

# Natural Resources Canada

2019–20

## **Departmental Results Report**

Originally signed by

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The Honourable Seamus O'Regan, P.C., M.P.  
Minister of Natural Resources

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## Minister's message

As we move towards our post-COVID recovery and advance our goal of net-zero emissions by 2050, we need to be smart, thorough and thoughtful.

This year's Natural Resources Canada Departmental Results Report demonstrates how we are delivering on results for Canadians.



Being *smart* means grounding all of our decisions in the best data and best science. Working with provinces and territories, this focus allowed us to reach a major milestone; the first digital geological maps of Canada's North. Freely available online, these maps provide important information on mineral exploration, land use, and infrastructure.

This approach also led to launching the latest RADARSAT satellites, which are providing imagery to guide responses to flooding across the country. Data is also the backbone of the virtual Canadian Centre for Energy Information – a single point of access to information on our energy future.

Science has been at the very core of the development of federal flood mapping guidelines and the creation of a national database to assess the sensitivity of our coasts to climate change. Science has allowed us to develop an early-warning system for earthquakes, and a Canadian Wildland Fire Strategy to lessen the devastation from forest fires. Science is keeping Canadians safe.

We have been *thorough* in how we're approaching climate change:

- Investing in zero-emission vehicles;
- Advancing the use of hydrogen in mining;
- Financing the development of ethanol from wood and agricultural waste;
- Accelerating homegrown battery innovation;
- Investing in key technologies and emission reduction programs to advance towards the cleanest global petroleum sector; and
- Joining with international partners to secure the supply of critical minerals essential to a clean-growth future.

Being thorough also means investing in clean technologies and innovation to make Canadian homes, buildings, and industries more energy efficient and resistant to climate change.

*Thoughtfully* developing our resources means focusing on people and leaving no one behind. The Softwood Lumber Action Plan helped to protect workers, companies and communities affected by trade disputes. New investments are helping to bring Indigenous and non-Indigenous women, young people, and other under-represented groups into resource development.

The Trans Mountain Expansion project established a new template for Indigenous engagement on major projects. We've also enacted a new approach to environmental reviews that strengthens both investor certainty and environmental performance.

It's been a busy and productive year and I've been honoured to work with the talented people of Natural Resources Canada. This report is a testimony to their smarts, thoroughness and thoughtfulness.

The Honourable Seamus O'Regan, P.C., M.P.  
Minister of Natural Resources



## Results at a glance and operating context

Canada's natural resources, which ranges from non-renewable energy, minerals and metals, to renewable forest and energy assets, are an important source of jobs and prosperity. Based on 2019 data, the sector accounted for approximately 17% of nominal gross domestic product, 1.9 million jobs (direct and indirect) and half of all merchandise exports (\$264 billion or 48%).

As a science based organization that supports the growth and prosperity of Canada's natural resource sectors, in 2019-20, Natural Resources Canada (NRCan) contributed to the achievement of commitments articulated in the Mandate Letter of the Minister of Natural Resources, and the Department's three Core Responsibilities:

- [Natural Resource Science and Risk Mitigation](#);
- [Innovative and Sustainable Natural Resources Development](#); and,
- [Globally Competitive Natural Resource Sectors](#).

### Operating Context

NRCan maintained strong support for the growth and prosperity of Canada's natural resource sectors in light of the global and domestic environment in which they operated. This environment included an evolving competitive landscape marked by cyclical downturns in pricing, changing supply and demand patterns, trade uncertainties, regulatory changes and new policy approaches to environmental sustainability. There continued to be an emphasis around the world on sustainable development practices and environmental stewardship, the urgent need to reduce greenhouse gas (GHG) emissions, adapt to the impacts of climate change and protect the environment.

Gender-based analysis (GBA+) and diversity and inclusion continued to be a commitment for the Government of Canada to ensure that the development of policies, programs and legislation includes the consideration of differential impacts on diverse groups.

NRCan ensured that mandate letter commitments for this reporting period were addressed. For example, the Department continued to build on the work of Generation Energy, working with provinces and territories to accelerate clean growth strategies supporting innovation and job creation in our natural resource sectors. The Department also helped put more low-emission vehicles on the road by, in part, building refueling stations across Canada. To further build the country's green economy, and as part of a broader commitment to natural climate solutions, the Department started the process of making available trees that will: help cities expand and diversify their urban forests; rebuild forests after a wildfire; and, help municipalities increase the resilience of urban forests.

Finally, the latter period of 2019-20 was marked by the beginning of the COVID-19 pandemic. Within a week of the World Health Organization (WHO) declaration, on March 11, 2020, the

Prime Minister announced several measures to address the impact of the pandemic on Canadians and the Canadian economy.

Within this operating context, NRCan focused on delivering five priorities derived from its core responsibilities, mandate and ministerial commitments.

### Improving market access and competitiveness in the natural resource sectors

NRCan took actions to ensure that Canada continued to access new markets, and that the natural resource sectors remain a source of good jobs and opportunities for Canadians. In 2019-20, NRCan:

- **Established International Agreements and Partnerships** - To facilitate diversification and greater access to global markets for Canadian suppliers of natural resources, we supported negotiations for the **Canada-United States-Mexico Agreement** (CUSMA),<sup>i</sup> **Mercosur**,<sup>ii</sup> and **Pacific Alliance**. We prepared for potential free trade agreement (FTA) negotiations with **ASEAN** and **India**, and the modernization of the FTA with **Ukraine**. We also worked towards implementing the **Canada-European Union Comprehensive Economic and Trade Agreement** (CETA),<sup>iii</sup> and the **Comprehensive and Progressive Agreement for Trans-Pacific Partnership** (CPTPP).<sup>iv</sup>
- **Supported Legislative and Policy Changes** - In support of major resource projects that will position Canada as the supplier of choice on the global stage and a favourable destination for investment, we supported horizontal leadership across the Federal Government for **Bill C-69**.<sup>v</sup> The Bill simultaneously enacted the *Canadian Energy Regulator Act* (CERA) and the *Impact Assessment Act* (IAA). These Acts will better facilitate decisions on major resources projects, creating business certainty and protecting the environment.
- **Promoted Responsible Development and Use of Canada's Natural Resources Domestically and Internationally** - We advanced support to the mining sector by operationalizing the **Canadian Minerals and Metals Plan** (CMMP)<sup>vi</sup> in collaboration with provinces and territories, through **Action Plan 2020**.<sup>vii</sup> This Action Plan introduced the first series of pan-Canadian initiatives aimed at improving the global competitiveness of the Canadian minerals and metals industry and positioning Canada as a global mining leader. It pursues the vision of Canada as home to a competitive, sustainable and responsible minerals industry that benefits all Canadians. We also collaborated with stakeholders on the **Shared Vision for the Forests of Canada: Towards 2030 Report**, which outlines Canada's role as a world leader in sustainable forest management.

We supported the Government of Canada's work related to the approval of the **Trans Mountain Expansion Project** (TMX) by completing consultations with Indigenous groups potentially impacted by the Project. In support of TMX and other major projects, 267 collaborative agreements were signed and approximately \$10.5 million allocated to communities.

Internationally, we participated at fora, such as the **G7** and **G20**, **Clean Energy Ministerial - Mission Innovation** (CEM-MI),<sup>viii</sup> **25th Conference of the Parties** (COP 25),<sup>ix</sup> **International**



**Energy Agency** (IEA),<sup>x</sup> **GLOBE 2020**,<sup>xi</sup> **Mining Indaba** (Africa),<sup>xii</sup> **Expomin** (Americas),<sup>xiii</sup> the **Food and Agriculture Organization** (FAO),<sup>xiv</sup> and the **UN Forum on Forests** to promote trade and investment, clean energy and to advance Canada's resource competitiveness and protect our trade interests and the sustainable development of natural resources. In January 2020, Canada and the U.S. announced the finalization of the **Joint Action Plan on Critical Minerals Collaboration**,<sup>xv</sup> which will improve critical mineral security and ensure the future competitiveness of Canadian and U.S. minerals industries.

- **Defended Firms, Communities and Workers** - We worked with Global Affairs Canada (GAC) to challenge trade actions on softwood lumber, uncoated groundwood paper, supercalendered paper and dissolving pulp under **NAFTA Chapter 19** and at the **World Trade Organization** (WTO).<sup>xvi</sup> As a result, duties were removed from uncoated groundwood paper, supercalendered paper and dissolving pulp, while litigation continued on softwood lumber. We also defended against tariffs imposed on Canada's other natural resources sector exports, including existing and intended U.S. tariffs.

### Accelerating the development of clean technology and supporting the transition to a low carbon future

Transitioning to a low carbon future requires investments in clean technology, collaboration with international and domestic partners, program investments and policy and regulatory changes. In 2019-20, NRCan:

- **Accelerated Clean Technology Innovation** - We facilitated clean technology innovation by funding research, development and demonstration (RD&D) projects<sup>1</sup> through existing clean energy innovation initiatives such as the **Green Infrastructure Programs**,<sup>xvii</sup> the **Clean Growth Program** (CGP)<sup>xviii</sup> and the **Energy Innovation Program** (EIP).<sup>xix</sup> Under the **Impact Canada Initiative**,<sup>xx</sup> six prize-based **Clean Technology Challenges**<sup>xxi</sup> were advanced including **Charging the Future**,<sup>xxii</sup> a \$4.5 million challenge announced in July 2019 to accelerate a made-in-Canada battery innovation. Further evidence of Canada's global leadership in leading clean technology innovation was illustrated through our participation in all eight **MI Innovation Challenges** (ICs), co-leading the Sustainable Biofuels and Clean Energy Materials ICs. Under the EIP, we developed with partners the stream **Breakthrough Energy Solutions Canada**<sup>2</sup> (BESC)<sup>xxiii</sup> that is investing up to \$40 million, as a game-changing public-private initiative, to accelerate the development and commercialization of clean technologies with potential for significant GHG emissions reductions.

<sup>1</sup> This included projects in renewable energy; energy efficient buildings; clean energy for rural and remote communities; low carbon fuels and transportation; grid modernization; improved batteries and energy storage; and reducing GHG emissions, water use and waste from oil and gas production, mining and other industries.

<sup>2</sup> Total Breakthrough Energy Solutions Canada (BESC) funding is \$40 million (\$20 million from NRCan; \$10 million from Breakthrough Energy Ventures; \$10 million from Business Development Bank of Canada).

Ten companies<sup>xxiv</sup> were selected in January 2020 under BESC and announced in February at **GLOBE 2020**.<sup>xxv</sup> We also hosted the **4th Mission Innovation**<sup>xxvi</sup> and **10th Clean Energy Ministerial Meetings (CEM-MI)**<sup>xxvii</sup> in May 2019, leading the way to clean technology research and policies.



10th Clean Energy Ministerial Meeting / 4th Mission Innovation Meeting, Vancouver Convention Centre West

To support local actions to improve energy efficiency of homes and community buildings and reduce GHG emissions, we continued to support the Federation of Canadian Municipalities' **Green Municipal Fund (GMF)**.<sup>xxviii</sup> For the forest sector, we helped create green jobs and reduced GHG emissions by supporting Woodland Biofuels through the **Investments in Forest Industry Transformation**<sup>xxix</sup> and CGP to produce, for the first time, ethanol from wood and agricultural waste.

- **Advanced Canada's Transition to a Low-carbon Economy** - We supported the government-wide priority to put more low-emission vehicles, including electric vehicles (EVs), on Canadian roads, through the **Electric Vehicle and Alternative Fuel Infrastructure Deployment (EVAFID) Initiative**<sup>xxx</sup> and the **Electric Vehicle Infrastructure Demonstration Program**.<sup>xxxi</sup> which is advancing new technological solutions for EVs. The **Zero Emission Vehicle (ZEV) Infrastructure Program**<sup>xxxii</sup> was also launched, facilitating greater access to charging where Canadians live, work and play.

We advanced the development of a **Hydrogen Strategy for Canada**, which will identify opportunities for clean hydrogen production and use across the country, while positioning Canada to become a supplier of choice to the world. Given that low carbon fuels, such as hydrogen, will play a key role in Canadian and global energy transformation on the path to net-zero, our domestic efforts were also complemented by the launch of a new **Hydrogen Initiative**, under the CEM.

This new Initiative serves as a cornerstone of hydrogen deployment efforts globally, cementing hydrogen's essential role in the energy transformation globally. In the mining sector, the **Hydrogen Implementation for Mining Initiative** is helping advance hydrogen fuel cell electric power as a clean alternative to diesel power for mining and the **Mining Value from Waste Program**<sup>xxxiii</sup> is helping reduce the environmental, social and economic footprint of mine wastes in support of the transition to a low-carbon economy.

To build resilience and fight climate change, we continued to implement the **Pan-Canadian Framework (PCF) on Clean Growth and Climate Change**.<sup>xxxiv</sup> We also collaborated with partners to implement recommendations from the **Generation Energy Council Report**,<sup>xxxv</sup> including a commitment to strengthen existing measures to reduce Canada's current 2030 emissions reduction goal to net-zero by 2050.

Finally, we continued to administer the **ENERGY STAR® for Products Program**,<sup>xxxvi</sup> which encourages consumer purchases of high-efficiency products. The **ENERGY STAR®**<sup>xxxvii</sup>

technical specifications for six product categories were updated, including windows, doors and skylights, and heat and energy recovery ventilators.

## Protecting Canadians from the impacts of natural and human-induced hazards

Natural and human-induced hazards can have devastating impacts on the lives of Canadians, as well as the security of Canada's critical infrastructure and overall economy. If not located, monitored, and tracked in near real time, they can also severely impact the competitiveness of the natural resources sector, and the prosperity and livelihood of Canadians. In 2019-20, NRCan:

- **Improved Monitoring of Natural Hazards** - Seasonal floods, wildfires, earthquakes, and destructive forest pests remain major ongoing threats to many communities across the country. Under the **Emergency Management Strategy for Canada (EMS)**,<sup>xxxviii</sup> we collaborated with provinces, territories and Indigenous peoples to develop **Federal Flood Mapping Guidelines**,<sup>xxxix</sup> and conducted research and development efforts to advance flood mapping tools and methods. These activities enabled us to respond to some of the most devastating flood seasons in Canada's history by monitoring events and providing first responders and municipalities with near real time satellite-based flood extent maps through the **NRCan Emergency Geomatics Services**. We led **CanCoast 2.0**,<sup>xl</sup> a national, open-access digital database to assess Canada's coastal sensitivity to climate change, and also increased the use of tools to enhance forest resilience through the **Forest Change Program**.

We commenced work on the Wildland Fire Component of the EMS and, in partnership with the Natural Sciences and Engineering Research Council (NSERC) and the University of Alberta, we provided assistance for the establishment of a **National Wildland Fire Research Network** to enhance response to wildland fires and support resilient communities. Being the lead in the development of the wildland fire component of the **National Risk Profile** (which determines the risk of wildland fires to communities), we also provided federal leadership for the implementation of the **Canadian Wildland Fire Strategy (CWFS)**<sup>xli</sup> to mitigate the effects of wildfires on Canadians. In addition, we helped mitigate the effects of forest pests by advancing the **Spruce Budworm Early Intervention Strategy Phase II**, which monitored and treated forest at risk of an outbreak in the Atlantic region.

To counter the destructive effects of earthquakes, we completed a full upgrade of the national earthquake-monitoring infrastructure, and commenced the rollout of a **National Earthquake Early Warning System**.

- **Strengthened understanding of the impacts of Climate Change and Adaptation** - Through the **Climate Change Geoscience Program**, we funded scientific research on the impacts of climate change and adaptation on permafrost, coastal erosion, sea level rise, ecosystems, extreme weather events and monitoring of Canada's glaciers. This information aims at protecting Canadians from changes in our climate. Our work also informed the ECCC publication, **Canada's Changing Climate Report 2019**,<sup>xlii</sup> that looks at how and why Canada's climate has changed and the changes that are projected for the future.

- **Strengthened Regulations and Security around Explosives and Cyber-security** - To improve regulation and protect infrastructure, we began the process of amending the regulated list of explosives precursor chemicals to include newly identified chemicals of concern. As well, a new **Risk-Based Inspection Plan** was implemented, allowing inspectors to be more resource effective and target sites which presented the highest risk. Cyber security being a priority, we played an active role in shaping Canada's cyber resilience by contributing to the implementation of the **National Cyber Security Strategy**<sup>xliii</sup> by deepening collaboration with domestic and international partners, and enhancing the cyber security of Canada's domestic and cross-border energy infrastructure.
- **Supported the Government's Response to the COVID-19 Pandemic** - In the last weeks of March 2020, we proactively worked with Statistics Canada and Shared Services Canada to respond to the Public Health Agency of Canada's request for assistance. In this regard, the Department contributed by establishing a multi-jurisdiction geospatial cloud based technology environment for geospatial data sharing and by developing situational awareness products, such as online **interactive maps and dashboards**,<sup>xliv</sup> which have since been viewed more than one million times by Canadians.

### Strengthening relationships and advancing reconciliation with Indigenous peoples

Reconciliation with Indigenous peoples based on the recognition of rights, respect, co-operation and partnership are essential to a renewed nation-to-nation relationship. NRCan has continued to renew and strengthen its relationship with Indigenous peoples. In 2019-20, NRCan:

- **Promoted Opportunities for Participation in Energy Infrastructure Development** – We supported the participation of Indigenous peoples in the natural resources sector through the **Indigenous Advisory and Monitoring Committees** (IAMC)<sup>xlv</sup> for TMX and Line 3 pipeline projects, as well as economic opportunities through the **Indigenous Natural Resource Partnerships program**. We confirmed our commitment to continued engagement with Indigenous groups on TMX through the establishment of the Phase IV Partnerships Office and by working collaboratively with other departments to implement Project accommodations and other measures. We continued engagement on the **Manitoba-Minnesota Transmission project** and engaged in Crown consultations with potentially impacted Indigenous groups on the proposed **Nova Gas Transmission Ltd. (2021) System Expansion Project**.
- **Advanced Capacity Building and Economic Development** - Through the **Indigenous Forestry Initiative** (IFI),<sup>xlvi</sup> and in collaboration with **Indigenous Services Canada's Strategic Partnership Initiative**, we invested \$6 million in 52 Indigenous-led forest projects that build capacity and support jobs in the Indigenous forest sector. Support for the economic development and participation of Indigenous communities was also encouraged through the **CMMP**, the new **Impact Assessment Act**,<sup>xlvii</sup> and the **Arctic and Northern Policy Framework** (ANPF).<sup>xlviii</sup> Further, we engaged with First Nation communities through the **First Nation Land Management Program**,<sup>xlix</sup> which support self-governance and the development of First Nation capacity in land surveying.

