open Science, Forest Innovation Program and First Nation Land Description Reports. As other new initiatives are undertaken, plans for future FTE requirements will be adjusted accordingly.

Expenditures by vote

For information on Natural Resources Canada's organizational voted and statutory expenditures, consult the Public Accounts of Canada 2021.[ccvi]

Government of Canada spending and activities

Information on the alignment of Natural Resources Canada's spending with Government of Canada's spending and activities is available in GC InfoBase.[ccvii]

Financial statements and financial statements highlights

Financial statements

The NRCan consolidated financial statements (unaudited) for the year ended March 31, 2022, are available on the Departmental website.[ccviii]

Financial statement highlights

The highlights presented in this section are drawn from the Department's consolidated financial statements.

The consolidated financial statements were prepared using the Government of Canada accounting policies, which are based on Canadian public sector accounting standards resulting in figures that may differ from those provided in other sections of the Departmental Results Report prepared on an expenditure basis. A reconciliation between authorities used on an expenditure basis and the net cost of operations prepared on an accrual basis is set out in Note 3 of the Department's consolidated financial statements.

Condensed Consolidated Statement of Operations (unaudited) for the year ended March 31, 2022 (dollars)

Financial information	2021–22 planned results*	2021–22 actual results	2020–21 actual results	Difference (2021–22 actual results minus 2021–22 planned results)	Difference (2021–22 actual results minus 2020–21 actual results)
Total expenses	1,821,313,961	2,107,406,869	1,467,730,454	286,092,908	639,676,415
Total net revenues	29,101,181	31,037,657	22,625,976	1,936,476	8,411,681
Net cost of operations before government funding and transfers	1,792,212,780	2,076,369,212	1,445,104,478	284,156,432	631,264,734

* The 2021-22 Planned Results are derived from the amounts presented in the 2021-22 Consolidated Future-Oriented Statement of Operations and included in NRCan's 2021-22 Departmental Plan.

Total NRCan expenses of $2,107 million in 2021-22 consist of $1,303 million in transfer payments, mainly related to non-profit organizations under Innovative and Sustainable Natural Resources Development and to other levels of government under Globally Competitive Natural Resource Sectors, along with $805 million in other operating expenses. The NRCan total net revenues of $31 million in 2021-22 resulted from re-spendable revenues such as those from service fees and from the Geomatics Canada Revolving Fund.

The increase of $631 million in the net cost of operations before government funding and transfers in 2021-22 is mainly explained by an:

- Increase of $325 million in transfer payments to ***Other levels of Government,*** largely in the Statutory Offshore Payments program due to an increase in offshore royalties and in forfeitures of security deposits for exploration licenses;
- Increase of $151 million in transfer payments to ***Non-Profit organizations,*** mainly due to the Smart Renewables and Electrification Pathways Program, the Youth Employment and Skills Strategy, and the Offshore Emissions Research, Development & Demonstration program;
- Increase of $88 million in transfer payments to ***Individuals*** due mainly to the Greener Homes program;
- Overall increase of $28 million in operating expenses, primarily for professional services; and

- Increase of $8 million in Net Revenue mainly due to the COVID-19 restrictions gradually being lifted in 2021-22, permitting research and revenue generating activities to resume.

The increase of $284 million to the net cost of operations before government funding and transfers between the planned and actual results is mainly attributed to increased spending in Statutory Offshore Accounts as noted above and additional funding received during the year, such as funding for Smart Renewables and Electrification Pathways Program, Natural Climate Solutions in Canada Program, and Youth Employment and Skills Strategy Program.

