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DEPARTMENT OF NATIONAL DEFENCE AND CANADIAN ARMED FORCES

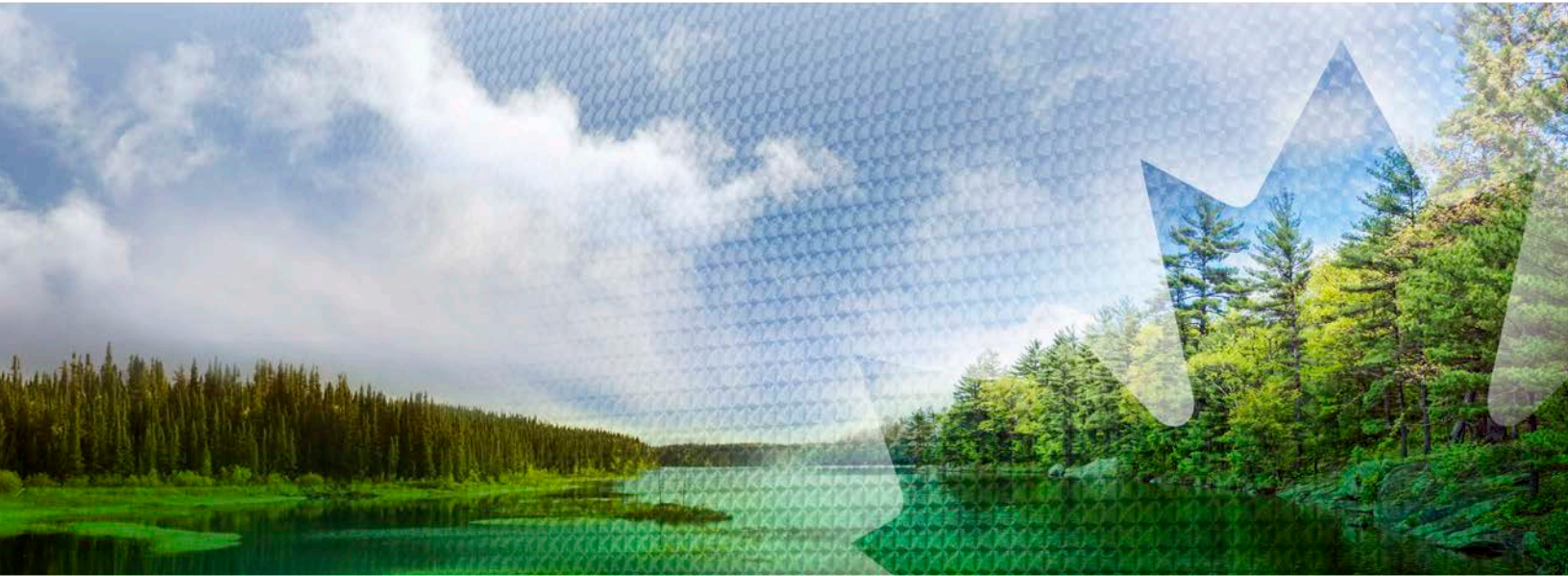


CANADIAN
ARMED FORCES

DEFENCE ENERGY AND ENVIRONMENT STRATEGY

Harnessing energy efficiency and sustainability:
Defence and the road to the future

2020–2023



**STRONG
SECURE
ENGAGED**

Canada 

CONTENTS

Message from the Ministeriii

1. Introduction 1

 1.1 The future of Canada’s military..... 1

 1.2 The role of Defence in energy and environmental management..... 1

 1.3 Engagement of Indigenous peoples 2

 1.4 Achieving the vision 3

2. Energy efficiency 7

 2.1 Focus on energy..... 7

 2.2 Improving the energy efficiency of bases and wings 7

 2.3 Modernizing the commercial light-duty vehicle fleet..... 11

 2.4 Implementing innovative energy solutions for military activities and operations..... 11

3. Climate change..... 15

 3.1 Climate Change Adaptation 15

4. Sustainable real property 17

 4.1 Managing contaminated sites 17

 4.2 Managing training areas..... 17

 4.3 Protecting flora and fauna 18

 4.4 Managing hazardous substances 20

 4.5 Waste Management 20

 4.6 Reducing the environmental footprint of the infrastructure portfolio..... 21

5. Green procurement..... 23

 5.1 Sustainable packaging 23

6. Sustainability going forward..... 25

Commitments for the Department of National Defence and Canadian Armed Forces 26



Photo: Leading Seaman Erica Seymour, 4 Wing Imaging

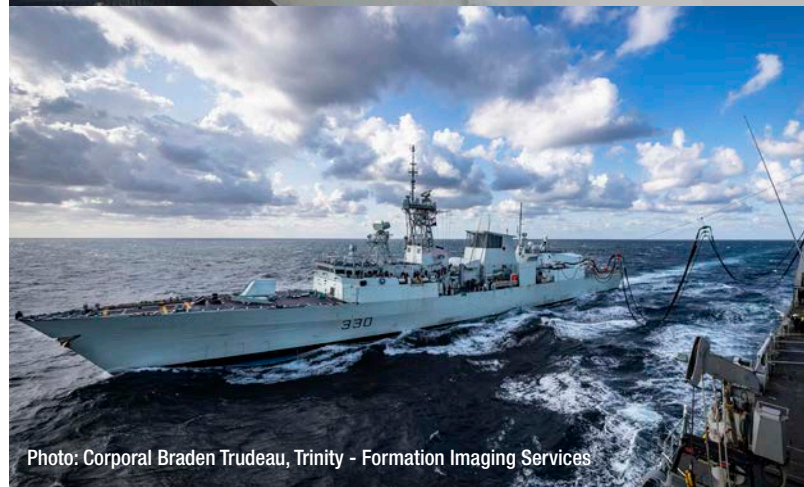


Photo: Corporal Braden Trudeau, Trinity - Formation Imaging Services



Photo: Aviator Melissa Gloude, Garrison Imaging Petawawa

MESSAGE FROM THE MINISTER



I am pleased to present an update to the Defence Energy and Environment Strategy (DEES). The DEES outlines our ongoing commitment to implement Government of Canada (GoC) commitments under the Federal Sustainable Development Strategy (FSDS), the Greening Government Strategy (GGS), the Pan-Canadian Framework on Clean Growth and Climate Change (PCF) and reconciliation with Indigenous peoples. The strategy acknowledges international agreements such as the 2030 United Nations Agenda for Sustainable Development and the United Nations Declaration on the Rights of Indigenous Peoples.

Since 2017, the Defence Team has made significant progress towards greening the organization. Ongoing investments in green technologies and innovative approaches to managing our business are helping us meet our sustainability commitments and will leave a healthier environment for future generations to enjoy. This strategy will continue to guide the Department of National Defence (DND) and the Canadian Armed Forces (CAF) in achieving sustainability in energy and environmental management.

