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ENERGY EFFICIENCY IN CANADA

REPORT TO PARLIAMENT UNDER THE *ENERGY EFFICIENCY ACT*

Canada

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2017–2018

Canada

Aussi disponible en français sous le titre : L'efficacité énergétique au Canada, Rapport au Parlement en vertu de la *Loi sur l'efficacité énergétique* 2017-2018

Cat. No. M141-15E-PDF
ISSN 2562-1408

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Foreword

This 24th *Report to Parliament Under the* Energy Efficiency Act outlines the actions taken by the Government of Canada from April 1, 2017, to March 31, 2018, relating to:

- **new and existing buildings**
- **appliances and equipment**
- **industrial energy efficiency**
- **lower-carbon transportation**
- **greening government operations**

The *Energy Efficiency Act* empowers the Minister of Natural Resources to promote the efficient use of energy and alternative fuel sources. It also gives the Government of Canada the authority to make and enforce regulations concerning minimum energy performance levels, labelling requirements and the collection of data on energy use for products that use energy or affect energy use.

Natural Resources Canada's (NRCan) Office of Energy Efficiency (OEE) administers the *Energy Efficiency Act* and *Energy Efficiency Regulations* and provides other programs and information that promote energy efficiency in the major energy-using sectors of the economy. The sectors include residential, commercial and institutional buildings; appliances and equipment; industry; and transportation and alternative fuels. Energy efficiency is an area of shared jurisdiction and shared responsibility, which is why we work closely with all levels of government and stakeholders.

Our activities help address market barriers that prevent investments in cost-saving energy-efficiency opportunities and technologies. We help Canadian consumers and businesses save money, embrace innovation and reduce greenhouse gas (GHG) emissions.

WHERE CAN I FIND MORE INFORMATION?

- For our most current information, see the **OEE website**.
- For detailed data tables and statistics, see the **National Energy Use Database (NEUD)**.
- For more detailed program information, see NRCan's ***Departmental Results Report***.
- For more detailed regulatory information, see Canada's ***Energy Efficiency Regulations***.
- For more information on Canada's Buildings Strategy, see ***Build Smart: Canada's Buildings Strategy***.
- **Electric Charging and Alternative Fuelling Stations Locator.**

Message from the Minister of Natural Resources

A global change in how we produce, distribute and use energy is underway. It is one of the greatest shifts the world has seen since the industrial revolution.

As Canada works to lead the way in this new energy future, we have engaged with experts, industry, and Canadians every step of the way. Through **Generation Energy**, our government heard that Canadians want a future of clean, affordable and reliable energy.

One of the quickest, cleanest and most inexpensive ways to help build this energy future and meet our international climate change commitments is through greater energy efficiency. In fact, consuming less energy would help Canada achieve one-third of its emissions reduction targets, while delivering significant social and economic benefits to Canadians – including good, well-paying jobs, lower energy costs for consumers, less pollution and reduced maintenance costs.

That is why our government is making significant investments in energy efficiency.

In 2017–2018, the federal, provincial and territorial governments worked together to release *Build Smart: Canada's Buildings Strategy* as a way to make homes and buildings more energy efficient. Federal, provincial and territorial governments continue to work together today through, for example, updating building codes to implementation these key commitments.

We have also invested in programs that help Canadians make more informed choices about the products they buy and the energy they use – using new technologies to engage directly with Canadians and increase awareness of how much energy we use.

For example, the ENERGY STAR® Challenge for Industry and the ENERGY STAR for Industry Certification program are helping businesses track, analyze and reduce their energy use, while five ENERGY STAR Energy Performance Indicators have been developed specifically for the automotive, integrated steel and commercial baking sectors. Improving energy efficiency in Canada's industry drives competitiveness, fuels economic growth at home and abroad, and results in a trade advantage on the global stage.

We have also helped Canadians by giving them more options to drive cleaner – leading to less air pollution, and day-to-day savings on transport costs. This includes creating a national network of electric vehicle fast-charging stations, and building natural gas refuelling stations along major transportation corridors and hydrogen refuelling stations in key metropolitan areas. As of June 2019, the Government has supported the construction of roughly 530 EV fast-chargers as well as 12 natural gas and six hydrogen refuelling stations. We are continuing to support the development of next-generation electric vehicle technology and the national standards that go with them.

These are just some of the highlights from this 24th edition of the Report to Parliament under the *Energy Efficiency Act*.

By working with all Canadians, we are securing Canada's place among the world's leaders in energy efficiency.

The Honourable Amarjeet Sohi, P.C., M.P.
Minister of Natural Resources

HIGHLIGHTS FROM 2017–2018

- NRCan undertook Generation Energy, a nation-wide dialogue with stakeholders, experts and individual Canadians to envision what a low-carbon energy future would look like. The largest conversation about energy in our history, Generation Energy reached 380,000 Canadians.
- We released ***Build Smart: Canada's Buildings Strategy*** with the provinces and territories, which outlines Canada's plan to transform Canada's built environment.
- More than 75,000 existing homes were labelled with the EnerGuide Rating System, while another 12,000 new homes were issued an EnerGuide, ENERGY STAR® or R-2000* label.
- NRCan initiatives for existing homes resulted in a savings of 2.26 petajoules (PJ) of energy and avoided emission of 94,696 tonnes (t) of GHGs.
- The ENERGY STAR Portfolio Manager® benchmarked over 20,000 buildings, representing almost 230 million square metres (m^2) (27%) of commercial floor space in Canada. The program was expanded to launch ENERGY STAR scores for ice rinks.
- The *Energy Efficiency Regulations* saved 293.11 PJ of energy and avoided emissions of 39.16 megatonnes (Mt) of GHGs. Since 1995, the *Energy Efficiency Regulations* saved approximatively 3,140 PJ of energy and avoided emissions of 465 Mt of GHGs.
- ENERGY STAR certified products saved 4.81 PJ of energy and avoided emissions of 0.51 Mt of GHGs. Since the program started in 2001, ENERGY STAR certified products saved approximatively 33.88 PJ of energy and avoided emissions of 3.92 Mt of GHGs.
- We helped businesses track, analyze and improve energy use by launching new initiatives, such as the **ENERGY STAR Challenge for Industry**, **ENERGY STAR for Industry Certification**, and five ENERGY STAR Energy Performance Indicators for integrated steel, automotive, and commercial baking sectors.

- We advanced industrial energy management and ISO 50001 adoption worldwide by leading the Clean Energy Ministerial Energy Management Working Group to continue to strengthen alignment with North American and other governments.
- We launched Phase I of the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative, exceeding all targets, and resulting in 102 electric vehicle fast chargers, 7 natural gas and 3 hydrogen stations being built.
- We created an interactive on-line map of all low-carbon refuelling locations across Canada (e.g. where you can refuel with electricity, natural gas, hydrogen, propane, E85 and B20).
- Canadian freight companies saved more than $170 million in annual fuel costs for 41,500 Canadian trucks in 2017, through the SmartWay partnership. We collaborated with the Brazilian government and freight industry to leverage and replicate our domestic green freight programming and expertise in Brazil.
- Our Greening Government Services program supported the renovation of the Parliamentary Precinct by modelling the energy demand of an integrated geothermal exchanger.

*R-2000 is an official mark of Natural Resources Canada.

Why energy efficiency matters

Energy efficiency means being smart about how we use energy. It results in using less energy while maintaining the same or better level of service, comfort, or performance that Canadians expect from appliances, homes, buildings, vehicles and industry.

Energy efficiency is hard to see, but we feel the benefits in our homes, neighbourhoods, economy, and wallets. It is the quickest and least costly way of addressing energy-related security, environmental and economic challenges.[1] Canada has a long history of working to improve energy efficiency. However, we can and should go further.

ENERGY EFFICIENCY . . .

Generates savings

Better-insulated homes cost less to heat and cool. More efficient equipment, such as your fridge or furnace, lowers energy costs. Fuel-efficient vehicles save you money at the pump. **In 2016, the total economy savings were $45.0 billion.** Of this, $23.4 billion were consumer savings and $21.6 billion were business savings. Energy efficiency makes energy affordable now and in the future.

Supports competitiveness and innovation

Companies with lower energy needs have a leg up on the competition. In addition to lowering energy costs, investing in **energy efficiency can enhance production and product quality, reduce resource use and pollution, and improve the working environment**. It also reduces the cost of operation, maintenance, and environmental compliance – all of which contribute to improved productivity and value creation.[2]

Premium standards such as ENERGY STAR® can drive development of innovations that can be marketed in the US$231 billion international energy efficiency marketplace.[3] A study of the global energy efficiency market by the International Energy Agency found that in 2017, global investment in energy efficiency increased by 3% to US$236 billion. This maintains an upward trend, but is a slowing of the rate compared to previous years (e.g. 9% in 2016). The building sector remains the largest recipient, accounting for nearly 60% of total efficiency investment, a similar share as in 2016.[4]

Creates jobs

Energy efficiency impacts the entire economy and creates direct and indirect jobs in many sectors. Employment in the energy efficiency sector includes both producing and installing energy-saving products and providing services that reduce energy consumption. These jobs include manufacturing energy-efficient products and providing building design and contract services that install insulation, improve natural lighting and reduce the overall energy consumption of homes and businesses. The majority of employees work in construction firms, installing or servicing energy-efficient products or performing energy efficiency services. Approximately 20% of employees work in business and professional services. A study by ECO Canada estimated that about 436,000 Canadians work in the energy efficiency sector in Canada.[5]

Money saved on energy by individuals or businesses because of energy efficiency improvements can also stimulate more spending on other goods and services. The reinvestment of energy savings into the economy has a multiplier effect, stimulating economic growth and job creation throughout the economy. This impact can be significant, especially when these individuals or businesses spend their energy savings on consumer-oriented goods and services that are relatively more labour-intensive.

Studies suggest that **every $1 million invested in energy efficiency creates 11 to 20 job-years**, depending on the investment. However, the Acadia Center estimate is higher. In its *Energy Efficiency: Engine of Economic Growth in Canada* report, Acadia Center estimated that the multiplier would range from 22 to 33 job-years per million dollars invested over the life of energy efficiency investment and savings.[6]

What is a job-year?

A job-year is one job for one year. For example, if you employ one person for two years, you have created two job-years.