Support was provided for renewable energy and capacity building projects across rural, remote and Indigenous communities to reduce reliance on fossil fuels, through NRCan's **Clean Energy for Rural and Remote Communities Program** (CERRC)<sup>i</sup> and **Impact Canada's Indigenous Off-Diesel Initiative** (IODI).<sup>ii</sup> In 2019-20, the CERRC Program selected 35 new projects, of which 32 were in Indigenous communities, while the IODI supported 15 Indigenous Energy Champions who are working with their communities to develop and implement clean energy plans.

- **Renewed and Strengthened Relationship** – Through an investment of \$3 million, the Royal Astronomer's Residence was transformed into the **Circle of Nations Learning Centre** (CNLC).<sup>iii</sup> This centre is a place where representatives from Indigenous organizations, academia, the private sector, federal departments and the not-for-profit sector can work together on building relationships and strengthening collaboration. The CNLC is a center-point for NRCan cultural competency activities, the **Indigenous Employees Network** (IEN), and reconciliation. Also, to help advance work on reconciliation, we successfully released the inaugural interactive tool map, **Stories from the Land: Indigenous Place Names in Canada**.<sup>iiii</sup>
- **Addressed the Impact of the COVID-19 Pandemic in Indigenous and Remote Northern Communities** - Through NRCan's **COVID-19 North Working Group**, in collaboration with other government departments, information was analysed and applied to operational requirements for whole-of-government initiatives. These efforts highlighted the importance of natural resources as a key contributor in planning for pandemic preparedness and response in Canada's North and across Indigenous communities.

## Ensuring our decisions and actions are grounded in transparent and robust science

Creating and leveraging scientific knowledge and expertise is essential to maintaining Canada's global competitive advantage, building a more sustainable future, and meeting the highest standards of stewardship. In 2019-20, NRCan:

- **Broadened Scientific Knowledge and Capacity** - Through the **Federal Geospatial Platform**<sup>iv</sup> and the **Earth Observation Data Management System**,<sup>iv</sup> we improved access to authoritative geospatial information and analysis ready data for decision makers. By leveraging expertise in Artificial Intelligence (AI) and machine learning and through the application of big data management tools, we successfully made use of optical and radar imagery to better understand the evolution of Canada's land, water, and infrastructure. As well, we launched our **Policy on Scientific Integrity**<sup>vi</sup> to support the



*Geologists from GEM's Multiple Metals Cumberland Peninsula Project examine an 1860 million-year-old mountain building event on Eastern Baffin Island, Nunavut (2009).*

continued excellence and integrity, in the conduct, use and communication of the Department's science.

We broadened knowledge of Northern Canada by creating the first modern digital geological maps of Canada's North and synthesized knowledge of geoscience in the North through the **Geo-mapping for Energy and Minerals program (GEM)**,<sup>lvii</sup> which contributes to better exploration investment decisions and more informed land use decisions within northern communities.

We also provided logistics support to enable science research in the North through the **Polar Continental Shelf Program**<sup>lviii</sup> and responded to the growing demand for knowledge regarding the Arctic. Canada's **Arctic Ocean submission to the Commission on the Limits of the Continental Shelf**<sup>lix</sup> was also finalised and is expected to be presented in 2021. This submission will define Canada's continental shelf beyond 200 nautical miles. International recognition of the outer limits will make this Canada's last international boundary, conferring sovereignty over the natural resources on the seafloor and in the subsoil.

To further science collaboration with federal partners, we co-led the development of a new multi-department science hub to transform how it delivers transdisciplinary science, and to address departmental laboratory infrastructure needs.

- **Expanded Access to Government Science and Earth Observation** - We contributed to launching the **RADARSAT Constellation Mission (RCM)**,<sup>lx</sup> and supporting the operation of three satellite ground stations. A 99.97% imagery transfer delivery standard was achieved. As a result, imagery from the RCM was effectively used in response to floods in Manitoba in early spring 2020.



*Canada's RADARSAT Constellation Mission provides essential imagery to guide emergency flood response and safeguard critical energy and transportation corridors.*

We launched the virtual **Canadian Centre for Energy Information**,<sup>lxi</sup> an independent, one-stop shop for comprehensive energy data and expert analysis, which will ensure individuals and communities have the most reliable, transparent and science-based information, as the evidence base for making informed decisions. Additionally, we invested in the **Building Regional Adaptation Capacity and Expertise Program (BRACE)**<sup>lxii</sup> and the **Adapting to Climate Change Program**.<sup>lxiii</sup> By providing access to government science, these programs aim to increase the capacity of small to medium sized enterprises, organizations, professionals and communities to better adapt to climate change. We also contributed successful delivery of Canada's national climate change adaptation conference, **Adaptation Canada 2020**,<sup>lxiv</sup> which covered a breadth of topics and showcased a range of adaptation solutions to climate change impacts such as sea level rise, flooding and permafrost thaw.

- **Strengthened and Modernize our Scientific Endeavors in Artificial Intelligence (AI)** - To better explore the application of AI and Big Data techniques and the role of digitally disruptive technologies in the natural resources sector, we appointed a thought leader in artificial intelligence (AI) as NRCan’s new Chief Scientist and Chief Science Advisor. In addition a new unit was created to identify opportunities to apply digital technologies and AI across NRCan science.

2019-20 Actual Spending	2019-20 Actual Full-Time Equivalents
2,454,790,927	4,381

For more information on Natural Resources Canada’s plans, priorities and results achieved, see the “Results: what we achieved” section of this report.

## 2019–20 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 2019–20?

#### 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 **504,242** 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 **30,957** times in making their decisions
- The department offered **121** training and development initiatives to ensure Indigenous knowledge complemented NRCan expertise
- Quality index of geographic and locational data on Canada’s land, water and infrastructure was **76%**

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

- 97%** of notification for hazardous natural events within Canada were issued in a timely manner (within 4 minutes for earthquakes and 15 minutes for space weather)
- 2** wildfire monitoring tools using remotely sensed information were enhanced
- 82%** 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 **46,085** 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

- 30%** of NRCan-funded innovation projects resulted in new intellectual property, standards or regulations based on interim results
- 77%** of completed NRCan-funded clean energy innovation projects advanced along the innovation scale
- 7** NRCan-funded green mining technologies, including waste and water management were proven through demonstrations
- 11** new forestry products that were informed by NRCan tools and knowledge were developed

#### Clean technologies and energy efficiencies enhance economic performance

- NRCan-funded clean technology demonstrations with economic goals are underway, and will report in **2024**
- For every **\$1** that NRCan invested in energy innovation projects, NRCan leveraged an additional **\$3** from partner organizations
- 35.6 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 **82%** (2019 results not yet available)
- 35** projects were selected for funding through the *Clean Energy for Rural and Remote Communities Program* to support renewable energy projects and **1** was completed in 2019-20
- Sustainable harvesting occurred as **155 million m<sup>3</sup>** total wood was harvested versus total sustainable wood supply of **220 million m<sup>3</sup>**, as per *State of Canada’s Forest Report 2019*
- 857** electric vehicle charging stations, **21** natural gas refueling stations and **8** hydrogen refueling stations were under development or completed
- 1.61** megatonnes of CO<sub>2</sub> reduction in greenhouse gas emissions resulted from NRCan-funded clean technology demonstrations
- 19** policies and initiatives were developed collaboratively with Indigenous groups and communities

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

- Canada’s market share to the U.S. was **26.8%** and **1.5%** globally for imports of natural resources
- 934** Canadian-owned resource companies were operating abroad in 2018 (2019 results not yet available)
- NRCan led **42** international missions and other engagements supporting the development or expansion of trade and investment in natural resources
- An average of **7.5** companies, **0.8** province/territory representatives and **0.4** Indigenous leaders participated in NRCan trade and promotion missions

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

- Policy, regulatory and legislative changes relied this year on targeted stakeholder engagements, as a result none required formal mechanisms for broad public engagement
- 15** joint analytical products were developed with provinces and territories and released to Canadians
- 365** Indigenous groups and communities were implicated in economic development projects, the number being greater than previous year as numerous groups and communities were engaged in more than one project

#### Enhanced competitiveness of Canada’s natural resource sectors

- 100%** of resource development project decisions were on target as per timelines
- NRCan’s economic and investment data was accessed **379,032** times quarterly







## Results: what we achieved

### Core responsibility

#### Natural Resource Science and Risk Mitigation

**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.

This Core Responsibility supports the advancement of the following **Strategic Priorities**:

- Protecting Canadians from the impacts of natural and human-induced hazards;
- Strengthening relationships and advancing reconciliation with Indigenous peoples; and,
- Ensuring our decisions and actions are grounded in transparent and robust science

#### Context:

NRCan is a science-based department with over half (61%) of the Department's budget devoted to science and technology and 48% of employees working as scientists or technicians. The Department collaborates with other federal departments, provincial, territorial and local governments, Indigenous peoples, academic institutions and industry to conduct first-class science and research. This research helps to improve the economic well-being of Canadians. It informs regulatory functions, promotes innovation and pre-commercial technology advancements and contributes to the development of standards, codes and guidance to support industry practices, as well as provide expert advice and guidance to decision-makers.

#### Results:

#### **NRCan's science and technologies ensured Canadians have access to cutting-edge research to inform decisions on the management of natural resources**

Canada's vast geography requires long-standing efforts in mapping both the surface and sub-surface of our country. Consequently, NRCan ensures that Canadians have access to cutting-edge research to inform decisions on the management of Canada's natural resources. To help in these efforts, the Department provides geospatial data through its **GeoBase program**, which informs the science and mapping work for the Department, other federal departments and the provinces and territories. NRCan also uses a variety of assets, such as satellite ground stations, to collect valuable data on the status and trends of our changing lands, water and infrastructure.

In 2019-20, to deepen and broaden geospatial knowledge of Canada, NRCan improved the currency and coverage of the authoritative geospatial data layers produced by the Department, including high resolution elevation data for 46 of Canada's largest cities. The NRCan **Emergency Geomatics Services (EGS)** provided support to Public Safety Canada's Government Operations Centre (GOC), the organisation responsible for an integrated federal emergency response to events of national interest. By the end of Spring 2019, the GOC and Canadians alike were able to access 86 flood extent and river ice monitoring maps derived from satellite imagery, each one produced within 4 hours after the EGS team received the imagery. Also, in Spring 2020, the NRCan EGS incorporated new data from Canada's RADARSAT Constellation Mission satellites, enabling daily updates of emergency flood extent maps instead of previous updates every 2-3 days using RADARSAT-2. To improve operations between levels of government and the accessibility of data, a series of **Federal Flood Mapping Guidelines** were developed. NRCan also provided high-quality and current data on Canada's land, resources, water and infrastructure through a quality index of geographic and locational data. In 2019-20, the quality index reached 76%, surpassing the target of 70%. This was slightly lower than the previous year (of 81.2%) because new, very high quality elevation data was added to the list of accessible data. As this new data is partial over Canada's landmass, the average is lower than last year.

In 2019-20, NRCan provided geoscientific knowledge, fundamental to managing Canada's onshore and offshore lands through the **Geological Survey of Canada (GSC)**<sup>lxv</sup> (see textbox). The **Geo-mapping for Energy and Minerals (GEM)**<sup>lxvi</sup> Program and the **Targeted Geoscience Initiative**<sup>lxvii</sup> publically released thousands of mineral maps, reports, innovations and science publications which was estimated by a **2020 Ernst and Young study**<sup>lxviii</sup> to have provided \$1.22B in economic benefits to Canadians, a 7:1 return on investment. Also, to advance knowledge of geoscience in the north, the GEM Program created the first digital maps of Canada's North, and presented research results to government, industry stakeholders and Northern and Indigenous communities. NRCan's **First Nation Land Management Program**<sup>lxix</sup> which supports self-governance and the development of First Nation capacity in land surveying, provided 84 land descriptions and delivered 42 weeks of in-community training and mentoring to eight participating First Nation communities across the country.

#### Accomplishments of the Geological Survey of Canada

The GSC at NRCan is Canada's national organization for geoscientific information and research. Its world-class expertise focuses on the sustainable development of Canada's mineral, energy and water resources; stewardship of Canada's environment; management of natural geological and related hazards; and technology innovation. In 2019-20, the GSC:

- Produced 387 external peer reviewed scientific publications;
- Co-authored publications with researchers from 84 countries and all Canadian provinces and territories;
- Was cited in peer-reviewed publications over 326,000 times;
- Attained 21 national and 5 international signed agreements; 10 national and 6 international Memorandum of Understandings and 15 interdepartmental agreements; and,
- Provided foundational geoscience results for Canadian sovereignty of the Arctic and to Public Safety Canada in support of Federal, Provincial, Territorial and Indigenous policies, regulation and land management needs.

NRCan finalized Canada's Arctic Ocean submission to the **Commission on the Limits of the Continental Shelf**.<sup>lxx</sup> Canada filed the submission at the **United Nations**.<sup>lxxi</sup> in May, 2019. The submission defines Canada's continental shelf in the Arctic Ocean, with the outer limits encompassing an area of over one million km<sup>2</sup>, including the geographic North Pole. International recognition of the outer limits will make this Canada's last international boundary, conferring sovereignty over the natural resources on the seafloor and in the subsoil. It is expected that Canada will make its formal presentation on the Arctic Ocean submission at United Nations Headquarters in New York in 2021.



*The CCGS Louis S St-Laurent (foreground) and the CCGS Terry Fox (following). A decade of research surveys were conducted from icebreakers to acquire geological and geophysical data to define Canada's continental shelf in the Arctic Ocean.*

To help achieve Canada's GHG emission reduction targets, NRCan worked with other federal departments, provincial and territorial governments and other stakeholders to assess the extent to which activities associated with forests and wood use supported efforts to mitigate GHG emissions. In this regard, forest carbon estimates and projections contributed to Canada's **4th Biennial Report on Climate Change**.<sup>lxxii</sup> and **Canada's annual GHG National Inventory Report**.<sup>lxxiii</sup> to the **UN Framework Convention on Climate Change**.<sup>lxxiv</sup> NRCan also advanced the development of forest carbon modelling tools to better understand the role human activities and other factors play in GHG emissions, thus improving estimates and climate change mitigation assessments.

NRCan continued to undertake and support research to protect Canadian forests from pests and to inform forest protection measures of provincial and territorial governments. NRCan successfully delivered the second year of large-scale research on an **Early Intervention Strategy** to mitigate the risk of spruce budworm outbreaks in Atlantic Canada. In collaboration with the provincial governments, forest sector companies and academia, the initiative monitored and treated forests at risk of an outbreak in the region, and generated 25 scientific publications as well as 62 communication and outreach opportunities with a range of stakeholders and the public. In addition, 8 scientific publications were generated that improved the understanding of the range expansion of the mountain pine beetle in Alberta's forests, which were invaded by the pest. Research led by NRCan also informed assessments of long-term management of the emerald ash borer and the risk this pest and other wood boring insects have on wood and wood products destined to international markets.

The Department continued to support ECCC in conserving and protecting woodland caribou by developing the **Canadian Conservation and Land Management Knowledge Network Portal**.<sup>lxxv</sup> and providing socioeconomic analysis on potential impacts of caribou protection

measures on the forest sector and communities in BC. NRCan provided expertise and tools to provinces and territories, Indigenous communities and natural resource industries to restore boreal caribou habitat as a member of the **National Boreal Caribou Knowledge Consortium**.<sup>lxxvi</sup>

NRCan recognises the value of Indigenous Knowledge and is working to ensure that it is used to complement Western science, as the inclusion of Indigenous Knowledge is key to the diverse perspectives that make NRCan science world-class and robust. As such, the Department undertakes training and development initiatives that enable staff to learn about Indigenous Knowledge and how it can better complement NRCan science. In 2019-20, 121 training and development initiatives were conducted, surpassing the target of 35.

In support of community-driven approaches to conservation built on Indigenous Knowledge, NRCan helped five First Nations across the country to develop the capacity to undertake habitat mapping and monitoring, as it relates to habitat restoration planning and caribou range planning. NRCan continued research to improve use of remote sensing techniques to support field measurement, classification and mapping of critical lichen habitat for caribou. The Department also produced Indigenous Place Names in the Canada map, **Stories from Land: Indigenous Place Names in Canada**,<sup>lxxvii</sup> as a commitment to reconciliation (see textbox).

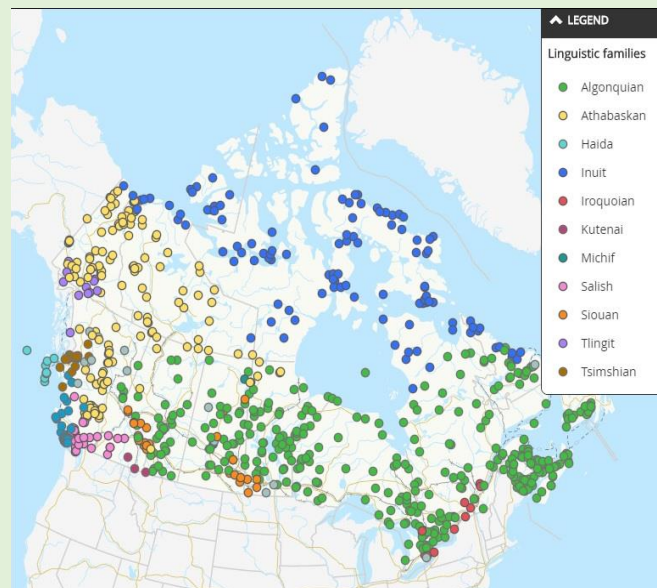
Scientific information keeps Canadians informed on matters that are important

### Interactive Map Recognizes Indigenous Place Names in Canada

Indigenous place names have an important role in recognizing, preserving and strengthening Indigenous languages and cultures. The United Nations has proclaimed 2019 as the International Year of Indigenous Languages in order to raise awareness of the important contribution Indigenous languages make to our world's rich cultural diversity.

On June 21, 2019, an interactive map was released that recognizes official place names in Canada that originate from Indigenous languages and dialects. The map is a joint project between Natural Resources Canada and the federal, provincial and territorial naming authorities of the Geographical Names Board of Canada.

Entitled **Stories from the Land: Indigenous Place Names in Canada**, the interactive map highlights the diversity, history and geographical breadth of Indigenous place names across Canada through a selection of over 780 geographical places named in over 65 Indigenous languages or dialects. These names are a small sample of the thousands of official place names in Canada with Indigenous origins. The map contains detailed information on place name origins, including the translated meaning of the name and links to historical reference documents, allowing visitors to explore the names in depth.



*A selection of geographical place names originating from Indigenous languages*

to them and NRCan provided access to scientific products related to natural resources. Throughout 2019-20, NRCan continued to observe a high level of access and use of its scientific products. These products were accessed by Canadians on an average 504,242 times quarterly (meeting its target of 500,000 and surpassing the results from 2018-19). The number of times NRCan scientific products were accessed has increased over time as more information is also published.