With the path set in Canada's defence policy, *Strong, Secure, Engaged*, we are as committed as ever to reducing our greenhouse gas (GHG) emissions while remaining operationally effective. We will do our part to support the GoC goal of net-zero GHG emissions by 2050. By 2025, DND has committed to reducing our GHG emissions from buildings and commercial light-duty vehicles by 40 percent from 2005 levels – this is five full years ahead of our initial target of 2030. We continue to focus on four key goals: improving energy efficiency, integrating climate change adaptation into our programs, maintaining sustainable real property, and strengthening DND's green procurement processes.

With this document, we join our allies in finding innovative ways to support operational success, while respecting Canadians' right to a safe and clean environment. We are committed to responsible environmental stewardship at home and on deployed operations. The challenge is great, but our resolve is greater.

The Honourable Harjit S. Sajjan, PC, OMM, MSM, CD, MP



Photo: Corporal Djalma Vuong-De Ramos

1. INTRODUCTION

1.1 THE FUTURE OF CANADA'S MILITARY

Canada's defence policy, *Strong, Secure, Engaged* (SSE) sets out the vision for the Canadian Armed Forces (CAF). To deliver on this vision, Defence is transforming to become more modern, agile, and better equipped to respond to 21st century challenges, such as terrorism, climate change impacts, and vulnerabilities in the space and cyber domains. This transformation also presents a unique opportunity for Defence to build on our long history of environmental stewardship, while greening the way we operate.

SSE initiative 101 and 102 reflect commitments for the responsible management of energy, lands and infrastructure, and greenhouse gas (GHG) emissions to meet government greening targets. Military operations and environmental protection and stewardship are not mutually exclusive. Minimizing the environmental impact of Defence activities is necessary for operational success, whether at home or abroad.

1.2 THE ROLE OF DEFENCE IN ENERGY AND ENVIRONMENTAL MANAGEMENT

The Defence Energy and Environment Strategy (DEES) provides the department with renewed direction to evolve as an environmentally sustainable organization, better manage our energy use and minimize our environmental footprint across a broad spectrum of activities. The DEES aligns Defence, where appropriate, with Canadian and United Nations direction on sustainable development.

Defence is among the federal government's largest employers and maintainers of equipment and real property in Canada. The Royal Canadian Navy (RCN), Canadian Army (CA) and Royal Canadian Air Force (RCAF) operate and train over large areas of sea, land, and airspace. In Canada alone, Defence is entrusted with managing approximately 2.1 million hectares of land and 20,000 buildings. We have a responsibility to show leadership in environmental and energy sustainability, and an obligation to manage our assets and operations efficiently.



Photo: Corporal Ken Beliwicz

SUSTAINABLE DEVELOPMENT GOALS TO TRANSFORM THE WORLD

Defence's contribution to the Government of Canada's Federal Sustainable Development Strategy includes activities that support the United Nations' 2030 Agenda for Sustainable Development and the 17 sustainable development goals applicable to all nations.

SUSTAINABLE DEVELOPMENT GOALS



The Drummers and Dancers of Kitigan Zibi, Rapid Lake, Pikwaknigan and Atikamekw perform during Fortissimo 2019 on Parliament Hill in Ottawa, Ontario, July 18th, 2019.

Photo: Ordinary Seaman Alexandra Proulx
Director of Army Public Affairs © 2019 DND-MDN Canada

1.3 ENGAGEMENT OF INDIGENOUS PEOPLES

The Government of Canada (GoC) is committed to advancing reconciliation and renewing its relationship with Indigenous peoples based on recognition of rights, respect, cooperation and partnership. In support of whole-of-government commitments and the United Nations Declaration on the Rights of Indigenous Peoples, Defence will fulfill commitments reflected in statutes, negotiated agreements and treaties, court decisions and policies through meaningful engagement with Indigenous groups in the early planning stages of its operations. We will engage, collaborate or partner with Indigenous groups on a range of operational and policy matters, including environmental remediation, land access, consultation, procurement, and major construction projects.

We are committed to promoting Indigenous economic development through a number of different GoC mechanisms that provide benefits to Indigenous people, businesses, and communities through procurement. Defence will support Public Services and Procurement Canada's (PSPC) commitment for all departments to have at least 5% of federal contracts awarded to businesses managed and led by Indigenous Peoples. We will consider Indigenous businesses in all areas of green procurement including when purchasing clean electricity or developing energy performance contracts, whenever capacity and capability allow.

ASPIRATIONAL GOALS UNDER FEDERAL SUSTAINABLE DEVELOPMENT STRATEGY 2019-2022

-  Effective action on climate change
-  Healthy coasts and oceans
-  Clean drinking water
-  Greening government
-  Pristine lakes and rivers
-  Sustainable food
-  Clean growth
-  Sustainably managed lands and forests
-  Connecting Canadians with nature
-  Modern and resilient infrastructure
-  Healthy wildlife populations
-  Safe and healthy communities
-  Clean energy











1.4 ACHIEVING THE VISION

THE ROAD TRAVELLED

Defence tabled its first DEES in October 2017 in keeping with the Federal Sustainable Development Strategy

(FSDS) goals to which we contribute, as well as the greening initiatives laid out in *Strong, Secure, Engaged*.

As of 2019-2020, DND had fulfilled 82% of the commitments in the first DEES. Below are some highlights of the energy and environment achievements over the past year. For more information on the department's plans, priorities, and results achieved, see our [Departmental Results Report](#).

DEES TARGET		2019-2020
	By 2030, reduce GHG emissions in DND buildings and commercial vehicle fleet by 40%	On track
	Invest \$225 million by 2020 in a wide range of infrastructure projects across Canada to reduce DND's carbon footprint	✓
	Designate energy managers at all bases and wings by 2019	✓
	Pursue opportunities to use clean power at all bases and wings by 2025	On track
	Require new construction and major recapitalization projects to meet industry-recognized standards for high performing buildings	✓
	Achieve an EnerGuide energy performance standard for all new or recapitalized residential housing units by 2020	✓
	Ensure 30% of DND light-duty vehicle fleet runs on hybrid, plug-in hybrid and/or electric technology , where suitable for operational needs, by 2020	✓
	Reduce DND's contaminated sites liability by 7% per year	✓
	Assess the environmental risk of all small arms ranges by 2019 to recommend modern range designs options and the sustainable use of range and training areas	✓
	Complete source water vulnerability assessments on all sites where DND supplies its own drinking water by 2020	✓

NET-ZERO

To help the GoC reduce GHG emissions, we have implemented energy performance contracts, designated energy managers at all bases and wings across the country, purchased clean power, greened our commercial light-duty vehicle fleet, and invested in energy efficient buildings and upgrades to existing facilities. As of 2019-20, Defence had reduced GHG emissions from our buildings and non-military vehicles by about 31% from 2005 levels.

THE ROAD AHEAD

Delivering on the Defence mission depends on sound energy management, the resilience of key infrastructure to climate change, meeting environmental regulatory requirements, and sustainably managing lands and resources to keep our communities safe and healthy. Contributing to Canada's sustainable development goals by integrating energy and environmental considerations into Defence's business processes and by using policy tools such as strategic environmental assessments and gender-based analysis will help us deliver on our mission.