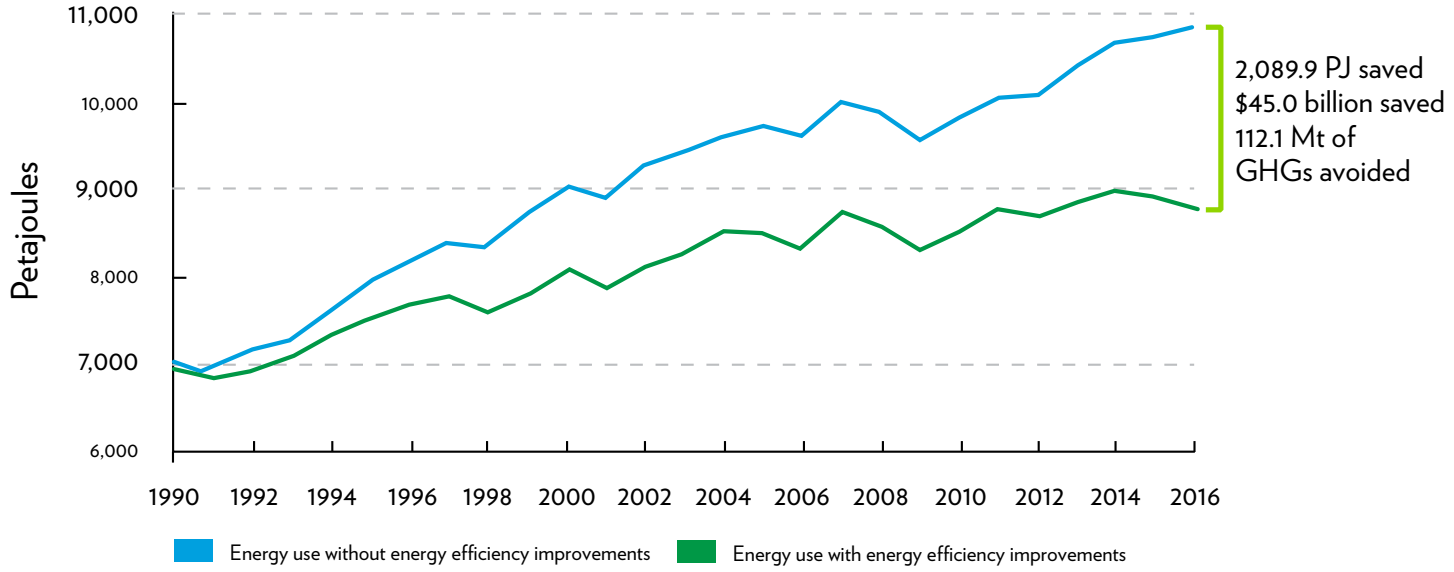
Reduces emissions

When energy efficiency reduces our need to burn fuels such as coal, gas and oil, we can reduce emitting GHGs and other air pollutants. Efficiency measures currently account for about a third of the reductions in GHG emissions planned under the Pan-Canadian Framework on Clean Growth and Climate Change. Avoiding emitting other air pollutants also has benefits for our health.

Reduces the need for new generating capacity

Energy efficiency is important for our energy infrastructure as well. As Canada transitions to sources of energy that do not emit GHGs, the demand for new generating capacity will grow. Saving energy now reduces the need to construct additional generating capacity in the future. This practice will reduce long-term energy production costs and the social and environmental impacts associated with some new generating projects. Energy efficiency also reduces the load on existing infrastructure, lowering ongoing maintenance costs.

SECONDARY ENERGY USE WITH AND WITHOUT ENERGY EFFICIENCY IMPROVEMENTS (1990–2016)



Source: *Energy Efficiency Trends in Canada 1990 to 2016*[7]

What is a petajoule?

A joule is a measure of energy. One joule is equivalent to the work required to produce one watt of power continuously for one second. One petajoule is 1 x 10^{15} joules – a million billion joules. This is equivalent to the energy required by more than 9,000 households (excluding transportation requirements) over one year.

What is secondary energy use?

Secondary energy use is the energy used by final consumers in various sectors of the economy. This includes, for example:

- the energy used by vehicles in the transportation sector
- the energy required to heat and cool homes or businesses in the residential and commercial/institutional sectors
- the energy required to run machinery in the industrial and agricultural sectors

GENERATION ENERGY

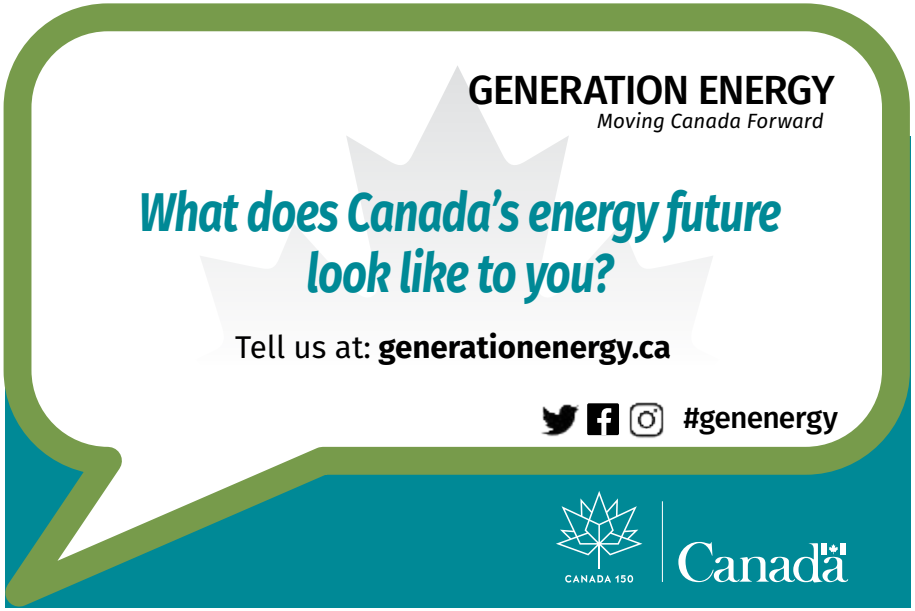
In April 2017, NRCan launched **Generation Energy**, a nation-wide dialogue with stakeholders, experts and individual Canadians to envision what a low-carbon energy future would look like over the course of a generation.

Generation Energy – the largest conversation about energy in our history – reached a record number of people by using innovative tools. Of the approximately 380,000 Canadians reached during Generation Energy, 80% were engaged on their smartphones through NRCan's Social Innovation Partnerships pilot with Carrot Rewards.

What did we hear?

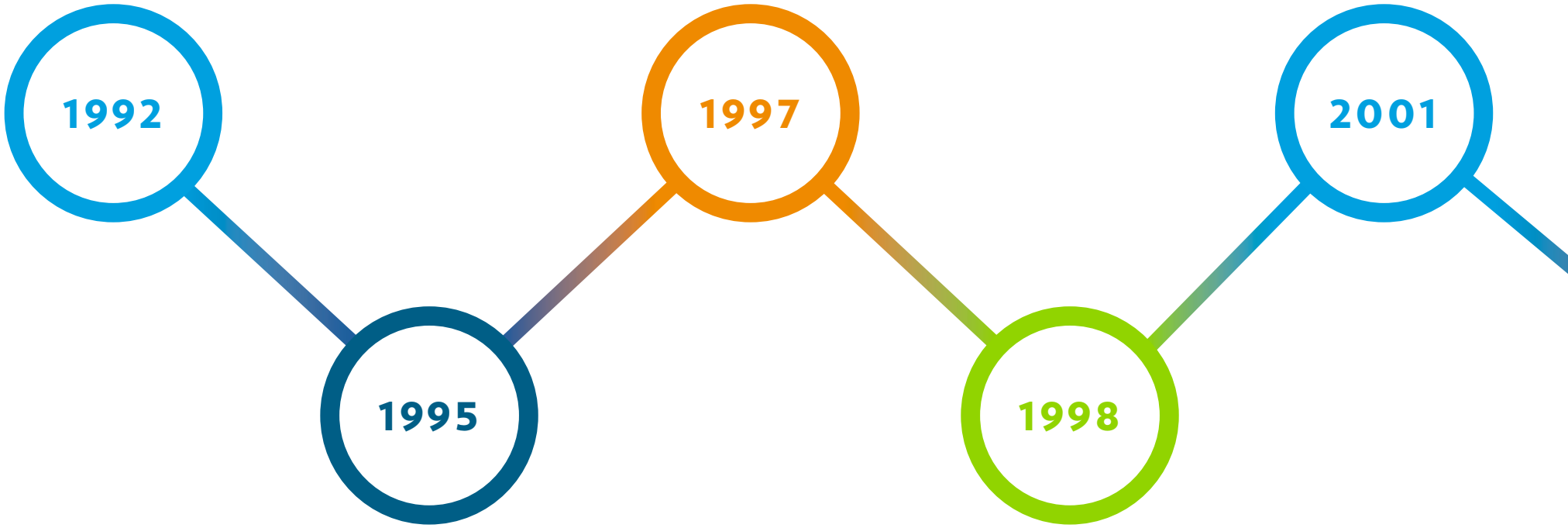
Canadians told us they want a future of clean, affordable and reliable energy – one that respects Indigenous rights, protects the environment and grows our economy. They also told us that energy efficiency is a critical tool in our energy transition, as a low-cost option to reduce energy demand.

Participants in the Citizen Dialogues on Canada's Energy Future initiative, which was led by the Simon Fraser University Centre for Dialogue and supported by NRCan, recognized and strongly supported energy efficiency actions as a means of shaping the future of energy in Canada.[8]



Building on the results of the dialogue, the Minister of Natural Resources formed the Generation Energy Council to prepare a report to answer crucial questions about Canada's energy future. You can find the council's report **here**. Energy efficiency and cleaner fuels are prominent among the recommended pathways to a cleaner energy future for Canada.

CANADIAN ENERGY EFFICIENCY MILESTONES



1992

The *Energy Efficiency Act* comes into force.

1995

The ***Energy Efficiency Regulations*** are introduced to stimulate innovation, eliminate the least efficient products, and reduce GHG emissions.

The regulations prescribe minimum energy performance standards for certain consumer and commercial products, and require labelling to allow consumers to compare the energy use of different products in a category.

Amendments over subsequent years increase the stringency and coverage of the regulations.

