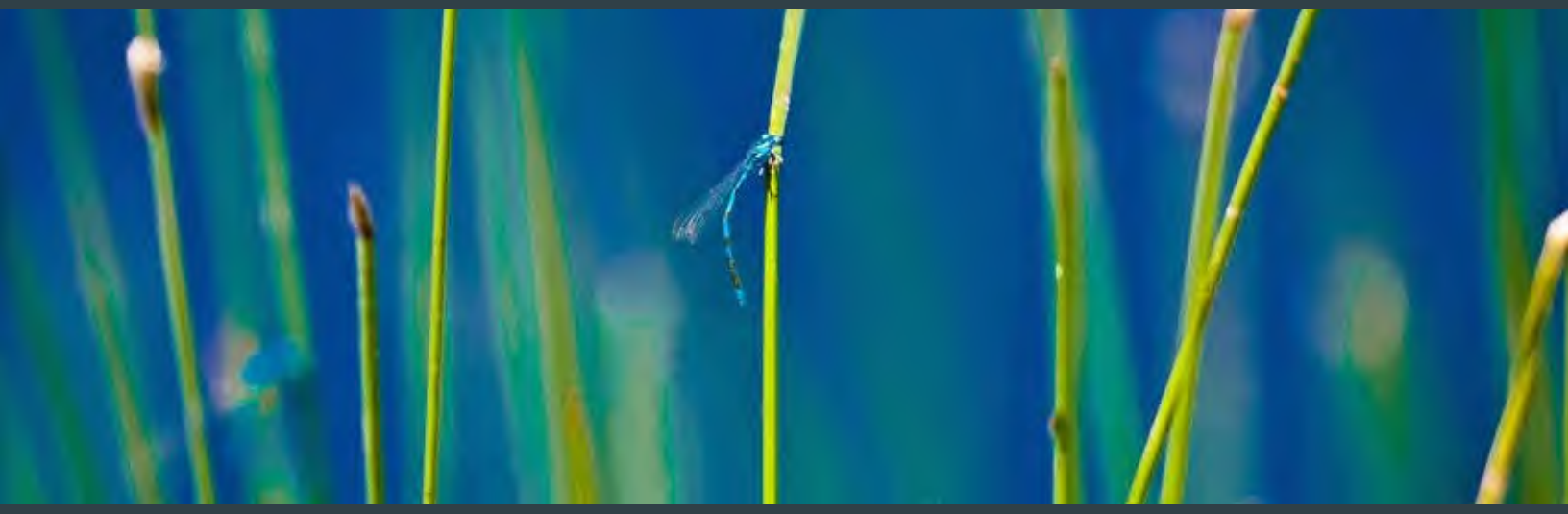
Canadian Nuclear Laboratories

Laboratoires Nucléaires Canadiens



SUSTAINABILITY AT CNL

OUR JOURNEY CONTINUES

2021-2022 SUSTAINABILITY REPORT

AUGUST 31, 2022

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CNL acknowledges that its operations across Canada occur on the unceded, traditional territories of Indigenous Peoples, and we recognize the unique history, spiritual beliefs, cultural practices and languages of these communities. We are also firmly committed to being an active participant in Canada's journey on the road towards healing and reconciliation.

DOING WHAT WE DO BEST

At Canada's national nuclear laboratories, solving problems is what we do best. Whether it is the development of clean energy technologies to power our way of life, the production of medical isotopes to improve the health and well-being of Canadian citizens, or the advancement of modern waste management practices to protect our environment, CNL has realized accomplishments that once seemed impossible, and which have helped to make Canada a healthier, more prosperous country.

When it comes to building a sustainable future in Canada, the problem could not be more challenging, or the issues more complex. Most pressing among many issues is climate change, which threatens our very way of life here in Canada. While Canada has an ambitious national target to reduce our greenhouse gas emissions by 40 to 45 percent from 2005 levels by 2030, achieving this reduction in emissions requires the full participation of communities, organizations and businesses across the country.

> As we work to revitalize the Chalk River Laboratories (CRL) and build the necessary groundwork for a new era of scientific discovery at CNL, this challenge has given us the rare opportunity to direct our passion for innovation and ingenuity inwards. How can we build a more sustainable CNL? What steps can we take as an organization to ensure that we are operating in harmony with the environment? How can we support Canada and the United Nation's sustainable development goals, not just through our research, but through responsible operations? These are the questions we ask ourselves at CNL, every single day.

And in the pages of this report, you will find some answers. These past few years, CNL has made considerable progress towards more sustainable operations, carefully enacting changes – big and small – that are designed to reduce our impact on the world around us. Most importantly, we have adopted a holistic approach to our work, ensuring that sustainability is integrated into everything we do as an organization, and all of the decisions that we make. This report is not just a public relations exercise to us – it is an opportunity to better serve the Canadian public by operating more responsibly.

Whether it is the construction of a new building, the procurement of new equipment, or the products we use to maintain our campus, everything we do is an opportunity to reduce our impact on the natural world. It is an opportunity to make sure that we are treating the environment with respect. And above all else, it is an opportunity to ensure that we build a bright future for the next generation.

CNL is on a sustainability journey, and much work lies ahead. The problems we face are bigger than ever, there is no doubt about that. But if history has taught us anything, it is that CNL employees are up for the challenge.

Joe McBrearty
President and CEO

OUR SUSTAINABILITY JOURNEY CONTINUES

Last year, CNL produced its first annual Sustainability Report, a new document that tracks our journey towards more sustainable operations. While the report was new, CNL's efforts to become a more sustainable organization have been years in the making.

As we work to modernize the Chalk River Laboratories campus and position the company for the future, we understand that our work can affect the environment around us, and that we have a responsibility to minimize these impacts on behalf of future generations. This is a commitment that CNL takes very seriously at all levels of our organization, and it is my hope that this report captures the spirit, ambition and enthusiasm that our employees have adopted in confronting this issue. While the pandemic certainly brought new challenges in our work, I am proud to say that we once again made steady, meaningful progress towards this vision. Among our many accomplishments in recent years, CNL has reduced its carbon emissions by 38%, we have safely decommissioned over 110 old and inefficient buildings, and we have transformed our vehicle fleet through the adoption of over 30 new fuel efficient vehicles. Perhaps most importantly, we also made progress in our major environmental remediation projects, including the closure of the long-term radioactive waste management facility in Port Granby, which safely contains over 1.3 million tonnes of low-level radioactive waste excavated from the Lake Ontario shoreline.

And our efforts did not go unnoticed. This year, CNL achieved the Wildlife Habitat Council's Gold Certification rating. The WHC's certification program is the only voluntary sustainability standard designed for broad-based biodiversity enhancement and conservation education activities on corporate land. Companies achieving WHC Conservation Certification are considered environmental leaders, voluntarily managing their lands to support sustainable ecosystems and the communities that surround them. CNL also successfully maintained its ISO 14001 certifications at the Chalk River Laboratories campus and the Whiteshell Laboratories site, demonstrating our commitment to continuous improvement and the highest standards of environmental stewardship. These environmental management standards have challenged us to operate more responsibly, making more efficient use of our resources while reducing waste, wherever we can.

But our commitment to sustainability goes beyond environmental stewardship – we are also committed to making a difference in our communities.

The establishment of a new Community Advisory Panel, support for local causes and initiatives, the receipt of the United Way Community Builder Award, and our continued work to foster relationships with local Indigenous communities, are just a few of many accomplishments from this year to better engage the local public.

It has clearly been a productive and positive year for CNL, but we recognize that sustainable operations is not necessarily a target to hit, but an ongoing commitment to maintain. That will remain our goal on our sustainability journey, and we hope you will continue to follow our progress through this report.

Jeff Willman
Vice-President of Health, Safety, Security and the Environment (HSSE)

CANADA'S NATIONAL NUCLEAR LABORATORY

As Canada's national nuclear laboratory, CNL works to bring innovation forward into real-world use, including carbon-free energy, cancer treatments and other therapies, non-proliferation technologies and waste management solutions.

While our expertise is relied on by the nuclear sector and the federal government, CNL has the resources and ambition to advance technologies across all sectors. In doing so, CNL acts as the link between industry, academia and government, working alongside like-minded organizations to discover and commercialize solutions that address critical national needs.

Guided by an ambitious corporate plan known as Vision 2030, CNL fulfills three key priorities on behalf of the Government of Canada: Restoring and protecting the environment, clean energy for today and tomorrow, and contributing to the health of Canadians.

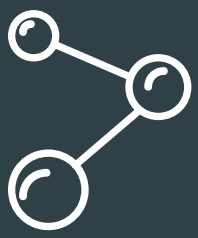
RESTORING AND PROTECTING THE ENVIRONMENT

CNL is managing the largest and most complex environmental clean-up missions in Canada, including the Chalk River and Whiteshell Laboratories sites, and the remediation of historic waste as part of the Port Hope Area Initiative (PHAI). We are also leading a number of major nuclear decommissioning projects, including the Near Surface Disposal Facility (NSDF) project, the Nuclear Power Demonstration (NPD) Closure Project, and the WR-1 Closure Project.

CLEAN ENERGY FOR TODAY AND TOMORROW

In clean energy, CNL is working to bring the next-generation of clean energy technologies to Canada – small modular reactors (SMRs). But our work also includes technical advances in hydrogen energy, the development of advanced nuclear fuels, the integration of clean energy technologies, and research to enable the safe and reliable operation of today's nuclear fleet.

CONTRIBUTING TO THE HEALTH OF CANADIANS



With over one billion medical treatments conducted using isotopes produced at the Chalk River campus, CNL has been a world leader in the production of radiopharmaceuticals for decades. We are leveraging this expertise to become an international hub in the development of a new generation of medical isotopes, including Actinium-225, a rare isotope that enables a revolutionary new cancer treatment.

OUR FOOTPRINT

CNL manages nuclear research and clean-up sites across Canada, including our main campus, the Chalk River Laboratories. The site is situated on the banks of the Ottawa River, and is home to approximately 2,700 employees, including scientists, engineers, physicists, and other technical experts, and some of Canada's most advanced nuclear research facilities, technologies and equipment.

CNL also manages the clean-up and decommissioning of the Whiteshell Laboratories site near Winnipeg, Manitoba, a former research campus that operated from 1961 to 1997, as well as the execution of the Port Hope Area Initiative, where the company is fulfilling the Government of Canada's commitment to safely clean-up historic low-level radioactive waste in two Ontario municipalities.

In addition to these sites, CNL maintains a small complement of staff in a number of locations across the country, managing commercial projects, leading academic work, implementing environmental improvements, and decommissioning redundant and prototype facilities.

WHAT DOES SUSTAINABILITY MEAN TO CNL?

2021-2022 SUSTAINABILITY HIGHLIGHTS:

- 38% reduction in Greenhouse Gas Emissions from 2005 baseline at CRL
- 2,500 tonnes of CO_2 sequestered using Canadian wood
- New climate resilient buildings and infrastructure
- Over 60,000 environmental analyses completed annually
- A new Chalk River Laboratories Community Advisory Panel
- 1.3 million tonnes of waste excavated from Lake Ontario shoreline
- ISO 14001 recertification for Chalk River and Whiteshell sites in Spring 2021
- Chalk River campus named a Gold Certified site by Wildlife Habitat Council
- Algonquins of Ontario gift CNL and AECL with name for Minwamon Building
- $180,000 in staff donations support many local causes and initiatives
- Public attitude survey shows confidence in CNL staff and projects
- Continued injury rate improvements since 2019
- 360 new Wellness Ambassadors supporting healthy workplace culture
- A three-year commitment totalling $240,000, made to to North Forge East by Canadian National Energy Alliance (CNEA) to support economic development
- CNL Forest Management Plan awarded the CFS Merit Award for Collaboration for 2022
- Awarded the United Way's Community Builder Award for our role in COVID-19 community support

At CNL, we understand that the actions we take today have implications for tomorrow. This is why we embrace sustainability as an organization, and why we incorporate sustainable principles and practices into all of our activities – to minimize the burden we place on future generations.

To organize these efforts, CNL is aligning with Atomic Energy of Canada Limited's (AECL) ESG strategy to identify 14 focus areas of sustainability where we must pursue more responsible operations. CNL has also adopted a holistic approach to this work which ensures that our planning and goals are fully aligned with the Government of Canada's vision for a more sustainable Canada.

In pursuit of environmental sustainability, CNL understands that climate change represents the biggest challenge of our generation, and we continue to take aggressive steps to reduce our carbon emissions, adopt energy efficiency improvements and embed climate resiliency into our operations. But our commitment to environmental stewardship also seeks to limit the impacts of our operations on the local wildlife surrounding our sites, through responsible operations and waste management practices.

For social sustainability, CNL is committed to a safe, healthy and inclusive work environment for our staff, engaging with members of the public and Indigenous communities about our program of work, and helping to advance societal health and well-being. With this responsibility in mind, CNL has established a number of new programs in recent years to support employees, strengthen community initiatives and better engage local residents, nurturing healthier communities near our sites.

Finally, in governance, CNL is incorporating ESG principles into our organizational vision, mission and corporate policies. We recognize the important role we play as one of the largest employers in many of the communities where we operate, and will take every opportunity to extend economic and procurement opportunities to local companies and businesses to help nurture economic prosperity in these communities, seek out suppliers with a like-minded philosophy on sustainability, and incorporate higher standards into our procurement policies.

14 FOCUS AREAS IN SUSTAINABILITY

Environment

- Carbon Emissions
- Energy Efficiency
- Climate Resilience
- Biodiversity
- Radioactive Waste Management
- Waste Management
- Water & Wastewater Management

Social

- Diversity & Inclusion
- Health & Safety
- Community Engagement
- Indigenous Relations
- Sustainable Work Environment

Governance

- Economic Development
- Sustainable Procurement

2021/2022 ENVIRONMENTAL SUSTAINABILITY SCORECARD

Total Monthly Water Usage (m3)		Status: Monitoring usage. Action: Target to be established
CRL Site Energy Use Intensity (GJ/m2)		Status: Monitoring usage. Action: Target to be established
Species at Risk (SAR) (COSEWIC) Mortality		Target: 0 SAR Losses Status: 2 SAR losses Action: Continue to implement SAR protection and mitigation management
Percent of critical habitat de-struction		Target – 0% destruction Status: Meeting target Action: Continue to implement land management strategies
Recycle Rate		Target: 75% recycle rate Status: Not meeting target due to operational constraints during COVID. Action: Integrated waste strategy to support improvements in this area.
Diversion from Landfill from Designated Office Space		Target: 90% diversion rate Status: Not meeting target due to operational constraints during COVID. Action: Integrated waste strategy to support improvements in this area.
Greenhouse Gas Emissions		Target: 40% GHG reduction by 2025, Carbon Neutral by 2040
Land Conversion		Target: 95% site applications not resulting in land conversion. Status: Meeting Target. Action: Continue to implement land management strategies.