The 2020-2023 DEES provides a framework for managing energy and environmental activities that support a sustainable and modern military. The DEES reinforces energy- and environmentally-conscious behaviour among Defence

personnel, and ensures sustainability and energy efficiency are factored into our decision making. The DEES aims to achieve three objectives:

1. Less energy waste and cleaner energy: Reduce the energy demand for Defence by ensuring systems and processes are in place to measure performance; increase energy efficiency and conservation measures in all aspects of Defence business; and move to lower-emission and more sustainable energy sources, such as hydro, wind and solar.
2. Reduce climate change risks: Assess the risk to Defence programs, critical infrastructure, operational and non-operational activities, and training to ensure we are ready to adapt to the changing climate.
3. Reduce Defence environmental footprint: Reduce impacts to land, air and water from the infrastructure portfolio, commercial and operational fleets, and equipment.

To achieve these objectives, Defence has committed to 16 targets in the 2020-2023 DEES with activities grouped into four themes:

1. Energy efficiency;
2. Climate change;
3. Sustainable real property; and,
4. Green procurement.

These themes and activities complement existing energy and environmental programs and projects and will guide Defence in improving our sustainability, energy and environmental performance.



Photo: Master Corporal Gabrielle DesRochers, Canadian Forces Combat Camera

DEFENCE ENERGY AND ENVIRONMENT STRATEGY













THEMES	ACTIVITIES					
ENERGY EFFICIENCY	 Focus on energy	 Energy efficiency	 Commercial fleet	 Military activities and operations		
CLIMATE CHANGE	 Adaptation					
SUSTAINABLE REAL PROPERTY	 Contaminated sites	 Training areas	 Flora and fauna	 Hazardous materials	 Waste	 Instructure footprint
GREEN PROCUREMENT	 Sustainable packaging					





Photo: Corporal Myki Poirier-Joyal, St. Jean/Montreal Imagery Section

2. ENERGY EFFICIENCY



2.1 FOCUS ON ENERGY

Defence capability is dependent on energy to fuel the fleets and equipment of the Canadian Armed Forces. It provides soldiers with portable power and sustains military camps, some of which are located in difficult or extreme environments that draw heavily on energy resources. Defence also operates and maintains an extensive range of infrastructure across the country, extending as far north as the High Arctic. Having access to reliable, affordable energy, when and where it is needed, is necessary to ensure Defence capability, operational readiness, sustainability, and responsiveness by the Defence Team to deliver on its mandate.

As the largest user of energy and the single largest emitter of GHGs in the federal government, Defence has a key role to play in helping the GoC reach its net-zero targets. The DEES provides the strategic direction to help the Defence Team consider energy and environmental factors in all areas of our business. Defence will play a leadership role in reducing GHG emissions from its infrastructure and commercial light-duty vehicle fleets, where feasible, with a commitment to reduce these emissions by 40% (below 2005 levels) by 2025 and to achieve net-zero emissions by 2050.

While GHG reduction opportunities exist within all aspects of the operational portfolio, reducing emissions from military fleets and operations are more challenging. Reliable low-carbon and renewable fuels are not yet broadly available to power the essential military equipment Defence needs. In support of the net zero objective, Defence will continue to report these emissions, and support innovative approaches to increase energy efficiency and reduce GHG emissions from military activities without compromising capabilities or operations.

TARGET 1

Reduce greenhouse gas emissions by 40% below 2005 levels by 2025¹ and achieve net-zero emissions by 2050

¹ Targeting emissions from infrastructure and commercial light-duty fleet



2.2 IMPROVING THE ENERGY EFFICIENCY OF BASES AND WINGS

IMPLEMENTING AN ENERGY FRAMEWORK

Defence has energy managers who identify, implement, and maintain efficiency measures for all bases and wings. Energy managers are the local energy champions and technical experts that integrate energy-engineering principles into base operations to increase the efficiency and sustainability of our infrastructure. Moving forward, an operational-level energy framework will integrate strategic energy programs, goals, and priorities, and guide the development of regional-level energy management plans. The framework, and subsequent plans, will provide an effective communication and planning tool for initiatives at the local, regional and national levels. Investing in building metering will be key to reporting on the impact of base/wing-level energy plans.

SMART BUILDING PILOT PROJECT

In 2017, Defence and the National Research Council launched a pilot project to install smart building technology at five CAF facilities. The equipment measures the energy consumption of various building systems including lighting, electrical, heating, cooling, and the energy efficiency of the building envelope. The data collected is used to increase building performance and achieve energy and operational efficiency.

CLEAN ENERGY PROCUREMENT

Buying clean power from regional grids can be a very cost-effective way to reduce GHG emissions from our buildings. Buying electricity from renewable sources also supports investments in green infrastructure and clean technology, and promotes innovation in the natural resources sector. Defence is committed to purchasing clean power as it becomes available.

In 2019-20, 74% of all electricity used to power our bases and wings in provinces with carbon-intensive electrical grids² came from clean sources. About 10% of DND's 31% reduction in GHG emissions comes from purchasing clean electricity for defence facilities in Alberta alone. This bulk electricity contract provides green or renewable energy for 90% of our electricity needs in the province.

We will continue to invest in renewable energy contracts to meet the government's target of using 100% clean electricity at all federal facilities by 2022, where available. We are also working with other federal departments to purchase clean electricity from new sources, like solar power, to run our bases in Alberta and New Brunswick.

² Alberta, Nova Scotia, New Brunswick, Saskatchewan, and Ontario

Renewable energy sources such as wind, solar, geothermal, synthetic fuels and other energy alternatives, will continue to evolve and offer more energy options, diversify the energy supply, increase the security of the fuel supply chain, and help reduce GHG emissions. Defence will be developing low-emission electrical micro-grids at select installations in the High Arctic. These micro-grids will reduce our GHG emissions in the Arctic while significantly reducing our reliance on fossil fuel in the North.

TARGET 2

Use 100% clean electricity by 2022, where available, and by 2025 at the latest by producing or purchasing renewable electricity



Photo: DRDC/CanmetENERGY

REDUCING RELIANCE ON DIESEL FUEL GENERATED POWER

Electricity and space heating in the Canadian Subarctic and High Arctic is currently produced almost exclusively with diesel-fired generators. Through our IDEaS challenge, Defence is looking to reduce fuel-generated electricity in the North to minimize operational, logistical, and environmental burdens. The challenge is to create ruggedized wind turbines that are able to withstand the harsh Arctic climate to reduce our reliance on diesel fuel for power.



ENERGY PERFORMANCE CONTRACTS

The energy sector is changing rapidly. New and emerging technologies, innovations and partnerships create opportunities that were previously unthinkable. Implementing energy performance contracts (EPCs) at our bases minimizes up-front costs to the taxpayer, and guarantees that the upgrades produce real savings.

Through an EPC, a company is hired to pay for and carry out an energy retrofit project at a base or wing. The money saved in energy costs is then used to pay the company back over a 5- to 15-year period. As of March 2020, Defence had implemented 11 EPCs on bases and wings across Canada and more are planned. Defence's intent is to assess all eligible bases and wings to determine where EPCs would be of benefit.