The chart presenting NRCan's actual expenses by type for 2021-22 is available on the NRCan website.[ccix]

Condensed Consolidated Statement of Financial Position (unaudited) as of March 31, 2022 (dollars)

Financial information	2021–22	2020–21	Difference (2021–22 minus 2020–21)
Total liabilities	864,073,371	618,946,543	245,126,828
Total net financial assets	768,066,953	514,001,414	254,065,539
Departmental net debt	96,006,418	104,945,129	(8,938,711)
Total non-financial assets	325,999,661	332,704,978	(6,705,317)
Departmental net financial position	229,993,243	227,759,849	2,233,394

Total NRCan liabilities of $864 million include $251.9 million in accounts payable and accrued liabilities. The increase of $245.1 million is primarily related to an increase in accrued liabilities, mainly due to the timing and increased volume of contribution payments at fiscal year-end.

Total NRCan net financial assets of $768 million mainly consist of $747 million due from the consolidated revenue fund (CRF), which represents amounts that may be disbursed without further charges to the NRCan authorities.

Total NRCan non-financial assets of $326 million mainly consist of $323 million of tangible capital assets.

The departmental net financial position, which is the difference between the total non-financial assets and the departmental net debt, remained stable.

Corporate information

Organizational profile

Appropriate minister: The Honourable Jonathan Wilkinson, P.C., M.P.

Institutional head: John Hannaford

Ministerial portfolio:

- Atomic Energy of Canada Limited;[ccx]
- National Energy Board; [ccxi]
- Canadian Nuclear Safety Commission;[ccxii]
- Canada-Newfoundland and Labrador Offshore Petroleum Board;[ccxiii]
- Canada-Nova Scotia Offshore Petroleum Board; [ccxiv]
- Northern Pipeline Agency;[ccxv] and,
- Energy Supplies Allocation Board (inactive).

Enabling instrument(s):

- Department of Natural Resources Act, S.C. 1994, c. 41;[ccxvi]
- Forestry Act, R.S.C., 1985, c. F-30;[ccxvii]
- Resources and Technical Surveys Act, R.S.C., 1985, c. R-7;[ccxviii]
- Energy Efficiency Act, S.C. 1992, c. 36;[ccxix]
- Extractive Sector Transparency Measure Act, S.C. 2014, s.376;[ccxx] and,
- Explosives Act, R.S.C., 1985, c. E-17.[ccxxi]

Year of incorporation / commencement: 1994

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

"Raison d'être, mandate and role: who we are and what we do" is available on Natural Resources Canada's website.[ccxxii]

For more information on the department's organizational mandate letter commitments, see the Minister's mandate letter.[ccxxiii]

Operating context

Information on the operating context is available on NRCan's website.[ccxxiv]

Reporting framework

Natural Resources Canada's Departmental Results Framework and Program Inventory of record for 2021–22 are shown below.

Natural Resources Canada's Departmental Results Framework 2021-22

NRCan CORE RESPONSIBILITIES

Natural Resource Science and Risk Mitigation	Innovative and Sustainable Natural Resources Development	Globally Competitive Natural Resource Sectors	Internal Services
Lead foundational **science** and **share expertise** for managing Canada's natural resources, **reducing the impacts of climate change** and **mitigating risks** from natural disasters and explosives.	**Lead** the transformation to a **low-carbon economy** by improving the environmental performance of Canada's natural resource sectors through **innovation and sustainable development and use**.	**Advance** and **promote market access**, inclusiveness and competitiveness for Canada's natural resource sectors, in **support of jobs and economic growth**.*	

DEPARTMENTAL RESULTS AND INDICATORS What is the department trying to achieve?