"The issues we face in Canada are incredibly complex, and CNL is well-positioned to confront these challenges through our capabilities in science and technology. CNL, at our Chalk River Laboratories campus, is home to some truly unique facilities, technologies, and people. Whether it is clean energy, public health, environmental stewardship or national security, we are harnessing these resources to build a more sustainable future for this country."

Jeff Griffin
Vice-President of Science and Technology

SUSTAINABLE SCIENCE & TECHNOLOGY

CNL's commitment to sustainability extends to our nuclear science and technology projects and programs, which contribute to a clean, healthy and prosperous future for Canada.

SITING CANADA'S FIRST SMR

In 2018, CNL issued an invitation to small modular reactor (SMR) developers who wish to participate in the evaluation process for the construction and operation of an SMR demonstration project at a CNL-managed site. At present, there are four proponents engaged in various stages of the invitation process, including Global First Power, which has signed a Project Host Agreement with CNL for the construction of their Micro Modular Reactor™ project.

As a source of clean energy, SMRs are smaller in size than traditional reactors, can be constructed efficiently, produce less waste, incorporate new safety technologies, and have the potential to be more cost-effective. They also produce heat, which could be used in a number of other applications, from greenhouses for agriculture to hydrogen production.

HYDROGEN RESEARCH

In 2020, the Government of Canada released its Hydrogen Strategy for Canada, an ambitious plan to cement hydrogen as a key part of Canada's path to net-zero carbon emissions. Hydrogen offers low-carbon options for the energy and transportation sectors, supporting Canada's international commitments for carbon reduction. Through a series of projects with industry partners, CNL is working to advance technologies in hydrogen production, safety and storage to support this federal priority.

LIFE EXTENSION & REACTOR SUSTAINABILITY

CNL continues to support the life extension and long-term reliability of the existing fleet of CANDU reactors domestically and internationally, and is now expanding its services to include support for other reactor designs. Through this work, CNL helps make nuclear power plants around the world more efficient and reliable, support reactor life extension and long term operation, and enable plant modernization through innovative technologies and inspection services.

TARGETED ALPHA THERAPY

CNL scientists are developing advanced life-saving treatments that harness the power of nuclear science to achieve unprecedented levels of precision in cancer treatment. This work includes the production of a promising new weapon in the fight against cancer—Actinium-225. An alpha-emitting isotope with a short half-life, Actinium-225 emits high-energy particles that effectively kill cancer cells, leaving nearby healthy cells virtually unharmed in the process. This treatment is known as targeted alpha therapy, and CNL is positioning itself to be an international hub for this type of research.

CLEAN ENERGY DEMONSTRATION INNOVATION RESEARCH (CEDIR) PARK

CNL is exploring a new strategic direction that could broaden the company's vision – the creation of a clean energy research park at the Chalk River Laboratories, where nuclear research can be carried out alongside work to develop other clean energy technologies. This could include the use of SMRs to provide baseload power for intermittent renewable energy sources like wind and solar, or using excess heat from SMRs to produce hydrogen or to enable district heating.

ADDRESSING CLIMATE-RELATED FINANCIAL DISCLOSURES

"As the company responsible for the operation of Canada's national nuclear laboratories, CNL has a responsibility to provide AECL with the information to support the timely disclosure of the recommended disclosures under the framework. In particular, adopting the TCFD recommendations provides increased transparency into our performance as it relates to sustainability, deeper insight into our transition towards lower-carbon operations, and better organizational understanding of our management of climate-related risks and opportunities. These metrics are critical here in Canada as we move towards a net-zero future."

Monica Steedman,
Vice-President, Business Management
Chief Financial Officer

ADDRESSING TCFD AT CNL

In April 2021, the Government of Canada announced in its budget that Crown Corporations with assets over $1 Billion dollars would be required to implement the recommendations of the Task Force on Climate Related Financial Disclosures (TCFD) no later than March 2023, which will therefore apply to Atomic Energy of Canada Ltd (AECL). The Financial Sustainability Board established the TCFD to develop recommendations on the types of information that companies should disclose to support investors, lenders, and insurance underwriters in appropriately assessing and pricing a specific set of risks—risks related to climate change. In order to support AECL in climate related financial disclosures, consistent with the recommendations under TCFD, the core elements of CNL's TCFD disclosure framework will include:

- **Governance** - Describe the board's oversight of climate-related risks and opportunities and management's role in assessing and managing climate-related risks and opportunities.

- **Strategy** - Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term and describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning. Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

- **Risk Management** - Describe the organization's processes for identifying and assessing climate-related risks, describe the organization's processes for managing climate-related risks and describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.

- **Metrics and Targets** - Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process, disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks and describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Core Elements of Recommended Climate-Related Financial Disclosures

Governance: The organization's governance around climate-related risks and opportunities.

Strategy: The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.

Risk Management: The processes used by the organizations to identify, assess, and manage climate-related risks.

Metrics and Targets: The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

ESG OVERVIEW & 14 FOCUS AREAS

In pursuit of more sustainable operations, CNL has identified 14 focus areas under environment, social and governance (ESG).

ENVIRONMENTAL SUSTAINABILITY

Climate change represents the biggest challenge of our generation, and CNL is taking aggressive actions to reduce carbon emissions, adopt energy efficiency improvements and embed climate resiliency into our operations. CNL also seeks to limit the impacts of our operations on the local environment and wildlife surrounding our sites, through responsible operations and waste management practices.

CARBON EMISSIONS

Objective: Minimize the production and release of greenhouse gas emissions, achieving carbon neutral operations at the Chalk River Laboratories campus by 2040.

In 2021, the Government of Canada announced a new, ambitious national target in the fight against climate change. In pursuit of a more sustainable, low-carbon future, Canada has set its sights on a 40-45% reduction in greenhouse gas emissions (GHG) by 2030, and carbon neutrality by 2050.

CNL is doing its part to help Canada meet these targets. Through actions big and small, CNL has already reduced its greenhouse gas emissions by 38% relative to 2005 levels, and has established an aggressive strategy to reduce GHG emissions by 40% by 2025 and to achieve carbon neutral operations at Chalk River Laboratories by 2040.

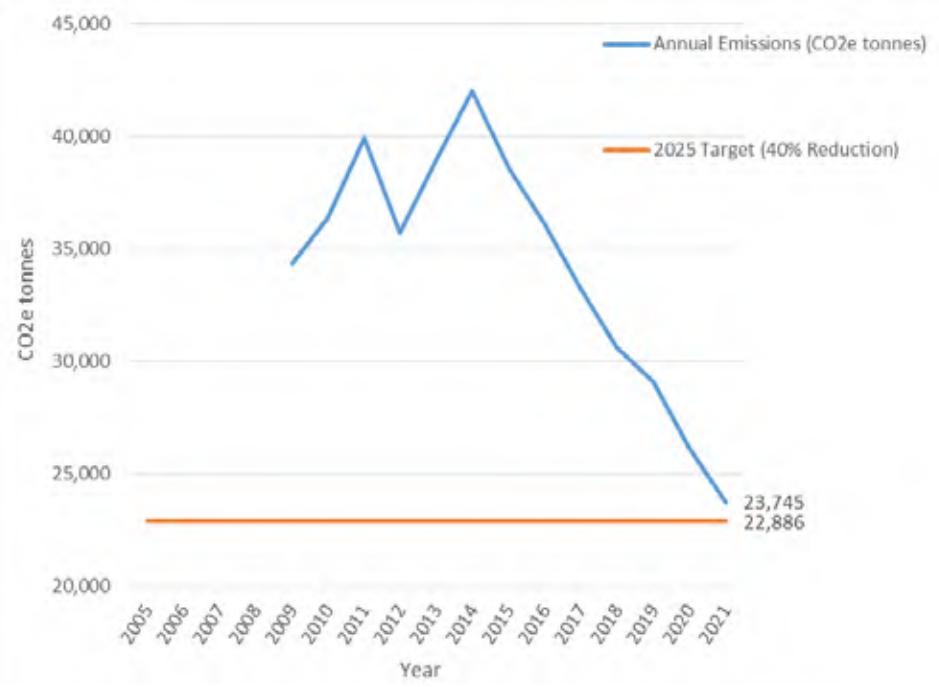


Figure 1: CO^2 Emissions at Chalk River Laboratories

CNL has reduced greenhouse gas emission by 38% relative to 2005 levels. We need to further reduce our emissions by another 859 CO^2e tonnes to meet our 40% target by 2025, a good step towards achieving carbon neutral operations by 2040.

A CARBON NEUTRAL CAMPUS

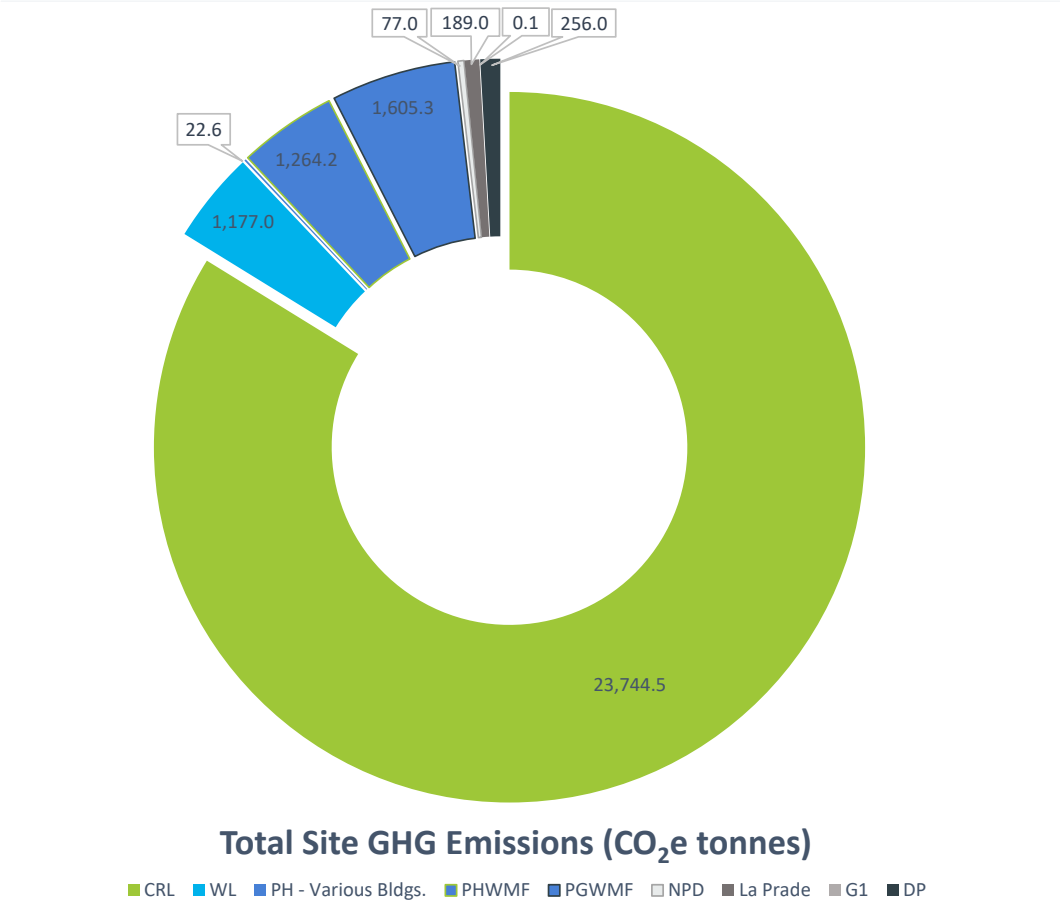
To achieve carbon neutral operations at the Chalk River Laboratories campus by 2040, CNL has developed a Carbon Neutral Strategy that will guide organization decision-making in pursuit of lower carbon emissions. This strategy incorporates energy efficiency improvements to existing facilities and infrastructure, process improvements, changes to our fleet and the construction of new buildings.

Measures identified in the strategy include the analysis of building retrofits for greenhouse gas savings, the reduction of embodied carbon in structural materials for major constructions projects, and the completion of lifecycle assessments for building and infrastructure projects.

Tracking Greenhouse Gas Emissions

In order to monitor and reduce the generation of carbon emissions and other greenhouse gases, and to improve energy efficiency at the sites it manages on behalf of AECL, CNL has adopted the use of Global Reporting Initiative (GRI) standards. This international set of standards enables an organization to better understand and report their impacts on the economy, environment and people in a comparable and credible manner, with increased transparency on their contribution to sustainable development.

Among the emissions CNL tracks through GRI standards is greenhouse gases (GHG), nitrogen oxides (NOx) and sulphur oxides (SOx), and other significant air emissions.



GHG REDUCTION AT CHALK RIVER LABORATORIES

In 2021, CNL completed a number of conservation and efficiency improvements that have reduced GHG emissions at the Chalk River Laboratories campus, including:

- Repairs to return condensate lines, steam traps and steam lines, which have all reduced natural gas usage by the site's powerhouse
- The severing of utilities to one building (pre-decommissioning) and the removal of four buildings which have resulted in natural gas and electricity reductions at the campus
- An interior lighting retrofit of nearly 6,000 incandescent and fluorescent lightbulbs to LED lights has reduced electricity consumption
- Installation of a powerful commissioning and analytics tool in seven buildings that monitor a building's performance and energy consumption, identifying performance issues and energy improvement opportunities, resulting in energy and natural gas savings.

2021 CY Scope 1 GHG Emission Reductions

Project	**Natural Gas Savings**	
	m^3/yr [14]	**CO_2e tonnes**
Demolished Buildings (B440, B440A, B440B and B413)	180,808	356.96
Smart Building Implementation (7 buildings)	57,085	112.70
Totals	**237,893**	**469.67**
Gases include in above GHG Emission Calculations	--	CO_2, CH_4, N_2O

GHG REDUCTION AT OTHER CNL SITES

- At Whiteshell, CNL achieved an important reduction in energy consumption through the removal of two buildings from the electrical grid and propane heating
- At the Port Hope Area Initiative, with the mound at the Port Granby site now capped, treatment water volume has and will continue to decrease in the future. As a result, one evaporator is now being decommissioned with another put on stand-by, reducing electricity usage
- At the La Prade site, a more efficient air conditioning system was installed, and temperatures have been lowered to reduce propane usage

In 2022 May, Canadian Nuclear Laboratories (CNL) marked the completion of the Port Granby Project. Over 1.3 million tonnes of waste excavated from the Lake Ontario shoreline is now safely stored in the engineered, aboveground storage mound that was capped and closed in fall 2021.

Sustainability is one of the guiding principles in the revitalization of the Chalk RIver Laboratories, shown here. In addition to the new construction, a number of conservation and efficiency improvements that have reduced GHG emissions at the campus.