We are currently working on an EPC at CFS Alert, where building upgrades could see a more than 40% reduction in heating fuel consumption leading to significant reductions in GHG emissions. This is especially important for a facility like Alert, which relies on fuel being transported in to generate energy.

LEVERAGING GREEN PARTNERSHIPS

Our energy performance contracts are on track to reduce annual GHG emissions by 22,209 tonnes of CO₂ equivalent, and save about \$5.7 million in annual energy costs. Energy performance contracts are being implemented at base Petawawa, Bagotville, Greenwood, Valcartier and Esquimalt.

TARGET 3

Assess 75% of eligible bases or wings for an EPC and move 50% to the implementation phase by 2023

GREEN BUILDINGS

Defence is committed to contributing to the GoC's targets for GHG reductions, climate change adaptation, and infrastructure resilience and sustainability, by integrating these concepts when designing, building, and renovating Defence's facilities. We are supporting the National Research Council to develop updated building codes that incorporate resilience to the potential impacts from climate change. We are also updating our Green Building Directive to reduce GHG emissions and ensure delivery of modern sustainable buildings in the Defence portfolio. The Green Building Directive will provide guidance and targets for non-fossil fuel heating sources, smart building controls, reducing energy loss, minimizing construction, renovation and demolition waste, and building to the latest industry standards for green construction, such as LEED Silver or Three Green Globes.

Preventative maintenance is an important activity to ensure we continue to see energy reductions in our buildings over time. Facility and equipment maintenance ensures energy savings from net-zero construction and energy performance contracts are not lost. Preventative maintenance also helps infrastructure withstand the impacts of climate change, such as extreme weather events and natural disasters.

TARGET 4

Revise the Green Building Directive to include construction, renovation and demolition waste, net-zero, and available industry standards on embedded carbon requirements by 2021

Green building and energy efficiency are also an important part of the Canadian Forces Housing Agency's (CFHA) business. Housing renovations typically include the replacement of all systems as well as upgrades to insulation and other components that improve the overall energy efficiency of homes. These changes improve the energy efficiency of Defence housing across Canada and ensure our military families have comfortable, contemporary homes with lower monthly utility costs.

From 2017-2020, the CFHA assessed all new construction and whole house renovations using Natural Resource Canada's EnerGuide for Houses (EGH) program. CFHA's assessments confirmed that these renovations are consistently reducing the overall energy consumption of the housing portfolio. CFHA will continue to use this assessment tool to improve the energy efficiency of military housing. The CFHA will also develop net-zero carbon-ready designs for 2 of its residential housing models by 2023. A net-zero carbon ready building is a highly efficient structure that produces or buys carbon-free renewable energy that off-sets the carbon emissions associated with its annual operation. Residential housing models or styles include multi-unit residential buildings up to 12 units, single home, semi-detached, and row houses.

TARGET 5

Develop net-zero carbon ready designs for 2 residential building archetypes by 2023



CFHA ENERGY ASSESSMENTS

Assessments were completed at base Borden, Greenwood, and Comox for various types of residential housing units originally constructed between 1950 and 1960. Following whole house renovations, they were assessed as performing better than comparable newly-constructed homes in Canada.

14 WING GREENWOOD

Whole house renovations reduced energy consumption by 21 GJ a year which is equivalent to 42 BBQ propane tanks.



Photo: Corporal Francis Lambert, CFB Valcartier



2.3 MODERNIZING THE COMMERCIAL LIGHT-DUTY VEHICLE FLEET

Defence has adopted an aggressive approach to reducing GHG emissions from our commercial light-duty vehicle fleet. As of 2019-20, 33% of Defence’s commercial light-duty fleet were hybrid, plug-in hybrid and zero-emission vehicles, and 84% of new purchases were green vehicles. We are continuing to look for opportunities to replace our vehicle fleet with greener options. A second wave of green vehicle procurement is planned. All new commercial light-duty vehicle purchases will be green vehicles where the option is available and operationally feasible. Defence will continue to examine other green solutions, such as converting internal-combustion engines to plug-in hybrid, tracking the performance of our vehicles and testing hydrogen vehicles. We are currently testing a hydrogen vehicle at CFB Valcartier in collaboration with Natural Resources Canada (NRCan). To support the new fleet of zero-emission vehicles, we will continue to install electric charging stations at our buildings.

TARGET 6
100% of DND commercial light-duty vehicle fleet purchases will be zero-emission vehicles (ZEVs) or hybrid when available, with a ZEV procurement target of 50% by 2023



2.4 IMPLEMENTING INNOVATIVE ENERGY SOLUTIONS FOR MILITARY ACTIVITIES AND OPERATIONS

USING CLEANER FUELS FOR THE MILITARY FLEET

Fuel to power the CAF is necessary to ensure national safety and security for Canadians. Defence recognizes the requirement to power our forces should be done as sustainably as possible without impacting safety and security.

PROMOTING ENERGY CONSERVATION THROUGH AWARENESS AND TRAINING

Defence reduces overall energy use during military activities and operations by increasing awareness of green practices among personnel through training. Energy efficiency best practices are incorporated in internal processes and decision making at all leadership levels. Management is responsible for communicating and engaging with personnel so that energy is valued as a key strategic capability that enables operational readiness and lowers operational risks.



Photo: Master Corporal Louis Brunet, Bagotville Imagery Section

Defence is working with other government departments to support efforts to create a sustainable aviation fuel supply chain in Canada. This supply chain could provide alternative fuel blends that meet military fuel standards, and are cost-competitive for use in the military fleet. Defence will consider using blends of sustainable fuels that meet military technical requirements and North Atlantic Treaty Organization (NATO) standards, when they are available and affordable. These standards allow us to maintain interoperability with allies, while increasing fuel security and military fleet resilience.

Defence continues to support NRCan's *Sky's the Limit Challenge* that encourages industry to develop a sustainable aviation fuel supply that could use existing fuel infrastructure without any equipment modifications. Until the fuel supply chain is ready, the RCAF will continue to prepare for the potential use of sustainable aviation fuels. This includes developing a strategy for aviation fuels that supports the government's goal of achieving net-zero GHG emissions by 2050. As a first step, the RCAF will modernize its aviation fuel tracking system to assess fuel use throughout the fleet.

Energy efficiency improvements will also be carried out on the water. The RCN will optimize energy performance of its fleet through data analysis, and testing energy efficient technologies and processes. In the short term, the RCN will monitor energy consumption for the in-service fleet and measure improvements. Defence will adopt a forward-looking approach to identify and trial emerging energy-efficient technologies that could have a significant impact on the performance of the marine fleet.

TARGET 7

Develop a strategy for aviation fuels that supports the Government of Canada's goal of achieving net-zero GHG emissions by 2050

TARGET 8

Complete baseline energy and fuel usage evaluations for select marine vessels by 2023

DESIGNING MORE EFFICIENT SOLDIER EQUIPMENT AND KITS

Defence is studying options to improve the energy efficiency of soldier equipment and kits that also improve a soldiers' ability to operate. Studies are underway to improve power management and wearable power sources that are needed to minimize the overall volume and weight burden for soldiers while enhancing their operational capability.