Natural Resource Science and Risk Mitigation	Innovative and Sustainable Natural Resources Development	Globally Competitive Natural Resource Sectors	Internal Services
Canadians have access to cutting-edge research to inform decisions on the management of natural resources ❖ Number of times scientific products related to natural resources are accessed by Canadians ❖ Percentage of environmental impact assessments demonstrating use of scientific and technical advice provided by NRCan ❖ Number of times stakeholders acknowledge using NRCan's scientific and technical products in making their decisions ❖ Number of NRCan agreements that recognize data and/or information derived from an Indigenous Knowledge source and is used to inform NRCan science and/or research ❖ Percentage of annual updates to make NRCan foundational geospatial data current **Communities and officials have the tools to safeguard Canadians from natural hazards and explosives** ❖ Percentage of hazardous natural events within Canada for which a notification was issued in a timely manner ❖ Percentage of emergency geomatics services provided to Canadians in a timely manner to assist during floods ❖ Percentage uptime of the Canadian Wildland Fire Information System during the wildfire season ❖ Percentage of inspections of explosives sites rated safe **Communities and industries are adapting to climate change** ❖ Number of times NRCan products and expertise on adaptation are accessed by Canadians ❖ Percentage of Canadian communities and industries that have taken steps to adapt to climate change	**Natural resource sectors are innovative** ❖ Percentage of NRCan-funded innovation projects that result in new intellectual property, codes, standards or regulations ❖ Percentage of innovative forest products and decision tools informed by NRCan research that contribute to the environmental sustainability of Canada's forests ❖ Percentage of NRCan-funded clean energy innovation projects advancing along the innovation scale ❖ Percentage of innovative mining technologies developed by NRCan that move towards being ready for commercial use **Clean technologies and energy efficiencies enhance economic performance** ❖ Percentage of NRCan-funded clean technology demonstration projects achieving their economic goals ❖ Ratio of partner investment to government spending in NRCan-funded energy innovation projects ❖ Total annual energy savings resulting from adoption of energy efficiency codes, standards and practices **Canada's natural resources are sustainable** ❖ Percentage of Canadian electricity generated from non-GHG emitting sources ❖ Number of renewable energy projects in remote communities and off-grid industrial operations ❖ Amount of wood harvested compared to the sustainable supply ❖ Number of low-carbon recharging and refueling stations under development or completed ❖ Reduction in greenhouse gas emissions resulting from NRCan-funded clean technology demonstrations ❖ Percentage of NRCan's projects on innovation and sustainable development that engage Indigenous communities, organizations or governments	**Access to new and priority markets for Canada's natural resources is enhanced** ❖ Canada's share of U.S. and global imports of natural resources ❖ Increase in value of assets abroad owned by Canadian natural resource companies ❖ Number of NRCan international engagements that support the development or expansion of trade and investment in natural resources **Canadians are engaged in the future of the new and inclusive resource economy** ❖ Number of joint products developed in collaboration with provinces and territories and released to Canadians ❖ Percentage of NRCan's projects that support participation of Indigenous communities, organizations or governments in Canada's natural resource economy **Enhanced competitiveness of Canada's natural resource sectors** ❖ Economic value of anticipated natural resource projects supported by analysis and solutions ❖ Number of initiatives enabled by NRCan to strengthen the cyber security and resilience of Canada's critical energy infrastructure ❖ Number of times NRCan's economic and investment data are accessed	

PROGRAM INVENTORY Covers 100 percent of the department's activities and resources

Natural Resource Science and Risk Mitigation	Innovative and Sustainable Natural Resources Development	Globally Competitive Natural Resource Sectors	Internal Services
Canadian Geodetic Survey: Spatially Enabling Canada Geological Knowledge for Canada's Onshore and Offshore Land Core Geospatial Data Canada-US International Boundary Treaty Canada Lands Survey System Geoscience for Sustainable Development of Natural Resources Pest Risk Management Forest Climate Change Climate Change Adaptation Explosives Safety and Security Geoscience to Keep Canada Safe Wildfire Risk Management Polar Continental Shelf program	Energy Innovation and Clean Technology Green Mining Innovation Fibre Solutions Sustainable Forest Management Cumulative Effects Lower Carbon Transportation Electricity Resources Energy Efficiency Energy and Climate Change Policy Innovative Geospatial Solutions	Forest Sector Competitiveness Provision of Federal Leadership in the Minerals and Metals Sector Energy Safety and Security, and Petroleum Resources International Energy Engagement Statutory Offshore Payments Natural Resources Canada's Indigenous Partnerships Office – West The Resource Partnerships Sector Youth Employment and Skills Strategy – Science and Technology Internship Program (Green Jobs) * Also includes statutory payments for offshore petroleum.	Management & Oversight Communications Legal Services Human Resources Financial Management Information Management Information Technology Real Property (Domestic) Materiel Management Acquisition Management