1997

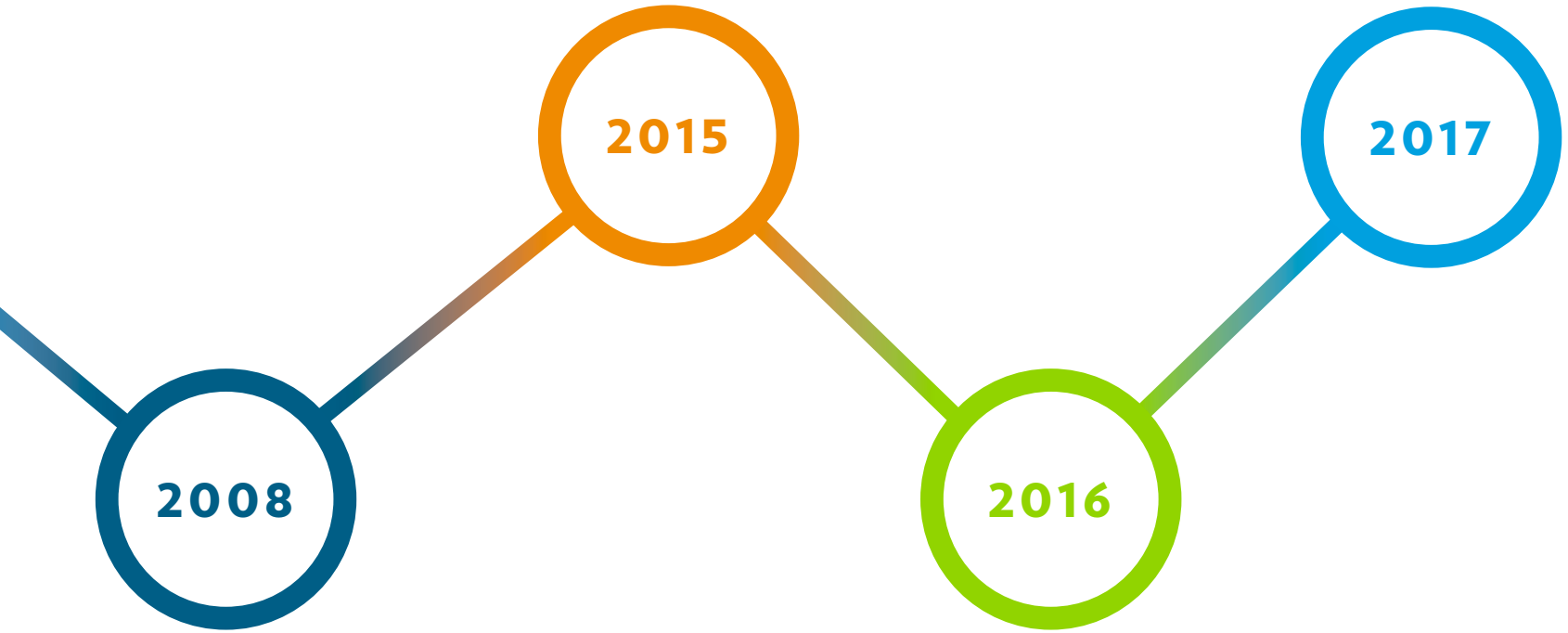
The Model National Energy Code for Buildings provides – for the first time – a national standard for building energy performance in Canada.

1998

The **EnerGuide** for Houses program and the EnerGuide label for vehicles are launched.

2001

Canada becomes an **international ENERGY STAR® partner** with the U.S. Environmental Protection Agency and launches the ENERGY STAR products program.



2008

Canada is the first country in the world to adopt **ISO 50001** as its energy management systems standard.

The **ecoENERGY Efficiency for Industry** and the **ecoENERGY for Biofuels** programs are launched.

2015

The 2015 update of the ***National Energy Code of Canada for Buildings*** is released, with more than 90 changes that will help to ensure a high level of energy efficiency in new Canadian commercial buildings.

Canada is one of 195 countries that together reach the Paris Agreement, which aims to limit global average temperature increase to less than 2°C.

2016

Canadian First Ministers release the **Pan-Canadian Framework on Clean Growth and Climate Change**.

2017

Federal, provincial and territorial governments release **Build Smart: Canada's Buildings Strategy**, a strategy to transform Canada's built environment.

NRCAN'S OFFICE OF ENERGY EFFICIENCY

The OEE has a mandate to strengthen Canada's commitment to energy efficiency and alternative fuels. It advances Government of Canada priorities, delivering energy cost savings, contributing to Canada's climate change targets, and supporting clean innovation and green infrastructure objectives. The core of our work includes the following.

COLLABORATION AND ENGAGEMENT

- Working closely with partners such as provinces and territories, municipalities, utilities and industry, businesses, academia, other countries, and international bodies to understand and address emerging issues and opportunities related to energy efficiency
- Engaging stakeholders and Canadians
- Providing information, data and tools to enable businesses and Canadians to make energy-conscious decisions

REGULATIONS, CODES AND STANDARDS

- Administering Canada's *Energy Efficiency Act*
- Regulating to eliminate the least efficient products from the Canadian market and increase efficiency standards for tires
- Promoting higher energy efficiency requirements within Canada's model national building codes
- Harmonizing alternative fuel codes and standards with the U.S.

CERTIFICATION AND LABELLING PROGRAMS

- ENERGY STAR program (for products, new homes, buildings, and industry)
- EnerGuide (for products, homes and vehicles)
- R-2000 for new homes
- ISO 50001 energy management
- SmartWay Transportation Partnership

DEPLOYMENT

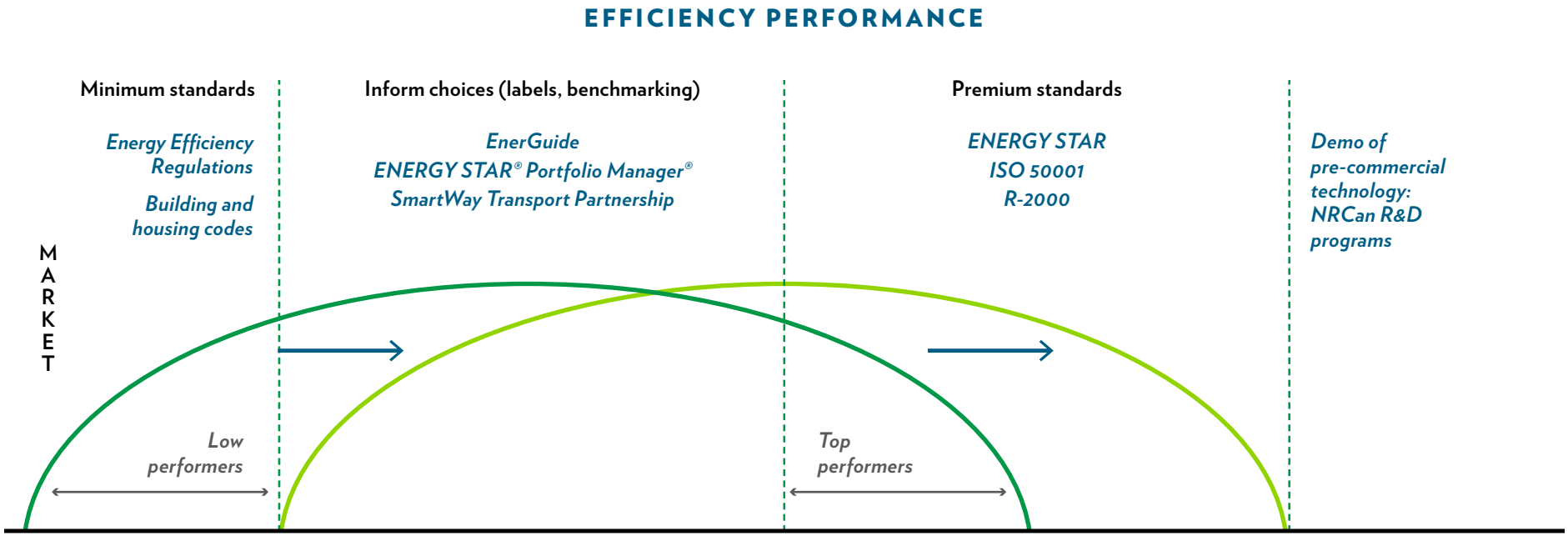
- Facilitating the uptake of new and proven technologies and infrastructure, such as that for electric vehicle charging

MARKET TRANSFORMATION

- Driving product innovation, transforming the market toward higher performing products, homes and buildings, transportation, and industrial facilities that use less energy, generate fewer GHG emissions and cost less to operate
- Providing consumers with the information required to make informed purchasing choices, affect behavioural change and drive market transformation

As we look back on our work from the 2017–2018 fiscal year, we see the transformative potential of collaboration. We worked with our industry partners to support adoption of energy management standards and cleaner ways to transport goods across North America. We worked with provinces, territories, and municipalities, with automakers, academics, the building sector, and appliance and equipment manufacturers to continue to advance energy efficiency—both here at home and internationally. We worked with other federal government departments to support the retrofit of federal buildings. Working with partners is a thread that runs through everything we do.

In the sections that follow, read more about our work on new and existing buildings, appliances and equipment, industrial energy efficiency, lower-carbon transportation, and greening federal operations.



Making our buildings more energy-efficient

When we invest in energy efficiency improvements to our homes and buildings – including hospitals, schools, and our workplaces—we are investing in our environment, economy, and even our personal health and overall comfort. NRCan's initiatives help move the market toward more energy-efficient buildings and homes and help Canadians make informed decisions.

In 2017–2018, NRCan initiatives for existing homes resulted in a savings of 2.26 PJ of energy and avoided emissions of 94,696 t of GHGs. That is equal to the energy use of 22,000 homes for one year.

BUILD SMART: CANADA'S BUILDINGS STRATEGY

In August 2017, NRCan released *Build Smart: Canada's Buildings Strategy* in collaboration with the provinces and territories. Build Smart outlines Canada's plan to transform Canada's built environment.

The strategy articulates commitments by federal, provincial and territorial governments in moving toward a clean energy future by making homes and buildings more energy-efficient. The plan recognizes that by investing in energy efficiency improvements to our homes and buildings, including hospitals, schools and our workplaces, we are investing in our environment and economy and even in our health and overall comfort.