PROVIDING MORE EFFICIENT POWER SOLUTIONS FOR OPERATIONS

Deployed forces must sustain themselves in harsh environments for extended periods of time. There are also ever increasing costs and risks associated with securing traditional resources, such as fuel and water for these types of camps. This requires modern, energy efficient, flexible and scalable deployable camp infrastructure and utilities that minimize logistical demands and footprint. Defence is continuing to explore the potential for energy efficiency improvements during major deployed operations including using analytical tools to design more efficient camps. The new *Camp Sustain* equipment project will replace Defence's aging and inefficient deployable camp equipment and ensure future operations have modern and efficient equipment. Alternative energy sources, such as wind and solar power, or shifting to host nation power, will be investigated to reduce our dependency on fossil fuels. We are also engaged in partnerships with NRCan, the NATO Science for Peace and Security program, and NATO Energy Security Centre of Excellence to help monitor and manage operational energy use.



Photo: Sgt Yannick Bédard, Canadian Forces Combat Camera

TARGET 9

Achieve an energy efficiency of 85% for fossil-fuel electrical generation and distribution utilities in major deployed camps by 2023

THE "POP-UP CITY" CONTEST

The CAF must be ready to deploy on short notice, in any climate and for long periods of time. The CAF relies on relocatable temporary camps for its deployments to sustain personnel in demanding operational and environmental conditions. The Pop-up City Contest is a multi-phased contest for innovators to propose and develop reliable, energy efficient, integrated and scalable energy, water and waste management systems for deployed military camps in national and international operations.



Photo: Corporal Myki Poirier-Joyal, St. Jean/Montreal Imagery Section



Photo: Master Corporal VanPutten, 3 CSDB Imaging

3. CLIMATE CHANGE

Climate change threatens to disrupt the lives and livelihoods of millions of people around the world. Operationally, climate change has emerged as a threat multiplier that knows no borders, potentially affecting the frequency, scale, and complexity of our future missions. It can also undermine the capacity of our infrastructure and training areas to support our readiness activities. The effects of climate change are contributing to the complexity of the global security environment.

The Arctic region is an important international crossroads where issues of climate change, international trade, and global security meet. Climate change has led to more widespread sea-ice-free conditions in the Arctic and Atlantic Oceans. Combined with technology advancements, these conditions are leading to a rise of activity in the Arctic that increases safety and security demands.

Climate change is affecting the frequency, duration and intensity of many climate-related hazards and disasters at home and around the world, such as floods, wildfires, droughts and extreme weather events that threaten the safety of Canadians and infrastructure. Defence must maintain the capacity to respond to a range of emergencies, including engaging in rapid disaster response and contributing to effective search and rescue operations when needed.



3.1 CLIMATE CHANGE ADAPTATION

Given the impacts a changing climate can have on infrastructure, operations and the safety of our personnel, Defence will take action to mitigate these risks. Proper management and maintenance of infrastructure, whether it be the bases and installations where the military trains and executes its missions, or the vast support network required to maintain and operate equipment and housing for our military families, is necessary to ensure resilience to the changing climate.

Defence will anticipate and better understand the impacts of climate change by reviewing existing policy and practice across the department and CAF, and identifying key areas where climate change can have an impact. Once identified, climate change adaptation measures will be included in key policies and practices.



Photo: Leading Seaman Peter Frew, Formation

TARGET 10

Develop an adaptation risk assessment framework and assess DND programs as well as priority-based critical infrastructure by 2023

TARGET 11

Assess the impacts of climate change on RCN, CA and RCAF activities by 2023



Photo: Master Corporal Gerald Cormier, 3rd Canadian Division Public Affairs

4. SUSTAINABLE REAL PROPERTY



4.1 MANAGING CONTAMINATED SITES

Defence manages its contaminated sites consistent with Treasury Board policy, by prioritizing sites based on human health and environmental risks using approved criteria, developing and implementing management strategies, executing projects, and reporting on results. Restoring lands impacted by past practices helps us understand and avoid such impacts in the future. We have made steady progress and in 2019-20, we reduced our contaminated sites liability by 16%. Defence will continue to leverage the Federal Contaminated Sites Action Plan to clean up contaminated sites to reduce its environmental liability related to real property.

TARGET 12

Reduce DND's contaminated sites liability by an average of 10% per year by 2023



4.2 MANAGING TRAINING AREAS

Training and readiness exercises are necessary for a combat-ready force at sea, on land, and in the air. While ensuring our training areas are effective for preparing our forces, Defence understands that they also need to be managed sustainably.

The CA has made significant strides in assessing and monitoring the sustainability of land-based ranges and training areas. To date, the CA has assessed all of the small arms classification ranges identified within the Canadian Forces Range Information System to evaluate how natural conditions at each range location will impact the ability of lead and other metals to migrate in the environment. This type of information will allow the CAF to make informed sustainable decisions regarding range design and range management. The CA also uses the Range and Training Area Sustainment System (RTASS) to assess the environmental impacts of its range activities and to select, monitor and report on site-specific indicators of range sustainability.

VALCARTIER RESEARCH CENTRE CLEANUP

The Valcartier Research Centre provides the Canadian Armed Forces with scientific and technical services. Three dumpsites operated on the site from 1960 to 1990. In 2020, Defence completed a remediation project that removed more than 25,000 m³ of waste from one of the dumpsites and converted it into a retention pond. The other dumpsites were properly shaped and covered with impermeable membranes and clean soils. In addition to reducing contamination, the project will save over 160 tonnes of GHG emissions by minimizing waste transport and due to the carbon-sink effect of the new retention pond and wetland on the site.



The RCN's Atlantic and Pacific operational range and training areas are paramount to Defence's ability to maintain a combat-ready force at sea. These areas are home to several marine species-at-risk, as well as critical marine habitat and protected areas. Defence will continue to assess, manage, monitor and minimize the environmental effects of military training and testing within our maritime range and training areas. Comprehensive maritime range and training area management plans will outline key activities undertaken in the maritime ranges, including baseline information, identification and implementation of monitoring objectives and additional research requirements. The RCN will collaborate with other federal partners to carry out activities in a way that meets national conservation objectives.



Photo: Able Seaman Camden Scott, Directorate of Army Public Affairs

CUTLASS FURY 19 – MINIMIZING IMPACTS IN TRAINING AREAS

The RCN collaborates with NATO allies to conduct international exercises in marine locations throughout the world. The RCN hosts the CUTLASS FURY exercise every two years in the North Atlantic Ocean. Environmental and species considerations helped shape the locations for this exercise. The RCN worked with other government departments to avoid known locations of marine mammal and turtle species, including the endangered North Atlantic Right Whale.



4.3 PROTECTING FLORA AND FAUNA

Defence administers large tracts of land across Canada that provide habitat for many species of flora and fauna, including those considered endangered or at risk. Through numerous studies and surveys, Defence maintains a solid understanding of the flora and fauna on Defence establishments. It considers this information together with relevant federal regulations when planning military training, developing land use plans, and maintaining training areas to avoid or minimize impacts. Defence is centralizing information that was previously maintained at individual Defence establishments into a national geographic information system to enable national planning that will reduce or avoid impacts of Defence activities on the environment.