Credible scientific and technical products facilitates sound decision making. The Department continued to provide science and technical advice to inform decision-making for impact assessments, and supported the development of Canada's approach to regional assessments for major natural resource development projects. In 2019-20, NRCan provided specialist and expert information and knowledge for 44 projects, responding to 100% of the requests received. NRCan achieved the 100% target as a result of increased capacity due to funding received from Budget 2018. Also, the 2019-20 results on stakeholders acknowledging the use of NRCan's scientific and technical products for decision making was 30,957, surpassing the target of 30,250. As well, the Department launched its **Policy on Scientific Integrity**<sup>xxviii</sup> to support the continued excellence and integrity in the conduct, use and communication of the Department's science.

In collaboration with ECCC, NRCan developed an online **Open Science and Data Platform**, which is expected to be launched in 2020. The Platform will provide public access to the science and data that supports greater understanding of cumulative effects and development activities in Canada. The Department will leverage existing platforms, such as the **Federal Geospatial Platform**<sup>xxix</sup> and **GEOSCAN**, to provide access to authoritative geospatial data and scientific publications related to cumulative effects. The Department also developed a new vision for geospatial information and worked with other departments to better leverage geospatial and energy data. This increased availability to accurate information to inform decision-makers. Scientific data remained available to the public through pre-existing avenues such as the Departmental website and the GEOSCAN database.

### **NRCan contributed to safeguarding Canadians from hazards through research and the development of tools**

NRCan research on the causative mechanisms of earthquakes, tsunamis and landslides is internationally recognised. In 2019-20, NRCan developed techniques using satellite data to better understand, map and monitor natural hazards such as landslides, flooding and wildland fires and continued to lead on space weather monitoring. Departmental decision making was informed by 24 custom mapping products which were delivered using the **Federal Geospatial Platform**.

Timely public warnings and information enable communities to respond to natural hazards. In 2019-20, NRCan surpassed the target for providing warnings for hazardous natural events in a timely manner, at 97%, beyond the target of 75%. In the same year, the Department commenced the creation of a **National Earthquake Early Warning System** to enhance the information available to communities and public officials to respond to these natural hazards. The Department continued to produce daily space weather forecasts, giving critical

infrastructure operators advance notice of solar storms that could damage equipment or interfere with communications of power distribution. New knowledge was published on natural hazards and their risks in Canada, including earthquakes, submarine and terrestrial landslides, space weather, volcanoes and tsunamis. This included a landslide fatality database for Canada, information on underwater avalanches in the Baffin Island, and significant new findings on faults and seismic hazards in Quebec and Ontario. New flood extent and river ice monitoring datasets were also added to the [Open Maps Portal](#).<sup>lxxx</sup> In 2019-20, NRCan's **Public Safety Geoscience Program** released overall 79 new publications on hazards and risks related to earthquakes, marine and terrestrial landslides, tsunamis, volcanoes and space weather.

The [Emergency Management Strategy for Canada](#) (EMS)<sup>lxxxi</sup> aims to strengthen the resilience of Canadian society from natural hazards. In support of the EMS, NRCan initiated the **National Earthquake Risk Assessment Framework**, which will develop a national seismic risk assessment as a support tool to practitioners and decision makers. In 2019, NRCan held a workshop on seismic hazard and risk modeling, which was facilitated by the [Global Earthquake Model Foundation](#),<sup>lxxxii</sup> of which NRCan is Canada's representative as a public sponsor, using the open source [OpenQuake](#)<sup>lxxxiii</sup> application. The national seismic risk assessment for Canada also supports Canada's reporting on the [Sendai Framework for Disaster Risk Reduction](#).<sup>lxxxiv</sup> Under the EMS, NRCan also began working with provinces and territories to compile Flood Hazard Data, published two documents within the [Federal Flood Mapping Guidelines Series](#),<sup>lxxxv</sup> collected and shared high-resolution imagery in high-risk flood zones, to ensure accurate modeling of flood hazards, and advanced co-development of guidance on the integration of Indigenous Knowledge in flood risk mapping.

Canada has 347 million square kilometers of forests, the monitoring of which is only feasible from space. NRCan is committed to using state-of-the-art remote sensing technologies to provide information in near real-time manner. This allows for timelier decision-making by wildfire managers to protect people and property. As new science and technologies emerge, NRCan upgrades its existing tools and develops new ones towards meeting this objective. In 2019-20, two enhanced wildfire monitoring tools using remotely sensed information were used by wildfire managers to support their planning and operational decision-making. This builds on a trend of developing two enhanced tools using remotely sensed information each year for the past three years and is above the target of one tool per year. NRCan continues to use science to minimise the risk to Canadians and their property due to wildfires. In 2019-20, the Department provided federal leadership for the implementation of the [Canadian Wildland Fire Strategy](#) (CWFS)<sup>lxxxvi</sup> by prioritising research topics, identifying gaps and identifying critical science questions. NRCan commenced work on the Wildland Fire Component of the EMS under the themes: (i) Supporting Resilient Communities; and (ii) Enhanced Response to Wildland Fires. Research on wildland



*Colorful Canadian fall in Mont-Saint-Bruno National Park, Quebec*

fire will help develop new tools while enhancing existing ones that can aid Canadians in assessing wildland fire risks to people, property, and industry. In this regard, support was provided for the establishment of a **National Wildland Fire Research Network**, in partnership with the Natural Sciences and Engineering Research Council (NSERC) and the University of Alberta. To determine the risk of wildland fires to communities, NRCan leads the development of the wildland fire component of the **National Risk Profile**. Also under the EMS, in 2019-20 NRCan continued the expansion and modernization of the **Canadian Wildland Fire Information System** (CWFIS),<sup>lxxxvii</sup> which provides daily national information on fire danger, fire activity and fire forecasts.

NRCan is also recognised as an international leader in the scientific and regulatory community on the safety and security of commercial explosives and explosives precursor chemicals. In 2019-20, to increase the safety of Canadians and the country's national security, the Department continued to implement science based innovations to regulation, such as advancements to implementing explosives precursor chemicals regulations and developing risk-based inspection plans. NRCan researched and initiated the process to expand the list of regulated explosives precursor chemicals and shared their expertise with allied countries at international gatherings and conferences. During this period, NRCan more than doubled the number of outreach visits to expected vendors of explosives precursor chemicals compared to the previous year. There was an increase in the number of licensed commercial explosives sites rated safe at the time of inspection at 82% (compared to 64% in the previous year) surpassing the target of 70%. This result is in line with expectations from the 2018-19 Departmental Results Report that predicted that changes to inspection methodologies would increase inspection ratings. The new inspection methodology improved inspector resource allocation while increasing the ratio of visits to the highest risk sites.

During the last weeks of March 2020, NRCan contributed to the COVID-19 pandemic response by leveraging the Federal Geospatial platform to establish a multi-jurisdiction geospatial cloud platform for geospatial data sharing. Situational awareness products, such as **online interactive maps and dashboards**,<sup>lxxxviii</sup> were also developed as visualization tools to present COVID-19 case data to senior decision makers in government, including the Chief Health Officer of Canada, and to all Canadians, in response to the Public Health Agency of Canada request for assistance.

### **NRCan leads activities to help ensure that communities and industry are adapting to climate change**

The Department leads the national assessment on climate change impacts and adaptation through the **Canada in a Changing Climate: Advancing Knowledge for Action**<sup>lxxxix</sup> process. This initiative assesses how Canada's climate is changing, the impacts of these changes and how we are adapting to reduce risk. From 2019 up to 2022, a series of authoritative, user-friendly, online reports were and will be released to raise awareness and inform decision making on climate change and adaptation. The first report in this series, **Canada's Changing Climate Report**,<sup>xc</sup> was released in April 2019. Co-led by ECCC, this report looks at how and why Canada's climate has changed and the changes that are projected for the future, with respect to variables such as temperature, precipitation, snow, sea ice, glaciers, permafrost, freshwater

availability and sea level. Between April 1, 2019 and March 31, 2020, the Report on the NRCan website received 68,492 views, while the [interactive version](#)<sup>xcvi</sup> of the report was viewed 211,026 times.

To better understand groundwater distribution, quantity, and flow dynamics within integrated water models for sustainable water management, the **Groundwater Geoscience Program** (GGP) initiated a National Dialogue on Groundwater in January, 2020, between the federal, provincial and territorial partners. The dialogue facilitated discussions success stories, research gaps and improved ways of collaboration at a national scale. Scientists from the **Climate Change Geoscience Program**,<sup>xcvii</sup> which seeks to increase understanding of the impacts of climate change and climate change adaptation on aspects of permafrost, coastal erosion, sea level rise, extreme weather events and Canada's glaciers, contributed to the ECCO publication, **Canada's Changing Climate Report 2019**.<sup>xcviii</sup> Work was also conducted for the **Permafrost Information Network**. NRCan led **CanCoast 2.0**,<sup>xcix</sup> a national, open-access digital database to assess Canada's coastal sensitivity to climate change, and also increased the use of tools to enhance forest resilience through the **Forest Change Program**. The **Public Safety Geoscience Program**<sup>xcv</sup> worked with coastal communities on the Pacific, Arctic and Atlantic coasts to understand the coastal hazards and sea level rise issues that affect these communities.

Investment in training and knowledge exchange activities contributed to increasing the capacity of organizations, professionals, communities and small-to-medium sized enterprises to undertake climate change adaptation actions. The **Building Regional Adaptation Capacity and Expertise** (BRACE)<sup>xcvi</sup> program continued to support 18 collaborative adaptation projects. The projects help people and organisations develop adaptation expertise and skills through courses, workshops and site visits. BRACE also helps communities and professionals share best practices through webinars and knowledge exchange networks. Examples of project include, the creation of community of practice for natural and nature-based climate change adaptation, which includes many case studies on natural infrastructure projects, the development of adaptation competencies, and the launch of training, such as a Climate Change Adaptation Fundamentals course for professionals (e.g. engineers, planners) to gain knowledge on topics such as the role of adaptation in risk reduction and use of tools for adaptation planning. The **Adapting to Climate Change**<sup>xcvii</sup> program facilitates and co-funds collaborative action among public, private-sector, academic and Indigenous organizations to address shared adaptation priorities and knowledge gaps for natural resource sectors and communities, and assesses and shares science-based knowledge and tools.

In order to encourage use of climate change information in departmental decision-making, under **Canada's Climate Change Adaptation Platform**,<sup>xcviii</sup> NRCan delivered two plenary meetings that brought together jurisdictions and sectors to leverage resources, knowledge, and skills. This collaboration has delivered several successful projects, including the Economics Working Group and the Chartered Professional Accountants of Canada (CPA Canada) led project, which aims to build the capacity of corporations and municipalities to disclose the risks posed by climate change impacts and to encourage use of climate change information in internal decision-making.



NRCan also supported the delivery of Canada's national adaptation conference, **Adaptation Canada 2020**<sup>xcix</sup> (February 2020). The conference brought together experts and leaders providing a broad forum for knowledge exchange and capacity building. The demand for this event was strong, as evidenced by an oversubscription of 750 participants and over 300 abstracts submitted for consideration (60 abstracts were accepted). The conference covered a breadth of topics and showcased a range of adaptation solutions to climate change impacts such as sea level rise, flooding and permafrost thaw.

NRCan strives to ensure Canadian communities and industry are adequately equipped with the scientific expertise they need to adapt to climate change. In 2019-20, NRCan products and expertise related to climate change adaptation were accessed 46,085 times each quarter, surpassing the target of 19,000. 57% of communities and 32% of businesses indicated they had taken steps to adapt to climate change (Based on NRCan's 2018 survey, which is administered every five years). Under the **Earth Observation Baseline Data for Cumulative Effects**<sup>c</sup> initiative, NRCan released new Earth observation derived datasets including land cover, a wetlands inventory, snow/ice extents, vegetation indices, and imagery mosaics, to help understand how the climate is changing.

### **Gender-based analysis plus**

NRCan supports the GoC policy on GBA+ and has sought to ensure its policies and programs reflect these principles.

**STEM the Gap** is a pilot program which enables women and Indigenous peoples who hold a bachelor's degree in science or engineering to re-enter the science, technology, engineering, and mathematics (STEM) workforce following an absence of five years or more. The objective of the program is to redress imbalances in gender and indigenous representation at NRCan and in the STEM disciplines in general. It provides an opportunity for those not eligible for other recruitment programs as well as for NRCan to benefit from the dedication, innovation and focus of experienced STEM professionals willing to continue contributing in their field of interest. Applicants typically left their STEM careers due to family obligations, relocation, or other responsibilities, and found it difficult to return.

In Fall 2019, NRCan hosted a Science-Policy Bootcamp. Also, the program supported four STEM-educated women through two six-month placements within the Lands and Minerals Sector of the Department, where they made concrete and significant project contributions.

### **Experimentation**

In 2019-20, NRCan continued to explore options for experimentation to support the delivery of results associated with natural resource science and risk mitigation.

## Departmental Risk

There are a number of key risks to achieving results under this Core Responsibility. These included the increasing impact of climate change on the natural resource sectors and on Canadian communities; keeping abreast of the rapid pace of science and technological innovation, including ensuring modern research laboratory facilities to support more robust science in the department; and, the increasing occurrence of natural and human-induced hazards and emergencies. NRCan's approach to managing these risks included:

- To support the advancement of science and innovation in the natural resource sectors, ongoing initiatives and strategic partnerships were established:
  - Inclusion of Indigenous Knowledge within the flood mapping process through the Indigenous Technical Working Group on Flood Mapping co-chaired by NRCan. This working group engaged Indigenous land managers to ensure that their requirements for the Federal Flood Mapping Guidelines Series were addressed;
  - Investments were made in the development, demonstration and deployment of projects that advanced solutions to pressing environmental challenges; and,
  - In support of the competitiveness of the forest sector, funding was provided to the [Forest Innovation Program \(FIP\)](#)<sup>ci</sup> and [Investment in Forest Industry Transformation \(IFIT\)](#).<sup>cii</sup>
- Collaboration with other government departments on government-wide green initiatives led to:
  - Support for the [Clean Growth Hub](#),<sup>ciii</sup> a government-wide service that connected clean technology innovators and adopters to all federal clean technology programs and services to ensure an environment which facilitates technological innovation.
  - Assistance to Canadian producers with business opportunities and partnerships in developing countries through the United Nations Climate Technology Centre and Network to accelerate the transfer of clean technologies.
- Protecting communities and Canada's critical infrastructure through pre-emptive and preventative measures through the application of science research and technology, as evidenced by:
  - The development of improved tools using satellite data to predict and model natural hazards, and to better understand, map and monitor natural hazards such as landslides, and flooding.
  - Operating the CWFIS to provide timely access to wildland fire information in support of fire management agencies including the Canadian Interagency Forest Fire Centre (CIFFC). NRCan initiated a significant modernization of CWFIS, and related data exchange with provincial and territorial agencies.
  - Responding to provincial and territorial requests for assistance through the Government Operations Centre at Public Safety Canada using satellite radar – (primarily RADARSAT-2 and RCM- imagery) to derive near-real time, flood extent and river ice classification products during major flooding events, such as the Spring 2020 flooding in Manitoba.

- Contributing in late March 2020 to the COVID-19 pandemic response by establishing a multi-jurisdiction cloud platform for geospatial data sharing and by developing situational awareness products in response to the Public Health Agency of Canada request for assistance.

These responses allowed NRCan to support green innovations, advance science and collaborate with partners and stakeholders. The Department will continue to pursue initiatives to mitigate identified risks effectively, while delivering on its mandate.

## Results achieved

Departmental results	Performance indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 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 500,000 quarterly average	March 2020	484,904	482,745	504,242
	Percentage of environmental assessment processes for which NRCan provided scientific and technical expertise	100%	March 2020	93%	96%	100%
	Number of times stakeholders acknowledge using NRCan's scientific and technical products in making their decisions	At least 30,250	March 2020	30,250	26,142	30,957

	<b>Number of training and development initiatives that enable NRCan to incorporate Indigenous traditional knowledge in conjunction with NRCan science</b>	At least 35	March 2020	Not available <sup>3</sup>	69	121 <sup>4</sup>
	<b>Quality index of geographic and locational data on Canada's land resources, water and infrastructure</b>	At least 70%	March 2020	Not available <sup>5</sup>	81.2%	76%
<b>Communities and officials have the tools to safeguard Canadians from natural hazards and explosives</b>	<b>Percentage of hazardous natural events within Canada for which a notification was issued in a timely manner</b>	At least 75% (100% by March 2023)	March 2020	70%	100%	97%
	<b>Number of enhanced wild fire monitoring tools using remotely sensed information</b>	At least 1	March 2020	2	2	2

<sup>3</sup> NRCan established a new Departmental Results Framework to report its results starting in 2018-19. Several indicators were new as of April 2018 and historical information is not available for all previous years.

<sup>4</sup> Since the 2019-20 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. This is reflected in the higher result achieved from the previous year.

<sup>5</sup> NRCan established a new Departmental Results Framework to report its results starting in 2018-19. Several indicators were new as of April 2018 and historical information is not available for all previous years.

	<b>Percentage of inspections of explosives rated safe<sup>6</sup></b>	At least 70% (90% by March 2025)	March 2020	Not available <sup>7</sup>	64.2%	82%
<b>Communities and industries are adapting to climate change</b>	<b>Number of times NRCan products and expertise on adaptation are accessed by communities and industry</b>	At least 19,000 quarterly	March 2020	18,602	20,272	46,085
	<b>Percentage of Canadian communities and industries that have taken steps to adapt to climate change</b>	At least 60% for communities  At least 40% for businesses	March 2023	57% for communities 32% for businesses  (from 2018 survey) <sup>8</sup>	57% for communities 32% for businesses  (from 2018 survey)	57% for communities 32% for businesses  (from 2018 survey)

### Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
205,570,026	205,570,026	231,586,322	207,688,086	2,118,060

<sup>6</sup> 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.

<sup>7</sup> NRCan has revised the methodology to more accurately calculate the percentage of inspections rated safe. This has resulted in a more rigorous inspection ratings regime but means that historical data prior to 2018-19 are not directly comparable to more recent results.

<sup>8</sup> This indicator tracks progress on long-term outcomes and is measured through a survey conducted every five years. The next set of results will be available in 2023. The previous survey results are from 2018, not 2017 as previously reported in NRCan's 2018-19 DRR.

**Human resources (full-time equivalents)**

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
1,240	1,274	34

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in [GC InfoBase](#).<sup>civ</sup>



## Innovative and Sustainable Natural Resources Development

**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.

This Core Responsibility supports the advancement of the following **Strategic Priorities:**

- Accelerate the development of clean technology and support the transition to a low-carbon future;
- Improve market access and competitiveness in the natural resource sectors;
- Strengthen relationships and advance reconciliation with Indigenous peoples; and,
- Ensure our decisions and actions are grounded in transparent and robust science.