ENERGY EFFICIENCY

Objective: Pursue energy efficiency improvements across all CNL operations, achieving a 30% reduction in energy intensity by 2035

CNL is working hard to position itself as leader in energy efficiency. This work is guided by our Energy Efficiency Strategic Improvement Plan (EESIP), which was developed to optimize energy expenditures, and reduce carbon emissions through strategic operations, maintenance and capital energy initiatives.

EESIP consists of short-term, intermediate-term and long-term strategic initiatives that are tracked and reviewed annually. Overall, CNL is targeting a 30% reduction in energy intensity at Chalk River Laboratories by 2035 compared to the 2015 baseline.

CNL's Energy Efficiency Strategic Improvement Plan targets a 30% reduction in energy intensity at Chalk River Laboratories by 2035.

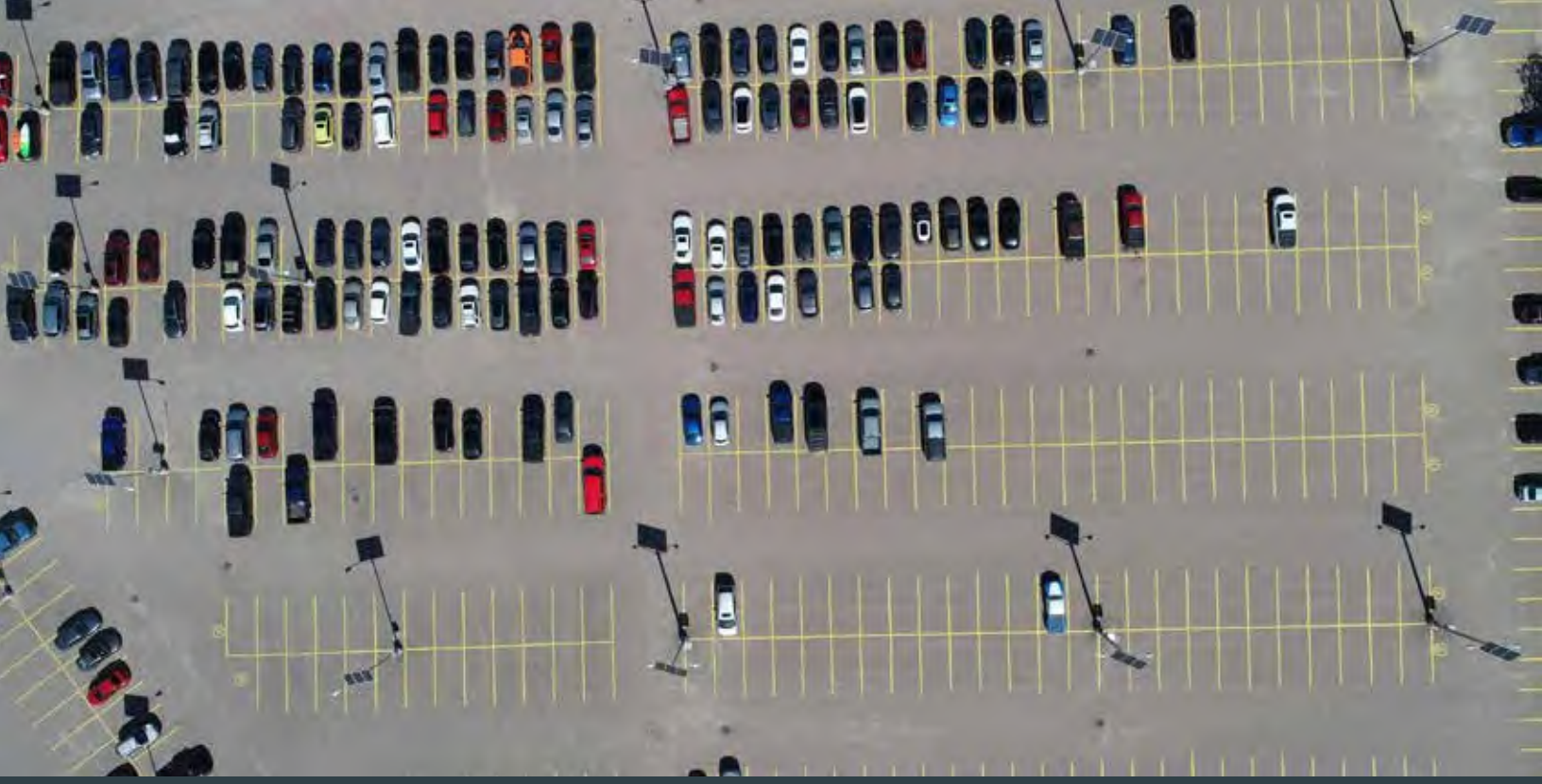
Tracking Energy Consumption

CNL uses GRI standards to monitor and reduce energy usage at all of the sites that it manages on behalf of AECL. These metrics include energy usage across the organization, energy consumption outside of the organization, and the reduction of energy consumption.

Projects identified earlier in this report, which reduced greenhouse gas emissions, also contributed to the reduction of energy usage at CNL. This includes the demolition of key buildings, the installation of more efficient LED lighting, and the adoption of new commissioning and analytics tools to monitor energy performance in several buildings.

2021 CY Scope 2 GHG Reductions

Project	**Electrical Savings**	
	MWh/yr	**CO_2e tonnes**
Demolished buildings (B440, B440A, B440B and B413)	1,409	42.94
Interior Lighting Retrofit (LED)	115	3.50
Smart Building Implementation (7 buildings)	446	13.59
Totals	1,970	**60.03**
Gases include in above GHG Emission Calculations	--	CO_2, CH_4, N_2O



A CLEANER, GREENER VEHICLE FLEET

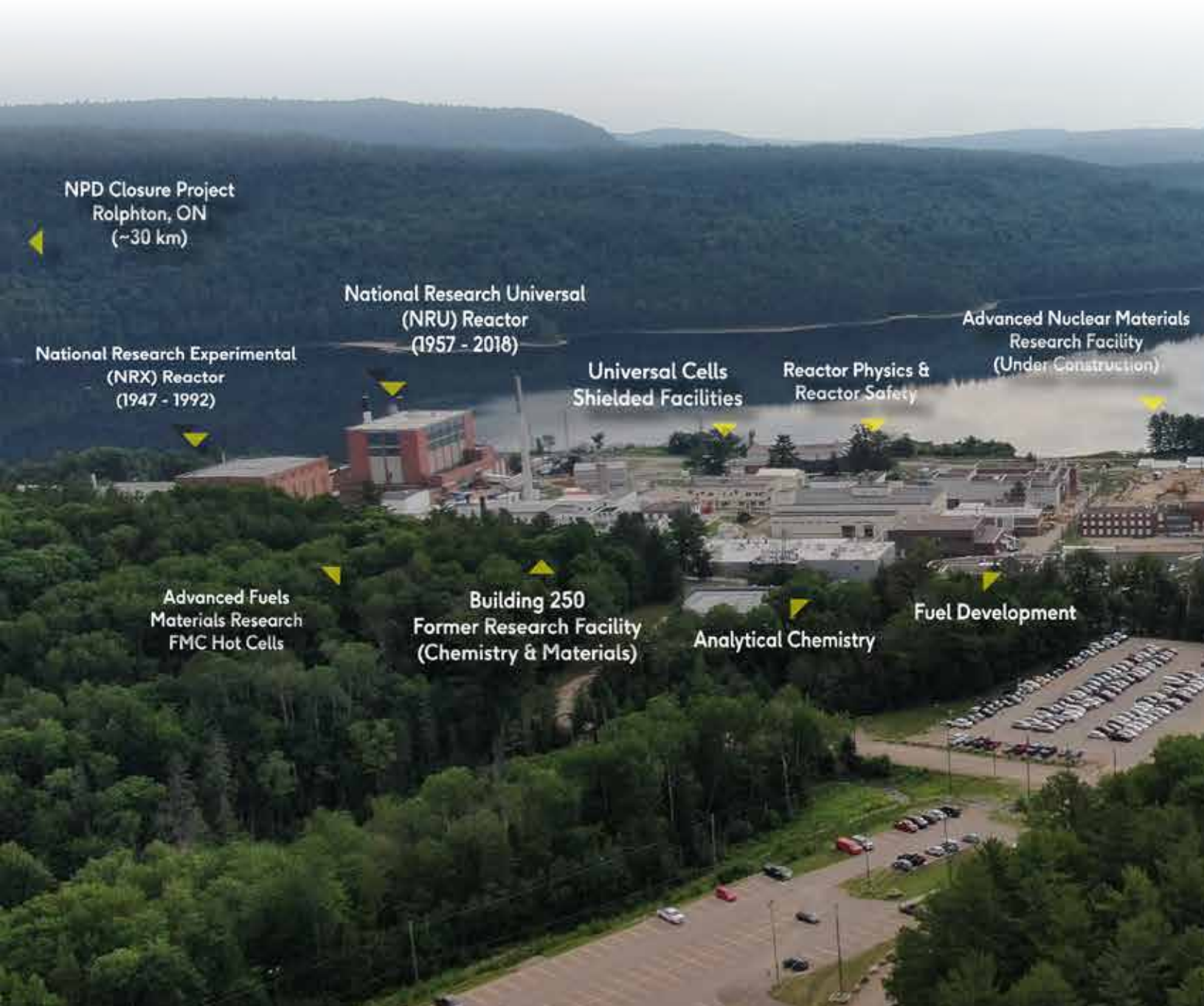
Following an in-depth analysis of the vehicle fleet at the Chalk River campus, CNL developed a Green Fleet strategy that increases energy efficiency in our vehicle fleet. Recent improvements include:

- CNL's CarShare program has added three Plug-in Hybrid vehicles to the fleet. When fully charged, these vehicles travel 60 km before using fuel, and only require 2.2 litres of gasoline per 100 km when using both fuel and electricity. Since 2019, CNL has transitioned from 2 passenger vehicles with engine sizes of three litres or less to 34 vehicles, an improvement which reduces exhaust emissions and improves fuel efficiency.
- With some vehicles, CNL has adopted vehicle monitoring and recording systems that provide key insights on fuel consumption, emissions and idle time, allowing CNL to identify improvement opportunities in greenhouse gas emissions.
- CNL is vying to be alongside some of the first Canadian organizations to offer biodiesel, which is a biodegradable diesel fuel substitute made from renewable materials such as plant oils, waste cooking oils, or animal fats. Compared to diesel, biodiesel has the potential to reduce GHG emissions by over 80% on a lifecycle basis.
- CNL is assessing the viability of adding even more electric vehicle (EV) charging locations for staff.

SITE PROFILE: CHALK RIVER LABORATORIES

The Chalk River Laboratories is the birthplace of nuclear research in Canada and has been home to some of the world's most exciting advances in nuclear science and technology. To build on this legacy, the Government of Canada has committed to a 10-year investment of $1.3 billion through AECL that is dedicated to the revitalization of the facilities and infrastructure at the site of CNL's headquarters.

This funding has presented CNL with an opportunity to transform the site into a modern, sustainable campus. This process began in 2016, and includes the renewal of essential site infrastructure, the decommissioning of outdated buildings and a significant investment in new, world-class science facilities. Environmental stewardship and sustainability are integrated into this capital program which, once complete, will transform the site into an energy efficient, low-carbon campus.



"When planning the revitalization of the Chalk River campus, and designing this new generation of research laboratories, waste facilities and office buildings, we certainly drove a new standard in pursuit of more sustainable, low-carbon operations. Using Canadian-sourced wood as our main construction material, which is a renewable resource, certainly helped reduce our carbon footprint. But the care and attention to detail that went into designing new facilities – whether it was adding window fritting to protect birds in certain areas, limiting water use by incorporating a storm water management pond into fire protection, or sourcing environmentally-friendly materials such as low carbon concrete – was truly inspiring. I couldn't be prouder of the team."

Brian Savage
Vice-President of Capital

USING MASS TIMBER TO REDUCE CARBON

When constructing our new buildings and research laboratories, CNL considered the carbon emissions lifecycle for the materials that would be used in these capital projects, and selected cross-laminated timber products made in Canada as the main construction material.

The use of this renewable resource in new buildings has lowered the embodied carbon at CNL when compared to a typical concrete building design. Overall, in three new buildings, CNL sequestered nearly 2,500 tonnes of CO2 and avoided nearly 1,000 tonnes of CO2.

Modern & Efficient New Buildings

CNL recently completed the construction of a number of new facilities, including a new site entrance building, known as the Minwamon Building, and a new support facility, which consolidates maintenance resources, work management and equipment into a single, centralized location at the campus. Both of these buildings incorporate LEED principles into their design, from low-flow fixtures and energy efficient lighting, to sustainable site development and low-carbon materials.

Science Collaboration Centre:

Scheduled for completion in the spring of 2023, the new Science Collaboration Centre will serve as the central planning and collaboration space for CNL's science and technology programs. Once complete, the SCC will use approximately 15% less energy than a comparable building, and will incorporate environmentally-friendly features that include:

- Constructed on an existing brown-field location
- Triple pane windows
- Mass timber construction as a main building structural material
- Roof-mounted dry cooler to take advantage of free cooling
- Heat and humidity exchange to precondition incoming air
- Efficient LED lighting systems with occupant sensors
- Dark sky friendly exterior LED lighting building-mounted fixtures
- Low-flow plumbing fixtures installed throughout building
- Limestone and slag added to cement, reducing CO2 compared to general-use cement
- Building orientation relative to sun direction siting, width, and glazing optimized to have natural light fully penetrate offices
- Façade colour variation to optimize seasonal solar heat gains
- OKA-Wood glass in the library to reduce solar thermal transmittance through the glazing, leading to reduced HVAC equipment in that space.

Advanced Nuclear Materials Research Centre (ANMRC)

As the largest single capital investment in the revitalization of the Chalk River campus, the ANMRC will be a 10,000 square metre research complex that will consolidate key research equipment and capabilities from aging facilities that are scheduled for decommissioning. The ANMRC design represents a 36% reduction in operational carbon than a typical building, and a 28% reduction in embodied carbon compared to a baseline building. Other features include:

- Building is situated on a brownfield rather than clearing greenspace
- Mass timber construction incorporated on part of the first floor
- Cement replacement with supplementary cementitious materials in the concrete material specifications to reduce carbon footprint
- Prefabricated construction and wall panels, which meet green building standards
- Incorporates steel as a material (alloy of iron and carbon where carbon ranges up to only 2%)
- Reusing fill from construction sites which offsets GHG emissions
- Amalgamation of facilities to reduce vehicle usage, emissions, and overall risks
- Office areas are fitted with ventilation programming
- Energy efficient heating, ventilation and air conditioning (HVAC) design
- The building automation system provides efficient energy management technology
- Radiation tolerant LED lighting in-cell
- Building is oriented to be able to integrate passive and solar strategies
- Incorporation of passive strategies, which includes increased insulation, improved window performance, ventilation heat recovery, focus on airtightness, and absence of thermal bridges

New Waste Facilities

In addition to new laboratories and research facilities, CNL will be constructing new waste management and processing facilities as part of the site revitalization process. This includes the construction of a new cask facility, an intermediate level waste storage facility, a heavy water detritiation facility, a shielded stabilization facility, a stabilized high-level waste storage building, and a stabilized intermediate-level waste storage building.