Defence works with federal partners to develop national recovery documents that outline the status of species and potential threats. Defence develops species-at-risk work plans for each Defence establishment that outline measures we will take to protect species and their habitat. From 2017 to 2020, DND developed work plans for the majority of land-based establishments with at least one species-at-risk on site.

In 2019, DND, ECCC, and the Province of Manitoba designated CFB Shilo as the first Defence establishment recognized in Canada as an “other effective area-based conservation measure” (OECM). This supports the government of Canada's commitment to conserve at least 17% of terrestrial areas and inland waters, and 10% of marine

CONTROLLING AQUATIC INVASIVE SPECIES

Defence is working with the Department of Fisheries and Oceans to perform case studies on the potential risks from invasive species. Sensor data from the Halifax Class of ships is being used to analyze performance impacts due to hull fouling. This information is used to develop strategies to mitigate impacts of aquatic invasive species to protect Canada's marine biodiversity. Managing hull fouling also supports fuel efficiency and emissions targets by improving the hydrodynamic profile of our fleets.



waters by 2020 through a network of protected areas and OECMs. OECMs are areas that are being used for a specific purpose, such as our military lands and waters, but that have a secondary goal of conserving biodiversity. Recognizing an area as an OECM is voluntary. Defence bases and wings often have conditions that promote high biodiversity because of their size, location, and management practices. We will continue to work with ECCC to consider other Defence establishments for OECM recognition where compatible with current and planned military land use.

TARGET 13

Implement a centralized geographic information system (GIS) tool for species at risk information and capture 40% of historic data by 2023



Photo: Sergeant Halina Folfas, 19 Wing Imaging



4.4 MANAGING HAZARDOUS SUBSTANCES

Defence uses a high volume of hazardous substances such as ammunition, explosives, gases, and flammable liquids and has a responsibility to manage them properly to protect the safety of personnel and the environment. Defence is committed to managing hazardous materials with care throughout their lifecycle, reducing their use where and when possible, and to seek out less hazardous alternative substances that meet Defence needs. Defence is committed to abiding by applicable laws and regulations, both domestic and international, to prevent the use of prohibited hazardous substances in Canada and on overseas deployments.

In 2019, Defence created a task force to look at how we manage per- and polyfluoroalkyl substances (PFAS), and to find fluorine-free foams that meet industry standards, regulations, and Defence needs. To prevent contamination of the environment, we published guidance on the proper use of Class B firefighting foams. Defence will continue to investigate PFAS alternatives and will develop a project plan, including costs, timelines, and alternative products to eliminate PFAS Class B foam at Defence locations.

TARGET 14
Develop a project plan, including costs, timelines, and alternative products to eliminate PFAS Class B foam at DND locations, by 2023



4.5 WASTE MANAGEMENT

Reducing our impact on natural resources and communities is important. The extensive operational capacity and real property portfolio of the Defence team results in a large amount of waste. Wherever possible, Defence will reduce, reuse, recycle and recover waste to increase resource conservation and reduce the environmental impact of Defence operations. Defence will work to reduce and divert recyclable materials from landfills, in particular recyclable plastics in support of the Ocean Plastics Charter and food waste in support of the UN 2030 Agenda. An important first step is to create a baseline for non-hazardous waste using data from representative bases and wings, with a focus on single-use plastics and food waste, before



Photo: Sergeant Frank Hudec, Canadian Forces Combat Camera

developing a reduction and diversion plan. The Defence policy for event hospitality has already been updated to promote the reduction of single-use plastic products and packaging materials.

We will also develop, update and implement policies, such as the Green Building Directive, to require the diversion of solid non-hazardous construction waste from landfills. Contractors will be required to develop comprehensive waste-management plans that reuse building materials as much as possible and dispose of non-reusable materials safely.

TARGET 15

Establish a baseline for non-hazardous waste and develop a reduction and diversion plan by 2023



4.6 REDUCING THE ENVIRONMENTAL FOOTPRINT OF THE INFRASTRUCTURE PORTFOLIO

The Defence team manages the largest infrastructure portfolio (\$26 billion) in the federal government, including over 20,000 buildings, 5,500 kilometers of roads and 3,000 kilometers of water works. However, the real property portfolio is facing a considerable range of new and evolving pressures. According to a recent review led by Treasury Board Secretariat, all custodial departments face similar pressures brought on by years of underinvestment in federal infrastructure. Improvements are needed to comply with health and safety, workplace risk mitigation and environmental sustainability standards while addressing the demand for infrastructure to support operational requirements in the Arctic, for continental defence, to avoid climate change impacts, and to support the GoC's Indigenous Reconciliation agenda. The Defence Real Property Portfolio Strategy will provide new vision, guiding principles, and key initiatives to align the portfolio with operational requirements in an affordable, efficient and sustainable manner that addresses legal compliance risks and ensures our infrastructure is resilient and able to adapt to climate change.

Defence will continue to plan, construct, maintain, repair, renovate, and divest of facilities to support military readiness, maintain efficiency, and reduce its environmental footprint. Reducing environmental impacts leads to a leaner, more affordable real property portfolio, and decreases long-term costs.