Build Smart includes five pathways:

- Getting Net-Zero Energy Ready: Raising the efficiency bar for new builds
- Bringing Buildings Into the Future: Modern energy codes for existing homes and buildings
- Setting Energy Data Free: Measuring and sharing energy use data to help Canadians and businesses make smart energy use decisions
- Being Equipped for the Future: Holding our appliances and equipment to a higher standard
- Financial Incentives: Making efficiency affordable, accessible and fair by supporting provinces and territories to scale up their efficiency programs

In January 2018, a $182-million federal investment was announced through the Green Infrastructure Fund to increase energy efficiency and address climate change by improving how our homes and buildings are designed, renovated and constructed. Through Build Smart, we are investing in the development of model national energy codes for new and existing buildings and in the evolution of our certification and labelling tools to provide information to help Canadians make smart energy choices. We are also investing in building capacity and skills to help our workforce thrive.

HIGHLIGHTS FROM 2017–2018

- ***Build Smart: Canada's Buildings Strategy***, which outlines Canada's plan to transform Canada's built environment was released, and we are working closely with provinces, territories and other partners to implement its commitments. Specifically:
  - NRCan signed a six-year memorandum of understanding with the National Research Council to develop a net-zero energy ready model code for buildings and houses as well as a new model energy code for existing buildings and houses.
  - Eight multi-sectoral projects that drive demand for energy efficiency and energy conservation in the residential building sector were implemented.
  - NRCan sponsored the **Building Owners and Managers Association of Canada's Net Zero Challenge**, which recognizes high performance buildings on the path to net zero.
  - The **ENERGY STAR certification** and "who will be the first" challenge for commercial and institutional buildings were launched.
  - More than 75,000 existing homes were labelled with EnerGuide, while another 12,000 new homes were issued an EnerGuide, ENERGY STAR or R-2000 label.
  - ENERGY STAR Portfolio Manager® benchmarked over 20,000 buildings, representing almost 230 million m^2 (27%) of commercial floor space in Canada. The program was expanded to include ENERGY STAR scores for ice rinks.
  - A federal-provincial-territorial and stakeholder needs assessment to establish a national harmonized labelling and disclosure framework for commercial and institutional buildings was completed.
  - EnerGuide home energy data was made accessible through an application programming interface to support provinces, territories and others create customized on-line tools for their energy efficiency initiatives, including sharing ratings for home energy use.

PAVING THE WAY FOR NET-ZERO ENERGY READY BUILDINGS

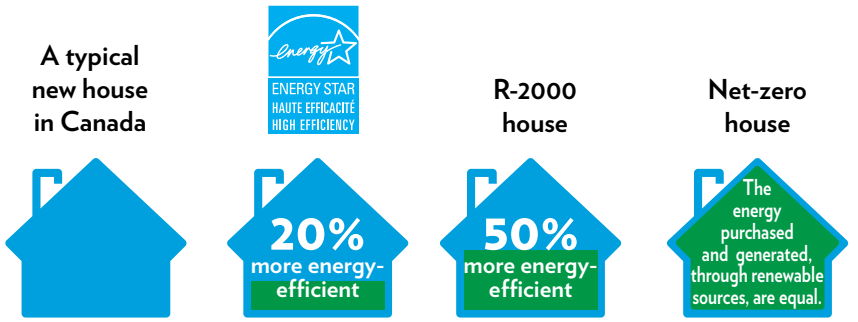
The design and construction phase is the most cost-effective point in the life of a building to incorporate energy efficiency measures, and these measures help to save energy and money throughout the life of a building.

SETTING HIGH PERFORMANCE STANDARDS FOR NEW HOMES

ENERGY STAR and R-2000 are voluntary energy performance standards for new homes that are 20% and 50% more efficient, respectively, than typical new homes.

Every premium home must meet mandatory requirements for energy savings, insulation and airtightness, which makes these homes more energy-efficient and more comfortable to live in.

Canada's residential tools



PILOTING NET-ZERO ENERGY HOMES

This fiscal year saw the conclusion of NRCan's R-2000 Net Zero Energy Pilot, a national demonstration project to engage the residential industry in designing and building net-zero energy houses. The goal was to showcase industry leadership in realizing such an ambitious goal, while delivering homes attractive to the marketplace.

NRCan established the energy performance framework that ensured consistent and transparent rating of the homes. The pilot requirements were based on NRCan's R-2000 high performance home program, a well-established and premium housing program in Canada.

This project saw the construction of 26 net-zero energy or net-zero energy ready homes.

What are net-zero energy and net-zero energy ready buildings?

- A **net-zero energy building** has a renewable energy system and is so energy-efficient that it produces as much energy as it consumes annually.
- A **net-zero energy ready building** is so energy-efficient that it could produce, **with the addition of a renewable energy system**, as much energy as it consumes annually.

Working with partners: The High Performance Building Community of Practice

In December 2017, to promote progress toward net-zero design, NRCan launched the High Performance Building Community of Practice. In one year, the community of practice has grown to 100 members, and six webinars have been held. The topics included the integrated design process, the incremental cost of high-performing designs, and the growing relevance of embodied carbon in high-performance design.

MAKING NEW BUILDINGS MORE ENERGY-EFFICIENT

— by the numbers —

AVERAGE LIFESPAN OF A BUILDING IS **50–70** YEARS

50–70
YEAR LIFESPAN

ENERGY STAR® AND R-2000 ARE VOLUNTARY ENERGY PERFORMANCE STANDARDS FOR NEW HOMES THAT ARE **20%** AND **50% MORE EFFICIENT**, RESPECTIVELY, THAN TYPICAL NEW HOMES.

12,000 NEW HOMES WERE ISSUED ENERGUIDE, ENERGY STAR OR R-2000 LABELS IN 2017–2018.

12,000
NEW HOMES ISSUED

ENERGUIDE ENERGY STAR HAUTE EFFICACITÉ HIGH EFFICIENCY R-2000

90,000 EFFICIENT NEW HOMES WERE BUILT SINCE THE INCEPTION OF CANADA'S ENERGY STAR FOR NEW HOMES AND R-2000 INITIATIVES.

90,000
EFFICIENT NEW HOMES

THE *NATIONAL ENERGY CODE FOR BUILDINGS 2017* WAS PUBLISHED, WHICH COULD RESULT IN POTENTIAL **ENERGY EFFICIENCY IMPROVEMENTS OF UP TO 14.4%** OVER THE NECB 2011 FOR NEW COMMERCIAL BUILDINGS.

LOOKING FORWARD: INCREASINGLY STRINGENT ENERGY CODES FOR HOMES AND BUILDINGS – MOVING TO NET-ZERO ENERGY READY CODES FOR HOMES AND BUILDINGS

We have made great technological strides in efficient building design, but there's still work to be done to make routine achievement of net-zero energy performance accessible to the entire industry.

Federal, provincial and territorial governments have committed to collaborate, develop and adopt increasingly stringent model building codes, starting in 2020. The goal is to have provinces and territories adopt model building codes that are net-zero energy ready by 2030. Achieving this goal will ensure that our future building stock has a much lower carbon footprint. Work is well underway to support provinces and territories and to advance the code development process, which is led by the National Research Council.

Premium labels, such as ENERGY STAR and R-2000, and initiatives, such as the R-2000 Net-Zero Energy Pilot and the National High-Performance Building Challenge, are helping to prepare the building sector for these more stringent codes. They encourage the use of new technologies and practices before they are required under new model codes. NRCan is also investing in code training for designers, builders and building inspectors as well as in projects that research, develop, validate, and demonstrate emerging technologies and construction practices. This investment will encourage their uptake by the construction industry, provinces and territories while lowering the costs to build or renovate to higher energy efficiency standards.

MAKING EXISTING BUILDINGS MORE ENERGY-EFFICIENT

One of the most effective means to become more energy-efficient is to upgrade homes and buildings. To have the most impact, it is important that we begin to do this now because 75% of the homes and buildings we will occupy in 2030 have already been built.

Integrating energy efficiency in significant renovation plans for homes and buildings will create more comfortable homes and workplaces, improve environmental outcomes and building performance, and save money on energy bills over time. Everybody wins. We can bring old buildings with us into the future through retrofits that meet smart and modern energy standards. Right now, there is no national model energy code that applies to existing buildings, but creating one is part of Canada's Buildings Strategy plan.

SHARING DATA AND INFORMATION

We have all heard the saying "what gets measured gets managed." Sharing energy use data is critical because it provides Canadians and Canadian businesses with transparent, reliable information. Tools such as the EnerGuide Rating System and the ENERGY STAR Portfolio Manager benchmarking tool provide home and building owners and managers with information about how these structures use energy and can help owners make decisions about what improvements would be most cost-effective.

Under the Pan-Canadian Framework on Clean Growth and Climate Change, we committed to work together with the provinces and territories with the aim of mandating labelling of building energy use as early as 2019. We are working with the provinces and territories to develop tools for jurisdictions to use to help Canadians access more information about the energy consumption of buildings across the country. In March 2018, we partnered with the Canadian Digital Service within Treasury Board Secretariat to build an application programming interface to open access to the EnerGuide Home Energy Ratings data. We also completed a stakeholder needs assessment to support the development of a model labelling and disclosure on-line database platform targeting commercial and institutional buildings.

ENERGUIDE HOME ENERGY RATING SYSTEM AND CARROT REWARDS PILOT

An EnerGuide home evaluation and rating provides useful information about a home's energy performance that can support informed decision making when operating, renovating or purchasing a home. Builders can also work with energy advisors to estimate the annual energy use of new homes and select potential energy efficiency upgrades.

In 2017–2018, NRCan delivered the second phase of its Carrot Rewards pilot to test the power of rewards to reach and engage Canadians on energy efficiency through their smartphones, including with EnerGuide and ENERGY STAR content. Home energy efficiency highlights include:

- Approximately 32,000 in-app ENERGY STAR Homes video views and 27,000 in-app Net Zero Energy Homes video views compared to the baseline of only hundreds of views on NRCan's YouTube channel
- Approximately 18,000 Canadians completed an on-line search for an energy advisor in their area.

EXPANDING ENERGY STAR PORTFOLIO MANAGER

Right now buildings across Canada are already tracking and sharing their energy performance using the ENERGY STAR Portfolio Manager benchmarking tool. This tool has benchmarked over 20,000 buildings, representing almost 230 million m^2 (27%) of commercial and institutional floor space in Canada.

The ENERGY STAR Portfolio Manager benchmarking tool provides an apples-to-apples comparison of buildings' energy performance while at the same time adjusting for regional differences such as weather, providing GHG emission metrics, and helping track trends. It is also used to support a range of building energy efficiency and sustainability programs.