While most of these facilities are in the conceptual and preliminary design phase, the Cask facility is in the detailed design phase and incorporates a number of environmentally-friendly features, including:

- Reduced energy use by 40% compared to baseline design
- Reduction in operational greenhouse gas intensity by 27% compared to baseline design
- First Lifecycle Carbon Accounting Report for Gating and Sanctioning, following new Treasury Board Secretariat guidance on Life Cycle Cost Analysis guidance
- Full building hydronic loops allow for net-zero carbon ready facility (ready to tie in to campus wide hot water loop, electrical boilers, or ground source heat pump field)

CLIMATE RESILIENCE

Objective: Develop and incorporate climate resilience practices and standards into all of CNL's major infrastructure projects and operational decisions.

While CNL will continue to make every effort to limit climate change by reducing greenhouse gas emissions in our operations, and by advancing clean energy solutions through our research programs, we recognize that some impacts are simply inevitable. Across the country, Canadians have already experienced unprecedented extreme weather events in recent years, from flooding and wildfires, to heatwaves and powerful storms and tornadoes.

CNL's sites across Canada are not immune to these events. As greenhouse gas emissions continue to rise around the world, we understand that we must be prepared for the potential consequences of climate change, ensuring that economic, social and operational risks are properly managed through our governance and risk management processes.
CNL is currently working to adopt climate resilience standards for all of our new infrastructure projects and our ongoing operations as a whole. This is taking shape in the form of climate resilience planning for project management and climate resilience mitigation opportunities within CNL's asset management. Initial work has included forest management planning to reduce forest fire risk, infrastructure improvements, such as the installation of larger culverts to accommodate stream crossings, the use of longer lasting concrete in construction work, and the selection of more resilient structural materials for new buildings and infrastructure.

Reducing Forest Fire Risk

In collaboration with the Canadian Forest Service, CNL has developed a Sustainable Forest Management Plan (FMP) for the Chalk River Laboratories property. Informed by a detailed Light Detection and Ranging (LiDAR) survey of the site, which provided detailed information down to each individual tree, CNL developed a comprehensive model of the Chalk River Laboratories site forest. The FMP allows for modelling of different forest management scenarios which can be based on advancing specific forest attributes such as species-at-risk habitat, forest fire resiliency, carbon sequestration and storage, and habitat for large mammals important to indigenous peoples. This FMP is a vital tool for managing the Chalk River site into the future and can lead to improved outcomes for many forest attributes.

Forest fires are an important public safety issue in Ontario that can pose risk to communities and organizations like CNL, whose operations occur in a rural area surrounded by forest and wildlife. This plan establishes harvesting and planting strategies that would minimize these types of natural risks, and represents the best mechanism to prevent on-site forest fire risk to CNL assets and infrastructure.

Flood Prevention through New Culverts

One of the main impacts of climate change is the potential threat of flooding, and CNL recently took steps to address this risk. CNL replaced aging culverts at the Chalk River campus with much larger culverts, an infrastructure improvement that enables the campus to accommodate stream flows which are two to three times bigger than the previous culverts could safely manage, and are designed with a lifespan that is two to three times longer.

More Resilient Infrastructure & Buildings

While CNL is developing climate resilience planning in 2022 to ensure that this issue is incorporated into future decision-making for upcoming infrastructure and capital projects, it is important to recognize that recent upgrades to the Chalk River Laboratories have been built to high standards and building codes. And looking forward, new facilities being constructed will contain even more features and measures to ensure climate resilience.

For example, the Advanced Nuclear Materials Research Centre (ANMRC) is being designed with tornado and earthquake resistance features, and with consideration to other factors, such as an increase in cooling days, the increased risk of forest fires, and increased peak temperatures. CNL's Near Surface Disposal Facility also includes a storm water management system, and has been designed to withstand extreme weather events, including forest fires, earthquakes, tornados, flooding and extreme rainfall.

WATER AND WASTEWATER MANAGEMENT

Objective: Optimize the use of water and wastewater management practices.

For any organization, the withdrawal, consumption and release of water can have a major impact on the health and well-being of the local ecosystem in profound ways, and even wider impacts on the quality of life in an area, including social and economic consequences for local communities and Indigenous Peoples. As a result, CNL recognizes the importance of understanding how our water use and wastewater affects the environment, the economy and local communities.

Water Management at Chalk River Laboratories

The vast majority of water used by CNL is at the Chalk River Laboratories, which is also the largest focus of our conservation efforts. The campus is located in the Ottawa River catchment area in Ontario, which is part of the St. Lawrence River watershed. Water is drawn from three sources, including the Ottawa River, Corry Lake and groundwater, which is then spread out across various buildings and facilities, and used as service water, process water and fire water.

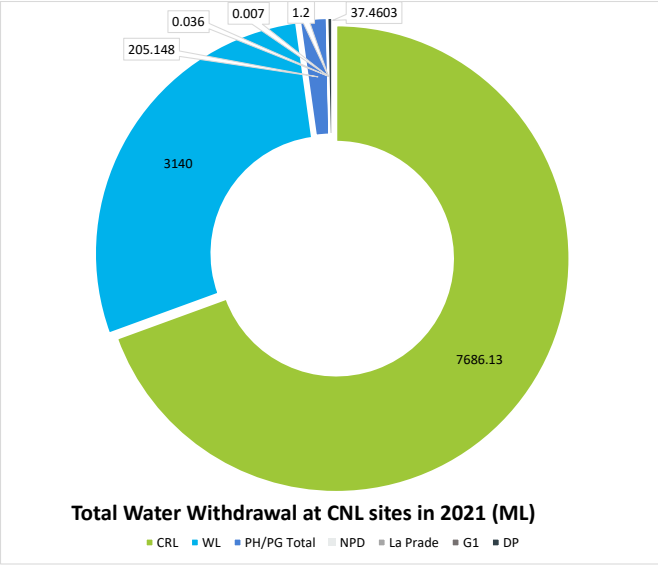
The majority of Chalk River's service water is supplied by nearby Town of Deep River municipal water, which is drawn from the Ottawa River. On average in 2021, approximately 45% of the incoming service water was directed through CNL's Sanitary Sewage Treatment Facility (SSTF) and safely discharged to the Ottawa River as effluent. The remaining 55% is directed directed to the process water drains on site and discharged through the process outfall to the Ottawa River. CNL's process water is drawn directly from the Ottawa River at the Chalk River location through pumps in our powerhouse, as is our fire water, which is only used in emergency situations.

Water Management at Whiteshell

At Whiteshell, CNL draws water directly from the Winnipeg River. The water is utilized by the site for various fire suppression systems, for site cooling in the summer and throughout the year for a variety of cleaning and sanitary purposes. With the current decommissioning work at Whiteshell, water is also used for misting to suppress dust during decommissioning operations.

The site returns the water it uses through a discharge outlet that releases effluent back to the Winnipeg River. The site also operates a small sewage lagoon that releases approximately 40,000 m3 (40 ML) of effluent on an annual basis. The lagoon effluent is released into a ditch system that delivers water back to the Winnipeg River. The site also has a Water Management System consisting of storm drains, which funnels water to our site discharge outlet, and a network of ditches that direct surface water runoff from our site back to the Winnipeg River.

In 2021, the Whiteshell site water usage increased by approximately 270%, going from 1,150 ML to 3,140 ML, primarily as a result of water misting as a dust control measure during building demolition.



SUSTAINABLE TARGETS FOR WATER AND WASTEWATER

At this time, CNL's sustainability objective is qualitative – to optimize the use of water and wastewater management practices. Our efforts include tracking, disclosing and understanding the key drivers of water consumption at all CNL sites, and minimizing water use for current and future activities, in order to establish more specific, quantitative reduction targets for water use and wastewater management in the future.

With respect to water and wastewater, CNL currently monitors and reports on its impact to the environment through water use in alignment with GRI standards.

Measuring Water-related Impacts at Chalk River Laboratories

The main discharges to the Ottawa River are the Process Outfall, the Sanitary Outfall, Powerhouse Discharge and several monitored storm outfalls. Because water is used in various nuclear facilities, and radioisotope, chemical and biological laboratories, CNL conducts various assessments to evaluate whether radiological or non-radiological contamination has occurred, including:

- For radiological parameters in liquid effluents, Derived Release Limits (DRL) are used to represent release rates that correspond to critical group exposures at the public dose limit. CNL operates with releases at a small fraction of the DRL to ensure that public doses are kept as low as reasonably achievable.
- A site-wide Environmental Risk Assessment is completed for Chalk River Laboratories every five years. This includes the comparison of measured liquid effluent results for radiological and non-radiological parameters to ecological screening and risk-based benchmark values to assess the potential for ecological effects.
- Liquid effluent monitoring results at Chalk River Laboratories are obtained through the Effluent Verification Monitoring Program, which are summarized and reported in an Annual Compliance Monitoring Report. This report is submitted to CNL's regulator, the Canadian Nuclear Safety Commission (CNSC), for approval.

The quality of effluent discharge at Chalk River Laboratories is assessed by comparison to a number of standards for radiological and non-radiological parameters. In 2021, there were 22 incidents of exceedances with non-radiological discharge limits. An exceedance is not necessarily indicative of environmental impact, but rather comparisons to these limits and further trending of routine results seeks to confirm the adequacy of controls on emissions, therefore driving continual performance improvement. Any upward trend or exceedance, if not coincident with planned work, is investigated with the source facility and when warranted, follow-up actions (changes/improvements) would be initiated to further reduce or minimize any risk to the environment and the public. There were no exceedances of radiological limits from facility effluents in 2021.

Table 4: Total Water Intake at all CNL sites in 2021 (ML)

Withdrawal Source	CRL	WL	PH/PG	NPD	La Prade	G1	DP	Total
Surface Water	7,343.8	3,140	185.67	0.007			0.059	**10,669.54**
Groundwater	0.23		0.15				37.4	**37.78**
Third Party Water	342.1		19.33		1.2	0.036	0.0013	**352.59**
Total	**7,686.14**	**3,140**	**205.15**	**0.007**	**1.2**	**0.036**	**37.46**	**11,069.98**

CNL's Environmental and Effluent Monitoring Program

As part of our commitment to understand and reduce the impacts of our operations on the environment, CNL maintains an extensive environmental monitoring program that tracks potential contaminants throughout the geosphere, atmosphere, and biosphere. The monitoring and evaluation of environmental impacts from CNL operations is carried out using a wide range of effluent, groundwater, and environmental monitoring activities that enable the measurement of potential contaminants in every significant environmental compartment.

Monitoring is conducted on a multitude of media, including air emissions, liquid effluent, groundwater, ambient air, surface water, vegetation, soil and sediments, fish, and game animals. More than 60,000 analyses are performed annually for radionuclides, major ions, trace elements, and a broad range of organic compounds. From direct release monitoring to contaminant pathways monitoring and biological effects monitoring, this integrated approach means that the evaluation of impacts on the environment from our operations is carried out in a comprehensive manner, and is effectively used to demonstrate protection of the environment and the health and safety of the public.

800 Million Environmental Data Points

To help guide environmental planning, CNL maintains a centralized, GIS-based Environmental Data Management System, which holds over 800 million historical environmental data records. This central repository maintains company-wide environmental data ranging from air emissions and liquid effluent data, soil, surface water, groundwater, vegetation, ambient air, game and wild animals, to biodiversity and cultural heritage information. It also serves as a focus point for environmental risk assessments, allowing for efficient data sharing and a multidimensional viewpoint and analysis capability. All data is GPS-referenced and accessible via a map interface that presents the data within spatial themes that includes infrastructure, topography, surficial geology, water features and forest inventory, showcasing spatial relationships that are inherent to environmental data. Analytical opportunities arise from the sheer abundance of data, serving as an important resource for environmental risk assessment and for collective decision-making and actions concerning the management of CNL sites.

Every year, CNL performs more than 60,000 analyses to monitor for radionuclides, major ions, trace elements, and a broad range of organic compounds, conducted on samples that include air emissions, liquid effluent, groundwater, ambient air, surface water, vegetation, soil and sediments, fish, and game animals.

WASTE MANAGEMENT

Objective: Prevent and minimize the production of conventional waste, wherever possible, while reusing and recycling waste when it is generated.

CNL works to safely manage our operational waste. As part of the ongoing program of work at CNL, clean waste is generated both routinely and through project-specific means, both of which adhere to CNL's Waste Management Process for the safe and secure management of waste.

Waste is managed following corporate strategies and approved processes in accordance with all regulatory requirements and guidance. CNL's Integrated Waste Strategy provides the framework for the lifecycle management of all waste types across CNL-managed sites, with a focus on lifecycle planning and optimization. External contracting services are utilized at CNL sites to follow sustainable practices which promote a circular economy, including the disposition of waste to reuse and recycle, as well as hazardous waste processing.

Waste minimization opportunities are considered for all routine waste and project-specific waste according to an approved Waste Management Plan, as part of CNL's Waste Management Process. For example, clean metal is segregated at source from other waste streams for recycling at an external contracting service. In 2021, approximately 97 m3 (28,437 kg) of secure paper material was generated at Chalk River Laboratories, 100% of which was recycled. Waste Electrical and Electronic Equipment (WEEE) is continually diverted through external service providers for reuse and recycling as part of CNL's on-going sustainability practices. In 2021, approximately 30 m3 (10,480 kg) of WEEE was collected and dispositioned for recycling at the Chalk River campus.

IMPROVING CNL'S WASTE MANAGEMENT FUNCTION

In order to implement waste management improvements, an analysis was initiated in 2021 to determine probable causes for low diversion rates from landfill. The Waste Management Function has responded by developing an updated Waste Management Process with a focus on upfront improvements to waste planning, waste characterization, and certification processes. The Waste Management Function has also enhanced its Management System documentation to enable CNL to adapt to the changing regulatory requirements and guidance, in alignment with federal sustainability priorities.

Looking forward, the Waste Management Function will place greater emphasis on compliance activities through waste surveillances at CNL-managed sites. The Waste Management Function will be conducting an audit of CNL's clean waste process, which will further identify areas where maximum waste diversion can be achieved. These planned surveillances will provide opportunities to identify specific actions to reduce waste, as well as increased monitoring and follow-up. Ongoing improvements to waste certification will also help to monitor and track the efficient use of CNL's sustainable resources, including inactive landfill, waste management storage facilities, and other disposition routes. This, coupled with improvements to employee awareness and communications through waste management training, will help establish the foundation for an improved waste management culture at CNL.