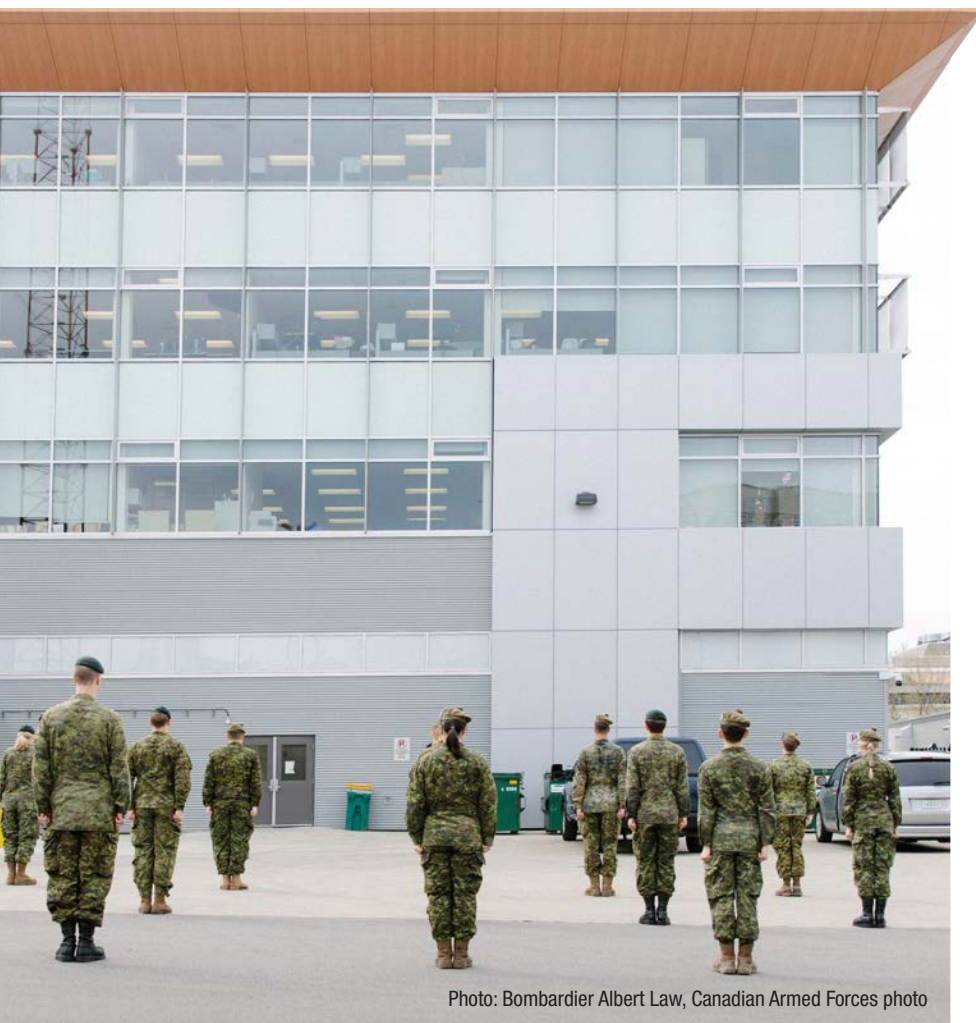


Photo: Bombardier Albert Law, Canadian Armed Forces photo



Photo: Corporal Vuong-De Ramos

5. GREEN PROCUREMENT

Defence understands the importance of green procurement and makes every effort to consider the environmental and energy implications of its purchasing decisions, while meeting its operational needs. We make thousands of procurement decisions every year, buying a wide range of products and services. We have a unique opportunity to influence the transition to a low-carbon economy by including criteria to address carbon reduction, sustainable plastics and broad environmental benefits. We have recently updated our Green Procurement directives to reflect our commitments. We will communicate these commitments to suppliers and contractors by purchasing through green standing offer agreements and including green criteria in contracts. This includes a commitment to leverage Defence's buying power in the construction industry to support the green economy by favoring low-carbon materials and green technologies.



5.1 SUSTAINABLE PACKAGING

Defence uses many kinds of plastic and non-plastic packaging material including corrugated fibreboard products, shipping sacks, envelopes, polyethylene bags, cushioning materials, straps and tape that are procured through a National Master Standing Offer (NMSO) that is available to all government departments. We are currently working with PSPC and others to develop a sustainable packaging NMSO. Defence and PSPC will consult industry on their capability to provide sustainable packaging and to meet other environmental and sustainability requirements. The results of the industry consultation will inform the new NMSO which is expected in 2024.

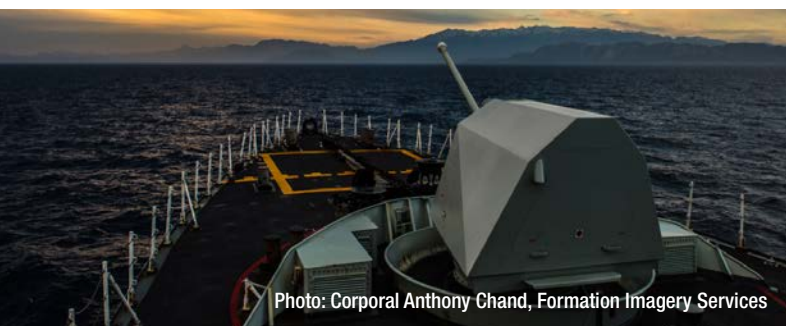


Photo: Corporal Anthony Chand, Formation Imagery Services

APPLYING A LIFE-CYCLE APPROACH TO MILITARY EQUIPMENT PROCUREMENT

Defence is committed to managing military equipment in the most sustainable way possible and in line with operational requirements. We will procure and use military equipment that is as energy efficient as is practical, to reduce overall operating costs and environmental impacts. We will focus on early integration of design specifications that emphasize energy performance and include environmental considerations through a life cycle lens.

TARGET 16

In partnership with PSPC, complete industry consultations to inform a new NMSO on sustainable packaging by 2023



Photo: Master Corporal Precious Carandang, 4th Canadian Division Public Affairs



Photo: Aviator Jérôme J.X Lessard



Photo: Corporal Tony Chand, Formation Imaging Services

6. SUSTAINABILITY GOING FORWARD

Reporting to Canadians and parliamentarians on our progress is key to ensure transparency and to show that we are achieving results. We will continue to report annually on the implementation of the DEES through FSDS and departmental results reporting.

Going forward, integrating sustainability into our decision making will support greater operational readiness and resilience for Defence. Energy and environment are strategic resources that, when managed effectively, enable the

defence mission. As we confront the security challenges that will come from climate change, DND will do its part to reduce its own impacts while ensuring that the CAF are always ready to respond when called upon by Canadians. The commitments in this Strategy focus not only on past and present practices, they lay the foundation for future changes and improvements through adaptation of infrastructure and operations that will build our resilience to climate change.



COMMITMENTS

FOR THE DEPARTMENT OF NATIONAL DEFENCE AND CANADIAN ARMED FORCES



GREENING GOVERNMENT: The Government of Canada will transition to low-carbon, climate resilient, and green operations

RESPONSIBLE MINISTER: All ministers

This goal captures commitments from the Greening Government Strategy, as well as reporting requirements under the Policy on Green Procurement.

Greening Government Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
Reduce GHG emissions from federal government facilities and fleets by 40% below 2005 levels by 2030 (with an aspiration to achieve this target by 2025) and 80% below 2005 levels by 2050 (with an aspiration to be carbon neutral)	All new buildings and major building retrofits will prioritize low-carbon investments based on integrated design principles, and life-cycle and total-cost-of ownership assessments which incorporate shadow carbon pricing	Reduce GHG emissions by 40% below 2005 levels by 2025 and achieve net-zero emissions by 2050	<p>FSDS: GHG reductions from the DND infrastructure and commercial light-duty vehicle portfolio are critical to achieving the GOC's FSDS goal.</p> <p>SDG: 7 (Affordable and Clean Energy), 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities), 12 (Responsible Consumption and Production), 13 (Climate Action)</p>	<p>Performance indicator:</p> <p>% GHG emissions reduction in DND buildings and commercial light-duty vehicle fleet relative to a 2005 baseline</p>

Greening Government Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
		Revise the Green Building Directive to include construction renovation and demolition waste, net-zero, and available industry standards on embedded carbon requirements by 2021	FSDS: Buildings built to the latest industry standards for green construction produce less GHG emissions SDG: 7, 9, 11, 12, 13	Performance indicator: Completed Green Building Directive by 2021
		Develop net-zero carbon ready designs for two residential building archetypes by 2023	FSDS: The net-zero carbon (or net-zero carbon ready) construction will reduce energy consumption leading to reduced GHG emissions from building operations SDG: 7, 9, 11, 12, 13	Performance indicator: Completed net-zero building designs for two residential building archetypes by 2023
	Departments will adopt and deploy clean technologies and implement procedures to manage building operations and take advantage of programs to improve the environmental performance of their buildings	Assess 75% of eligible bases or wings for an energy performance contract and move 50% to the implementation phase by 2023	FSDS: Implementation of energy performance contracts will reduce energy consumption leading to reduced GHG emissions from building operations SDG: 7, 9, 11, 12, 13	Performance indicator: % of eligible bases assessed, % of energy performance contracts moved to the implementation phase
	Fleet management will be optimized including by applying telematics to collect and analyze vehicle usage data on vehicles scheduled to be replaced	See administrative fleet		