### Context:

Canada’s natural resource endowment creates billions of dollars in economic activity across the country. Competitive, low-carbon and environmentally sound development of our natural resources holds the potential for substantial economic growth and job creation and are a source of innovation and prosperity for Canadians. NRCan fostered clean technology innovation across Canada’s energy, mining and forest sectors through several of its programs and initiatives. Canada’s transition to a low carbon future is also being achieved by encouraging Canadian households and industry to become more energy efficient, improving the energy efficiency of our buildings and collaborating with stakeholders, including Indigenous peoples.

### Results:

#### **NRCan works to ensure that the natural resource sectors are innovative**

NRCan research and innovation projects generate valuable knowledge, assisting clean and green natural resource innovations and technologies to advance along the innovation continuum from research, development and demonstration, to deployment and commercialization. In 2019-20, 30% of completed NRCan-funded innovation projects resulted in new intellectual property codes, standards or regulations, surpassing the target of 5%. In addition, NRCan continues to advance pre-commercial technologies towards commercial readiness at a high rate. During this period, 77% of completed NRCan-funded clean energy innovation projects advanced along the innovation scale.

International leadership is required for the global drive towards a low carbon future and a reduction in greenhouse gas (GHG) emission. This will be achieved in part by the transformative nature of innovations within the natural resource sectors. Canada exhibited global leadership in clean energy innovation, as a founding member of **Mission Innovation (MI)**,<sup>cv</sup> with NRCan hosting, in May 2019, the **10<sup>th</sup> Clean Energy Ministerial Meeting**<sup>cvi</sup> and **4<sup>th</sup> MI Ministerial Meeting (CEM-MI)**<sup>cvi</sup> in Vancouver. These fora welcomed over 25 countries and nearly 2500 stakeholders. Under NRCan’s leadership at the Ministerial Meeting, MI members and participants from the private sector advanced clean energy innovation by supporting policies that drive innovation and public-private co-investments.

For more than 20 years Canadian companies have been at the forefront of global hydrogen demonstration and deployment efforts. Since 2016, NRCan has been working with governments at all levels, industry, academia, and Indigenous organization to fully understand how to lever this world leading industry, and our vast natural resources, to seize the economic and environmental opportunities that hydrogen production and deployment can bring across Canada. This analysis is informing the development of a **Hydrogen Strategy for Canada**, expected to be completed in fall 2020.

Momentum on hydrogen is growing globally. Countries around the world are making significant investments in hydrogen as a key component of their long-term energy and environment strategies. To harness this momentum, and to complement our domestic efforts, Canada (led by NRCan) developed and launched a new **Hydrogen Initiative** at the CEM. This initiative ensures hydrogen’s essential role in the global energy transformation remains a priority for governments around the world. Moving forward, NRCan’s goal is to build on Canada’s hydrogen advantage, both domestically and internationally, and maintain Canada’s global leadership position in hydrogen and fuel cell technologies.

NRCan participation in all eight **MI Innovation Challenges (ICs)**, co-leading the Sustainable Biofuels and Clean Energy Materials ICs is further evidence of its global leadership. The Department supported the federal government’s **Mission Innovation pledge** to double investments in clean energy innovation over five years (from \$387 million in 2014–15 to \$775 million by 2020).

Six prize-based **Clean Technology Challenges**<sup>cviii</sup> were advanced under the **Impact Canada Initiative**,<sup>cix</sup> including **Charging the Future**,<sup>cx</sup> a \$4.5 million challenge announced in July 2019, aimed at accelerating made-in-Canada battery innovation. Finalists of all six challenges have been announced, with funding agreements in place for all 43 finalists.



*Charging the Future Challenge video*

In June 2019, a series of six stakeholder engagement sessions were also initiated with approximately 300 battery value chain stakeholders in Canada, bringing perspectives from the mining, manufacturing, automotive and energy storage sectors, to understand the potential opportunities in the global battery value chain. These engagement sessions resulted in a report entitled, **From Mines to Mobility: Seizing Opportunities** for Canada in the Global Battery Value Chain – What We Heard Report,



which included recommendations for governments and stakeholders to support the development of Canada's battery ecosystem.

The Department fostered innovation in the forest sector by ensuring that NRCan tools and knowledge informed the development of new forest-based products. In 2019-20, 11 products were developed, surpassing the current target of six and that of the previous two years (seven). This upward trend demonstrates that knowledge products are attaining refined levels of maturity and new products align better with national initiatives that incorporate stakeholder needs and stakeholder participation. Further, NRCan's **Canadian Wood Fibre Centre (CWFC)**<sup>cx1</sup> collaborative FasTRAC project, funded by Genome Canada, Génome Québec and multiple organizations through the Genomics Applied Partnership Program (GAPP), developed innovative tools for end-users to support reforestation and tree breeding programs using forest genomics. The strong partnership between NRCan's **Canadian Forest Service (CFS)**,<sup>cxii</sup> Université Laval, FPInnovations, the Government of Québec, J.D. Irving Ltd, and the New Brunswick Tree Improvement Council led to the development of various novel approaches and tools demonstrating and applying tree genomics. At the operational level, these approaches and tools assisted in the selection of more efficient spruce trees that will grow faster, have a higher wood quality and are more resistant to insect pests; all characters that bring higher value products for the forest sector.

Using NRCan pioneered wastewater irrigated willow plantation technology, rural municipalities were assisted with restoring closed coalmines and treating their wastewater and biosolids. Collaboration with the private sector helped advance the technology, delivering on all four pillars of the **Canadian Council of Forest Ministers (CCFM) Framework**.<sup>cxiii</sup> The project of the CFS **Refining Woody Biomass Supply Chain Options** generated knowledge on the packaging and storage of fast-growing hardwood tree fibre. The plantation growing regimes used by this project promoted the forest bioeconomy, supporting knowledge of biomass sources, production and recovery and, contributing to specific Clean Fuel Types, Standards and carbon mitigation. In addition, NRCan's **Enhanced Forest Inventory**<sup>cxiv</sup> was used by industry to better integrate feedstock characteristics and wood properties into supply chain assessment, allowing industry to adjust rapidly to changing market signals. These activities and the project both supported the CCFM framework.

### **NRCan supports clean technologies and energy-efficiencies that enhance economic performance**

The adoption of clean technologies, as well as energy efficiency codes, standards and practices can enhance Canada's economic performance. NRCan continues to successfully leverage its projects with partners to optimize resources and opportunities for success. In 2019-20, project partners contributed \$3 for every \$1 in NRCan funding for energy innovation projects. This leveraged funding helps accelerate the advancement of the technologies towards adoption, demonstrates partners' commitment to this work and contributes to economic performance. NRCan's funded clean technology demonstration projects continued throughout 2019-20.

To enhance the competitiveness of Canada's natural resource sectors and reduce the impacts of climate change, NRCan collaborated with provinces and territories to co-fund clean technology and energy innovation RD&D projects in the energy, mining and forest sectors

through the **Clean Growth Program** (CGP).<sup>cxv</sup> Projects included: the **Carbonix**'s<sup>cxvi</sup> development of tailored activated carbons to capture contaminants from industrial effluent streams and mine tailings; the **SYLVIS**'<sup>cxvii</sup> use of willow plantations to reclaim mines while sequestering carbon in soils; and, the **Razor**'s<sup>cxviii</sup> conversion of a functioning oil and gas operation to a geothermal site.

Working with Innovation, Science and Economic Development Canada (ISED), NRCan also provided a single, easy point of contact for connecting clean technology producers and users with government programs and services through the **Clean Growth Hub** (Hub).<sup>cxix</sup> Activities related to the Hub have led to formalized partnerships with two provinces, British Columbia and Alberta, as well as with Western Economic Diversification to improve information sharing on projects to identify programs and services that best support Canadian clean technology producers and users. As part of the **Clean Technology Data Strategy**, the Hub improved federal coordination of clean technology activities and, developed protocols for departments and agencies to better track and report on clean technology federal efforts, including the environmental impact of programs. By March 2020, the Hub had served over 1,450 clients.

Enhancing the competitiveness, affordability and reliability of Canada's energy sector while helping to reduce GHG emissions remains a priority for NRCan. In 2019-20, under the **Energy Innovation Program** (EIP)<sup>cxx</sup> 65 external RD&D projects were supported, fostering innovations in: renewable energy; smart grids; energy-efficient buildings; carbon capture, utilization and storage; and, the cleaner production of oil and gas. This included \$4.5 million to Ameresco Canada Inc. to demonstrate a carbon-free microgrid energy system at John Paul II Secondary School in London, Ontario, and \$3.9 million to Tugliq Energy Corp. to build on previous successful work in displacing diesel with wind power at Glencore's RAGLAN mine in Nunavik, Quebec.

Additionally, under the EIP, NRCan and Alberta Innovates jointly funded the Canadian Emission Reduction Innovation Network (CERIN) which supports targeted infrastructure investments at existing facilities and sites across Canada, bringing together national expertise into an integrated network. Two projects were selected for funding in 2019-20.

At the 4<sup>th</sup> MI Ministerial, a new funding stream was launched under the EIP in partnership with **Breakthrough Energy Ventures**. NRCan developed the stream, **Breakthrough Energy Solutions Canada**<sup>9</sup> (BESC)<sup>cxxi</sup> that is investing up to \$40 million, as a game-changing public-private initiative, to accelerate the development and commercialization of clean technologies with potential for significant GHG emissions reductions. **Ten companies**<sup>cxix</sup> were selected in January 2020 under BESC and announced in February at **GLOBE 2020**<sup>cxiii</sup> by Minister O'Regan. Along with support from NRCan, these companies will have the opportunity to receive feedback from BEV, BDC and the Export Development Bank of Canada, and to attend annual accelerator events to showcase their technical innovation to additional investors. (see textbox).

Green mining and mineral exploration make significant contributions to the Canadian economy. In 2019-20, NRCan led a **Hydrogen Implementation for Mining Initiative**, focused on R&D, to advance hydrogen fuel cell electric power as a clean alternative to diesel power for mining. The Department's support to the sector was also demonstrated through the **Mining Value from Waste Program**,<sup>cxiv</sup> which is a pan-Canadian initiative focused on reducing the environmental, social and economic footprint of mine wastes in support of the transition to a low-carbon and circular economy. NRCan's support was through the Green Mining Innovation, and investing \$8.5M through the Science and Technology Internship Program (STIP) to create green jobs for youth in the natural resource sectors. Further, the **Canadian Mining Science and Engineering Laboratory Network** is advancing collaborative research in green mining technologies. The Network is managing three technical projects: one on bioleaching to develop a cost-effective process to recover nickel and cobalt from mine tailings; the second is developing innovative methods in ore sorting to reduce waste, save energy and enhance productivity; and the third on evaluating and optimizing innovative electrically driven green technologies for the removal of total dissolved solids from mining effluents. These projects are evidence of the continuous successes of NRCan investments in green mining technologies.

#### Breakthrough Energy Solutions Canada

NRCan launched Breakthrough Energy Solutions Canada (BESC) in May 2019, providing \$20 million in funding for companies to advance clean energy technologies in the electricity, transportation, buildings and manufacturing sectors with the potential to significantly reduce global GHG emissions (0.5GT/year globally for each project).

Breakthrough Energy Ventures (BEV) and the Business Development Bank of Canada (BDC) have each committed up to \$10 million in follow-on funding. BESC leverages NRCan's technical expertise and funding as well as business development and investment support from BEV and BDC.



*Minister O'Regan with the 10 BESC finalists and NRCan staff at GLOBE 2020, February 2020*

<sup>9</sup> Total Breakthrough Energy Solutions Canada (BESC) funding is \$40 million (\$20 million from NRCan; \$10 million from Breakthrough Energy Ventures; \$10 million from Business Development Bank of Canada).

Building on previous achievements, by 2019-20, seven NRCan-funded green mining demonstrations supported advancement towards deployment, meeting the target set for March 2020.

Recognizable efforts at making **Artificial Intelligence** (AI) central to the Department's research came with the creation of a new unit to identify and leverage opportunities to apply digital technologies and AI across NRCan sciences. To further promote AI, the Department delivered a digital transformation and AI workshop for decision-makers at NRCan, and in collaboration with **MaRS**,<sup>cxv</sup> offered an AI energy symposium in Washington D.C. with counterparts from the U.S. NRCan continued its collaboration with academia and industry on AI by exploring the application of AI and Big Data techniques to understanding the role of digitally disruptive technologies in the natural resources sector. This research facilitated the application of transformative technologies to solve mining challenges to optimize productivity, enhance automation and improve energy management. NRCan's commitment to advancing the understanding and application of AI is further demonstrated by the appointment of a thought leader in AI as NRCan's new Chief Scientist and Chief Science Advisor.

**Small Modular Reactors (SMR)** have the potential to provide energy from non-emitting sources, such as grid-scale electricity generation for use in heavy industry and remote communities. In 2019-20, the Department advanced efforts to develop SMRs. In February 2020, the Minister of Natural Resources announced that the Department will launch an **SMR Action Plan**<sup>cxvi</sup> in the fall of 2020, with partners from across the country. The Action Plan will build on the momentum of Canada's **SMR Roadmap**.<sup>cxvii</sup> All enabling partners and stakeholders, including provinces, territories, SMR innovators, and Indigenous voices were invited to contribute to the SMR Action Plan.

### **NRCan helps make Canada's natural resources more sustainable**

Maintaining the sustainability of the natural resource sectors and decreasing GHG emissions require engagement with all stakeholders, investments in green infrastructure across Canada and recognizing that Indigenous rights and interests inform sustainable development. NRCan continues to make progress towards long-term targets with GHG reductions. In this regard, NRCan-funded clean technology demonstrations under the EIP resulted in a decrease of 1.61 Mt of GHGs in 2019-20.

The Department also worked with provinces and territories to deliver the **National Forest Inventory** (NFI),<sup>cxviii</sup> a biophysical database on Canada's forests. This, along with the **National Forest Database** (NFD), a tool that synthesizes annual data from Canadian jurisdictions, is available to national and international stakeholders. The annual data derived from these collaborations, such as wood supply and volume harvested, provides evidence of sustainable forest management practices. Various partners, such as ECCC, use NFI and NFD data for carbon emissions modelling and for reporting on sustainable harvesting practices through their annual Canadian Environmental Sustainability Indicators report. While the **State of Canada's Forests**<sup>cxix</sup> report was not published in 2019-20, NRCan continued to provide scientific insights to past reports and will continue to engage with partners and stakeholders on future reports.

In collaboration with provinces, territories and Indigenous communities across the country, NRCan ensures the long-term sustainability of the forest sector by safeguarding the amount of wood harvested such that it remains within the sustainable limit and remains available for future generations. Similar to previous years, in 2019-20, Canada reported that it harvested less wood than the sustainable supply (155 million m<sup>3</sup> was the total harvest versus the total wood supply of 220 million m<sup>3</sup>). The area harvested each year is less than half of 1% of Canada's 347 million hectares of forest, significantly smaller than the areas impacted by insects and burned by fires each year. NRCan's policies, programs and engagements with stakeholders, including Indigenous peoples, on maintaining the sustainability of the forest bioeconomy for generations to come are informed by the Department's monitoring of economic activities within the forest sector.

Improving energy use is an important element in Canada's drive to a low carbon future, as is smarter use of energy. Energy demand is predicted to rise by more than 2% annually until 2040. To make clean energy accessible to all Canadians, NRCan continued to build on the recommendations of the **Generation Energy Council Report** four pathways for a low carbon future - wasting less energy, switching to clean power, using more renewable fuels and producing cleaner oil and gas, including in the offshore. In support of these pathways, NRCan made numerous investments, including \$2.1 million for Qikiqtaaluk Properties Inc. for a deep-energy retrofit of Nunavut's Arctic College residence building to save energy and cut pollution. The federal and BC governments also committed to electrifying natural gas operations in that province to significantly reduce GHG emissions, to produce the world's cleanest natural gas and liquefied natural gas (LNG).

Canadians working together is key to achieving our shared goal of transitioning successfully to a low carbon future. The **Pan-Canadian Framework on Clean Growth and Climate Change**<sup>cxix</sup> (PCF) serves as a vehicle for promoting green investments, drive innovation and growth and ensure the competitiveness of Canadian businesses. To help achieve these goals, the Department continued to fund the **Green Infrastructure** (GI)<sup>cxix</sup> Programs.

Through the **Smart Grids Program**,<sup>cxxxii</sup> NRCan promoted the modernization of grid infrastructure by funding the demonstration of promising, near-commercial smart grid technologies and the deployment of smart grid integrated systems across Canada. The program supported 21 projects, including: \$2.5 million to EQUUS REA, Canada's first member-owned rural smart grid project, and \$5.1 million to Nova Scotia Power to demonstrate and deploy an energy system platform (see textbox). NRCan also held the first Smart Grid Symposium in October 2019, the kick-off of a series over the course of the Smart Grid Demonstration and Deployment Program. The purpose of the symposium included initiating a knowledge sharing strategy, establishing NRCan as a thought leader in smart grid technology and understanding how utilities replicate and scale innovative projects. In support of these efforts, NRCan continues to work towards increasing the percentage of Canadian electricity generated from non-GHG emitting sources.

#### NRCan and Nova Scotia Power collaborate on Smart Grid Project

NRCan's funding contributes to both the demonstration and deployment components of Nova Scotia Power's *Smart Grid Nova Scotia* project. While utility ratepayer funds would traditionally only be invested in deployment projects, the hybrid nature of this project and of NRCan's funding has allowed the utility to also invest in the demonstration component. This in turn allows NRCan's researchers to work more closely with the utility, ensuring that project results are directly and immediately available. Projects of this nature help ensure Canada maintains its capacity for electrification.

NRCan is working to promote this type of synergistic alignment of efforts across federal and provincial initiatives.

NRCan advanced 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 under the **Clean Energy for Rural and Remote Communities (CERRC) Program**.<sup>cxxxiii</sup> CERRC's **BioHeat, Demonstration, Deployment, and Capacity Building** streams are developed in collaboration with local groups, including many Indigenous communities and in some instances, driven by the communities themselves. In 2019-20, one renewable energy project was completed.<sup>10</sup> During this period, CERRC completed its second round of applications and selected 35 projects<sup>11</sup> to support reduced reliance on diesel fuel. 32 (91%) of these new projects are in Indigenous communities, and 25 of those will be led by the communities themselves. As an example, CERRC is providing \$2.7 million investment to Oujé-Bougoumou Cree Nation to upgrade and expand an existing biomass district heating system - a cost-effective, renewable-energy fuelled system — for the community, while also providing a market for local sawmill waste. With this enhanced engagement, the number of policies and initiatives developed collaboratively with Indigenous groups and communities increased to 19 in 2019-20, surpassing the set target of at least 10, a major improvement over the eight reported the year before.

As well, NRCan supported provinces and territories to expand the portfolio of commercially viable renewable energy sources available as they worked to reduce GHG emissions from their electricity sectors through the **Emerging Renewable Power (ERPP)**.<sup>cxxxiv</sup> The ERPP has, to

<sup>10</sup> The program was launched in February 2018, and the first contribution agreement was signed in fall 2018.