Integrated Waste Strategy

CNL's Integrated Waste Strategy ensures that responsible waste management is an integral component of every aspect of our work, and that it is carried out uniformly in every location across the country. It is also an aspirational strategy, encouraging employees to constantly seek waste management improvements and take action when and where they can.

The strategy also defines the processes for managing waste, including the steps to correctly plan, assess, characterize, segregate, package, transport, process, store, and dispose of waste. This ensures that all waste generated or received at CNL-operated sites not only meets the necessary standards and requirements, but is managed in a safe and environmentally responsible manner.

Sort and Segregation Pilot Project
At the Chalk River campus, CNL initiated the Sort and Seg pilot project to retrieve and segregate legacy waste stored within the Waste Management Areas for further characterization. Through the application of modern techniques, waste inventory changes are expected as the waste characteristics of historical waste packages are further understood. In 2021, the Sort and Segregation Pilot Project processed 107,311 kg of waste in these areas, 18% of which was clearable by weight and dispositioned as clean (confirmed to be free of radiological contaminants) through a waste clearance process.

Ambitious Waste Management Targets

CNL's Waste Management Function monitors and tracks progress on waste sustainability goals and targets using the following metrics for clean waste:

Diversion from Landfill from Designated Office Spaces
This metric measures the diversion rate from buildings or areas deemed to be office spaces through central sorting stations, and includes recycling and organic bags. CNL has set a target waste diversion rate of 90% for the Chalk River Laboratories site and 75% for other CNL sites.

Overall Recycle Rate
This metric represents the percentage of total wastes being generated that are being diverted away from either storage or landfill, and includes concrete reuse, conventional recycling, and composting. CNL has set a target overall recycling rate of 75% for the Chalk River Laboratories site and 50% for other CNL sites.

Minimizing Plastic Waste
The reduction of plastic waste is recognized as a growing priority within industry, and the Government of Canada has established targets to reduce plastic waste in this country, including a diversion target of 75% from landfill by 2030. Currently, CNL does not meet the specified diversion target. CNL acknowledges the priority for plastic waste reduction and is doing its part to help meet national sustainability targets. A CNL Sustainability Group has been enacted to help drive these improvements.

RADIOACTIVE WASTE MANAGEMENT

Objective: Support the Government of Canada's commitment to a clean and healthy environment for Canadians.

CNL is managing the delivery of major decommissioning, environmental remediation and radioactive waste management projects across the country. These activities are designed to safely manage risks, hazards and liabilities, as well as address the Government of Canada's long-term management and disposal of radioactive waste.

This work encompasses the largest and most complex environmental remediation projects ever undertaken in Canada. In addition to the cleanup of the Chalk River campus, it includes the Whiteshell Laboratories, a former national research laboratory undergoing decommissioning, and the Port Hope Area Initiative, where CNL is cleaning up historic low-level radioactive waste in the municipalities of Port Hope and Clarington. A number of major environmental remediation projects are also in various stages of planning, design and development, including the Near Surface Disposal Facility (NSDF) project, the Nuclear Power Demonstration (NPD) Closure Project, and the WR-1 In Situ Decommissioning.

The Cleanup Function

The Cleanup Function ensures that all CNL work is compliant with the latest regulations and industry best practices, providing employees with the guidance, tools, and support they need to enable the effective and appropriate cleanup of CNL-managed sites. This includes guidance on site-wide planning, a focus on public and Indigenous engagement to establish next land uses and end states, and emphasis on the need for capital projects to consider the end states at the beginning of the lifecycle.

The Cleanup Function is made up of three separate programs – the Land Use program, the Decommissioning and Demolition program, and the Environmental Remediation program.

- The Land Use Program enables sites to plan decommissioning and environmental remediation on a holistic, site-wide basis. It guides sites in determining what land uses and end states should be targeted, and this is captured in an overview cleanup plan for each site.
- The Decommissioning and Demolition program, and the Environmental Remediation program work together to ensure that buildings, affected lands, and other environmental media are appropriately cleaned up to the right next land uses and end states.

THE CLEANUP PLAN FOR CHALK RIVER LABORATORIES

The Chalk River Laboratories Overview Decommissioning and Cleanup Plan (ODCP) documents CNL's strategic cleanup approach to the decommissioning and environmental remediation of buildings, infrastructure, and affected lands. The ODCP will allow CNL to integrate the overall cleanup plan with operational needs and revitalization efforts to ensure CNL's long-term science and technology mission is sustainable at the Chalk River campus.

CNL has a Public Information Program that ensures stakeholder, public and Indigenous engagement is conducted on an ongoing basis, which is vital in developing confidence and trust in the cleanup process. To bring new voices from the Renfrew and Pontiac communities into dialogue with CNL, the Chalk River Laboratories Community Advisory Panel (CAP) was established in 2021.

Through the CAP, CNL hopes to increase public understanding of our work, better comprehend the diverse perspectives of local communities, and enable members of the community to access first-hand knowledge about CNL activities. Discussions between CNL and the CAP focus on the projects and activities that are subject to licensing and environmental regulation, as well as those that may affect the social and economic life of the community. This includes an ongoing focus on the CRL ODCP. Introductory sessions on the CRL ODCP have also been held with some Indigenous communities and CNL is working together with these communities to pursue further engagement through the development of a long-term relationship agreement.

CNL is managing the delivery of the largest and most complex environmental remediation projects ever undertaken in Canada. In addition to the cleanup of the Chalk River campus (below), it includes the Whiteshell Laboratories, the Port Hope Area Initiative, and a number of prototype reactors.

Near Surface Disposal Facility: The Right Solution for Low Level Waste (LLW)

CNL executives and subject matter experts participated in the final series of regulatory hearings concerning the Near Surface Disposal Facility (NSDF) project before the Canadian Nuclear Safety Commission (CNSC) in spring of 2022. The CNSC is considering CNL's application to amend its operating licence to authorize the construction of the proposed NSDF, and the hearing presented another opportunity for Indigenous communities and members of the public to participate in the regulatory review process for the project.

The proposed NSDF is an engineered containment facility planned to be built at the Chalk River campus to enable the permanent disposal of decommissioning waste from more than 100 legacy buildings and structures at the site, as well as waste from 70 years of science and technology research, contaminated lands, and continuing operations. The facility is designed to contain one million cubic metres of low-level radioactive waste in a multi-layer base liner and cover system, and features a dedicated waste water treatment plant to safely remove contaminants from any precipitation that enters the facility. If approved, construction of the facility will begin in 2023.

Completion of the Port Granby Project

In May 2022, CNL celebrated the completion of the Port Granby Project with members of the Clarington community. Undertaken as part of the Port Hope Area Initiative (PHAI), the Port Granby Project involved the safe excavation and transfer of low-level radioactive waste from an unstable site to a newly constructed long-term waste management facility.

In total, over 1.3 million tonnes of waste excavated from the Lake Ontario shoreline in Southeast Clarington is now safely stored in the engineered, aboveground storage mound that was capped and closed in fall 2021.

Phase 3 Decommissioning at Douglas Point

Following a series of public hearings, the CNSC recently announced its decision to amend the waste facility decommissioning licence issued to CNL for the Douglas Point Waste Facility (DPWF).
The DPWF has been in a safe, shutdown state of storage-with-surveillance for more than three decades, which has allowed for sufficient radioactive decay required to reduce radiological risk to workers as we progress into the next phase of decommissioning. The amended license now allows CNL to begin Phase 3 decommissioning activities, including the decommissioning and dismantlement of certain facilities and structures at the site.

SITE PROFILE: WHITESHELL LABORATORIES

Located in Pinawa, Manitoba, the Whiteshell Laboratories is the second largest AECL site operated by CNL. It was established in 1963 as a research laboratory, with a focus on the largest organically cooled, heavy water moderated, nuclear reactor in the world, the WR-1.

In 1998, the Government announced the closure of the Whiteshell Laboratories, and decommissioning activities have been underway since then in order to protect the environment. With increased emphasis placed on tackling its environmental and decommissioning responsibilities, AECL has asked CNL to accelerate the decommissioning of the Whiteshell Laboratories site. As a result, CNL is proposing to decommission and close the site by 2027, well ahead of schedule. The acceleration of the decommissioning of the site includes a proposal to decommission the WR-1 reactor in situ, which is currently undergoing an Environmental Assessment.

The Demolition of Building 200
Building 200 served as Whiteshell's active liquid waste treatment center, and due to the radiological contamination present in the building, it was one of the more challenging buildings to decommission and demolish. Demolition of the building began in the fall of 2020, but it was not completed before the winter weather came to Manitoba, requiring a pause to the project.

Demolition activities were resumed in May of 2021, and continued until October of 2021. The crawl space of the building still requires remediation, and this will occur once the surrounding areas are also ready for remediation. In the meantime, a temporary geomembrane has been laid across the walls and floor of the crawl space to demark and shelter the soil that still requires remediation.

The Demolition of Buildings 305 and 402
Building 305 was Whiteshell's accelerator application research facility, while Building 402 was used as an occupational health services building. The facilities were attached, and their demolition began in September of 2021. The process was safely completed in March of 2022 and included remediation of the site's footprint. Site restoration by backfilling is required before the next land use can be realized. In the meantime, CNL is currently planning to install a modular office complex on the building footprint to temporarily house the staff who currently reside in a building scheduled for decommissioning.

WR-1 Reactor Decommissioning
The WR-1 reactor at Whiteshell played a significant role in Canadian nuclear history. It was built by General Electric and first achieved criticality in 1965. It served as a research reactor for twenty years, including as a testing site for the CANDU fleet. It was safely shut down in 1985, and has been maintained in a state of "storage with surveillance" since then.

CNL is proposing to decommission and safely leave the reactor in place at the Whiteshell site. All fuel and liquids have been removed, and only the structural components of the reactor, such as the vessel and piping, remain. CNL's proposed approach – in-situ decommissioning – will provide a safe, secure and effective disposal solution for the existing contaminated below-grade building and components. This approach minimizes the risks to the health, safety and security of the public, workers and the environment. It also avoids the need for transportation of contaminated components and to find another licensed location and facility for disposal.

BIODIVERSITY

Objective: Responsibly manage AECL sites and activities to ensure the protection of local wildlife and the environments that surround them.

At CNL, we recognize that the sites we manage are located in some of the most beautiful locations in the world, and that our work is carried out on the habitat of a rich variety of plant and animal species. In conducting our operations, we are committed to carrying out our work in harmony with the local environment, ensuring the protection of biodiversity that inhabit our sites – the unique variety of plants, animals, insects and aquatic life – for future generations.

This commitment is reflected in our ISO 14001 certification, which CNL has maintained at the Chalk River Laboratories site since 2004 and the Whiteshell Laboratories site since 2010. With more than 300,000 certifications in 171 countries around the world, ISO 14001 provides assurance that our environmental impact is being carefully measured and improved.

More importantly, CNL takes care of its surrounding environment because it is the right thing to do. As Canada's national nuclear laboratory, it is vital that we lead by example in environmental stewardship. For this reason, CNL has an Environment Policy which ensures that protection of the environment is an integral component of our decision-making in all phases of our business activities, including project development, project planning, project implementation, operations and decommissioning. We also focus our environmental efforts on minimizing nuclear legacy obligations for future generations.

Bird-friendly Buildings
In the design of its new buildings, CNL put a lot of care attention into the protection of birds, which can often injure themselves on windows or other building features.

The new buildings under construction at CNL incorporate bird-friendly designs to prevent these types of collisions and incidents. Among other features, the Science and Collaboration Centre uses a glazed window with an internal timber grid, which provides light tones, sun and glare protection, and will serve as a visible deterrent which should help prevent bird strikes.

Reptile and Amphibian Eco-passages
As part of its turtle road mortality mitigation plan, CNL recognized an important opportunity to better protect species at risk at the Chalk River Laboratories campus when it replaced some road culverts that were nearing the end of their design life. Most of the culverts around the site were undersized and needed to be larger in order to encourage wildlife such as turtles to use these passageways instead of crossing over the road.

To date, a total of seven eco-passages have been installed in the past two years to allow the free inter-wetland movement of reptiles and amphibians without having to cross the road. CNL also built exclusion fencing to direct animals towards crossing structures, as well as artificial nesting mounds within the eco-passage area to help limit the need for turtles to cross roads to access suitable nesting habitat. All eco-passages have been successful and used by several species including, bats, raccoons, snapping turtles, bears, and the iconic Blanding's turtle.

AGGRESSIVE TARGETS, NO COMPROMISE

CNL has established aggressive targets to minimize the use of undisturbed lands and conserve the habitats of its animal populations, which include:

- 0% loss of species at risk
- 0% loss of critical habitat for species at risk
- 95% land conversion avoidance
- Incorporating Indigenous Traditional Knowledge into our biodiversity work

Understanding our Bat Population
In collaboration with Trent University, CNL recently completed a two-year telemetry study on its bat population. With a permit issued by Environment and Climate Change Canada under the Species-at-Risk Act, the project encompassed the live trapping and release of bats at the point of capture, and tracking of the species to their roost over the subsequent days. The information was used to develop a Habitat Suitability Index, which demonstrates areas of the site where preferred bat habitat was previously unavailable.

The study helped CNL to confirm that the 16 bat boxes which had been installed in eight locations at the Chalk River Laboratories site were being used by Little Brown Myotis bats. Lactating female bats were also monitored exiting the bat boxes, which confirms that the bat boxes are being used as maternity roosts as intended, which is a key habitat for bats.

Managing our Forest
CNL has nearly finalized our Sustainable Forest Management Plan, which was developed in collaboration with the Canadian Forest Service. In addition to information collected through its telemetry study on bats, wildlife habitat that were modeled to develop optimal harvesting scenarios included moose, deer, and bear. CNL is now engaging with local Indigenous communities to finalize the plan, ensuring that all of the values that are important to these communities have been carefully assessed and considered before CNL advances to the implementation phase of the project.

This plan was recognized by the Canadian Forest Service (CFS), which awarded CNL the CFS Merit Award for Collaboration for 2022 as part of their annual CFS Assistant Deputy Minister Merit Award Program. This award honours employees who demonstrate successful and collaborative leadership, working within the CFS to demonstrate respectful and collegial working relationships, creativity and innovation in engaging partners and stakeholders, dedication and integrity, and collaborative approaches to achieve organizational objectives and goals.

In 2022, CNL received the WHC 2022 Reptiles and Amphibians Project Award for our turtle eco-passages, and the CFS Merit Award for Collaboration for our Forest Management Plan.

Environmental Excellence: WHC Gold Certification
This year, CNL was once again recognized by the Wildlife Habitat Council (WHC) for its commitment to environmental stewardship in the management of the Chalk River Laboratories campus. The WHC awarded CNL with Gold Certification for the site, a designation that CNL also received in 2019, and which represents the highest tier of environmental certification given by the WHC.