In 2017, ENERGY STAR Portfolio Manager was expanded to include the ENERGY STAR score feature to more building types. The ENERGY STAR Buildings Certification program was launched in 2018 to recognize participating buildings that perform better than at least 75% of similar buildings in the country.

26.5% Canada boosted its **energy efficiency** between 1990 and 2015.

900,000+ **efficiency retrofits** resulting from **EnerGuide home evaluations**

$38.2 BILLION **Canadians saved on energy bills** in 2015 as a result of **effiency improvements** since 1990.

1,200,000 **homes rated** to date using the ENERGUIDE rating system

230 MILLION m^2 of **floor space** in Canada are **registered** in **ENERGY STAR Portfolio Manager.**

ENERGY EFFICIENCY IN EXISTING BUILDINGS

— by the numbers —

AS OF MARCH 2018, THE **ENERGUIDE RATING SYSTEM** SUPPORTED MORE THAN 60 PROVINCIAL, TERRITORIAL, MUNICIPAL, UTILITY, AND INDUSTRY HOME LABELLING PROGRAMS AND REGULATIONS ACROSS CANADA.

ENERGUIDE

2017–2018 RESULTED IN SAVINGS OF
94,696 t OF GHGS AND 2.26 PJ OF ENERGY.
THAT IS THE EQUIVALENT OF TAKING ALMOST 47,000 CARS OFF THE ROAD.

75% OF THE HOMES AND BUILDINGS
WE WILL LIVE IN 2030 HAVE ALREADY BEEN BUILT.

AS OF MARCH 2018, **27%** OF COMMERCIAL AND INSTITUTIONAL FLOOR SPACE IS REGISTERED IN ENERGY STAR® PORTFOLIO MANAGER®. THAT'S OVER **20,000 BUILDINGS BENCHMARKED**, REPRESENTING ALMOST **230** MILLION m^2.

A GOOD RETROFIT CAN HELP PEOPLE SAVE A LOT ON THEIR ELECTRICITY AND WATER BILLS. FOR SOME, THAT COULD MEAN **SAVING MORE THAN $800 PER YEAR.**

LOOKING FORWARD: INTRODUCING MODERN ENERGY CODES FOR EXISTING BUILDINGS

Under the Pan-Canadian Framework, federal, provincial, and territorial governments are working to develop a model energy code for existing buildings. This is expected to be published by 2022, with the goal that provinces and territories adopt it. Development of the codes is a collaborative and consensus-based process that is informed by consultation with other orders of government, stakeholders, and Canadians. The process takes into account the cost-effectiveness and affordability of energy efficiency measures that could be included in the codes. The Government of Canada is also investing in projects that research, develop, validate, and demonstrate emerging technologies and renovation practices. The goal is to encourage their uptake by industry, provinces and territories while lowering the costs to build or renovate to higher energy efficiency levels.

Our next steps include:

- Engaging with industry stakeholders to encourage commissioning of existing buildings, a proven strategy for optimizing existing building operations. We are undertaking partnerships to support pilot projects, case studies and awareness-building activities
- Funding research, development and demonstration projects to lower deep energy retrofit costs
- Developing training materials for designers, builders and building inspectors to help ensure the ability to comply with the codes
- Supporting efforts to ensure that provinces and territories have the skills and tools to implement new and more stringent model energy codes

Improving energy efficiency of appliances and equipment

Canadian consumers, businesses, and public institutions buy energy-efficient products to save energy, lower their utility bills and reduce their environmental impact. These products range from small electronics to appliances to motors used in industrial production processes. NRCan helps transform the market for high performance, energy-efficient appliances and equipment through initiatives supporting manufacturers, retailers and consumers.

HIGHLIGHTS FROM 2017–2018

- The *Energy Efficiency Regulations* saved 293.11 PJ of energy and avoided emissions of 39.16 Mt of GHGs. Since 1995, the *Energy Efficiency Regulations* saved approximatively 3,140 PJ of energy and avoided emissions of 465 Mt of GHGs. That is the equivalent of taking almost 65 million cars off the road.
- ENERGY STAR® certified products saved 4.81 PJ of energy and avoided emissions of 0.51 Mt of GHGs. Since the program started in 2001, ENERGY STAR certified products saved approximatively 33.88 PJ of energy and avoided emissions of 3.92 Mt of GHGs. That is equal to the energy use of 330,000 homes for one year.
- More than 75 types of products were eligible for ENERGY STAR certification in Canada.

- At the August 2017 Energy and Mines Ministers' Conference, First Ministers endorsed market transformation strategies and action plans to define goals and pathways to increase the energy performance of key equipment.
- NRCan collaborated with government and industry participants to seek input on how to address the main barriers to adopt more efficient equipment in space heating, water heating, and residential windows.

MARKET TRANSFORMATION: ADVANCING ENERGY-EFFICIENT EQUIPMENT IN THE BUILDING SECTOR

As an important component of Build Smart, federal, provincial and territorial governments are focusing collaborative efforts on supporting market transformation in three equipment areas based on their current energy use and potential to reduce GHGs. Residential windows, space heating and water heating offer significant opportunities when next generation technologies are installed:

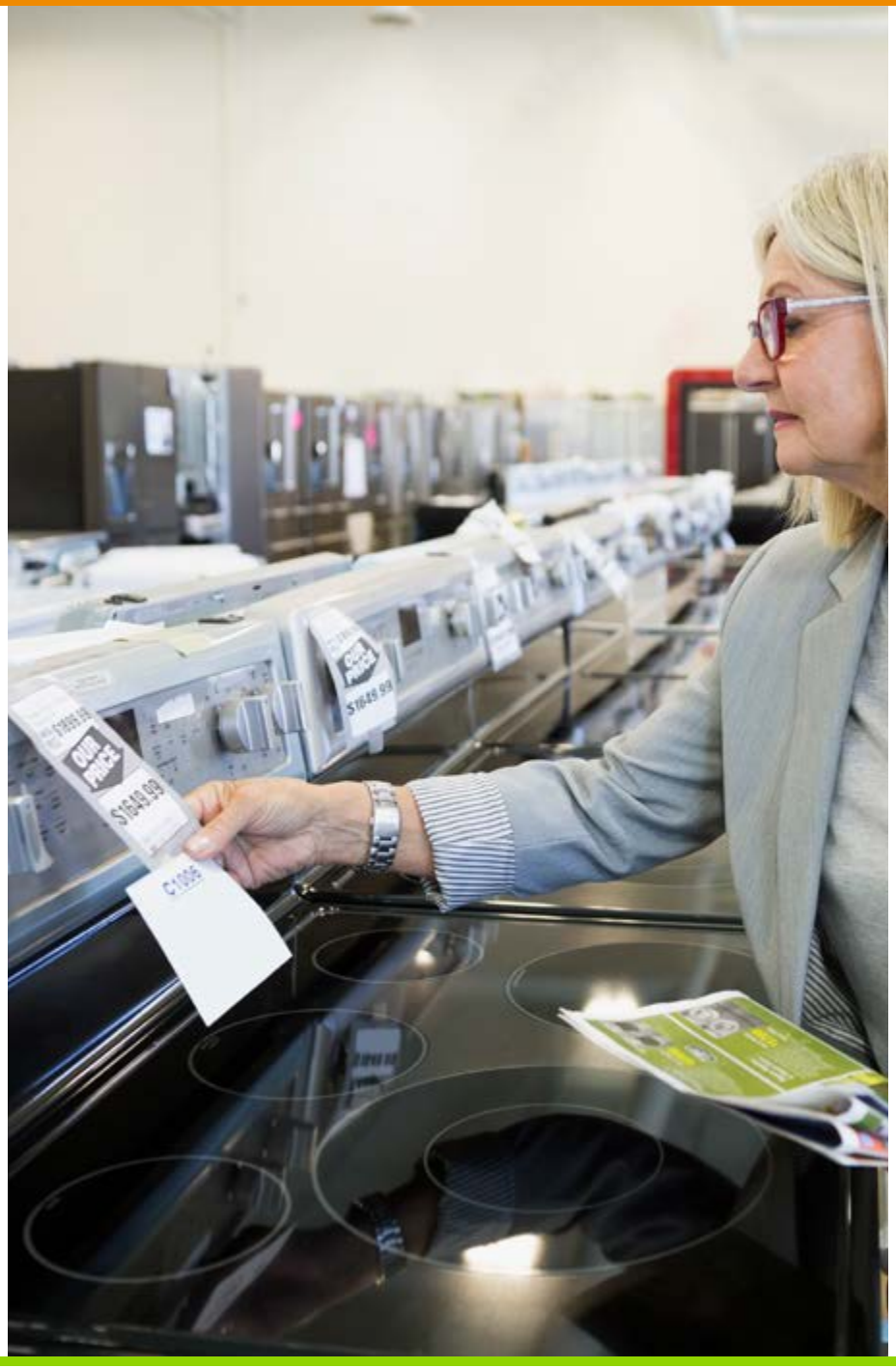
- **Residential windows** can account for up to 35% of heat loss from a home during the heating season.
- **Space heating** is the largest source of energy consumption in Canada's residential and building sectors. It accounts for 64% of the energy used in homes and 56% of the energy used in commercial buildings.
- **Water heating** is the second-largest source of energy consumption in Canada's building sector. It accounts for 19% of the energy used in homes and 8% of the energy used in commercial buildings.

Throughout 2017–2018, federal, provincial and territorial governments worked in partnership with stakeholders to develop a strategy to bring new equipment technologies to market and encourage their wider adoption, with the goal of improving energy performance in the building sector.

At the August 2017 Energy and Mines Ministers' Conference, First Ministers endorsed the following:

- **Encouraging Market Transformation Through Collaboration on Energy Efficiency Standards** to define action plans for how federal, provincial and territorial governments can collaborate to support market transformation and achieve greater harmonization on energy efficiency standards
- **Market transformation strategies for energy-using equipment in the building sector** to define goals to increase the energy performance of key equipment to 2030 and beyond

These reports serve as a basis to guide stakeholder engagement toward the development of detailed road maps to achieve the aspirational goals outlined, as well as to establish performance indicators to measure and report to Energy Ministers on progress each year.



SHOW AND TELL: LABELS AND REGULATIONS

NRCan delivers two labelling programs to provide consumers with energy information and encourage energy-efficient purchase decisions through identification of high performing products.