Supporting information on the program inventory

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in GC InfoBase.[ccxxv]

Supplementary information tables

The following supplementary information tables are available on Natural Resources Canada's website:[ccxxvi]

- Details on transfer payment programs
- Gender-based analysis plus
- Response to parliamentary committees and external audits
- Horizontal initiative
- Up-front multi-year funding
- United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals

Federal tax expenditures

The tax system can be used to achieve public policy objectives through the application of special measures such as low tax rates, exemptions, deductions, deferrals and credits. The Department of Finance Canada publishes cost estimates and projections for these measures each year in the Report on Federal Tax Expenditures.[ccxxvii] This report also provides detailed background information on tax expenditures, including descriptions, objectives, historical information and references to related federal spending programs as well as evaluations and GBA Plus of tax expenditures.

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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 report on the plans and expected performance of an appropriated department over a 3-year period. Departmental Plans are usually tabled in Parliament each spring.

departmental priority *(priorité)*

A plan or project that a department has chosen to focus and report on during the planning period. Priorities represent the things that are most important or what must be done first to support the achievement of the desired departmental results.

departmental result *(résultat ministériel)*

A consequence or outcome that a department seeks to achieve. 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 quantitative measure of progress on a departmental result.

departmental results framework *(cadre ministériel des résultats)*

A framework that connects the department's core responsibilities to its departmental results and departmental result indicators.

Departmental Results Report *(rapport sur les résultats ministériels)*

A report on a department's actual accomplishments against the plans, priorities and expected results set out in the corresponding Departmental Plan.

experimentation *(expérimentation)*

The conducting of activities that seek to first explore, then test and compare the effects and impacts of policies and interventions to inform evidence-based decision-making, and improve outcomes for Canadians, by learning what works, for whom and in what circumstances. Experimentation is related to, but distinct from innovation (the trying of new things), because it involves a rigorous comparison of results. For example, using a new website to communicate with Canadians can be an innovation; systematically testing the new website against existing outreach tools or an old website to see which one leads to more engagement, is experimentation.

full-time equivalent *(équivalent temps plein)*

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. For a particular position, the full-time equivalent figure is the ratio of number of hours the person actually works divided by the standard number of hours set out in the person's collective agreement.

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; and understand how factors such as sex, race, national and ethnic origin, Indigenous origin or identity, age, sexual orientation, socio-economic conditions, geography, culture and disability, impact experiences and outcomes, and can affect access to and experience of government programs.

government-wide priorities *(priorités pangouvernementales)*

For the purpose of the 2021–22 Departmental Results Report, government-wide priorities refers to those high-level themes outlining the government's agenda in the 2020 Speech from the Throne, namely: Protecting Canadians from COVID-19; Helping Canadians through the pandemic; Building back better – a resiliency agenda for the middle class; The Canada we're fighting for.

horizontal initiative *(initiative horizontale)*

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

non-budgetary 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.

performance indicator *(indicateur de rendement)*

A qualitative or quantitative means of measuring an output or outcome, with the intention of gauging the performance of an organization, program, policy or initiative respecting expected results.

performance reporting *(production de rapports sur le rendement)*

The process of communicating evidence-based performance information. Performance reporting supports decision making, accountability and transparency.

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 to the expected result.

planned spending *(dépenses prévues)*

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in 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 the department and focus on a specific set of outputs, outcomes or service levels.

program inventory *(répertoire des programmes)*

Identifies all the department’s programs and describes how resources are organized to contribute to the department’s core responsibilities and results.

result *(résultat)*

A 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.

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