In addition to the WHC certification, CNL also received the WHC 2022 Reptiles and Amphibians Project Award for the installation of new turtle eco-passages at the Chalk River campus, was named a finalist in the WHC 2022 Bats Project Award for their bat telemetry study and bat box monitoring project, and was a candidate for the Gold Program Award, which recognizes one exceptional program in the Gold Certified tier.

SOCIAL RESPONSIBILITY

With respect to social responsibility, CNL is committed to a safe, healthy and inclusive work environment for our staff, engaging with members of the public and Indigenous communities about our program of work, and helping to advance societal health and well-being. With this responsibility in mind, CNL has established a number of new programs in recent years to support employees, strengthen community initiatives and better engage local residents, nurturing healthier communities near our sites.

INDIGENOUS RELATIONS

Objective: Participate in meaningful engagement activities with Indigenous communities, in an open and cooperative way, to pursue a mutual understanding of shared interests and opportunities in CNL's work.

CNL believes that the inclusion of Indigenous knowledge into our projects and organizational decision-making not only helps to improve our work, but it builds trust and understanding between CNL staff and Indigenous communities whose traditional territory is in proximity to CNL-managed sites. This work is delivered in coordination with Atomic Energy of Canada Limited (AECL).

CNL maintains a commitment to ongoing proactive engagement with Indigenous Peoples regarding the activities that we undertake to protect the environment, manage legacy waste and advance new, exciting technologies to produce clean energy and save lives. In addition to this information sharing, Indigenous communities continue to be interested in cultural heritage as it relates to our sites and program of work, including archaeological studies and environmental monitoring.

A Call to Action & FPIC

One of the Calls to Action delivered in the Truth and Reconciliation Commission report from 2015 calls upon corporate Canada to act and help advance the process of reconciliation. As a company, CNL also acknowledges the United Nations Declaration on the Rights of Indigenous Peoples, and the clauses pertaining to Free, Prior and Informed Consent (FPIC) as a framework that recognizes the basic human rights and rights of self-determination of Indigenous Peoples. We are committed to engagement in the spirit of FPIC, as well as the long-term provision of sustainable benefits from economic development, and education and training for staff and management about the history of Indigenous Peoples.

Guided by this report and declaration, CNL is now developing a Reconciliation Action Plan to help guide how we engage with Indigenous communities, and to ensure their perspectives are embedded in the work that we do. Not only that, CNL will incorporate ways in which we can make the campus as a whole more Indigenous-friendly and welcoming; the recent renaming of a new building at the gates of the Chalk River Laboratories with an Algonquian name, Minwamon, is one example of reconciliation in action. This reconciliation planning considers:

- How CNL can actively promote economic reconciliation and prosperity with Indigenous communities and businesses
- How CNL can help Indigenous communities build capacity and increase our spending on local, Indigenous suppliers, wherever possible
- And, how CNL can ensure our staff gain a deeper understanding about the history of Indigenous Peoples in Canada, especially those Indigenous nations whose territory is in close proximity to the projects that we manage

Through the development and implementation of this action plan, CNL is working to establish positive, long-term relationships with Indigenous communities based on mutual understanding and respect. These efforts will be complemented by periodic check-ins with these communities as part of our continued engagement to verify whether we are meeting their expectations for meaningful engagement, and if not, how we can improve.

CNL is also evaluating how our supply chain and procurement processes can be adapted to encourage and include Indigenous business participation, either as a direct supplier of goods and services, or as a sub-contractor to one of our prime contractors, who could coach Indigenous businesses about working within the nuclear sector. CNL is currently developing an Indigenous business portal where Indigenous businesses can register directly and obtain guidance on how to access contracting opportunities or sub-contracting opportunities within CNL-managed projects. Overall, CNL will continue to seek out opportunities to improve how we work with Indigenous businesses, organizations and communities.

Working towards Long-Term Relationship Agreements

As part of the Environmental Assessment process for CNL's environmental remediation projects, CNL has worked to develop strong relationships with First Nations, Métis and other Indigenous communities and organizations, by providing meaningful opportunities for project dialogue and participation.

CNL initiated this outreach by asking these Indigenous communities if and how they wanted to be engaged. With that guidance, CNL has maintained an ongoing dialogue that has been oriented towards the needs of each community. We have also provided capacity funding to help interested communities participate in our engagement activities and initiatives. Since that work began, CNL and AECL have both signed Memorandums of Understanding with the Métis Nation of Ontario, the Algonquins of Ontario and the Algonquins of Pikwakanagan First Nation. We have also signed a Letter of Intent with Kebaowek First Nation that established a commitment to work together. In addition, we have signed Contribution Agreements with Curve Lake First Nation, Smith's Landing First Nation, the Historic Saugeen Métis and the Métis Nation of Ontario. These agreements will guide dialogue on matters of mutual interest, and work towards establishing longer-term relationship agreements.

Clear Path: The Minwamon Building

In December 2021, the Algonquins of Ontario honoured both AECL and CNL by bestowing a name upon their new site entrance building at the Chalk River Laboratories. Now known as the Minwamon Building, which means 'clear path' in the Algonquin language, the facility was officially inaugurated during a ceremony held at the Chalk River campus. The gifting of the new name for the Minwamon Building is another positive step in pursuit of CNL's recognition of Indigenous rights and is part of a broader effort between AECL, CNL and the Algonquins of Ontario to formalize a long-term relationship.

Patricia Stirbys Joins CNL as Director of Indigenous Relations

This year, CNL was pleased to welcome Patricia Stirbys as our new Director of Indigenous Relations. A citizen of Cowessess First Nation, Ms. Stirbys is an accomplished lawyer with extensive experience leading Indigenous consultation and engagement activities for both private and public sector organizations, and will oversee CNL's efforts to grow its relationships with Indigenous Peoples.

Among her responsibilities as Director of Indigenous Relations, Patricia will help CNL to improve its Indigenous engagement practices to better align with the needs and interests of local Indigenous Peoples, and to build capacity through long-term relationship agreements. Patricia will also play a leadership role in cultivating collaboration in areas including environmental monitoring and protection, human resources, cultural heritage, and diversity, equity and inclusion, among others.

INDIGENOUS RELATIONS TARGET

Zero incidents or violations of the rights of Indigenous peoples.

SITE PROFILE:
PORT HOPE AREA INITIATIVE

The Port Hope Area Initiative (PHAI) represents the Government of Canada's commitment to the cleanup and safe, local, long-term management of historic low-level radioactive waste (LLRW) in two Southern Ontario municipalities – Port Hope and Clarington. The waste is the result of radium and uranium processing in Port Hope between 1933 and 1988 by the former Crown Corporation, Eldorado Nuclear Limited, and its private-sector predecessors.

The PHAI is based on community-recommended solutions for the cleanup and safe long-term management of approximately 1.7 million cubic metres of LLRW. It is currently one of Canada's largest environmental remediation projects, and it is being carried out as two individual projects – the Port Hope Project and the Port Granby Project. As part of our pursuit of more sustainable operations, CNL is also developing a site-specific sustainability plan for the PHAI that will contribute to the company's broader sustainability objectives.

Indigenous Engagement at PHAI

In support of CNL's Reconciliation Action Plan, CNL is in the process of developing and implementing a distinct PHAI Indigenous Communications & Engagement Program (ICEP) in 2022. The program is being developed in consultation with Indigenous organizations and representatives, and will be implemented in tandem with the PHAI Public Information Program (PIP). In addition to ICEP, CNL will further enhance all communications, plans and reporting to incorporate more balanced language and acknowledgement of Indigenous rights and perspectives. As CNL advances on this journey, Indigenous knowledge will also be integrated into our PHAI project planning and activities.

In addition to the hiring of Patricia Stirbys as CNL's Director of Indigenous Relations, CNL has further expanded its PHAI resources with the addition of a Senior Advisor of Indigenous Relations, a brand new position who will help to lead these efforts.

Port Granby Long Term Waste Management Facility - Over 1.3 million tonnes of waste excavated from the Lake Ontario shoreline in Southeast Clarington is now safely stored in the engineered, aboveground storage mound that was capped and closed in fall 2021.

Ongoing Engagement Activities at PHAI

Following the successful completion of PHAI milestones in 2012, the Mississauga communities of the Williams Treaties First Nations requested regular updates about the PHAI projects. In recent years, CNL has also shared PHAI project updates with representatives from the Anishinabek Nation and Métis Nation of Ontario (MNO).

Other Indigenous Peoples who live in proximity to the project, or who have shown interest in similar local projects, have been identified for their potential interest in the PHAI, including the Mohawks of the Bay of Quinte (MBQ) and local Métis Councils. Over the years, CNL has provided these communities with project information to foster increased awareness and understanding about our work. CNL also regularly extends invitations to these communities for special events, including Industry Day, career fairs and information sessions.

In early 2021, PHAI updates were provided through sessions with staff, consultants and other Grand Council representatives from Anishinabek Nation, some of which included participation from Alderville First Nation. Later that year, CNL engaged the MBQ to gauge whether there was interest in arranging in-person meetings with CNL, given their interest in the Port Granby Project licence extension application. At the suggestion of MBQ staff, CNL will reconnect in 2022 once pandemic restrictions lift.

Finally, in early 2021, CNL provided PHAI presentations and virtual tours of project sites for MNO representatives, staff and Region 5 and 6 councillors. Later that year, a more focused session with MNO representatives focused on the remediation of the Port Hope Harbour and waterfront area sites, followed by a session in late 2021 that shared details related to CNL's application to amend the PHAI Cleanup Criteria.

Monthly Meetings with Williams Treaties First Nations

Last year, at the request of Curve Lake First Nation, CNL's Indigenous Relations team established monthly meetings with representatives from the Mississauga First Nations as well as the Chippewa communities of Beausoleil, Georgina Island and Rama First Nations. The meetings and agenda are developed with input from the community representatives, and each meeting includes a focus on CNL's environmental remediation projects or interests identified by these communities. This past fiscal year, these topics included an overview of the Port Granby Project, the Port Hope waterfront remediation and CNL's application to amend the PHAI Cleanup Criteria. As pandemic restrictions lift in 2022, Williams Treaties First Nations has requested that in-person meetings commence.

"At CNL, we fulfill a key role on behalf of the Government of Canada and our commercial customers, ensuring that they have the nuclear science and technology products and services they need, which supports a strong Canadian economy, a clean environment and a healthy society. This work simply wouldn't be possible without the support of our local communities, which is why we are fully committed to maintaining on-going, timely and two-way communications and engagement with the public, ensuring that they understand our work, and we understand their concerns."

Lou Riccoboni, Vice-President of Corporate Affairs

COMMUNITY ENGAGEMENT

Objective: To enable respectful and open dialogue with the public, local municipalities, and Indigenous communities regarding CNL's program of work.

It is only through the support of our local communities that CNL is able to provide our government and commercial customers with the nuclear science and technology services they need, while contributing to a strong economy, a clean environment and a healthy society.

As a result, CNL works hard to develop and maintain strong, long-term relationships with residents in the local communities where we work, as well as the companies we do business with, and the public at large. We do so by communicating in a timely manner, exchanging information, and by listening to our stakeholders and working with them to resolve their concerns.

To gather feedback and input from our local communities, CNL has invited members of the public to participate in different groups and committees at a number of our sites. This includes the Environmental Stewardship Council, which meets regularly to discuss activities at the Chalk River Laboratories, and the newly formed Community Advisory Panel. CNL also hosts a Public Liaison Committee at the Whiteshell Laboratories, and a Port Hope Project Citizens Liaison Group for the Port Hope Area Initiatives.

Chalk River Laboratories Community Advisory Panel

The new Community Advisory Panel (CAP) at Chalk River Laboratories aims to welcome new voices from the community into an ongoing dialogue between CNL and the Renfrew and Pontiac region. Through the CAP, we hope to increase understanding of our work, hear more diverse community perspectives, and enable members of the community to access first-hand knowledge about CNL activities.

Discussions between CNL and the CAP focus on activities that are subject to licensing and environmental regulation, as well as activities that may affect the social and economic life of the community. CNL hosts meetings four times a year, which are managed by independent third-party facilitators.

NO STONE UNTURNED
CNL'S COMMUNICATIONS VEHICLES

- Community Newsletters
- Regular Social Media Updates
- News Releases & Announcements
- YouTube Videos
- Briefings for Local Elected Officials
- Information Sessions
- Site Tours & Visits
- Speakers Bureau
- CNL Alumni Updates
- School Resources & Presentations
- North American Young Generation in Nuclear (NAYGN) Chapter
- Performance Reporting
- Community Information Bulletins
- Public Webinars

Community Update: Public Webinar

This year, AECL and CNL hosted a live public address to provide the community with an update on their progress to build a bright, successful and sustainable future for the Chalk River Laboratories. The webinar was accessible through CNL's website and streamed on CNL's social media platforms, and discussed topics that included the revitalization of the Chalk River site, as well as new and exciting projects underway in clean energy, public health and environmental stewardship.

The webinar served as an opportunity for the public to better interact and engage with both organizations, and to learn more about the many exciting projects that are underway to grow the nuclear science and technology programs carried out at the site.

Measuring Public Attitude

This year, CNL conducted a survey with Nanos Research to gauge public attitude towards CNL, which was completed randomly by phone with more than 500 residents within Renfrew and Pontiac counties. Among the key findings:

- There is broad awareness about CNL in the community
- There is growing awareness about the work being conducted at the Chalk River Laboratories, including site revitalization, the NSDF project, and CNL's small modular reactor (SMR) program
- A clear majority of local residents have confidence that the staff at the Chalk River Laboratories site have followed the necessary regulatory review process in developing their proposal for the NSDF and in their capabilities to safely construct and operate the facility.

The survey also provides CNL with insight into the effectiveness of its public engagement program and evolving public perceptions since 2018, when CNL last conducted the survey. Among the improvements in public awareness and confidence, results show increased awareness of Chalk River Laboratories, CNL's activities to revitalize the campus, CNL's NSDF project, and CNL's SMR program.

Social Media
Twitter, Linkedin, Facebook, Instagram, YouTube

CNL's social media platforms have become an integral part of our communications program to engage with the public. They are used to disseminate information in a timely manner, cultivate public interest in our program of work, and to draw attention to CNL news, events and public engagement opportunities.

In 2021, CNL's social media statistics included:

- Twitter: 72 Posts, 1,625 Followers, 282 Likes, 126 Retweets
- LinkedIn: 103 Posts, 18,835 Followers, 7,820 Reactions, 646 Shares,
- Facebook: 260 Posts, 4,846 Followers, 13,501 Reactions, 2,749 Shares,
- Instagram: 69 Posts, 715 Followers, 1,425 Likes, 31 Comments,
- YouTube: 16,075 Views, 538 Subscribers, 797.9 Watch Time Hours

HEALTH AND SAFETY

Objective: Maintain a work environment that protects the health and safety of employees, controls workplace hazards, and is free of workplace injuries and illnesses.