Disclosing energy consumption with EnerGuide

The EnerGuide label helps consumers make better purchasing decisions by providing verified data about a product's energy performance and making it easy to compare the energy performance of different models of a product. The label is mandatory for seven product categories (e.g. clothes dryers and washers) as a part of Canada's *Energy Efficiency Regulations*, and its presence is voluntary for five product categories (e.g. central air conditioners and furnaces).

ENERGUIDE

Recognizing top performers with ENERGY STAR

The ENERGY STAR label identifies the top 15% to 30% of energy-efficient products of their class, and more than 75 product categories can qualify for the label. It tells consumers that the model they are buying will use less energy without compromising performance. The ENERGY STAR Most Efficient designation is offered each year to a selection of certified products that meet higher efficiency requirements, making them the top energy performers in their class.

energy
ENERGY STAR
HAUTE EFFICACITÉ
HIGH EFFICIENCY

ENERGY STAR: CONTINUOUS IMPROVEMENT

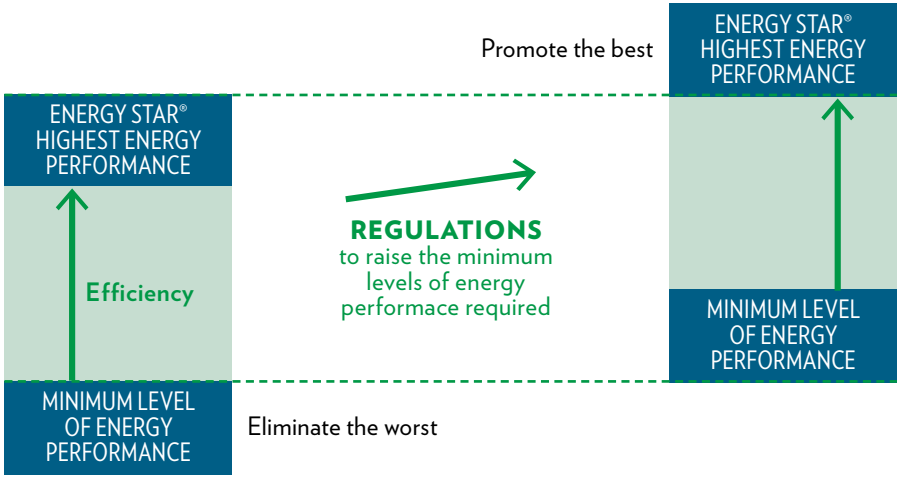
The ENERGY STAR equipment program in Canada has grown to support more than 75 product categories since it came to Canada in 2001. Each year, new product categories are added, and existing ones are reviewed and updated to ensure they continue to offer consumers the features and savings they have come to expect.

Over 87% of consumers, including home owners, businesses, and public sector organizations recognize the ENERGY STAR logo, which can assist them in finding products and equipment that use less energy and offer the same or better performance and features simply by looking for the little blue certification symbol on products in these categories:

- appliances
- heating, ventilation and cooling
- windows and doors
- office and data centre equipment
- home electronics
- lighting
- commercial cooking products
- laboratory equipment

REGULATIONS

Energy efficiency regulations are recognized as one of the most cost-effective tools for reducing GHG emissions and are used in almost 50 countries as a cornerstone of national climate change policies. The government drives energy efficiency and innovation with regulations to eliminate products with the lowest level of efficiency and, through programs such as ENERGY STAR, promote those with the highest.



Canada's *Energy Efficiency Regulations* (the Regulations), administered by NRCan under authority of the *Energy Efficiency Act*, set minimum energy performance standards for products. Products must be certified to enter Canada for sale or lease or to be traded across provincial borders. From time to time, the government amends the Regulations to add new products or to update efficiency standards.

Since August 2014, Canada and the U.S. Department of Energy have worked toward aligning new and updated energy efficiency standards and test methods for common product categories. This is accomplished through enhanced information sharing and a cooperative development and implementation process, to the extent practicable and permitted by law within the context of the Canada-United States Regulatory Cooperation Council.

Advancing our ambitious regulatory agenda

- The new *Energy Efficiency Regulations*, 2016 (also called Amendment 13) came into force on June 28, 2017. This amendment was significant in two respects. First, it updated existing energy efficiency standards for 20 product categories to align with requirements in the U.S. Second, it was completely rewritten to remove references to obsolete and out-of-date standards and to make it easier for stakeholders to find and understand the requirements that apply to them.
- Amendment 14 to the Regulations was pre-published on March 31, 2018, in the *Canada Gazette* Part I. This amendment updates existing energy efficiency standards for 17 product categories to align with requirements in force or soon to be in force in the U.S. Amendment 14 was subsequently published in *Canada Gazette* Part II on October 31, 2018.
- Other products that would eventually become parts of amendments 15 and 16 are included as part of NRCan's published **Forward Regulatory Plan** on-line. They include the mention of several heating products with leading energy efficiency standards being proposed for North America. Amendment 15 was pre-published in *Canada Gazette* Part I on October 20, 2018 and Amendment 16 was pre-published in *Canada Gazette* Part I on December 8, 2018.

VERIFICATION

As of March 31, 2018, there were 58 product categories covered by the Regulations. The Regulations outline the responsibilities of dealers of prescribed products that are imported into Canada or shipped from one Canadian province to another for the purpose of sale or lease. NRCan relies on several monitoring strategies:

- dealer self-monitoring
- energy efficiency and import reporting
- product testing
- collaboration
- tips and complaints

To monitor compliance with the Regulations, NRCan collects data from energy efficiency reports submitted by dealers before a product enters the market and from import documents provided to the Canada Border Services Agency at the time of importation. When a regulated product enters Canada, the import data is compared with the energy efficiency report data to confirm that the product meets the required energy performance levels. Information on the data requirements of the energy efficiency and import reports can be found on NRCan's **Guide to Canada's *Energy Efficiency Regulations*** website.

Between April 1, 2017, and March 31, 2018, NRCan processed almost 6.1 million records relating to the importation of regulated energy-using products to Canada. More than 10.1 million new or revised model numbers were submitted to NRCan for entry into the department's equipment database from dealers' energy efficiency reports.

LOOKING FORWARD: APPLIANCES AND EQUIPMENT

Stay tuned for new ENERGY STAR certified products and updates to existing ones with features such as connected controls, smart features that allow products to offer users performance feedback, and interoperability with other devices and home control centres.

NRCan will continue to work closely with provincial and territorial governments to improve the energy efficiency of equipment through a combination of tools, including market transformation activities and regulations. This work will focus on reducing energy use from space and water heating – the largest end uses in the built environment.

Improving industrial energy efficiency

Canada has one of the most energy-intensive economies, with industrial energy use accounting for 39% of total energy use, 36% of emissions, and up to 45% of industrial production costs. Recent nation-wide engagement and international research show energy efficiency as a key pathway to improving industrial competitiveness and achieving a sustainable, secure energy future.

Energy efficiency is often seen as a cost, with energy savings viewed as an ancillary benefit. In reality, energy efficiency provides much more than cost savings – it can generate value through enhanced competitiveness, profitability, production, and product quality, an improved environment for workers, and lower operational costs for companies. NRCan supports Canada's industrial sector to realize these opportunities through the adoption of energy management standards and processes, recognition programs, energy-saving investments, and the exchange of best practices.

HIGHLIGHTS FROM 2017–2018

- NRCan provided financial and technical assistance to Canadian companies for energy management projects through the NRCan **Industrial Energy Management Program**.
- We helped businesses track, analyze and improve energy use by launching new initiatives, such as the **ENERGY STAR® Challenge for Industry**, **ENERGY STAR for Industry Certification**, and five **ENERGY STAR Energy Performance Indicators** for the integrated steel, automotive, and commercial baking sectors.
- We advanced industrial energy management and ISO 50001 adoption worldwide by leading the **Clean Energy Ministerial Energy Management Working Group** to continue to strengthen alignment with North American and other governments. ISO 50001 is an internationally recognized voluntary standard that gives organizations a structured framework to manage energy.

- We advanced international energy collaboration through our participation with the U.S. and Mexico in the **North American Energy Management Pilot program**, a project sponsored by the **Commission for Environmental Cooperation (CEC)**. This innovative training program helped 18 industrial facilities improve energy management practices, including three Canadian participants, one of which is Canada's largest steel producer, ArcelorMittal Dofasco's steel plant in Hamilton, Ontario. A second CEC training cohort focused on supply chains is planned for fiscal year 2019–2020.

INDUSTRIAL ENERGY MANAGEMENT

NRCan's Industry Energy Management program offers a continuum of strategic energy management options, resources and tools to Canadian industrial facilities at all levels of experience with energy management. These include:

- **Frameworks** for facilities to systematically manage energy, set priorities and adopt energy-efficient practices that are best suited to their situation, including energy management information systems, ENERGY STAR for Industry, the ISO 50001 standard, and Superior Energy Performance®.
- **Tools and funding** to assist in building capacity to adopt energy management systems to improve energy performance and save money. Funding is available for projects with industrial facilities to **implement ISO 50001**, energy management information systems, and technical studies. Tools include technical information, benchmarking tools, calculators, newsletters, webinars and conferences.
- **Recognition** for top energy performance through the **Canadian Industry Partnership for Energy Conservation (CIPEC)** awards and ENERGY STAR and Superior Energy Performance certifications.
- **Collaborative networks.** The CIPEC network and federal, provincial, territorial and international partnerships provide a foundation to promote programs and leverage resources.

Working with partners: Stakeholder networks

Stakeholder networks play an important role in advancing industrial energy efficiency by providing platforms to share information, access to financing, technical resources and support for implementation and monitoring. The Industrial Energy Management Program includes several partners, including:

- Canadian Industry Partnership for Energy Conservation (CIPEC)
- International networks and partnerships including the Clean Energy Ministerial (CEM), International Partnership for Energy Efficiency Cooperation (IPEEC) networks, and participating in the development of ISO 50001 standards
- Federal, provincial, and territorial governments and agencies
- Government-wide initiatives encouraging horizontal collaboration
- Industry associations

IMPROVING INDUSTRIAL ENERGY EFFICIENCY

— by the numbers —

UP TO 45%
OF THE OPERATING COSTS IN THE INDUSTRIAL SECTOR
ARE ENERGY-RELATED.