Greening Government Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
Divert at least 75% (by weight) of non-hazardous operational waste from landfills by 2030	Other	Establish a baseline for non-hazardous waste and develop a reduction and diversion plan by 2023	<p>FSDS: Diverting and reducing waste will help to reduce Scope 3 GHG emissions. Diverting waste from landfills also reduces landfill gas emissions and recycling reduces emissions from the extraction and production of virgin materials</p> <p>SDG: 11, 12, 13</p>	Established baseline and completed plan by 2023
Divert at least 75% (by weight) of plastic waste from landfills by 2030	Other	See non-hazardous waste		
Divert at least 90% (by weight) of all construction and demolition waste from landfills (striving to achieve 100% by 2030)	Other	See Green Building Directive		
Our administrative fleet will be comprised of at least 80% zero-emission vehicles by 2030	Fleet management will be optimized including by applying telematics to collect and analyze vehicle usage data on vehicles scheduled to be replaced	100% of DND commercial light-duty vehicle fleet purchases will be zero-emission vehicles (ZEVs) or hybrid when available, with a ZEV procurement target of 50% by 2023	<p>FSDS: Replacing conventional vehicles with hybrid, plug-in hybrid, or electric vehicles will reduce GHG emissions</p> <p>SDG: 7, 11, 12, 13</p>	<p>Performance indicator:</p> <p>% available vehicles that meet operational requirements purchased that are ZEVs or hybrid</p>

Greening Government Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
By 2022, departments have developed measures to reduce climate change risks to assets, services and operations	Increase training and support on assessing climate change impacts, undertaking climate change risk assessments and developing adaptation actions to public service employees, and facilitate sharing of best practices and lessons learned	Develop an adaptation risk assessment framework and assess DND programs as well as critical infrastructure, by 2023	FSDS: Incorporating the impacts of climate change into policy, programs, and operations is paramount to adapting to a changing climate and ensuring resilience SDG: 13	Performance indicator: Completed framework by 2023; % of identified programs assessed
		Asses the impacts of climate change on RCN, CA and RCAF activities, by 2023	FSDS: Incorporating the impacts of climate change into policy, programs, and operations is paramount to adapting to a changing climate and ensure resilience SDG: 13	Performance indicator: The RCN, CA and RCAF will identify the impacts of climate change on its activities and operations in 3 separate reports by 2023
	By 2021, adopt climate-resilient building codes being developed by National Research Council Canada	See Green Building Directive		
Use 100% clean electricity by 2025	Other	Use 100% clean electricity by 2022, where available, and by 2025 at the latest by producing or purchasing renewable electricity	FSDS: The use of clean electricity eliminates GHG emissions from the grid in jurisdictions with emitting generation sources SDG: 7, 9, 13	Performance indicator: % of clean electricity consumption across provinces with carbon-intensive grids (AB, NS, NB, SK, and ON)
Actions supporting the Goal: Greening Government	Minimize embodied carbon and the use of harmful materials in construction and renovation	See Green Building Directive		

Greening Government Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
	The potential use of alternative energy options in national safety and security-related fleet operations will be examined	Develop a strategy for aviation fuels that supports the GoC's goal of achieving net-zero GHG emissions by 2050	<p>FSDS: In preparation for the potential use of sustainable aviation fuels, developing a strategy for aviation fuels supports the GOC's goal of achieving net-zero GHG emissions by 2050</p> <p>SDG: 7, 12, 13</p>	<p>Performance indicator: Completed strategy by 2023</p>
		Complete baseline energy and fuel usage evaluations for select marine vessels by 2023	<p>FSDS: Optimizing energy performance will reduce energy consumption and GHG emissions from the Navy fleet</p> <p>SDG: 7, 9, 12, 13</p>	<p>Performance indicator: % of select ships with baseline energy and fuel usage evaluations</p>
	Departments will use environmental criteria to reduce the environmental impact and ensure best value in government procurement decisions	In partnership with PSPC, complete industry consultations to inform a new NMSO on sustainable packaging by 2023	<p>FSDS: Factoring sustainable packaging into procurement will reduce the environmental impact and ensure best value in government procurement decision</p> <p>SDG: 11, 12, 13</p>	<p>Performance indicator: Complete industry consultation by 2023</p>

Greening Government Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
	Greening Government - Other	Achieve an energy efficiency of 85% for fossil-fuel electrical generation and distribution utilities in major deployed camps by 2023	FSDS: Modern and energy efficient deployable camps will reduce energy consumption leading to reduced GHG emissions SDG: 7, 9, 11, 12, 13	Performance indicator: Efficiency of electrical generation and distribution utilities, with a target of 85%



HEALTHY WILDLIFE POPULATIONS: All species have healthy and viable populations

RESPONSIBLE MINISTER: Minister of Environment and Climate Change

Healthy Wildlife Populations FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
Actions supporting the Goal: Healthy Wildlife Populations	Healthy Wildlife Populations - Other	Implement a centralized geographic information system (GIS) tool for species at risk information and capture 40% of historic data by 2023	FSDS: Implementation of a centralized geographic information system will support compliance with the Species at Risk Act and the protection of species at risk, their residences and critical habitat on DND lands SDG: SDG 15 (Life on Land)	Performance indicator: % of historic data entered into the system



SAFE AND HEALTHY COMMUNITIES: All Canadians live in clean, sustainable communities that contribute to their health and well-being

RESPONSIBLE MINISTER: Minister of Environment and Climate Change; Minister of Health

Safe and Healthy Communities FSDS target(s)	FSDS contributing action(s)	Corresponding departmental action(s)	Contribution by each departmental action to the FSDS goal and target	Performance indicator(s)
Actions supporting the Goal: Safe and Healthy Communities	Demonstrate leadership on assessing and remediating contaminated sites	Reduce DND's contaminated sites liability by an average of 10% per year by 2023	FSDS: By managing contaminated sites in a manner that is consistent with TB Policy, DND is reducing risks to human health and the environment SDG: SDG 3 (Good Health and Wellbeing), SDG 9 (Industry, Innovation and Infrastructure), SDG 12 (Responsible Consumption and Production)	Performance indicator: % of reduction in contaminated sites liability based on the closing liability of the previous year
	Safe and Healthy Communities - Other	Develop a project plan, including costs, timelines and alternative products to eliminate PFAS Class B foam at DND locations, by 2023	FSDS: Managing harmful substances protects human health and the environment, and benefits Canada's economy SDG: 3, 9, 12	Performance indicator: Completed project plan by 2023