CNL emphasizes continual improvement of our health and safety performance. While CNL's primary focus is prevention, we also provide processes for emergency response and mitigation. To achieve this goal, CNL promotes health and safety through the provision of information, training, instruction and supervision. Employees are required to participate in these activities, and to report concerns in order to help identify hazards and ensure that the necessary safety measures are in place to protect one another.

CNL acknowledges and embraces its responsibility
to provide a safe and healthy working environment for all its employees,
contractors and visitors to our sites.

CNL's Safety Excellence Vision

In 2021, CNL developed a new Safety Excellence Vision using the input of various committees and employee groups across the company. The triangle represents our complete Health, Safety, Security and Environment Management System Framework, which is at the core of all of our improvement efforts. Three core aspects to health and safety – compliance, protection and improvement – surround the triangle, while the arrows represent the five core tenets of the vision, including empowerment, communication, engagement, collaboration and accountability. The arrows also acknowledge that our philosophy is a continuous improvement cycle that acknowledges we can always improve our safety posture, and that safety excellence is a journey and not a destination.

A Safety Excellence Team (SET) was formed in 2021 representing working groups from all of our major CNL missions and sites, including staff with diverse positions, job knowledge, tenure and skills that are well respected and looked to for support and advice from their colleagues. This team has developed a four year implementation plan to accompany the Safety Excellence Vision, which identifies 15 core objectives and encompasses 67 actions that are planned over the next four years. These actions are all focused on closing the identified gaps in our approach to safety and are meant to facilitate overarching cultural improvements that propel us towards safety excellence.

2021-2022 Improvements to the OSH Program

Conventional health and safety is implemented through CNL's Occupational Safety and Health (OSH) Program and our Health Centre Program. In 2021, OSH revised a number of procedures and standards arising from legislative changes, revisions to reference standards, or for the purpose of program continual improvement. OSH also consolidated its reporting structure to ensure efficient use of resources, clarify lines of reporting, and to increase responsiveness to stakeholder needs. Recent improvements to the OSH Program include:

- Revisions to CNL's procedure for Hazardous Energy Control procedure to ensure consistency of documentation
- Increased coordination between the Radiation Protection and the OSH with respect to standards for respiratory protection, in line with regulatory changes
- Completed major construction activities as part of a project to renovate and modernize the Industrial Hygiene Lab at Chalk River Laboratories, which will increase CNL's ability to collect and analyze samples for a range of workplace hazards
- Significant changes to the laser safety procedure, based on evolving best practices and revision of relevant standards
- Creation of a formal list of OSH program roles to identify single points of contact for technical areas within OSH
- Progress to an ongoing project that seeks to strengthen our ability to maintain an accurate "real-time" inventory of hazardous substances in the work place

Enhancements to the Health Centre Program include:

- Creation of an Ergonomics Specialist position, to support the transition to remote work by a number of employees
- Actively addressed COVID-19 pandemic concerns and implemented numerous mitigating measures, aligned with public health protocols, to prevent or limit the spread of the COVID-19 virus
- The Health Centre recruited a Wellness Specialist in the fall of 2021 to coordinate wellness activities and assist in the promotion and delivery of employee supports geared towards digital workers
- CNL expanded its virtual psychologically safe workplace and mental health services to assist employees experiencing anxiety and depression

Employee Engagement

Employee engagement is the foundation of a strong safety culture, and employee involvement in the development and implementation of safe work processes is essential to ensure their adoption and success. CNL uses committees comprised of both management and non-management representatives to develop our policies, to inspect for hazards, to investigate events, and to resolve concerns.

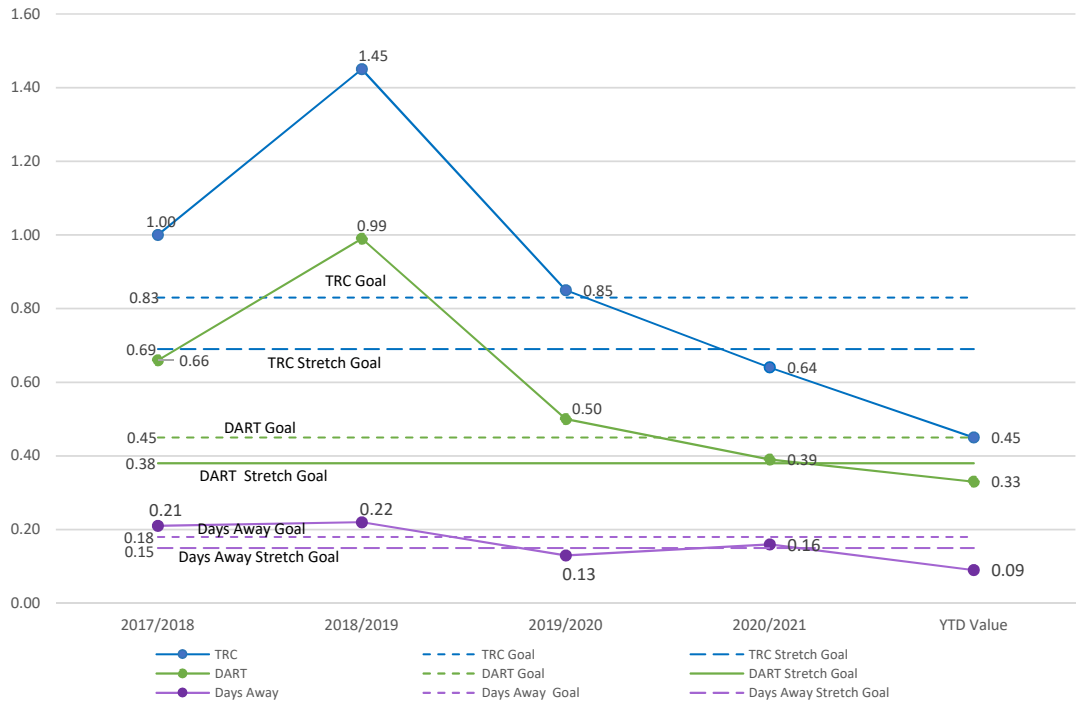
The Health and Safety Policy Committee is the principal company-wide forum for joint employee and management consultation. It meets quarterly to develop health and safety policies, procedures and standards that may affect the health and safety of the workers.

CNL also has Site Safety and Health Committees for each of our major sites, which perform inspections of the work place, and meet monthly to address incidents and injury reports, concerns, complaints, and emergent issues.

Improvements in Injury Rates

CNL measures and tracks our safety performance through a number of metrics. We measure both how our own performance changes over time, and how our performance compares against our industry peers. Our flagship metrics for safety performance are our rate (events per 100,000 hours worked) of occupational injuries or illnesses resulting in days away from work or temporary job restrictions or transfers (DART), days away from work (DA), and separately, our total recordable cases (TRC), which includes both DARTs and less serious events.

This past fiscal year, CNL demonstrated exceptional performance against these metrics, and achieved all goals and stretch goals for recordable injury rates, with COVID cases excluded. In particular, CNL's TRC and DART metrics ranks better than the average performance across the U.S. Department of Energy (DOE) laboratories during the same period, and has improved on a year-over-year basis since 2019.



"I am incredibly proud of the work that we have accomplished these past few years to cultivate a strong safety culture at CNL, where our employees look out for one another, and where we are recognized around the world as an industry leader in safe operations. That is our goal, and despite the added challenges we faced due to the pandemic, CNL's injury rates continue to decline, and we continue to improve when compared against our industry peers. This is all thanks to a team of hard-working professionals who are fully committed to the pursuit of safety excellence at CNL."

Jeff Willman, Vice-President of Health, Safety, Security & Environment

SUSTAINABLE WORK ENVIRONMENT

Objective: Maintain and improve a work environment that promotes positive physical and mental health for our personnel.

CNL's commitment to sustainability starts with its people, who represent our most valuable asset as an organization. In managing our workforce, CNL has implemented a broad range of programs that are designed to ensure the physical, mental and psychological well-being of our employees.

Most of these initiatives are coordinated through CNL's Health Centre, located at the Chalk River campus, whose mandate is to protect workers from occupational disease, injuries and illnesses; support CNL's capacity to address occupational hazards; and to promote the social, mental and physical well-being of workers and their families. Through this work, the Health Centre helps employees in attaining the highest level of physical and emotional health and well-being in their careers at CNL, while optimizing their job performance and decreasing workplace stressors.

Health & Wellness Programs

The CNL Health Centre offers on-site and virtual services to support occupational health, disability management and return-to-work programming. This year, to help employees stay physically and mentally healthy, the Wellness Program expanded to include more virtual services.

In 2022, CNL also continued the implementation of the National Standard of Canada for Psychological Health and Safety in the Workplace, which included mental health training and the Not Myself Today initiative. The LifeWorks Employee and Family Assistance Program (EFAP) digital platform was also launched for employee accessibility. Promotion of the LIFT, virtual fitness application, the LifeSpeak series, and the digital platform are ongoing through myCNL bulletins, presentations and through the engagement of 360 CNL wellness ambassadors.

Protecting Employees during the Pandemic

In 2021-2022, CNL continued to maintain workplace policies and measures to protect employees from the COVID-19 virus. This work included the provision of site access screening, contact tracing, masking protocols, physical distancing, enhanced sanitizing efforts and the availability of on-site COVID-19 PCR and rapid antigen detection testing capabilities.

Cultivating a Psychologically Safe Workplace

To help nurture a psychologically safe workplace culture, CNL provided mental health training opportunities to build awareness and skill development across the organization, including:

- The Mental Health Commission of Canada's Mental Health First Aid, which was completed by 150 CNL employees
- The Canadian Mental Health Association's (CMHA) Psychological Health and Safety Advisor Certificate, which was completed by CNL's Wellness Specialist
- The LifeWorks Mental Health Leadership Training, which was developed by Queen's University, is being completed by three CNL Health Centre team members

LifeWorks Employee and Family Assistance Program (EFAP) Digital Platform

To help CNL employees and their families navigate a wide range of personal issues, CNL has collaborated with LifeWorks to launch a new digital platform for our Employee and Family Assistance Program (EFAP) that is accessible any time, any place, at your own pace. The service offers confidential support for mental, financial, physical and emotional wellbeing, and is available 24/7 by phone or online.

Key Highlights from 2021-2022

- In 2021, CNL retained an Ergonomic Specialist to provide ergonomic expertise to its remote workers, and to support remote workers in transitioning successfully from on-site work. The company also hired a Wellness Specialist, who helps manage and promote CNL employee health and wellness initiatives for the entire workforce.

- A growing total of 360 employees have accepted the role of Wellness Ambassador. These representatives disseminate weekly newsletters featuring resources, tips, news and other promotional materials to encourage self-care. This network of employees has proven to be invaluable in increasing connectivity and awareness across the organization.

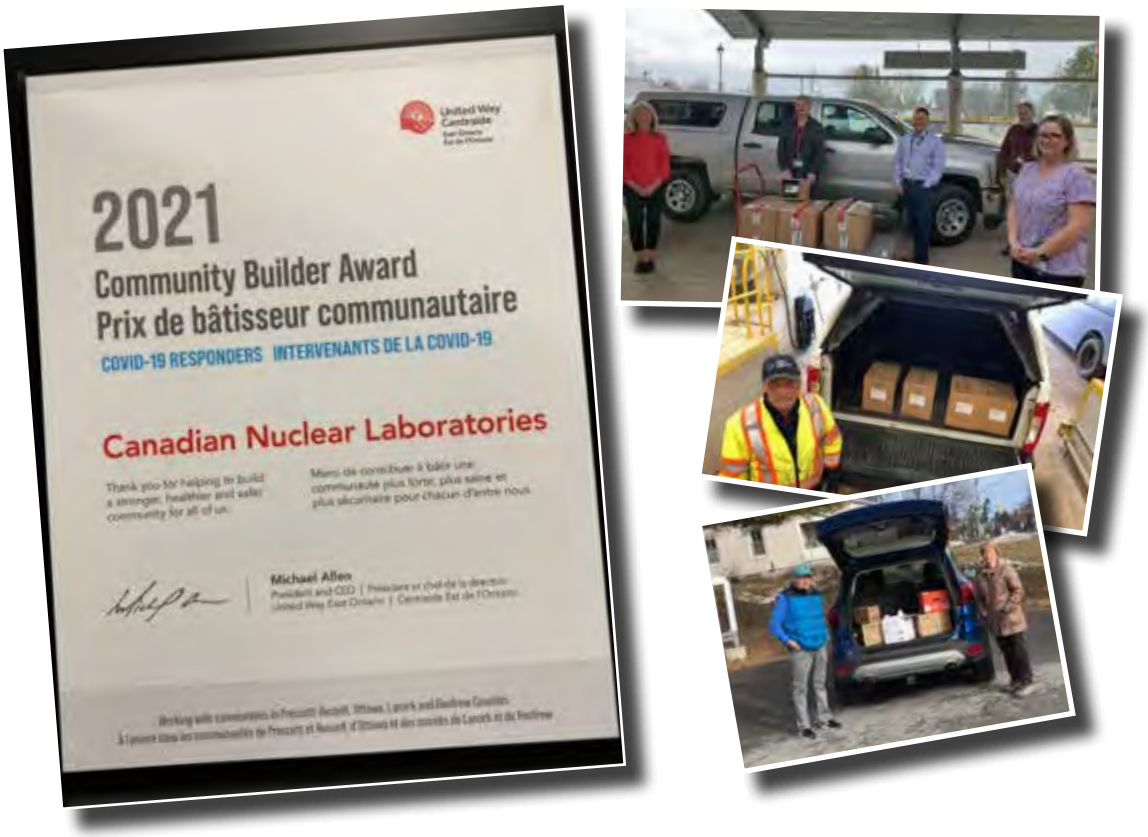
- CNL retained a counselor at Whiteshell to provide personal support to employees who work at that campus. The new counselor specializes in individual and family therapy, and was hired to help employees navigate challenging situations, such as grief, trauma, divorce, relationship conflict, anxiety and depression, among other issues.

- CNL continues to renovate offices at the Chalk River Laboratories campus that will be used for treatment and assessment rooms, providing much needed space for medical surveillance testing, counseling, meditation and physical therapy sessions.

- Addiction Treatment Services has resumed on-site at the Chalk River Laboratories, which provides addictions counselling services and includes the STOP program to assist with smoking cessation.

- As part of CNL's pandemic recovery plan, a number of services are being reopened and restored at the Chalk River Laboratories, including the site fitness facility, on-site health professional resources, diabetes screening, physical therapy, and wellness promotional events

- *CNL received the United Way's Community Builder Award for their role as a COVID-19 Community Response Table participant. The group, which featured a CNL Health Centre representative, provided support for those most impacted by COVID-19 from a social services perspective, including people who experienced a loss of social contact, loss of work, unstable housing, and loss of in-person services, as well as the challenges associated with isolation or the need to isolate as a high-risk contact.*



DIVERSITY, EQUITY & INCLUSION (DE&I)

Objective: Create a workplace where all employees feel involved, valued, and appreciated.