MORE THAN 70%
OF ECONOMIC INDUSTRIAL ENERGY SAVINGS
REMAIN UNTAPPED FROM EXISTING TECHNOLOGIES, ACCORDING TO THE INTERNATIONAL ENERGY AGENCY.

38% OF BUSINESSES HAVE USED
GOVERNMENT AND UTILITY PROGRAMS.

75% OF EXECUTIVES BELIEVE
ENERGY EFFICIENCY COULD GO FURTHER.

IN 2016, **CANADIAN INDUSTRY SAVED**
$4.9 BILLION IN ENERGY COSTS
THROUGH ENERGY EFFICIENCY INVESTMENTS THAT LOWERED ENERGY USE BY 426 PJ FROM 1990 TO 2016. THAT IS THE EQUIVALENT OF ALMOST 68 MILLION BARRELS OF OIL.

ENERGY MANAGEMENT SYSTEMS

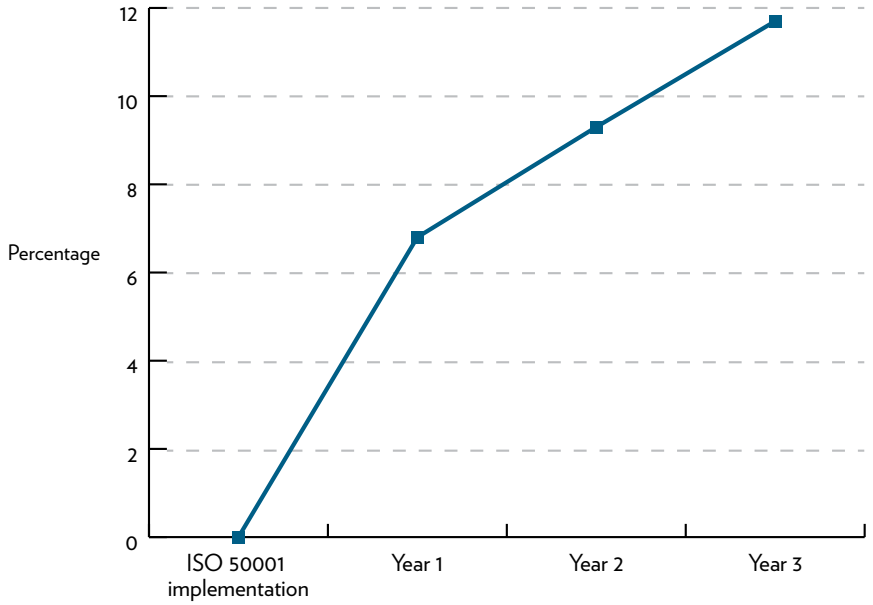
Accelerating the uptake of energy management systems can help us achieve regional and national climate and energy goals. The Pan-Canadian Framework on Clean Growth and Climate Change highlighted ENERGY STAR for Industry, ISO 50001, and Superior Energy Performance as key programs and tools to help businesses track, analyze and improve their energy efficiency.

If 8% of Canada's total industrial energy use came from ISO 50001-certified facilities by 2030–2031, it would save over 117 PJ annually. These energy savings translate into:

- The energy use from over 1 million Canadian households
- Over $800 million in cost savings for Canadian industry
- 6.7 Mt of annual reductions in GHG emissions

Energy management systems increase competitiveness. They are inexpensive, can be implemented quickly, produce results immediately, generally have payback periods of less than two years, and continually generate savings. For example, Canadian companies that have implemented ISO 50001 have achieved an average cumulative energy intensity improvement of nearly 10% within the first two years, resulting in up to $10 million in annual energy cost savings for large Canadian companies. Effectively implemented energy management systems can ultimately save up to 30% of the total energy use in industry and up to 40% in commercial buildings.

IMPACT OF ISO 50001 CERTIFICATION IN CANADIAN INDUSTRY



Average cumulative energy intensity improvement

LOOKING FORWARD: INDUSTRIAL ENERGY MANAGEMENT

In 2018–2019, NRCan will expand the suite of tools offered by the Industrial Energy Management Program by preparing for the launch of the Superior Energy Performance certification and the ISO 50001 Ready program.

In support of the Industrial Energy Management Program, we will continue to undertake the following activities on an ongoing basis:

- Develop sector-specific Energy Performance Indicators to support the ENERGY STAR for Industry Certification program
- Provide cost-shared assistance for projects to accelerate industry uptake of energy management systems
- Produce technical publications and tools to build energy management capacity within industry
- Publish case studies and newsletter articles to share best practices and lessons learned on energy management system implementation
- Partner with the provinces and territories to amplify the impact of investments in energy management systems
- Continue work to expand participation at and the profile of the ENERGY SUMMIT, a biennial event that brings together Canada's energy efficiency experts to help businesses grow through improved energy performance

Driving the transition to lower-carbon transportation

NRCan works to reduce energy use and GHG emissions from the transportation sector by informing and enabling Canadians, businesses, and governments to adopt fuel-efficient, lower-carbon vehicles and driving behaviours. We provide tools, training and technical expertise to commercial users seeking to green their fleets and operations.

HIGHLIGHTS FROM 2017–2018

- Deployed electric vehicle and alternative fuel infrastructure: $16.4 million for Phase I of the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative, resulting in 102 electric vehicle fast chargers, 7 natural gas stations and 3 hydrogen stations, exceeding all program targets.
- Launched Phase II of the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative. The initiative provides an additional $80 million over four years starting in 2018–2019, targeting an additional 900 new electric vehicle fast chargers, 15 natural gas stations and 12 hydrogen stations by 2024.
- To inform zero-emission vehicles policy and program development and foster greater deployment, lead two of five expert working groups focused on consumer awareness and infrastructure readiness related to challenges and opportunities to greater deployment of zero emission vehicles.
- Internationally, Canada became the co-chair (with China) of the Electric Vehicle Initiative, under the Clean Energy Ministerial.
- Launched an interactive Alternative Fuels locator map in collaboration with the U.S. Department of Energy, including the location of all low-carbon refuelling options (e.g. electric, natural gas, hydrogen, propane, E85, B20) across Canada and the U.S.
- Administered SmartWay in Canada to save more than $170 million in annual fuels costs for 41,500 Canadian trucks in 2017. The SmartWay Transport Partnership helps businesses reduce fuel costs while transporting goods in the cleanest, most efficient way possible.

- Worked with other countries to reduce emissions from freight. This included partnering with the U.S. EPA to **expand the SmartWay Partnership into Mexico** by launching a pilot project to determine the viability of SmartWay tools within the Mexican industry. We also worked with the Government of Brazil to replicate NRCan's SmartDriver master curriculum and suite of green freight programming in their country.
- Developed nine new or revised Canada-U.S. binational codes and standards for electric and alternative fuel vehicles and charging and refuelling infrastructure to support the adoption of these new technologies across North America
- Supported tire testing to inform the development of minimum efficiency standards for replacement tires for light-duty vehicles in collaboration with Transport Canada and the U.S. National Highway Traffic Safety Administration

INFORMING CONSUMER VEHICLE PURCHASING DECISIONS

Researching and purchasing a vehicle is a complex consumer undertaking and one of the biggest financial decisions that Canadians make. Canadians have distinct preferences for vehicle purchase and ownership. When considering adopting new technologies (e.g. electric vehicles), consumers generally go through stages. They begin with initial awareness and education, acceptance, and then adoption, which ultimately leads to more widespread adoption, provided the overall experience is a positive one.

NRCan delivers a suite of programs tailored to provide consumers with information and tools along every stage of the consumer process, to assist and inform their purchasing and driving behaviours.

EnerGuide Label and the *Fuel Consumption Guide*

In 2017, about 1.2 million new cars and light trucks sold in Canada had an EnerGuide Label, providing consumers with information on key vehicle fuel type, consumption, and technology. Over time, the data and content available on the Label has evolved and improved to ensure it continues to meet the needs of consumers. The Label provides information on fuel efficiency for the specific vehicle, as well as information on:

- CO_2 reduction
- fuel cost savings
- benchmarking compared to other vehicles in each class

Over the past couple of years, NRCan has worked to make the EnerGuide Label for Vehicles data available to Canadians on-line and on smartphones, in keeping with changing habits to access consumer information.

The on-line ***Fuel Consumption Guide*** uses EnerGuide label data and related content, allowing users to select and compare vehicle ratings across multiple model years, manufacturers and vehicle classes. Consumers can use other search parameters to help identify the most fuel-efficient and lower-emission vehicle choices. In 2017–2018, the Fuel Consumption Ratings search tool had over 900,000 page views, making it one of the most visited pages on NRCan's website.

Understanding consumer behaviour

In the 2017–2018 fiscal year, detailed studies and in-depth analysis were completed to better understand consumer behaviour when purchasing a new vehicle. The behavioural insights and key findings from these studies will help inform our strategies to more effectively engage consumers and to better support the consumer uptake of lower emission vehicles, such as battery-electric vehicles (BEV) and plug-in hybrid-electric vehicles (PHEV).

Social media and rewards programs were also used to encourage Canadians to adopt more energy-efficient buying and driving behaviours. The Carrot Rewards Transportation Awareness campaign engaged more that 71,000 respondents with quizzes designed to increase their awareness of transportation and fuel consumption issues.

Working with partners: The SmartWay Transport Partnership

The SmartWay Transport Partnership helps businesses reduce fuel costs while transporting goods in the cleanest, most efficient way possible. SmartWay works with freight carriers and shippers committed to benchmarking their operations, tracking their fuel consumption and improving their annual performance.

About SmartWay

- Created in 2004 by the U.S. Environmental Protection Agency and the freight shipping industry
- Has been delivered in Canada by NRCan since 2012
- Over 3,500 members across North America
- Represents more than 430 Canadian partners and over 41,500 trucks

Progress

- To further the deployment and expansion of SmartWay in Mexico, we launched a pilot project to test customized tools and process with select participants. Results will feed into the launch of the North American SmartWay Transport Partnership in 2019.
- Canadian experience and expertise is also leveraged to facilitate green freight activities beyond North America. In Brazil, work was undertaken with the freight industry to help them replicate Canada's fuel-efficient driver training master curriculum. This suite of green freight programming, developed in Canada, will enable the Brazil freight industry to reduce fuel use and emissions, while also reducing fuel costs.