<sup>11</sup> 53 were selected for funding in the first round of application (2018-19) and 35 were selected for funding in the second round of application (2019-20) making a total of 88.

date, supported first-of-a-kind projects in Canada (two geothermal, one instream tidal and one bifacial solar power project) that increase the portfolio of renewable technologies contributing to GHG reductions.

Energy efficiency saves money, improves comfort, and reduces energy use and related emissions, and a transformation of Canada's existing building stock is key to the energy system transition, and to reach Canada's ambitious climate objectives. At NRCan, efforts to reduce energy consumption and reduce GHG emissions are being advanced through the adoption of energy efficient codes, standards and practices. In 2019-20, the total annual energy savings resulting from the adoption of codes, standards and practices was 35.6 petajoules (PJ), which was higher than the previous years (26.7PJ in 2018-19 and 20PJ in 2017-18). NRCan is striving to reach the target of 600PJ by the year 2030.

Through a suite of RD&D programs, including the EIP, and the Energy Efficient Buildings RD&D Program, NRCan funded projects to improve the energy performance of Canada's housing, buildings and communities. For example, NRCan announced \$3 million for Carleton University's Centre for Advanced Building Envelope Research to construct new large-scale building envelope research equipment, to be used for developing innovations that cut heat loss in housing and buildings by 65% or more. NRCan's **CanmetENERGY** researchers also created energy analysis tools to evaluate energy conservation options for housing, commercial and institutional buildings, in support of new building codes that set Net Zero Energy Ready levels of energy performance for new buildings. Further, the department provided support to small-scale field studies to test high efficiency heating technologies (cold climate heat pumps and heat pump water heaters) in five regions of Canada.

Federal, provincial, and territorial governments will work to develop and adopt increasingly stringent model building codes, starting in 2020, with the goal of provinces and territories adopting a "net-zero energy ready" model building code by 2030. NRCan continues to support the work of the National Research Council to develop a tiered net-zero energy ready model building code by 2030. The final publication of these more stringent codes is expected in early 2020-21. Model National Labelling and Disclosure Framework guidelines for commercial and institutional buildings were released in early 2019 to promote highly energy efficient new construction. Canada is also providing financial assistance to support provinces, territories, municipalities and other stakeholders, in implementing benchmarking, labelling and disclosure programs. This includes launching the **EnerGuide Home Labelling Portal**<sup>cxv</sup> in April 2019, an online platform to leverage data and provide open access to EnerGuide energy use data for labelling and energy disclosure for homes.

In 2019-20, three amendments to the *Energy Efficiency Regulations* covering 38 product categories came into force. This is intended to result in savings of 2.61 MT in 2030, through energy efficiency improvements in appliances and equipment. In addition, NRCan continued to administer the **ENERGY STAR® for Products Program** (see textbox), and the **ENERGY STAR Portfolio Manager Benchmarking** tool and certification program was expanded to support improved energy management in large buildings.

NRCan also launched the **Energy Manager Program**, designed to help select Canadian organizations identify and adopt energy efficiency practices.

NRCan also invested \$950 million in endowment funding for the **Federation of Canadian Municipalities' Green Municipal Fund (GMF)** to support local actions to improve energy efficiency of homes and community buildings and reduce GHG emissions. These investments will advance Canada's clean energy future, bridge the commercialization gap of clean tech, make communities more energy efficient and reduce the business risk of developing tomorrow's low-carbon innovations.

#### ENERGY STAR®



NRCan continues to administer the **ENERGY STAR®** for Products program, which encourages and promotes consumer purchases of high-efficiency products.

In addition to certifying products, 158 commercial and institutional buildings were ENERGY STAR certified in 2019-20.

The Government of Canada continued to expand the **ENERGY STAR Portfolio Manager** benchmarking tool to include additional features and offer a certification program that recognizes higher performing commercial and institutional buildings. By the end of 2019-20, over 25,000 buildings have used the **ENERGY STAR Portfolio Manager** benchmarking tool.

Since the launch of the **ENERGY STAR® Challenge** for Industry and the **ENERGY STAR® for Industry Certification** in 2017, 42 Canadian industrial facilities have participated in the programs. **ENERGY STAR® Energy Performance Indicators** have also been developed for automobile assembly facilities, automobile engine facilities, automobile transmission facilities, cement manufacturing facilities, commercial bakeries, fertilizer manufacturing facilities, frozen fried potato processing facilities and integrated steel mills.



The scientists and engineers at NRCan's Canmet research centres and other federal energy research facilities undertook applied research and development projects to support a cleaner energy future and transition Canada to a low-carbon economy. In 2019-20, the laboratories focused on reducing emissions in carbon intensive industries, piloting new industrial production methods and commercializing new materials (see textbox).

A successful shift to the widespread use of **Zero Emitting Vehicles (ZEV)** requires continuous investments in research and infrastructure across the country. Through the **Electric Vehicle Infrastructure Demonstration Program (EVID)**,<sup>cxxxvi</sup> the Department supported 26 projects aimed at addressing technological gaps and barriers to the introduction of electric vehicles (EVs), such as charging options for multi-residential units and public transit. Through the Canadian Bus Demonstration and Integration Trials, for example, NRCan funded a cohort of projects that will help pave the way for widespread adoption of electric buses and other low-carbon buses among Canada's public transit systems. Projects funded under EVID also addressed barriers of particular concern to Canada, such as the functionality of EV charging infrastructure in cold climates. In this regard, NRCan provided support to the **Government of Yukon**<sup>cxxxvii</sup> to demonstrate the all-season performance of public charging stations, in order to encourage the uptake of EVs in the Yukon and other cold climates.

In 2019-20, the Department's **Electric Vehicles and Alternative Fuel Deployment Initiative**<sup>cxxxviii</sup> (EVAFID) helped establish 837 EV fast-chargers

### Canmet National Laboratories

NRCan's Canmet labs led the way in 2019-20 in:

- **Reducing waste and optimizing oil Sands Production:** Successfully demonstrated that oil sands tailings can be re-purposed for steam generation. This up-scaled demonstration builds on pilot projects and brings this technology closer to commercial readiness where it can reduce waste and optimize Canada's oil sands production.
- **Strengthening Canada's Pulp and Paper industry:** Delivered an impact study showing the successful and promising partnership with FPIinnovations. Six mills were evaluated and the total potential savings of identified energy optimization projects was \$6.4 million per year. This represents a reduction of 68.2 kt direct GHG emissions per year.
- **Improving the production of steel:** In partnership with STAG Specialty Steels, NRCan's Hamilton laboratory provided metallurgical expertise and helped refine the casting and rolling of an innovative new steel alloy. In conjunction with Stelco, a Canadian steel producer, the laboratory successfully conducted a pre-commercialization production trial in which over a kiloton of the new steel alloy was produced.
- **Making Canadian Pipeline Production Safer:** Played a key role in the development of an economical steel heavy gauge line pipe for Canadian steelmaker EVRAZ, North America's leading supplier of line pipe for oil and natural gas transmission. This allowed EVRAZ to meet the high standards and stringent specification requirements to become the majority pipe supplier for TC Energy's Coastal GasLink pipeline, which is a critical piece of infrastructure currently under construction in Western Canada. This result improves domestic value-chain integration, and secures good jobs.



*CanmetMaterials' main facility is located in Hamilton, Ontario.*

along Canada's highways (377 are opened); 21 natural gas refuelling stations along key freight corridors (seven are open); and eight hydrogen stations in metropolitan areas (two are open). These investments promoted the Government's overarching ambition for ZEVs to constitute 10 percent of new light-duty vehicles sold in Canada by 2025, 30 per cent by 2030, and 100 per cent by 2040. NRCan remains committed to increasing the number of public EV chargers and alternative fuel refuelling stations available across Canada.

Engagements with partners and stakeholders continued in 2019-20 to advance the three Pillars and recommendations presented by the **Expert Panel on Sustainable Finance** (EPSF),<sup>cxviii</sup> launched to engage stakeholders on sustainable finance in Canada, to support and inform the Department's approach to encouraging the financing of energy efficiency retrofits for buildings. As a member of the technical committee and the sub-committee for oil and gas, NRCan brought attention to the economic activities and relevant criteria that highlighted the opportunities for GHG emission reductions within a natural resource-based economy.

In 2019-20, NRCan and other federal departments continued to improve the accessibility and quality of energy information, including launching the **Canadian Energy Information Portal**<sup>cxli</sup> in June 2019, which represents the first stage towards establishing a single-point-of-access to federal energy data and analysis. Further collaborative efforts with federal departments were on the creation of the virtual **Canadian Centre for Energy Information**,<sup>cxlii</sup> announced in Budget 2019. The Centre is an independent, one-stop shop for comprehensive energy data and expert analysis. This will ensure individuals and communities have the most reliable, transparent and science-based information, as the evidence base to make informed decisions.

Through studies, analysis and leading industry-government working groups, NRCan supported the development of the **Clean Fuel Standard**, a key regulation led by ECCC that is intended to achieve up to 30 MT of annual reductions in greenhouse gas emissions by 2030 by requiring a reduction in the carbon intensity of all fossil fuels used across the economy.

## Gender-based analysis plus

GBA+ was applied extensively to both ongoing and new programs under this Core Responsibility. A GBA+ framework was developed for program design and development by reviewing secondary information and interviewing GBA+ experts in NRCan. The framework aims to support programs in identifying gaps and opportunities as they relate to advancing GBA+.

Annual reporting processes for different NRCan programs such as, the Smart Grid Program and the CERRC program, have integrated GBA+ considerations through the collection of gender-disaggregated data that align with program goals. For example, training and hiring metrics are now collected at gender-disaggregated levels and aligned with Statistics Canada terminology (e.g., female, male and gender diverse). The CGP and the new EIP streams, such as BESC, have also integrated gender as part of project reporting on employment and training of highly qualified personnel.

Access to capital funding and related issues, are recognized as barriers preventing or discouraging Indigenous organizations and governments from participating in the renewable

energy sector. It can be difficult to access funding for these types of projects from traditional financing institutions given the high cost, longer payback periods and the perceived risk of both the project proponent and the project itself. CERRC's capacity-building stream will help to enhance energy literacy and community capacity needed to plan, develop and implement clean energy projects. The CERRC program worked to the benefit of a broad group of rural and remote communities, including First Nations, Inuit and Metis women, men and gender-diverse people.

Under CERRC, disaggregated data was collected and tracked for renewable energy projects in remote areas. This included measuring the percentage of projects and the number of projects led by or partnered with Indigenous groups or communities. The program also collected disaggregated data regarding participation of women and youth. With this information, the program will undertake analyses on the basis of region (rural and remote communities), Indigenous status (participation, leadership or ownership), gender and age (participation of women and youth).

The Department is also advancing the goals of the GoC **Gender Results Framework** by strengthening the integration of GBA+ considerations within its programs and major initiatives. For example, the **Impact Canada's Indigenous Off-Diesel Initiative** (IODI)<sup>cxliii</sup> seeks to transition up to 15 remote Indigenous communities off diesel as a primary energy source. In addition, the IODI has an all-Indigenous expert external jury that is gender-balanced, with diverse ages and regional representation. The jury is responsible for selection and project review.

## Experimentation

In 2019-20, NRCan completed experiments as part of the Government of Canada-wide **Experimentation Works** Initiative.<sup>cxliii</sup> The experiments randomized participants to test different messaging frames as well as the performance of the **Energuide home label** relative to other labelling standards. The results were shared through Experimentation Works as well other relevant groups including a Federal-Provincial-Territorial-Municipal working group on energy labeling.

NRCan also supported randomized experimentation in municipal contexts by supporting a published experiment in the **City of Medicine Hat** with academics and **MyHeat** that used thermal imaging to encourage homeowners to reduce home energy consumption.

## Departmental Risk

Key risks to achieving results under this Core Responsibility included remaining competitive in the global marketplace for the clean technology sector and keeping abreast of the rapid pace of science and technological innovation. A number of mitigation responses and initiatives were put in place to address these:

- Building on Generation Energy to accelerate clean growth, enhance competitiveness and improve Canada's environmental performance. This informed the development of green proposals, including:

- The Small Modular Reactors (SMR) roadmap;
  - A Hydrogen Strategy for Canada;
  - Implementation of clean power projects; and,
  - Reducing reliance on diesel for Indigenous and remote communities.
- Providing federal leadership and scientific expertise to advance sustainable energy technologies through multiple initiatives, including the EIP and the Program of Energy Research and Development (PERD). Through EIP and PERD funding, NRCan's CanmetENERGY laboratory carried out world-class research, fostering Canada's transition to a low-carbon economy. Highlights include:
    - The Remote Community Renewable Energy Analysis Tool (ReCREAT), a software tool which uses wind and solar resource data, along with modelled and actual community loads to analyze the impact of wind and solar PV generation on diesel reduction in up to 200 remote communities. ReCREAT is already being used to inform key policy questions;
    - Working with home builders to evaluate the performance of hybrid systems, composed of an air source heat pump and a gas furnace, with smart switching controls to tailor economic and environmental performance according to the preferences of the homeowner. Researchers determined that replacing air conditioners with air source heat pumps in 5.1 million homes already fitted with a gas furnace, at a cost of \$500-1000 per home, would result in approximately 9 Mt in GHG reductions, representing 10% of Canada's GHG reduction targets under the Pan-Canadian Framework.
  - Making investments and working collaboratively to reduce GHG emissions through the CGP, the Impact Canada Initiative Cleantech Challenges, the EIP and the Green Infrastructure demonstration programs.

These responses allowed NRCan to support clean technology sector and 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

Departmental Results	Departmental Results Indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 Actual results
Natural resource sectors are innovative	Percentage of NRCan-funded innovation projects that result in new intellectual property (IP), standards or regulations	At least 5% of projects will have IP or an impact on codes, standards and regulations by project completion (typically 2-4 years)	March 2020	Not available	65%	30% <sup>12</sup>
	Percentage of NRCan-funded clean energy innovation projects advancing along the innovation scale	At least 50% of research, development and demonstration projects advance one level on the technological readiness scale by project completion (typically 3-4 years)	March 2024	Not available	90% <sup>13</sup>	77% <sup>14</sup>
	Number of NRCan-funded green mining technologies, including waste and water management, proven through demonstrations	At least 7 <sup>15</sup>	March 2022	5	7	7
	Number of new forestry products developed that	At least 6	March 2020	7	7	11

<sup>12</sup> This indicator tracks progress on results at the completion of NRCan-funded projects in 2020.

<sup>13</sup> This indicator tracks progress on results at the completion of NRCan-funded projects. The figure represents only a fraction of the full program portfolio and is provided only as an indication of progress to date.

<sup>14</sup> This indicator tracks progress on results at the completion of NRCan-funded projects. The figure represents only a fraction of the full program portfolio and is provided only as an indication of progress to date.

<sup>15</sup> The number of technologies reported over the years are cumulative.

Departmental Results	Departmental Results Indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 Actual results
	are informed by NRCan tools and knowledge					
Clean technologies and energy efficiencies enhance economic performance	Success of NRCan-funded clean technology demonstrations in terms of economic performance	At least 50% success rate measured by project completion (typically 3-4 years)	March 2024	Not available <sup>16</sup>	Not available <sup>17</sup>	Not available <sup>18</sup>
	Ratio of leveraged investments in energy innovation projects funded by NRCan	At least 1:1 ratio of industry investment to government investment	March 2020	2.6:1	3.1:1	3:1
	Total annual energy savings resulting from adoption of energy efficiency codes, standards and practices	Annual savings of at least 600 petajoules (PJ)	March 2030	20.0 PJ <sup>19</sup>	26.7PJ	35.6PJ
Canada's natural resources are sustainable	Percentage of Canadian electricity generated from non-greenhouse gas emitting sources	At least 90%	March 2030	81.6%	82%	Not available <sup>20</sup>

<sup>16</sup> NRCan established a new Departmental Results Framework to report its results starting in 2018-19. Several indicators were new as of April 2018 and historical information is not available for all previous years.

<sup>17</sup> This indicator tracks progress on results at the completion of NRCan-funded projects. No projects with economic goals were completed during 2018-19.

<sup>18</sup> 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.

<sup>19</sup> The petajoule savings resulting from improved building code standards is now based on the 2015 National Energy Code for Buildings (NECB), instead of the 2011 NECB. As a result, the petajoules saved in 2017-2018 have been revised to 20.0 rather than the 27.4 petajoules that were previously reported in the 2019-20 Departmental Plan.

<sup>20</sup> Data for Fiscal Year 2019-20 is not available as electricity statistics are only available on a calendar year-basis. On December 31, 2018, the percentage of non-emitting electricity was 82%. There is no data available yet for calendar year 2019. The next data update is expected to be available by June 2021. Additionally, reporting has been impacted due to the delayed availability of statistics amid the COVID-19 pandemic.

Departmental Results	Departmental Results Indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 Actual results
	<b>Number of renewable energy projects in remote communities and off-grid industrial operations</b>	At least 50	March 2024	Not available <sup>21</sup>	0 <sup>22</sup>	1 <sup>23</sup>
	<b>Amount of wood harvested compared to the sustainable supply</b>	Harvest is less than sustainable supply	March 2020	160 million m <sup>3</sup> total harvest versus total wood supply of 226 million m <sup>3</sup> (SoF, 2017 – data from 2015) <sup>24</sup>	155 million m <sup>3</sup> total harvest versus total wood supply of 223 million m <sup>3</sup> (SoF, 2018 – data from 2016)	155 million m <sup>3</sup> total harvest versus total wood supply of 220 million m <sup>3</sup> (SoF, 2019 – data from 2017)
	<b>Number of low-carbon recharging and refuelling stations under development or completed</b>	At least 900 Electric vehicle charging stations  At least 15 Natural gas refuelling stations  At least 12 Hydrogen refuelling stations	March 2024	Electric vehicle charging stations = 102  Natural gas refuelling stations = 7  Hydrogen refuelling stations = 3	Electric vehicle charging stations = 526  Natural gas refuelling stations = 12  Hydrogen refuelling stations = 6	Electric vehicle charging stations = 837  Natural gas refuelling stations = 21  Hydrogen refuelling stations = 8
	<b>Change in greenhouse gas emissions resulting</b>	Clean Growth Program: Between 0.3 – 0.7 megatons (Mt) of direct	March 2026 (Clean Growth Program)	Clean Growth Program:	Clean Growth Program:	Clean Growth Program:

<sup>21</sup> This is a new indicator implemented in 2018-19. Past actuals are not available as the indicator tracks a new program that began in January 2018.

<sup>22</sup> This is a new indicator implemented in 2018-19, which measures the number of completed renewable energy projects in remote communities and off-grid industrial operations. While no projects were completed in 2018-19, NRCan selected 53 projects for funding in the Clean Energy for Rural and Remote Communities Program towards the 2024 target.