To realize Vision 2030 and maintain our status as a globally recognized nuclear laboratory, CNL is committed to cultivating a work environment where all employees – current and future – feel valued and included. While each of us have a responsibility to ensure that our workplace is inclusive to people from all walks of life, CNL's Workforce Enabling Initiative (WEI) team is actively developing a company-wide Diversity, Equity and Inclusion (DE&I) program.

Our program will strive to:

- Develop an inclusive, and equitable workplace, which nurtures innovation and encourages problem-solving
- Establish practices to support unique needs and identities, enabling and engaging employees to do their best work
- Meet federal legislative requirements and standards for Canadian workplaces

Vision 2030 builds on CNL's support for the Equal by 30 Campaign, which encourages organizations to make meaningful commitments to promote equal pay, equal leadership, and equal opportunities for women in the clean energy sector. It also builds on CNL's previous DE&I pilot program, which focused on developing our cultural competence in working effectively across differences.

Diversity, Equity & Inclusion Needs Assessment

This past year, CNL conducted an analysis and assessment of our status with respect to DE&I, not only to establish alignment across our leadership, but to understand where we could focus our efforts to maximize impact. This included individual interviews with employees at all levels, a company-wide DE&I survey, and an assessment conducted with all managers.

The outcome of these activities have been reviewed, and CNL is now focused on creating a short-term action plan and a long-term strategy. Both of these planning documents will help us better elevate the importance of our DE&I program across the organization, with the goal of creating a diverse organization where all employees feel respected, valued, and can reach their full potential.

Celebrating Diversity

To show our support and celebrate the ongoing contributions of employees from all walks of life, CNL recognizes cultural, ethnic, gender and other diversity-based celebrations of significance that may apply to our staff. This past year, CNL marked the beginning of Pride Month, National Indigenous History Month, Black History Month, and International Women's Day, among other notable events. This included external events, community sponsorships, web content, social posts and in-person activities. We do so to help employees feel safe, valued, included and proud at work, and to establish an environment where our diversity is accepted, appreciated and celebrated.

DE&I Employee Survey

This year, CNL employees were invited to participate in a DE&I survey, which is part of our journey to learn and assess where we are as an organization on this issue. With over 1,500 employees participating in the survey, CNL gathered useful information and data that will be used to shape our long-term DE&I strategy. Among the results:

- With respect to DE&I, employees feel respected and valued by their colleagues and peers (76%) and by the leader to whom they directly report (77%)
- Six out of ten employees reported feeling comfortable discussing race, identity and cultural experiences with their colleagues
- Employees feel like their identity and lived experience are reflected in the organization's culture, visual materials and communication (46% agree / strongly agree; 38% neutral)
- CNL supervisors and managers were recognized for providing an environment where the open expression of ideas, opinions and beliefs are valued (74% agree / strongly agree), and are actively upholding anti-discrimination and workplace harassment policies
- Six out of ten employees also agree that supervisors and managers value diversity and demonstrate a commitment to meeting the needs of employees with disabilities
- The majority of employees also feel that everyone has access to equal employment opportunities regardless of their identity, and that all eligible employees are granted promotions and rewards, regardless of race or ethnicity

"In 2021, CNL completed a comprehensive review led by industry-leading DE&I experts, focused on providing a clear picture of the current state of Diversity, Equity and Inclusion at CNL. By understanding exactly how our employees and stakeholder see and experience CNL from a DE&I perspective will help us craft an informed strategic plan built to cultivate a workplace where everyone feels valued, appreciated and included."

Todd Cook
Vice-President of Human Resources

GOVERNANCE

In governance, CNL is incorporating ESG principles into our organizational vision, mission and corporate policies. We recognize the important role we play as one of the largest employers in many of the communities where we operate, and will take every opportunity to extend economic and procurement opportunities to local companies and businesses to help nurture economic prosperity in these communities, seek out suppliers with a like-minded philosophy on sustainability, and incorporate higher standards into our procurement policies.

SUSTAINABLE PROCUREMENT

Objective: Integrate sustainability into CNL's procurement activities, policies and standards.

CNL's Supply Chain department is responsible for purchasing the materials and services we buy as an organization, and has taken great strides to incorporate CNL's sustainability objectives into its all of its practices. This work culminated in the development of an updated Supply Chain Policy, which reinforces CNL's commitment to sustainability in the operation of our supply chain, strengthens our policies and standards, and enforces more accountability on our suppliers.
While CNL's Supply Chain is working to embrace sustainable procurement, the process begins much sooner than the purchase of goods and services. The design of a new building, the development of a new technology or the renewal of aging infrastructure are all opportunities to consider sustainability, and CNL works to identify socially responsible suppliers, source renewable materials and pursue more environmentally-friendly practices well before the procurement process officially begins.

Incorporating Sustainability Standards

To align with AECL's ESG Strategy and Government of Canada's Greening Government Strategy, CNL performed an internal review of its procurement processes in 2020. This evaluation process included the development of a gap analysis that identified improvement opportunities in procurement, and CNL used this information to develop an action plan that would move the company towards more sustainable procurement processes.

One of the actions identified in that gap analysis was the development of a Sustainable Procurement standard which has already been integrated into procurement processes, and embedded into statement-of-work templates. This standard details how CNL is implementing sustainable procurement practices that reduce environmental impacts and support a sustainable and safe work environment.

Since then, CNL has updated all procurement procedures to better support this standard. We have also conducted awareness training for CNL procurement teams and the CNL executive team, and published a statement on our vendor portal communicating our expectations for all vendors with respect to sustainability. CNL is now working to implement this standard across the entirety of the organization, through continued awareness, communications and training.

"Given the size and scope of our program of work, and associated expenditure in the Supply Chain, CNL has a real opportunity to work with its suppliers in the adoption of socially and environmentally-friendly practices. With our new Sustainability Procurement Standard, we are now positioned to improve our supply chain by reducing environmental impacts, supporting economic development and community engagement, and ensuring a safer, more sustainable work environment for our staff and suppliers."

Monica Steedman
Vice-President of Finance & Business Management

Sustainable Procurement Principles

Objectives and improvement opportunities that CNL is targeting through its Sustainable Procurement Standard include:

- Indigenous Relations: Support Indigenous businesses, wherever possible. Seek to implement contracts with companies that ensure equitable access to jobs, training and education opportunities for Indigenous peoples. Specifically this includes the practice of initiating the discussion of Indigenous business inclusion early on in the development of the procurement processes, and including criteria to promote Indigenous business inclusion within the supply chain.
- Carbon Emissions and Climate Resilience: Work with suppliers who prioritize waste minimization, energy efficiency, and reduction in embodied carbon, and that disclose GHG emissions and environmental performance.
- Fleet Management: Prioritize low-carbon mobility, low-carbon fuels in mobile equipment, and battery-powered and rechargeable equipment.
- Energy Efficiency: Encourage contractors and service providers to implement energy efficient tools and equipment, correct sizing of equipment, and EnergySTAR.
- Water and Wastewater Management: Prioritize low-flow, sizing, wastewater technologies, and use of groundwater for potable applications.
- Conventional Waste: Work with suppliers with targets for diversion of waste from landfills, waste management education strategies, and diversion of construction waste.
- Radiological Waste Management: Aim to reduce permanent radioactive waste creation, and reuse of remediation tools and equipment
- Chemical Management: Source companies who inventory only as needed, and who embrace EcoLogo.

CNL Supplier Readiness Survey

As CNL works to adopt our Sustainable Procurement Standard across the organization, we understand the importance of engaging with our suppliers and contractors. This year, CNL partnered with ISN, a global leader in contractor and supplier information management, to issue a voluntary Supplier Readiness Survey. Approximately 75% of CNL's suppliers and contractors are registered with ISN, and we received a 40% response rate from these organizations that yielded the following findings:

- 41% have criteria to evaluate environmental performance
- 29% track their water usage
- 33% have identified their GHG emission sources
- 23% are tracking and reporting GHG emissions
- 29% are implementing energy efficiency strategies
- 65% have a policy on waste management
- 58% have a human rights policy
- 91% have an anti-discrimination policy
- 64% are training employees on labour rights
- 75% have a system to allow employees to report corruption or bribery concerns
- 24% have a policy on protecting Indigenous People's rights

CNL is conducting a detailed review of the data generated through this survey to further evaluate suppliers, determine supplier performance measures, identify gaps, and develop plans to encourage supplier sustainability improvements. The plan is expected to be complete in 2022.

INDUSTRY DAY

Delivered in partnership with the Organization of Canadian Nuclear Industries (OCNI), CNL's Industry Day is an annual event that is part of CNL's ongoing effort to build awareness about our business needs, and strengthen connections between local companies, Indigenous-owned businesses and the broader nuclear supply chain. This year's event drew over 50 organizations and groups to the Chalk River campus for a day of networking, presentations and engagement

A key focus of Industry Day was CNL's long-term plan for sustainability across the company, where we are working to adopt more environmentally-friendly and socially responsible practices. We also plan to continue supporting Indigenous businesses, where capabilities exist, and to implement contracts with companies that give equal opportunities to Indigenous Peoples. Finally, CNL promoted our plans to pursue Strategic Delivery Partnerships, which will leverage sustainability and diversity alongside economic development. For CNL's local vendors, these partnerships ensure that the local supply chain will continue to flourish and economic development in local communities will be supported.

ECONOMIC DEVELOPMENT

Objective: Extend economic benefits and opportunities through CNL's program of work to local organizations, businesses and Indigenous communities.

While CNL's activities impact residents, businesses, and municipalities across the country, our major area of influence is the County of Renfrew, Pontiac County and Eastern Ontario. The County of Renfrew is home to the Chalk River Laboratories, which employs approximately 2,700 people in both professional and trades related occupations. These employees are paid $380 million annually in wages, salaries, and benefits, much of which circulates through the local economy through consumer spending.*

The Chalk River Laboratories operations drive the purchase of goods and services totalling $115 million annually from organizations in Eastern Ontario, $43 million of which is sourced directly from suppliers in Renfrew County.* These figures demonstrate the important role that we play in supporting business activity within Ontario, and in particular, within Renfrew County.

CNL is conducting a detailed review of the data generated through this survey to further evaluate suppliers, determine supplier performance measures, identify gaps, and develop plans to encourage supplier sustainability improvements. The plan is expected to be complete in 2022.

**Source: County of Renfrew Social, Economic and Environmental Impact Analysis of CNL/CRL (April 2021)*

Prioritizing Local Resources in Major Projects

This past year, CNL finalized the integrated project delivery (IPD) agreement for the design and construction of the Chalk River Laboratories' new laboratory research complex, the Advanced Nuclear Materials Research Centre (ANMRC). With construction scheduled to begin in 2022, the ANMRC will be one of the largest nuclear research facilities ever constructed in Canada, and will serve as the backbone of CNL's research and development infrastructure.

With a goal of increased collaboration and shared success, the IPD agreement is a single, multi-party contract that designates the roles and responsibilities of all the companies involved in the complex capital project. In building its IPD team, CNL made it a priority to retain qualified local organizations wherever possible, and to incentivize the use of local resources in the work, to ensure the project brings economic benefits and employment opportunities to the region.

Economic Development support in Pinawa

CNEA, the consortium that operates CNL, recently donated an additional $240,000 to North Forge East to support economic development in Pinawa, Manitoba, which is home to the Whiteshell Laboratories campus. The donation raises the total CNEA contributions made to NFE in recent years to nearly $650,000, funding that is being used to encourage entrepreneurship, business innovation, and commercialization in the region.

ECONOMIC IMPACT

CHALK RIVER LABORATORIES

~2,700 employees

$380 million paid in wages

$724 million impact to GDP

$115 million in purchases in Eastern Ontario

4,169 people years of employment in Renfrew County

Significant spin off and indirect economic benefits

Source: County of Renfrew Social, Economic and Environmental Impact Analysis of CNL/CRL (April 2021)

A PARTNER IN OUR COMMUNITIES

In recognition of CNL's outstanding performance in 2020-2021, CNL's parent company, Canadian National Energy Alliance (CNEA) decided to do something different with the annual morale fund allocation. While the money, which is provided by the consortium members – SNC Lavalin, Jacobs, and Fluor – is typically used for team events, company apparel or other personal items, this year CNL ran a "crowdfunding campaign" to see how the money could be better spent through investments into local communities or important causes.

Following a week long 'idea submission' stage which generated over 90 ideas, a CNL review team then shortlisted and condensed the ideas into 53 eligible applicants, which were then moved forward to an 'investment stage.' Each CNL staff member was provided funds to invest into the project of their choosing. In only four days, employees fully funded 29 ideas that will now receive financial support through the program.

In total, approximately $180,000 was donated to a number of causes, many of which directly benefit those in need within our local communities, including investments in schools, in parks and outdoor trails, in mental health and homelessness, in the protection of animals, and financial aid for the less fortunate.

- The Northumberland Humane Society
- Anishinaabe Cultural Circle
- Child Poverty Action Network (CPAN)
- The Renfrew County SPCA
- The Ottawa Valley Recreational Trail (Algonquin Trail)
- Junior Farmers of Ontario
- Hospital Health Care Workers in Renfrew County
- The Women's Sexual Assault Centre of Renfrew County
- The Laurentian Valley Skating Trail
- Local Food Banks
- Bonnechere Museum Geoheritage Trail
- The Grind
- Emergency Extraction Equipment
- St Anthony's School
- Petawawa Terrace
- Nature Conservancy of Canada (NCC)
- Water First Education and Training for Indigenous Communities
- Community Turtle Crossing Signs
- The Tiverton Fire Department
- Watch My 6 Service Dogs
- Whitewater Ontario
- Lac du Bonnet & District Arena
- Seven Sisters Falls Community Club
- Dumoine River Canoe Route and Tote Road Trail
- Mount Martin Ski Club
- Mackenzie Community School
- North Renfrew Family Services
- Petawawa Predators Swim Club

LOOKING FORWARD: A SHARED JOURNEY

Last year, CNL published its very first Sustainability Report, which summarized our goals, achievements and ongoing efforts to become a more sustainable organization. This annual document is not only a record of our work – it also represents a sincere effort to help our neighbours, the public and Indigenous communities understand our operational decision-making, and to bring people along on our journey towards sustainable operations.

We want to thank employees at CNL who are working incredibly hard to make this journey possible, and to everyone who has followed along in the pages of this report. Looking forward, we will continue to make every effort to evaluate our operations and planning, and adopt policies and practices that build a better, brighter future for tomorrow.

Canadian Nuclear Laboratories

Laboratoires Nucléaires Canadiens

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