LOOKING FORWARD →

- In response to industry feedback, SmartWay is developing a Small Carrier App that will allow truck carriers with fewer than 10 trucks to complete a simplified version of the Truck Tool on-line. The Truck Tool helps carriers gather basic data on factors that affect their fleet's fuel efficiency and environmental performance and allows them to assess efficiency improvements over time. SmartWay partners submit their performance data to NRCan through these tools, which enables the creation of industry benchmarks.
- A successful green freight workshop brought together more than 100 public and private sector stakeholders from across North America. Building on this success, a Green Freight Pathways report will be developed to determine ways to reduce GHG emissions and overall costs linked to freight transportation in Canada.
- The green freight suite of programming through the Green Freight Assessment program will be expanded. The program will enable shippers to analyze their operations and identify and implement steps they can take to improve overall fuel efficiency and explore fuel switching opportunities. Taking these actions will increase the profitability, competitiveness and resilience of the Canadian trucking industry, which is of particular importance because of the relatively small profit margins on which the industry operates.

MOVING US TOWARD THE NEXT GENERATION OF VEHICLE INFRASTRUCTURE

The government is supporting the establishment of a coast-to-coast network of electric vehicle fast chargers along Canada's highway system, natural gas stations along key freight corridors, and hydrogen stations in metropolitan centres. A network of charging and refuelling infrastructure will support wider adoption of lower-carbon vehicles, assuring consumers and businesses that they will be able to recharge or refuel their vehicles when and where required.

Phase I of the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative targeted 70 electric vehicle fast chargers, 6 natural gas stations, and 2 hydrogen stations. By March 2018, projects were in place exceeding targets in all fuels: 102 electric vehicle fast chargers, 7 natural gas stations and 3 hydrogen stations.

Concurrently, the government is working with the private sector and all levels of government to address gaps and misalignments in codes and standards. Aligning codes and standards across all jurisdictions will ensure that Canadians driving lower-carbon vehicles can travel with the comfort of knowing that refuelling technologies and vehicle components will be available regardless of which region they are in. Through ongoing efforts under the Canada/U.S. Regulatory Cooperation Council, the development of nine binational codes and standards for electric and alternative fuel vehicles and charging and refuelling infrastructure was completed in coordination with the U.S. Department of Energy. In addition, a first ever Canada-U.S. workshop on codes and standards for hydrogen vehicles and refuelling infrastructure was held, with over 70 subject matter experts in attendance.

Where can I recharge?

To help users of alternative fuels and electric vehicles find charging and refuelling stations across Canada and the U.S., an **on-line map** was developed in collaboration with the U.S. Department of Energy.

ALTERNATIVE FUELS

As of March 2018, the Canadian biofuels industry had the capacity to produce 1.8 billion litres of ethanol and more than 600 million litres of biodiesel annually. The current production capacity for renewable natural gas (RNG) is less than 1% of the total domestic natural gas consumption. However, the interest in RNG production has increased significantly over the last three years, with some gas utilities providing consumers the option of purchasing a percentage of natural gas as RNG.

The new Clean Fuel Standard (CFS), which is currently under development (led by Environment and Climate Change Canada), will encourage the use of cleaner, lower-carbon fuels (i.e. biofuels, renewable natural gas, hydrogen as a fuel carrier) in many sectors of the economy, including transportation, buildings and industry. Under the CFS, low-carbon fuels such as RNG, hydrogen and biojet will also be well placed for growth.

NRCan has a long-standing collaboration with the domestic low-carbon fuels industry and has subject matter expertise.

NRCan launched the Expert Steering Committee on Lower Carbon Fuels in June 2017. The committee's 30 members represent other government departments, industry, non-government organizations, provinces, territories and industry associations. The committee undertakes studies in support of the deployment of lower-carbon fuels in Canada, with a focus on informing the development of the CFS. In 2017–2018, four studies (covering feedstock availability, fuel-switching opportunities for industry, mid-level ethanol blends, and renewable drop-in fuels) were completed to help inform the committee's work. The studies are publicly available on the **NRCan website**.

Greening Government Services

The federal government owns and operates many buildings and vehicles. This provides both a responsibility and an opportunity to reduce federal emissions and energy use. Leading by example, the federal government has set ambitious GHG reduction targets for its own operations. With a target of 40% emissions reduction by 2030 and 80% by 2050, the federal government is demonstrating to the market that deep reductions are feasible.

HIGHLIGHTS FROM 2017–2018

Buildings

NRCan's Greening Government Services program builds federal capacity to reduce energy consumption in facilities through increasing energy management skills, supporting strategic planning, and derisking innovative clean and energy-efficient technologies:

- Federal officials benefited from over 240 training days in facility and energy management. Technical support and energy management information was provided to 38 federal organizations that account for almost all of 2017–2018 federal buildings-related emissions. In addition, the program provided engineering support for the development of eight departmental carbon neutral plans and energy audits.
- As part of the $4-billion Parliamentary Precinct rehabilitation, NRCan modeled the energy demand of an integrated geothermal exchanger and provided a set of design options to reach carbon neutrality.

Fleets

- NRCan's advice contributed to half of all new vehicle acquisitions in 2017–2018, or 183 vehicles, being electric or hybrid. We analyzed 650 light-duty vehicles of five federal organizations. These five departments represent 37% of federal fleet emissions reported in 2017–2018.

REDUCING OUR FOOTPRINT

Since 1991, NRCan has offered support services to federal organizations to reduce their energy and carbon footprint. Support includes:

- information and awareness through networking (Community of Practice sessions)
- technical tools and support to quantify energy and GHG reduction potential and to plan and implement projects
- technical support to develop projects and establish project financing through energy performance contracts, contracting and monitoring and verification
- case studies and awards to celebrate leaders

Working with federal partners toward our shared targets

In December 2017, the President of the Treasury Board announced the **Greening Government Strategy**. Led by the Treasury Board Secretariat, it is a set of ambitious and targeted measures for federal operations to "lead by example" and stretch the national GHG reduction target to 80% by 2050, relative to 2005 levels.

Federal leadership reinforces broader measures under the Pan-Canadian Framework on Clean Growth and Climate Change, specifically:

Buildings

- Early adoption of net-zero energy ready building codes
- All new buildings and major building retrofits prioritize low-carbon investments based on integrated design principles and life cycle and total cost of ownership assessments, which incorporate "shadow carbon pricing" (based on PCF trajectory from $10/t to $50/t).
  - All new buildings should be constructed to be "net-zero carbon ready" starting at the latest in 2022.
- 100% clean electricity use by 2025 by producing or purchasing megawatt hours of renewable electricity equivalent to that produced by the high-carbon portion of the electricity grid
- Meter energy use and report energy use intensity by 2022 for government-owned buildings of no less than 1,000 m^2.
- Departments will deploy technologies and implement procedures to manage building operations and take advantage of programs to improve building performance.

Fleets

- Starting in the 2019–2020 fiscal year, 75% of new vehicle purchases for light-duty administrative fleets will be zero-emission vehicles or hybrids. The objective is that the government's administrative fleet comprises at least 80% zero-emission vehicles by 2030.
- Starting in the 2018–2019 fiscal year, all new executive vehicle purchases will be zero-emission vehicles or hybrids.

In addition to commitments to green federal buildings and fleets over the coming years, the strategy includes mandatory measures to:

- reduce waste, plastics and water use
- expand green procurement
- incorporate internal carbon pricing
- report a broad scope of direct and indirect emissions
- increase the climate resilience of operations

GREENING GOVERNMENT SERVICES

— by the numbers —

BUILDINGS

FUNDED OVER **240** TRAINING DAYS AND **65%** OF CLIENTS FOUND IT USEFUL FOR THEIR **EMISSION REDUCTION PROJECTS**

PROVIDED TECHNICAL SUPPORT TO **38** FEDERAL ORGANIZATIONS THAT ACCOUNT FOR ALMOST ALL OF 2017–2018 BUILDINGS-RELATED EMISSIONS

ENGINEERING SUPPORT PROVIDED FOR **5** CLIENT ORGANIZATIONS FOR **CARBON-NEUTRAL** POTENTIAL STUDIES OF THEIR BUILDINGS. THESE CLIENTS ACCOUNT FOR **27% OF REPORTED FEDERAL BUILDINGS** EMISSIONS IN 2017–2018.

ALONG WITH THE REAL PROPERTY INSTITUTE OF CANADA, AWARDED THE **RCMP PACIFIC REGION TRAINING CENTRE** FOR THE **GREATEST** REDUCTION OF **ENERGY** CONSUMPTION AND AWARDED PUBLIC SERVICES AND **PROCUREMENT CANADA** FOR THE OFFICE BUILDING DEMONSTRATING THE **LOWEST ENERGY INTENSITY**

FLEETS

650 LIGHT-DUTY VEHICLES ACROSS **5 FEDERAL DEPARTMENTS** HAVE BEEN ANALYZED FOR **LOW-CARBON** ALTERNATIVES. THESE FIVE DEPARTMENTS PRODUCED **37% OF THE FEDERAL FLEET EMISSIONS** REPORTED IN 2017–2018.

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183 ELECTRIC OR **HYBRID VEHICLES** WERE ADDED TO THE FEDERAL FLEET, REPRESENTING **HALF OF ALL NEW ACQUISITIONS** IN 2017–2018.

LOOKING FORWARD: GREENING GOVERNMENT SERVICES

As we look ahead to the 80% GHG reduction target for 2050, the program is focused on both short- and long-term opportunities:

- NRCan is piloting innovative ways to attract private sector financing for retrofitting federal buildings by bundling several small-scale projects in British Columbia. This will produce economies of scale and deliver value for Canadians.
- Client federal organizations are prioritizing their long-term training needs to develop a cost-effective approach for planning and implementing energy and GHG reduction projects.
- Longer term, we are helping clients to shift their focus toward a strategic view of their buildings to achieve deeper GHG reductions. This involves more complex, long-term planning, more costly retrofits, and greater use of clean energy.
- We are also working to develop a suite of products and services focused on the other 20,000+ vehicles across all vehicle categories, including medium- and heavy-duty trucks. Though electrification may not currently be an option for all of these vehicles, switching to lower-carbon fuels such as hydrogen and natural gas offers a technically feasible alternative – one that will still lead to lower emissions.
- NRCan is investing in two investor protocols to help address market barriers to retrofit financing and to create a robust road map to guide retrofit project development, with the intention that the tools will be used by both the federal and private sectors.

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