<sup>23</sup> 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 selected 35 additional projects for funding in the Clean Energy for Rural and Remote Communities Program towards the 2024 target.

<sup>24</sup> The 2017-18 actual results have been revised to reflect consistency with the 2017 State of Canada's Forests Report.

Departmental Results	Departmental Results Indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 Actual results
	<b>from NRCan-funded clean technology demonstrations</b>	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 GHG direct and indirect reductions per year	March 2030 (Energy Innovation Program)	Not available <sup>25</sup>  Energy Innovation Program: 1.2 Mt/ year <sup>26</sup>	Not available <sup>27</sup>  Energy Innovation Program: 1.32 Mt/ year <sup>28</sup>	Not available <sup>29</sup>  Energy Innovation Program: 1.61 Mt/ year <sup>30</sup>
	<b>Number of policies and initiatives developed collaboratively with Indigenous</b>	At least 10	March 2020	Not available <sup>31</sup>	8	19

<sup>25</sup> NRCan established a new Departmental Results Framework to report its results starting in 2018-19. Several indicators were new as of April 2018 and historical information is not available for all previous years.

<sup>26</sup> On track for 2030 target. Projects are just now underway and only represent a small percent of the final target.

<sup>27</sup> This indicator tracks progress on results at the completion of NRCan-funded projects. No projects were completed during 2018-19, as projects were at the early stages of implementation.

<sup>28</sup> On track for 2030 target. Projects are just now underway and only represent a small percent of the final target.

<sup>29</sup> Demonstration projects can only report on GHG emissions once demonstrations are fully operational and emissions have been assessed. Some projects experienced delays in 2019-20. The program will monitor the effects of the COVID-19 pandemic on project progress, timelines and potential impact on program target dates.

<sup>30</sup> On track for 2030 target. Projects are just now underway and only represent a small percent of the final target.

<sup>31</sup> NRCan established a new Departmental Results Framework to report its results starting in 2018-19. Several indicators were new as of April 2018 and historical information is not available for all previous years.



Departmental Results	Departmental Results Indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 Actual results
	<b>groups and communities</b>					

### Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
594,180,420	594,180,420	1,557,282,967	1,498,877,063	904,696,643

### Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
1,590	1,645	55

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in [GC InfoBase](#).<sup>cxliv</sup>





## Globally Competitive Natural Resource Sectors

**Description:** Advance and promote market access, inclusiveness and competitiveness for Canada’s natural resource sectors, in support of jobs and economic growth.

This Core Responsibility supports the advancement of the following **Strategic Priorities**:

- Improving market access and competitiveness in the natural resource sectors;
- Strengthening relationships and advancing reconciliation with Indigenous peoples; and,
- Ensuring our decisions and actions are grounded in transparent and robust science.

### Context:

Canada is recognized globally for its abundant natural resources and remains one of the world’s most attractive countries for investment in sustainable natural resources development. Domestically, the natural resource sectors continue to be a driver of growth, accounting for a significant proportion of the gross domestic product (GDP) and creating well-paying jobs.

In 2019-20, Canada’s natural resource sectors faced a number of challenges, including infrastructure constraints, a cyclical downturns in pricing, trade uncertainties, punitive tariffs and U.S. tax reform challenges, as well as adapting to new domestic regulatory and policy approaches. Nearing the end of the year, the sectors also encountered an unprecedented challenge in having to manage through the COVID-19 pandemic. These challenges underscored the importance of NRCan’s efforts to diversify trade and to support the competitiveness of Canada’s energy, mining and forest sectors including (in collaboration with provincial, territorial counterparts and Indigenous peoples), as well as ensuring the safe and uninterrupted production and supply of energy to industrial, domestic and international customers. It also highlighted the need for Canada to show global leadership in transitioning to a low-carbon economy, and continuing engagement with partners at international fora.

### Results:

#### **NRCan is working to enhance access to new and priority markets for Canada’s natural resources**

In 2019-20, Canada’s share of the U.S. market rose to 26.8% and the global market to 1.5%, surpassing the established targets of 24.4% and 1.2% respectively. As well, while 2019-20 data is not yet available, the number of Canadian-owned resource companies operating abroad increased in 2018-19 to 934, surpassing the 2017-18 result of 895 and the target of 800. This

was due to rising energy demand in the Asia-Pacific and a robust demand for most minerals and metals.

NRCan also supports market access through international engagements that contributed to the development or expansion of trade, investment and diversification. In 2019-20, there were 42 department-led trade missions and other engagements supporting the development or expansion of trade and investment in natural resources, up slightly from 39 in 2018-19, and well above the target of 26. Further, the average number of representatives from companies, provincial/territorial and Indigenous representatives participating in those missions rose compared to last year (7.5, 0.8 and 0.4 respectively). While these numbers were below their respective targets, the overall number for international engagements demonstrates the Department's commitment to enhancing market access, as a contributor to economic growth and job creation, including actively promoting Canada's natural resource and clean technology sectors.

NRCan supported the Government of Canada's work related to the approval of the **Trans Mountain Expansion (TMX)** Project, including completing consultations with Indigenous groups potentially impacted by the Project. Since the Project was approved in June 2019, NRCan continued engagement with Indigenous groups including developing and implementing accommodation measures and other commitments to address the potential impact of the Project on Indigenous rights and other concerns and has hosted workshops with Indigenous groups.

From this respect, NRCan supported four Governor in Council's (GiC)'s decisions, the TMX project and the **Manitoba-Minnesota Transmission Project (MMTP)**(June 2019), approval to Petrogas Energy for a 25-year licence to export propane from specific locations across the country, and in February 2020, the approval of a 40-year licence for exports from the proposed Kitimat LNG facility.

In support of the above activities on TMX and other major projects, NRCan worked to reduce the administrative burden on Indigenous groups and implemented the delivery of funding to Indigenous groups for TMX, Nova Gas Transmission Ltd (2021), and the MMTP. This resulted in 267 signed collaborative agreements and approximately \$10.5 million allocated to communities.

NRCan continued to support partnerships with Indigenous peoples through the **Indigenous Advisory and Monitoring Committees (IAMC)** for TMX and Line 3 Replacement. The two IAMCs delivered over \$8.5 million in contribution funding, including support for two ground-breaking monitoring initiatives that facilitated Indigenous participation in the monitoring and oversight of regulatory activities for the projects. NRCan also promoted opportunities and economic development through the **Indigenous Natural Resource Partnership program**<sup>cxlv</sup> which aims to increase Indigenous economic participation in infrastructure projects that have a



*Stack of pipe sections ready for laying pipeline across prairie land*

direct link to oil and gas activities in B.C. and Alberta.

The Department also worked with Global Affairs Canada to support other cross border energy infrastructures to expand Canadian access to energy markets in the U.S. and other global regions. This included the **Keystone XL, Line 3, Line 5 pipelines** and the **New England Energy Connect transmission lines**, while support was provided to the LNG Canada project in Kitimat, BC, which is expected to create 10,000 jobs in Canada at the height of construction. This project is the largest foreign direct investment in Canada's history.

To better facilitate decisions on major resource projects, which will create greater business certainty and protect the environment, NRCan provided support across the federal government for the enactment and coming into force of **Bill C-69**.<sup>cxlvi</sup> The enactment of the Bill simultaneously enacted the *Canadian Energy Regulator Act* (CERA) and the *Impact Assessment Act* (IAA). The CERA allowed the establishment of the **Canada Energy Regulator** (CER),<sup>cxlvii</sup> replacing the National Energy Board and the IAA allowed the establishment of the **Impact Assessment Agency of Canada**.<sup>cxlviii</sup> This new system is intended to ensure more inclusive engagements, greater Indigenous participation, evidence based scientific decisions, stronger safety and environmental protection and timelier project decisions to enhance certainty for the natural resource sectors. In this regard, NRCan provided scientific and technical information for all projects or regional impact assessments.

NRCan also engaged with stakeholders to ensure Canada's offshore industry remained world-class and a source of jobs and prosperity for all Canadians. This included participating in a federal-provincial-industry competitiveness table. Other results included help to implement a basin-wide improvement plan that ensures continued safety and environmental protection in the offshore and a regional Assessment (RA) of Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador.

On the international scene, NRCan worked to modernize Canada's trade relationships, improve market access and ensure natural resources and clean technology exporters' interests are reflected in Canada's FTA. The Department supported negotiations for the **Canada-US-Mexico Agreement** (CUSMA), **Mercosur**, and **Pacific Alliance** while also engaging on preparations for potential FTA negotiations with **ASEAN**, **India**, and the modernization of the FTA with **Ukraine**. CUSMA will ensure the continued free flow of energy products while strengthening energy trade relationships. The inclusion of an energy side letter with the U.S. will increase transparency and foster continued access to Canada's closest energy trading partner. NRCan also collaborated with international partners to improve market access through:

- Canada-European Union Comprehensive Economic and Trade Agreement;
- Comprehensive and Progressive Agreement for Trans-Pacific Partnership; and,
- North American Free Trade Agreement (in force until July 1, 2020, with other provisions still active as well as advance CUSMA ratification and implementation).

On January 9, 2020, Canada and the U.S. announced the finalization of the **Joint Action Plan on Critical Minerals Collaboration**.<sup>cxlix</sup> The announcement delivered on the June 2019 commitment by Prime Minister Trudeau and President Trump to improve critical mineral security and ensure the future competitiveness of Canadian and U.S. minerals industries. This is in line with the aims of the **Canadian Minerals and Metals Plan** (CMMP)<sup>cl</sup> to increase Canada's

global leadership, strengthen Canada’s business and innovation environment, foster export opportunities and make Canada a more competitive and attractive destination for investment.

The Minister of Natural Resources also advanced the interests of Canada’s natural resource sectors by participating in international fora such as, **Bloomberg New Energy Finance**,<sup>cli</sup> the **Prospectors and Developers Association of Canada** (PDAC),<sup>clii</sup> the World Bank’s Climate Smart Mining Facility, and the International Energy Agency (IEA). Departmental engagement included **Mining Indaba** (Africa), **APEC Mining Week**, among other fora. To enhance strategic energy partnerships and promote Canada as a stable investment destination and preferred trade partner, NRCan also undertook bilateral high-level missions to priority nations such as Japan, China, the U.S. and the UK.

In February 2020, the Minister participated in **GLOBE 2020**<sup>cliii</sup> where he hosted two roundtables on investment (including one on renewable energy), held bilateral meetings with provinces and industry to advance stakeholder relations and promote trade and investment in the natural resource sector (see textbox).

Further, the Department advanced Canada’s resource competitiveness, facilitated transition to a low carbon economy, domestically and globally, and protected our trade interests and the sustainable development of natural resources, through engagement at the **G7, Organization for Economic Co-operation and Development** (OECD), **International Energy Agency**, the **International Renewable Energy Agency** (IRENA), the **Food and Agriculture Organization** (FAO)<sup>cliv</sup> the **UN Forum on Forests** and the **G20**, where the signing of two MOUs on clean energy cooperation with Japan was announced.

In 2019-20, NRCan further supported the climate action and low carbon transition by its participation in meetings and initiatives, such as the **25th Conference of the Parties (COP25)** to the **United Nations Framework Convention on Climate Change** (UNFCCC), **United Nations Committee on Forests and the Forest Industry** (UN COFFI), **Sustainable Development Goals** (SDGs), and the **United Nations Convention for the Law of the Sea** (UNCLOS). Through these engagements, the Department demonstrate global leadership in promoting the importance of an inclusive and just energy transition, advancing climate action, and sharing best practices with regards to sustainable forest management and other sustainable practices across all resource sectors, and ensure that international commitments are in alignment with Canada’s domestic low carbon objectives.

NRCan also advanced the Cooperation Framework under the **High-Level Energy Dialogue** (HLED)<sup>clv</sup> to position Canada as a trade and investment partner to support the Europe Union in attaining energy security and moving toward a low carbon economy. Established to foster increased bilateral contacts and cooperation on energy, the HLED provides an annual forum to



At GLOBE 2020, held in Vancouver in February, NRCan provided federal leadership in supporting and partnering with key clean technology stakeholders through its programs. Collaborations included a GLOBE Exchange Session led by the **Clean Growth Hub** and a consultation session engaging Canadian clean technology producers on how the regulatory system can support the growth of the clean tech sector.

The Minister’s keynote address was attended by a large audience of clean technology and oil and gas stakeholders, and the Minister followed the speech by announcing the Breakthrough Energy Solutions Canada winners.

discuss energy policy issues, the current focus of which is transition toward a low carbon future, addressing market barriers and ‘clean financing’.

To further advance bilateral relations and promote trade and investment in the energy, nuclear, and natural resource sectors, NRCan has been engaging with UK interlocutors through key events such as the **Canada-UK Nuclear Energy Summit** and the UK Department of International Trade’s **Civil Nuclear Showcase**. This resulted in the signing of the **Canada-UK Nuclear Cooperation Action Plan** and an MOU on nuclear collaboration during both events in March 2020.

NRCan deepened collaboration with the **U.S. Department of Energy (DOE)** on cyber security through a number of high-level engagement activities and initiatives aimed at strengthening cross-border energy infrastructure security and resilience. NRCan worked with the DOE, as well as Canadian and U.S. intelligence agencies, to conduct joint classified threat briefings with Canadian and U.S. energy industry stakeholders. In November 2019, a Canadian delegation participated in the **U.S. DOE Industrial Control Systems International Hackathon**, which brought together experts from government, private sector and academia to raise awareness of ICS challenges and explore cyber security vulnerabilities within these systems. These initiatives helped promote Canada as a global leader and ally in cyber security.

Following the conclusion of the **Resources of the Future**<sup>clv i</sup> and **Clean Technology Economic Strategy Tables**,<sup>clv ii</sup> NRCan also contributed to a whole-of-government approach to delivering concrete and sustainable policy actions that respond to key recommendations, including continued support to the **Science and Technology Internship Program (STIP)** to help provide green jobs in the natural resources sector; leading a Clean Technology Regulatory Review, including consultations and additional engagement with small and medium-sized enterprises, aimed at addressing regulatory issues and opportunities to support the competitiveness of Canada’s clean technology sector; and working with Statistics Canada to enhance our understanding of the diversity of the workforce in the clean tech sector.

Finally, NRCan is proud to support the continued advancement, at the domestic and international level, for gender equality through the **Equal by 30 campaign**.<sup>clv iii</sup> The Department contributed by expanding the Equal by 30 campaign, reaching over 145 signatories, from more than 20 countries worldwide, which will help close the gender gap. The global signatory base spans multiple areas of the energy sector, including renewables, energy efficiency, nuclear, oil and gas, along with likeminded organizations in the sustainable environmental and climate space.

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

NRCan strives to engage stakeholders to ensure that they benefit from the new and inclusive resource economy. In 2019-20, efforts to engage Indigenous communities were strengthened by the opening of the **Circle of Nations Learning Center (CNLC)**, in September 2019 (see textbox). The CNLC is a place where representatives from Indigenous organizations, academia, the private sector, federal departments and the not-for-profit sector can work together on building relationships and strengthening collaboration.

NRCan strives to be responsive to stakeholders when also creating policies and programs through broad public engagement and more targeted stakeholder engagement. In 2019-20, much of NRCan's work required targeted engagement with stakeholders on policy, regulatory or legislative changes. In this context, the target for broad public engagement (50%) was not met. In 2017-18, under **Generation Energy**,<sup>clix</sup> the result associated with NRCan's broad public engagement spiked (77%); this trend has not continued due to diversion toward specific interactions with stakeholders. A complementary tool for developing policies and programs is the production of analytical products that can inform the policy development process. In this regard, the Department increased the production of its number of analytical products to 15, in collaboration with provinces and territories, in order to advance Canada's natural resource sectors' competitiveness and find ways to address barriers to investment, surpassing the target of eight joint analytical products.

To ensure that Indigenous peoples benefit from resource development, NRCan engages with the relevant Indigenous groups and communities in economic development projects. The 2019-20 result of 365 surpassed the target significantly as numerous groups and communities were engaged in more than one economic development project. This amount can be attributed to the number of communities engaged in multiple major natural resource projects (TMX, MMTP,

### Circle of Nations Learning Center

The **Circle of Nations Learning Center** opened in September 2019, and is a center-point for NRCan cultural competency activities, the Indigenous Employees Network (IEN), and reconciliation. The CNLC was booked to an 89% occupancy rate (until mid-March 2020), priority being given to programs and policy groups where Indigenous considerations are discussed. For example, a Pikwàkanagàn First Nation community leadership meeting and a Spanish forestry delegation met to discuss traditional Indigenous medicines and teachings concerning trees in 2019-20.

*"The new NRCan @NRCan Circle of Nations Learning Centre is now open! The Centre is a unique venue that provides an opportunity for Indigenous groups and public servants to gather and learn in a space that honours and supports Crown-Indigenous relationships #GCIndigenous."*

Shawn Tupper, Associate Deputy Minister, NRCan



*Employees from NRCan pose with the Deputy Minister and Associate Deputy Minister of NRCan for the official opening of the Circle of Nations Learning Center*



NOVA Gas Transmission Ltd) and number of groups that may also be involved in multiple types of economic development projects simultaneously. In addition, NRCan engaged with First Nations, Inuit and Métis leaders at the National Indigenous Organizations to further identify joint priorities and continue to build relationships.

NRCan also provides learning and work experience opportunities, through STIP, part of the Youth Employment and Skills Strategy (YESS), to youth (15-30 years) across Canada that are interested in green jobs in the fields of STEM fields. The program actively promoted diversity in the natural resources labour market by requiring 50% of program participant to be from the designated employment equity groups (women, Indigenous Peoples, visible minorities, and persons with disabilities (see textbox).

NRCan also supported the **Arctic and Northern Policy Framework** (ANPF)<sup>clx</sup> through the delivery of the **Polar**

**Continental Shelf Program**,<sup>clxi</sup> a program that provides the facilities and environment for supporting pan-Arctic science and military training. In addition, key areas such as infrastructure, skilled workers, geospatial innovation, and affordable energy sources in the North were advanced through collaboration with other government departments.

### **NRCan is enhancing the competitiveness of Canada's natural resource sectors**

NRCan contributes to the competitiveness of the natural resource sectors by coordinating assessments of resource development projects. In 2019-20, 100% of resource development project decisions were on target as per timelines, helping to support an effective, accountable, transparent and timely approach to the regulatory review of resource development projects.

Competitiveness can be further enhanced when economic and investments data is used to inform decisions. In 2019-20, NRCan's economic and investment data was accessed over 379,032 times per quarter, which is above the target of 150,000. In 2019-20, the number doubled from that of 2018-19 due to the addition of multiple databases on economic and investment data that users could access. The decision to include visitors from outside of Canada was made since the economic and investment impacts of Canada's natural resources are tied to international markets. It is clear from this significant change in volume that including international visitors is an important factor when looking at the competitiveness of Canada's natural resource sectors.

#### **Science and Technology Internship Program**

NRCan's Science and Technology Internship Program (STIP) collects disaggregated data to facilitate assessments of the program's impacts on the designated employment equity groups and potential gaps of participation by employment equity groups. In 2019-2020, the Program actively engaged Indigenous youth and youth living in northern and remote communities in identifying barriers to employment.

Following engagement, the program made changes to eliminate identified barriers, such as removing the post-secondary education requirement, increasing support for skills training, and increasing the maximum wage subsidies to account for higher cost of living in northern and remote communities. Preliminary data demonstrates early success for key GBA+ outcomes, such as increased labour market participation of diverse groups.

For example, STIP has seen a doubling of participation by Indigenous and northern youth from 5% to 12% in 2019-20; more than 50% participation from Employment Equity groups; and the expansion of internships and training opportunities into the Territories.

NRCan operationalized the CMMP with provinces and territories, through [Action Plan 2020](#),<sup>clxii</sup> and created the **Critical Minerals Task Force**. These actions supported Canada's role as a sustainable responsible supplier of critical minerals. The task force led engagements with the U.S., Japan, the E.U., Australia and the UK. In addition, the competitiveness of Canada's mining sector was enhanced by the publication of new data and knowledge products on mineral exploration and production. In this regard, the Department developed more than 15 deliverables that helped advance shared energy and mining priorities, including highlighting Canada's Energy Advantage, which emphasizes the Pan-Canadian Approach to Energy Information, and progress made under the [Market Transformation Road Map for Energy Efficient Equipment in the Building Sector](#)<sup>clxiii</sup> and [Build Smart: Canada's Building Strategy](#).<sup>clxiv</sup>

In support of the forest sector, NRCan invested \$16.9 million in 13 projects, including \$4.9 million for an innovative technology to manufacture industrial-scale cellulose filaments through the IFIT Program. Also, the Department helped create green jobs and reduce GHG emissions by supporting Woodland Biofuels through the IFIT and the CGP to produce, for the first time, ethanol from wood and agricultural waste. In addition, in support of the forest sector's innovation agenda, \$20.4 million was invested through the [FIP](#)<sup>clxv</sup> in **FPInnovations** to support 27 research projects. Funding for both of these programs will help to diversify the industry into new product streams and implement innovative process improvements to ensure industry competitiveness. Finally, through the [Indigenous Forestry Initiative](#),<sup>clxvi</sup> and in collaboration with **Indigenous Services Canada's Strategic Partnership Initiative**, the department also invested \$6 million in 52 Indigenous-led forest projects that build capacity and support jobs in the Indigenous forest sector.

To demonstrate that wood can be a competitive material option for commercial buildings and to showcase Canadian wood and wood construction techniques, NRCan made investments through the [Green Construction through Wood Program](#)<sup>clxvii</sup> that included a 10-storey Tall Wood building on the George Brown campus in Toronto, a 4-storey office building in Toronto, identified as a pilot project for part of Canada's **Green Building Council's Zero Carbon Building Pilot Program**, and advancing the implementation of wood design education at Canadian post-secondary institutions through the development of course materials and other education resources.

Technical advisors in Canada, funded through the [Expanding Markets Opportunities Program](#),<sup>clxviii</sup> influenced the use of wood in 296 non-traditional and mid-rise construction projects between April 1, 2019 and March 31, 2020, resulting in incremental wood sales of \$191.1 million in 12.7 million square feet of construction; and, delivered over 44,000 wood education hours to nearly 25,000 practitioners. These results are an all-time high for project conversions and wood sales. In addition, nationally, a set of six low-rise commercial design examples were prepared by technical experts to be introduced to both existing practitioners in the market, as well as integrated into post secondary institutional training. The building designs will be instrumental in demonstrating that wood can be a competitive material option for commercial buildings.

To improve exploration investments in the Arctic and inform land use decisions within northern communities, NRCan modernized geo-mapping and advanced knowledge of geoscience in the north through the **Geo-mapping for Energy and Minerals Program** (GEM).<sup>clxix</sup> This program created the first digital maps of Canada's North, and presented research results to government and industry stakeholders and to Northern and Indigenous communities. GEM developed a comprehensive geoscientific framework that will be available through a web portal when launched later in 2020. NRCan also provided geoscience data to industry to support mineral exploration, through the **Targeted Geoscience Initiative**,<sup>clxx</sup> which focused on deeply buried mineral deposits.



*A researcher studies black shales on the Peel River in central Yukon. These shales can contain nickel, zinc, molybdenum, and gold.*

In 2019-20, Canada successfully defended workers in the natural resource sector who had been impacted by trade actions of other countries. In the forest sector, the Government challenged trade actions on softwood lumber, uncoated groundwood paper, supercalendered paper and dissolving pulp under **NAFTA Chapter 19** and at the **World Trade Organization** (WTO).<sup>clxxi</sup> As a result, duties were removed from uncoated groundwood paper, supercalendered paper and dissolving pulp, while litigation continued on softwood lumber. In addition, with support from NRCan, the Government also responded to U.S. steel and aluminum tariffs, which were temporarily lifted, with reciprocal, proportionate countermeasures, litigation under **NAFTA** and the **WTO** consulted broadly and transparently to implement retaliatory measures on targeted products. At the same time, Canada continued to develop and implement mitigation policies, such as the **Softwood Lumber Action Plan**,<sup>clxxii</sup> to support industries, communities, and workers affected by trade disputes.

Finally, NRCan worked with partners to monitor and respond to the challenges experienced by the energy sector as a result of the COVID-19 pandemic. NRCan supported the implementation of strategic measures, such as cleaning up inactive and orphan wells in Alberta, Saskatchewan, and British Columbia and establishing an **Emission Reduction Fund**,<sup>clxxiii</sup> designed to create jobs and bring people back to work in the sector while also maintaining environmental targets.

## Gender-based analysis plus

Guided by the pillars of the **Gender Results Framework** (GRF),<sup>clxxiv</sup> GBA+ was integrated into departmental decision-making processes, including through a rigorous assessment of the potential implications of new or ongoing policies or programs on diverse populations of Canadians, which has helped to underpin activities and results achieved under this Core Responsibility.

For example, developed under NRCan's leadership and in partnership with provinces, territories, Indigenous groups and industry, the CMMP highlights the need to take action on gender equality and identifies strategies to increase the number of women and visible minorities in the mining sector and advance Indigenous participation, particularly of Indigenous women. Through its vision for a more diverse workforce and related calls to action, the CMMP supports

the pillar for Economic Participation and Prosperity under the Gender Results Framework (GRF). In recognising the under representation of women in the mining sector, NRCan's target was to increase the participation of women in mining to 30% by 2030, compared to 16% in 2016.

To achieve the target of 30% female representation by 2030 in mining, NRCan strengthened several measures in the CMMP, including:

- Supporting **Mining Matters**, a charitable organization dedicated to bringing knowledge and awareness about Canada's geology and mineral resources to students, through an outreach and engagement grant (\$20,000) to bring mining and mineral literacy to youth, Indigenous Peoples, remote communities, and other sector stakeholders. The grant was used to educate five remote communities involving at least 150 youth; undertake three teaching-training workshops for up to 12 teachers; and coordinate at least five public education community-based events; and,
- Collaborating with the **Council for the Advancement of Native Development Officers (CANDO)**, through an outreach and engagement grant (\$20,000), on the development and test pilot of a mining sector specialization program for Economic Development Officers to engage and inform Indigenous Peoples on how minerals and mining can contribute to their community development goals.

## Experimentation

NRCan conducted two experiments that shed insight on, and improved, self-identification by employees and job applicants who are employment equity group members. Another experiment improved the retention of francophone job applicants in a premier policy analyst recruitment and development program. These experiments increased inclusiveness in the NRCan workforce working to deliver its mandate of supporting jobs and economic growth. These results have been shared broadly with other departments, and will inform future recruitment campaigns. NRCan continues to actively explore ways to engage in experimentation within this area of responsibility.

## Departmental Risk

Key risks to achieving results under this Core Responsibility included the changing trade context and market access for the natural resource and clean technology sectors, maintaining public confidence and engagement, including Indigenous peoples, in natural resources development and keeping ahead of the rapid pace of science and technological innovation. The Department managed these risks through mitigation responses, and by supporting key initiatives:

- Supporting business investment in clean energy technology through full, immediate deduction of costs until 2024 and by introducing the **Accelerated Investment Incentive**,<sup>clxxv</sup> and engaging with other government departments and international partners as well as industry stakeholders, institutional and venture capital investors, to attract investments in Canadian natural resources and clean tech sectors.

- Supporting the diversification of Canada's market for natural resources, which includes strategies on addressing trade barriers and infrastructure capacity. Specifically by:
  - Influencing negotiation positions to advance natural resource interests in trade and investment talks, advocating favourable policies and challenging unfair ones, including trade disputes, in consultation with provinces, territories and industry.
  - Engaging with key international partners to promote Canada as the preferred partner in natural resources and clean technology trade and through the Market Opportunities Program, with offices in China, Japan, South Korea, Vietnam, India and Europe; and
  - Implementing the Transportation Modernization Act, which is now law, to allow the department to improve transparency and resolve transportation interruptions in rail service.
- Working on restoring public trust in regulatory processes and environmental assessments of natural resources development through initiatives such as Bill C-69, which more clearly reflects the Government's commitment to the United Nations Declaration on the Rights of Indigenous Peoples, clarifies the protection and consideration of Indigenous Knowledge, and increased collaboration with Indigenous peoples through an early planning and engagement phase and an Indigenous Advisory Committee for the CER.
- Establishing the *Canadian Energy Regulator Act*, which came into force on August 28, 2019, replacing the National Energy Board with the Canadian Energy Regulator, emphasizing effective consultation as well as environmental safety and protection.

The Department will continue to pursue initiatives, enabling effective mitigation of risks in support of delivery of its mandate.

## Results achieved

Departmental results	Departmental Result Indicators	Target	Date to achieve target	2017-18 Actual results	2018-19 Actual results	2019-20 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	<p>Canada's market share in the U.S. = At least 24.4% of total U.S. imports (in value)</p> <p>Canada's market share in the World (non-U.S.) = At least 1.2% of the total World imports (in value)</p>	December 2019	<p>25.2% (U.S.)</p> <p>1.4% (global imports)</p>	<p>24.8% (U.S.)</p> <p>1.4% (global imports)</p>	<p>26.8% (U.S.)</p> <p>1.5% (global imports)</p>

	<b>Number of Canadian-owned resource companies operating abroad</b>	At least 800	December 2019	895	934	Data not yet available <sup>32</sup>
	<b>Number of NRCan international engagements that support the development or expansion of trade and investment in natural resources</b>	At least 26	March 2020	27	39	42
	<b>Average number of companies, provinces/territories and Indigenous leaders participating in trade and promotion missions</b>	Companies: At least 10  Provinces and Territories: At least 2  Indigenous Communities: At least 1	March 2020	Companies: 6.67  Provinces and Territories: 0.33  Indigenous Communities: 0.22	Companies: 4.2 per year  Provinces/Territories: 0.56 per year  Indigenous communities: 0.15 per year	Companies: 7.5;  Provinces/Territories: 0.8;  Indigenous communities: 0.4
<b>Canadians are engaged in the future of the new and inclusive resource economy</b>	<b>Percentage of policy, regulatory and legislative changes with formal mechanisms for broad public engagement</b>	At least 50%	March 2020	77%	35%	0% <sup>33</sup>
	<b>Number of joint analytical products with provinces and territories</b>	At least 8	March 2020	10	18	15

<sup>32</sup> 2019-20 Industry data is not available before December 2020 and will be reported in the 2020-21 Departmental Results Report.

<sup>33</sup> In 2019-20, much of NRCan's work required targeted engagement with stakeholders on policy, regulatory or legislative changes, similar for 2018-19. In 2017-18, under Generation Energy, the result associated with NRCan's broad public engagement spiked (77%); this trend has not continued due to diversion toward specific interactions with stakeholders.

	<b>Number of Indigenous groups and communities implicated in economic development projects</b>	At least 15	March 2020	Not available <sup>34</sup>	184	365 <sup>35</sup>
<b>Enhanced competitiveness of Canada's natural resource sectors</b>	<b>Percentage of resource development project decisions on target as per timelines</b>	100%	March 2020	100%	100%	100%
	<b>Number of times NRCan's economic and investment data are accessed</b>	At least 150,000 quarterly average	March 2020	191,735	133,147	379,032

### Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
572,418,934	572,418,934	638,695,250	595,634,877	23,215,943

### Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
385	469	84

Financial, human resources and performance information for Natural Resources Canada's Program Inventory is available in [GC InfoBase](#).<sup>clxxvi</sup>

<sup>34</sup> NRCan established a new Departmental Results Framework to report its results starting in 2018-19. Several indicators were new as of April 2018 and historical information is not available for all previous years.

<sup>35</sup> The 2018-19 and 2019-20 result surpassed the target significantly as numerous groups and communities were engaged in more than one economic development project. In addition, in 2019-20 there was an increase in the number of major resource projects that engaged Indigenous groups and communities.



## 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 which are required to meet the 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 of the 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; and Real Property Management Services.

### Results:

#### Supporting science

In collaboration with bargaining agents, and in consultation with other science-based departments and agencies, the Department started implementing its **Policy on Scientific Integrity**<sup>clxxvii</sup> in 2019-20. Implementation focussed on the development of guidelines, tools, and a process for addressing breach allegations. The Policy on Scientific Integrity sets out clear expectations on the design, conduct, review, management, communication and use of research and science to ensure the rigor, relevance and reputation of NRCan's science.

To guide Open Science activities in Canada, the federal government launched its **Open Science Roadmap** (OSR) in February 2020. Recommendations and best practice principles emanating from OSR guide federal departments and agencies in developing open science action plans for their respective organization by 2021. NRCan will undertake this work in 2020-21.

#### Emergency Management and Cybersecurity

In support of integrating IT security within all areas of NRCan for the protection of information and system assets, including the IT network from potential compromise in compliance with expectations from the Government, the Department improved its cyber security related guidance by leveraging TBS governance methodology. As a result, senior management (i.e., Program and Service Delivery Managers / Business Owners) can now rely on an agile and effective IT Security Assessment & Authorization (SA&A) approach. To help ensure business security requirements and IT security implementation, SA&A is integrated within the IT Project Management Framework of the Department

Further, NRCan's end-user computers and application layer components on servers are monitored to help maintain appropriate security posture in support of mitigating risk with appropriate stakeholders engaged as, and when, needed. NRCan Cyber Security remained actively engaged with Government of Canada's IT Security Lead Agencies in support of strategic direction alignment.

## Open and Accountable Government

NRCan continued its participation in the **Federal Science Library (FSL)**.<sup>clxxviii</sup> As a partnership of seven departmental science libraries that provide researchers everywhere with enhanced access to departmental scientific information and library services, the FSL began as a commitment under **Canada's Action Plan on Open Government**.<sup>clxxix</sup>

Building on the Department's data inventory is key to making NRCan scientific information accessible to Canadians. By 2019-20, NRCan Data Inventory had captured 732 data sets and data collections, an addition of 45 new data sets and 178 undated versions. NRCan Data Inventory is a deliverable under the **Directive on Open Government**,<sup>clxxx</sup> and the Department continued to release data sets to the **Open Government Portal**.<sup>clxxxi</sup> NRCan's S&T promotion video, "**Our Science, Our Strength**"<sup>clxxxii</sup> was released on YouTube in April 2019, showcasing how NRCan's science community builds knowledge networks and applies them for the public good.

## Workforce and Workplace

In February 2020, the Executive Committee approved the department's three-year Official Languages Action Plan focusing on three priorities: reinforcing communications with and services to the public; strengthening a bilingual workplace, and, promoting English and French by sharing our science.

The Pride Network was established in 2018 and since then, has been raising awareness of and addressing LGBTQ2+ issues within the department. In support of the Inclusion priority in 2019-20, the Pride network delivered six sessions of the Positive Space Training in both English and French. During Ottawa Pride week in 2019, senior management and member of the network held a ceremony to raise the pride and transgender flags. A similar event was held at the location in Devon, Alberta.

In 2019-20, NRCan explored innovative monitoring practices and initiated a multi-year and multi-phase qualitative staffing initiative to determine effectiveness of its staffing processes in hiring and retaining the right people using various tools throughout the staffing process. Data gathered from both managers and employees hired will be analysed to determine whether the staffing tools used resulted in hiring and retaining the right candidate. In ongoing efforts to improve Employment Equity (EE) representation data, NRCan experimented with a self-identification process. As part of the annual recruitment campaign of the Policy Analyst Recruitment and Development Program (PARDP), two self-identification forms were distributed (one as an interrogative question and the other as a reflective statement). There was 29% more self-identified as EE group members who responded to the reflective question and the simple "yes/no" question on first form.

On March 10, 2020, NRCan hosted its first ever **Great NRCan Quest for Gender Equity**, an International Women’s Day Challenge, led by the Department Women’s Champions and aimed at developing a framework for gender equality in the forest, mining and energy sectors.

Finally, the latter period of 2019-20 was marked by the beginning of the COVID-19 pandemic. NRCan rose up to the task of dealing with the pandemic by putting in place measures to ensure business continuity and staff safety (see textbox).

#### Ensuring Business Continuity during COVID-19

Measures to mitigate the effects of the pandemic on our business and protect employees around the country included:

- Expanding Business Continuity Planning (BCP);
- Developing health & safety protocols;
- Informing staff on COVID-19 developments;
- Introducing tools to help with remote working;
- Developing a list of critical service and dependencies to ensure that NRCan sectors have the tools and services required to perform business functions;
- Developing a matrix to ensure the continuity of NRCan’s critical services following two tabletop exercises held in March 2020; and,
- Increased telework capacity to ensure that all NRCan staff were able to work remotely.

#### Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)*	2019–20 Difference (Actual spending minus Planned spending)
122,871,508	122,871,508	155,010,140	152,590,901	29,719,393

#### Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
1,038	993	(45)

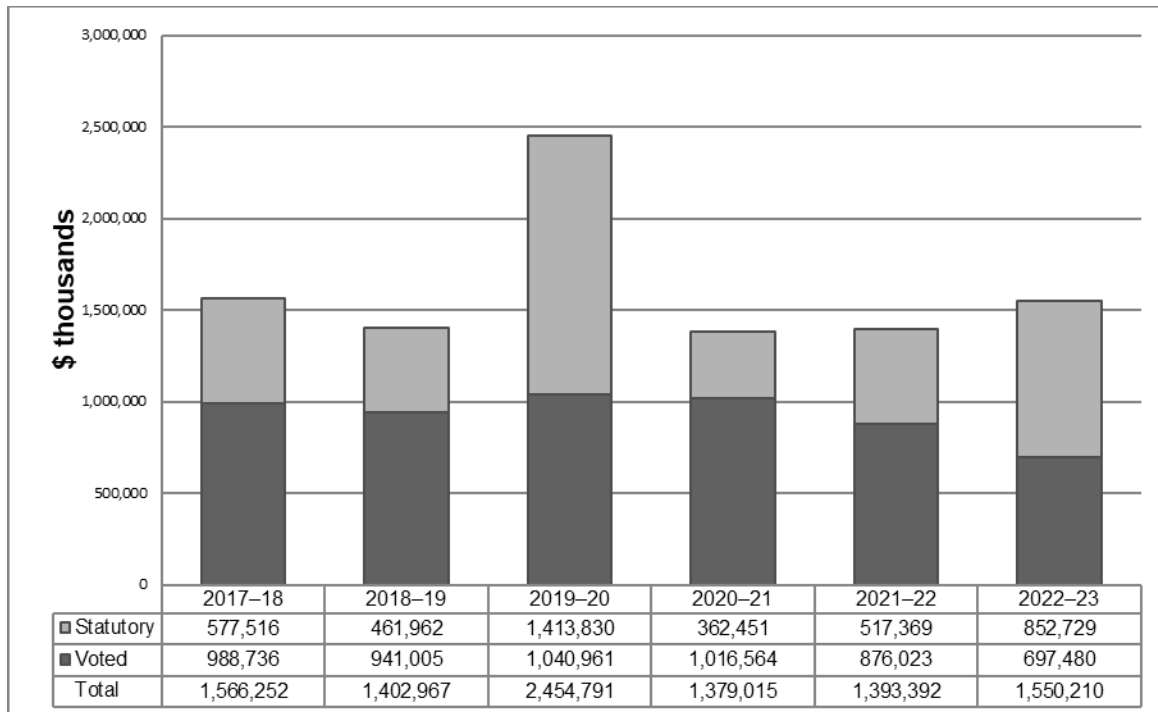
Financial, human resources and performance information for Natural Resources Canada’s Program Inventory is available in [GC InfoBase](#).<sup>clxxxiii</sup>

## Analysis of trends in spending and human resources

### Actual expenditures

#### Departmental spending trend graph

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



Planned spending in Voted authorities from 2020-21 to 2022-23 is declining, mainly as a result of reduced funding profiles for major initiatives and sunsetting programs. 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 2020-21 to 2022-23, 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 2019.

## Budgetary performance summary for Core Responsibilities and Internal Services (dollars)

Core responsibilities and Internal Services	2019–20 Main Estimates	2019–20 Planned spending	2020–21 Planned spending	2021–22 Planned spending	2019–20 Total authorities available for use	2017–18 Actual spending (authorities used)	2018–19 Actual spending (authorities used)	2019–20 Actual spending (authorities used)
Natural Resource Science and Risk Mitigation	205,570,026	205,570,026	214,015,248	211,981,702	231,586,322	189,693,261	208,683,836	207,688,086
Innovative and Sustainable Natural Resources Development	594,180,420	594,180,420	610,218,394	477,529,144	1,557,282,967	548,425,192	483,259,791	1,498,877,063
Globally Competitive Natural Resource Sectors	572,418,934	572,418,934	425,892,047	573,749,450	638,695,250	685,107,560	561,781,790	595,634,877
Budget Implementation vote – unallocated authorities	0	0	0	0	4,926,991	0	0	0
<b>Subtotal</b>	<b>1,372,169,380</b>	<b>1,372,169,380</b>	<b>1,250,125,689</b>	<b>1,263,260,296</b>	<b>2,432,491,530</b>	<b>1,423,226,013</b>	<b>1,253,725,417</b>	<b>2,302,200,026</b>
Internal Services	122,871,508	122,871,508	128,888,904	130,131,763	155,010,140	143,026,202	149,241,560	152,590,901
<b>Total</b>	<b>1,495,040,888</b>	<b>1,495,040,888</b>	<b>1,379,014,593</b>	<b>1,393,392,059</b>	<b>2,587,501,670</b>	<b>1,566,252,215</b>	<b>1,402,966,977</b>	<b>2,454,790,927</b>

From 2017-18 to 2019-20, expenditures increased mainly as a result of a statutory endowment in 2019-20 to the Federation of Canadian Municipalities for the Green Municipal Fund and due to new or incremental spending for various programs such as the Green Infrastructure envelope and the Clean Growth program. These increases were partially offset by reduced spending in the Federal Infrastructure Initiative as the program was winding down, and lower payments under the Statutory Atlantic Offshore Accords Act.

The 2019-20 planned spending of \$1,495 million increased during the year by \$1,093 million resulting in total authorities available for use of \$2,588 million mainly due to:

A statutory endowment in 2019-20 to the Federation of Canadian Municipalities for the Green Municipal Fund, increases to payments under the Statutory Atlantic Offshore Accords Act, receipt of the operating and capital budget carry forward, and increases for collective bargaining. Additionally, funding was received through Supplementary Estimates and the Budget Implementation Vote mainly for Zero Emission Vehicles, Engaging Indigenous

Communities in Major Resource Projects, Ensuring Better Disaster Management Preparation and Response, and TMX Accommodations.

Of the \$2,588 million total authorities available for use in 2019-20, NRCan spent \$2,455 million. The \$133 million in unspent funding is explained mainly by:

Funding that was not spent in 2019-20 on a number of programs such as the Green Infrastructure envelope, Clean Growth, and Impact Canada as the financial needs of the approved projects didn't align with the current profile of the program, the volume of applications and the complex nature of the projects resulted in due diligence taking longer which resulted in delays in spending, and, towards year-end, the COVID-19 pandemic impacted projects which resulted in projects being paid less in 2019-20 than anticipated. To mitigate the impact on program delivery, much of the unspent funding was carried forward or reprofiled into future years so that funding will be available when needed to support the projects that contribute to departmental objectives.

## Actual human resources

### Human resources summary for core responsibilities and Internal Services

Core responsibilities and Internal Services	2017–18 Actual full-time equivalents	2018–19 Actual full-time equivalents	2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2020–21 Planned full-time equivalents	2021–22 Planned full-time equivalents
Natural Resource Science and Risk Mitigation	1,138	1,223	1,240	1,274	1,226	1,215
Innovative and Sustainable Natural Resources Development	1,524	1,581	1,590	1,645	1,581	1,466
Globally Competitive Natural Resource Sectors	390	407	385	469	436	421
Subtotal	3,052	3,211	3,215	3,388	3,243	3,102
Internal Services	928	960	1,038	993	1,036	1,033
Total	3,980	4,171	4,253	4,381	4,279	4,135

For 2017-18 and 2018-19, the figures represent actual FTEs as reported in Departmental Results Reports. For 2019-20, the planned FTEs are drawn from the 2019-20 Departmental Plan and the 2019-20 actual FTEs reflect the actual FTEs for the year. For 2020-21 and 2021-

22, the figures represent total planned FTEs to support NRCan program activities, as identified in the 2020-21 Departmental Plan.

The increase between 2019-20 planned and actual FTEs is partially explained by the new funding received through Supplementary Estimates and the Budget Implementation Vote as explained in the Budgetary Performance Summary section.

The decrease between 2019-20 Actual FTEs and 2021-22 Planned FTEs is mainly explained by the sunsetting of a number of major initiatives. As new initiatives are undertaken or renewals approved, plans for future FTE requirements will be adjusted accordingly.

## Expenditures by vote

For information on the Natural Resources Canada's organizational voted and statutory expenditures, consult the [Public Accounts of Canada 2019–2020](#).<sup>clxxxiv</sup>

## Government of Canada spending and activities

Information on the alignment of the Natural Resources Canada's spending with the Government of Canada's spending and activities is available in [GC InfoBase](#).<sup>clxxxv</sup>

## Financial statements and financial statements highlights

### Financial statements

Natural Resources Canada's consolidated financial statements (unaudited) for the year ended March 31, 2019, are available on the [departmental website](#).<sup>clxxxvi</sup>

### 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, 2020 (dollars)

Financial information	2019–20 Planned results <sup>*</sup>	2019–20 Actual results	2018–19 Actual results	Difference (2019–20 Actual results minus 2019– 20 Planned results)	Difference (2019–20 Actual results minus 2018– 19 Actual results)
Total expenses	1,582,820,706	1,542,109,099	2,440,808,586	(40,711,607)	(898,699,487)
Total Net revenues	38,277,417	27,606,132	27,543,704	(10,671,285)	62,428
Net cost of operations before government funding and transfers	1,544,543,289	1,514,502,967	2,413,264,882	(30,040,322)	(898,761,915)

\* The 2019-20 Planned Results are derived from the amounts presented in the [2019-20 Future-Oriented Statement of Operations](#)<sup>clxxxii</sup> and included in NRCan's 2019-20 Departmental Plan.

Total NRCan expenses of \$1,542 million in 2019-20 consist of \$788 million in transfer payments, mainly related to industry under Innovative and Sustainable Natural Resources Development and to other levels of government under Globally Competitive Natural Resource Sectors, along with \$754 million in other operating expenses. The NRCan total net revenues of \$28 million in 2019-20 resulted from re-spendable revenues such as those from the Geomatics Canada Revolving Fund.

The decrease of \$899 million in the net cost of operations before government funding and transfers in 2019-20 is mainly explained by:

- Decrease of \$914 million in transfer payments to *Non-profit organizations* mainly due to the 2019 transfer payment of \$950 million to the Federation of Canadian Municipalities' Green Municipal Fund;
- Decrease of \$38 million to *Other levels of Government* mainly in the Statutory Offshore Payments program;
- Offset by an increase of \$31M transfer payments to Individuals and an overall increase of \$23M in the operating expenses.

For the most part, these explanations also account for the decrease of \$30 million to the net cost of operations before government funding and transfers between the planned and actual results.

The chart presenting NRCan's actual expenses by type for 2019-20 is available on the [NRCan website](#).<sup>clxxxviii</sup>



### Condensed Consolidated Statement of Financial Position (unaudited) as of March 31, 2020 (dollars)

Financial information	2019–20	2018–19	Difference (2019–20 minus 2018–19)
Total liabilities	540,602,144	1,536,988,588	(996,386,444)
Total net financial assets	440,598,199	437,494,599	3,103,600
Departmental net debt	100,003,945	1,099,493,989	(999,490,044)
Total non-financial assets	346,536,830	360,303,870	(13,767,040)
Departmental net financial position	246,532,885	(739,190,119)	985,723,004

Total NRCan liabilities of \$541 million include \$408.5 million in accounts payable and accrued liabilities payable. The decrease of \$996 million is mainly related to a 2019 accrual of \$950 million for a transfer payment to the Federation of Canadian Municipalities' Green Municipal Fund, which was paid in 2020.

Total NRCan net financial assets of \$441 million consist of \$418 million of an amount 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 \$347 million consist of \$345 million of tangible capital assets.

The increase of \$986 million in the departmental net financial position, which is the difference between the total non-financial assets and the departmental net debt, is mainly attributable to the decrease in accounts payable and accrued liabilities

## Additional information

### Organizational profile

**Appropriate minister[s]:** The Honourable Seamus O'Regan, P.C., M.P.

**Institutional head:** Jean-François Tremblay

### Ministerial portfolio:

- [Atomic Energy of Canada Limited](#);<sup>clxxxix</sup>
- [National Energy Board](#); <sup>cxc</sup>
- [Canadian Nuclear Safety Commission](#); <sup>cxc i</sup>
- [Canada-Newfoundland and Labrador Offshore Petroleum Board](#); <sup>cxc ii</sup>
- [Canada-Nova Scotia Offshore Petroleum Board](#); <sup>cxc iii</sup>
- [Northern Pipeline Agency](#); <sup>cxc iv</sup> and,
- Energy Supplies Allocation Board (inactive).

### Enabling instrument[s]:

- [Department of Natural Resources Act, S.C. 1994, c. 41](#); <sup>cxc v</sup>
- [Forestry Act, R.S.C., 1985, c. F-30](#); <sup>cxc vi</sup>
- [Resources and Technical Surveys Act, R.S.C., 1985, c. R-7](#); <sup>cxc vii</sup>
- [Energy Efficiency Act, S.C. 1992, c. 36](#); <sup>cxc viii</sup>
- [Extractive Sector Transparency Measure Act, S.C. 2014, s.376](#); <sup>cxc ix</sup> and,
- [Explosives Act, R.S.C., 1985, c. E-17](#).<sup>cc</sup>

**Year of incorporation / commencement:** 1994

**Other:**

### 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 [NRCan's website](#).<sup>cci</sup>

## Reporting framework

NRCan's Departmental Results Framework and Program Inventory of record for 2019–20 are shown below.

Natural Resources Canada's Departmental Results Framework			
NRCan CORE RESPONSIBILITIES			
<p><b>Natural Resource Science and Risk Mitigation</b></p> <p>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.</p>	<p><b>Innovative and Sustainable Natural Resources Development</b></p> <p>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.</p>	<p><b>Globally Competitive Natural Resource Sectors</b></p> <p>Advance and promote market access, inclusiveness and competitiveness for Canada's natural resource sectors, in support of jobs and economic growth.*</p>	<p><b>Internal Services</b></p>
DEPARTMENTAL RESULTS AND INDICATORS			
<p><b>Canadians have access to cutting-edge research to inform decisions on the management of natural resources</b></p> <ul style="list-style-type: none"> <li>Number of times scientific products related to natural resources are accessed by Canadians</li> <li>Percentage of environmental assessment processes for which NRCan provided scientific and technical expertise</li> <li>Number of times stakeholders acknowledge using NRCan's scientific and technical products in making their decisions</li> <li>Number of training and development initiatives that enable NRCan to incorporate Indigenous traditional knowledge in conjunction with NRCan science</li> <li>Quality index of geographic and locational data on Canada's land resources, water and infrastructure</li> </ul> <p><b>Communities and officials have the tools to safeguard Canadians from natural hazards and explosives</b></p> <ul style="list-style-type: none"> <li>Percentage of hazardous natural events within Canada for which a notification was issued in a timely manner</li> <li>Number of enhanced wild fire monitoring tools using remotely sensed information</li> <li>Percentage of inspections of explosives rated safe</li> </ul> <p><b>Communities and industries are adapting to climate change</b></p> <ul style="list-style-type: none"> <li>Percentage of Canadian communities and industries that have taken steps to adapt to climate change</li> <li>Number of times NRCan products and expertise on adaptation are accessed by communities and industry</li> </ul>	<p><b>Natural resource sectors are innovative</b></p> <ul style="list-style-type: none"> <li>Percentage of NRCan-funded innovation projects that result in new intellectual property, standards or regulations</li> <li>Percentage of NRCan-funded clean energy innovation projects advancing along the innovation scale</li> <li>Number of NRCan-funded green mining technologies, including waste and water management, proven through demonstrations</li> <li>Number of new forestry products developed that are informed by NRCan tools and knowledge</li> </ul> <p><b>Clean technologies and energy efficiencies enhance economic performance</b></p> <ul style="list-style-type: none"> <li>Success of NRCan-funded clean technology demonstrations in terms of economic performance</li> <li>Ratio of leveraged investments in energy innovation projects funded by NRCan</li> <li>Total annual energy savings resulting from adoption of energy efficiency codes, standards and practices</li> </ul> <p><b>Canada's natural resources are sustainable</b></p> <ul style="list-style-type: none"> <li>Percentage of Canadian electricity generated from non-GHG emitting sources</li> <li>Number of renewable energy projects in remote communities and off-grid industrial operations</li> <li>Amount of wood harvested compared to the sustainable supply</li> <li>Change in greenhouse gas emissions resulting from NRCan-funded clean technology demonstrations</li> <li>Number of low-carbon recharging and refueling stations under development or completed</li> <li>Number of policies and initiatives developed collaboratively with Indigenous groups and communities</li> </ul>	<p><b>Access to new and priority markets for Canada's natural resources is enhanced</b></p> <ul style="list-style-type: none"> <li>Canada's share of U.S. and global imports of natural resources</li> <li>Number of Canadian-owned resource companies operating abroad</li> <li>Number of NRCan international engagements that support the development or expansion of trade and investment in natural resources</li> <li>Average number of companies, provinces/territories and Indigenous leaders participating in trade and promotion missions</li> </ul> <p><b>Canadians are engaged in the future of the new and inclusive resource economy</b></p> <ul style="list-style-type: none"> <li>Percentage of policy, regulatory and legislative changes with formal mechanisms for broad public engagement</li> <li>Number of joint analytical products with provinces and territories</li> <li>Number of Indigenous groups and communities implicated in economic development projects</li> </ul> <p><b>Enhanced competitiveness of Canada's natural resource sectors</b></p> <ul style="list-style-type: none"> <li>Percentage of resource development project decisions on target as per timelines</li> <li>Number of times NRCan's economic and investment data are accessed</li> </ul>	
PROGRAM INVENTORY			
<p>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 Post Risk Management Forest Climate Change Climate Change Adaptation Explosives Safety and Security Geoscience to Keep Canada Safe Wildfire Risk Management Polar Continental Shelf program</p>	<p>Clean Energy Technology Policy, Research and Engagement Clean Growth in Natural Resource Sectors Energy Innovation Program 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</p>	<p>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 Major Projects Management Office Initiative Science and Technology Internship Program</p>	<p>* Also includes statutory payments for offshore petroleum.</p>

## Supporting information on the program inventory

Financial, human resources and performance information for NRCan's Program Inventory is available in [GC InfoBase](#).<sup>ccii</sup>

## Supplementary information tables

The following supplementary information tables are available on NRCan's website:

- ▶ [Departmental Sustainable Development Strategy](#);<sup>cciii</sup>
- ▶ [Details on transfer payment programs of \\$5 million or more](#);<sup>cciv</sup>
- ▶ [Gender-based analysis plus](#);<sup>ccv</sup>
- ▶ [Horizontal initiatives](#);<sup>ccvi</sup>
- ▶ [Response to parliamentary committees and external audits](#);<sup>ccvii</sup> and,
- ▶ [Up-front multi-year funding](#).<sup>ccviii</sup>

## **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](#).<sup>ccix</sup> This report also provides detailed background information on tax expenditures, including descriptions, objectives, historical information and references to related federal spending programs. The tax measures presented in this report are the responsibility of the Minister of Finance.

## **Organizational contact information**

Natural Resources Canada  
580 Booth Street  
Ottawa, Ontario  
K1A 0E4  
Canada

## 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 in order 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+)** (analyse comparative entre les sexes plus [ACS+])

An analytical process used to assess how diverse groups of women, men and gender-diverse people experience policies, programs and services based on multiple factors including race ethnicity, religion, age, and mental or physical disability.

**government-wide priorities** (priorités pangouvernementales)

For the purpose of the 2019–20 Departmental Results Report, those high-level themes outlining the government's agenda in the 2019 Speech from the Throne, namely: Fighting climate change; Strengthening the Middle Class; Walking the road of reconciliation; Keeping Canadians safe and healthy; and Positioning Canada for success in an uncertain world.

**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.

## ENDNOTES

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