



Build Smart

Canada's Buildings Strategy

A Key Driver of the Pan-Canadian Framework
on Clean Growth and Climate Change

Energy and Mines Ministers' Conference
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BUILD SMART CANADA'S BUILDINGS STRATEGY

A Key Driver of the Pan-Canadian Framework
on Clean Growth and Climate Change 2017



Build Smart - Canada's Buildings Strategy
A Key Driver of the Pan-Canadian Framework on Clean Growth and Climate Change

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The Future Feels Just Right.

Put your summer fan in cold storage. Say “good-bye” to your office sweater. You won’t need them anymore.

You’re not too hot. You’re not too cold. You’re comfortable. That’s the beauty of a well-designed building, and efficiency is the key.

It’s often said that good design is 99% invisible. When the elements of our physical environment conspire to meet our needs, our experience of the world feels seamless and smooth. We walk across the kitchen, getting dinner ready, without feeling the floor beneath our feet. We give that great presentation in the conference room, without worrying: is it getting too stuffy in here?

As any builder or architect will tell you, it takes intention and good planning to achieve this invisible comfort in the places where we live and work. It is an art, a science, and – more than ever – an imperative. That’s because when our homes and buildings fail us, they fail the planet too.

We have the power to make our homes and buildings work for us and save us money every month.

The energy we use to power, heat, and cool our buildings and run our appliances accounts for 17% of Canada’s greenhouse gas emissions. Every time we have to pump up the thermostat to offset a drafty window or crank up the air conditioning to get some relief on a hot summer night, that’s our homes and buildings letting us down. Just about every month of the year, we end up wasting energy and money to get what we need from our homes and buildings.

Given what we now know about climate change and the incredible strides in home and building innovation, it doesn’t make sense for us to live that way anymore. We have the ability to make our homes and buildings work for us – to anticipate our physical needs while lowering our energy costs and our environmental impact.

Canada is building smart for a future that feels just right. This is the story of how we get there, together.



GREEN BUILDINGS MAKE US HAPPIER AT WORK.

You may have heard that energy efficient buildings are good for the environment and for the bottom-line. But did you know that they may also make for happier and more productive work lives? A recent study by RBC and the National Research Council of Canada found that people who work in sustainable office buildings are more likely to feel satisfied in their jobs and committed to their organizations.¹ Further research from the *Journal of Organizational Behaviour* found that these buildings increase employee productivity by 16%.²

¹ http://www.nrc-cnrc.gc.ca/eng/achievements/highlights/2017/nrc_rbc.html?utm_campaign=construction&utm_source=comm_prod_eng&utm_medium=redirect_eng

² Delmas, Magali A. and Pekovic, Sanja (2012). Environmental standards and labor productivity: Understanding the mechanisms that sustain sustainability.

Energy-efficient homes save us money. In fact, living in one could significantly lower your heating bills. But it might surprise you to know that, when designed right, high-efficiency homes can also help us live better and healthier lives. Considering that we Canadians spend 90% of our time indoors,³ it's good to know that building smart means: a) better indoor air quality; b) improved occupant comfort; c) fewer mould issues; d) and warmer and less damp living and working spaces.⁴

BUILT FOR EFFICIENCY, BUILT FOR LIFE.



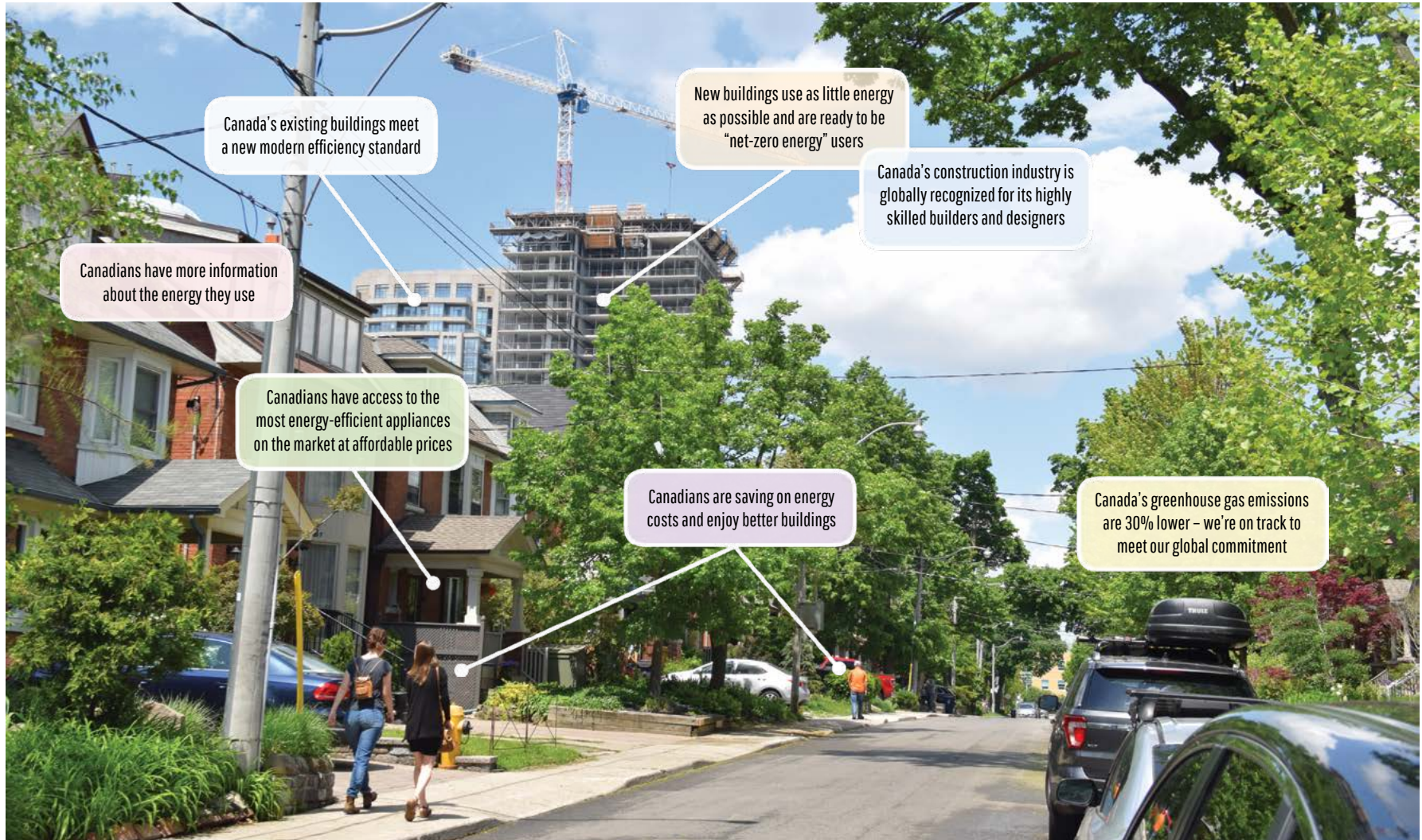
³ Canadian Parks Council, Connecting Canadians with Nature (2014) http://www.pc.gc.ca/APPS/CP-NR/release_e.asp?id=2082&andor1=nr

⁴ Capturing the Multiple Benefits of Energy Efficiency (2015), IEA



Canada 2030: Don't We Look Smart.

Efficiency is hard to see, but we feel it in our homes, our neighbourhoods, our economy, and our own wallets.

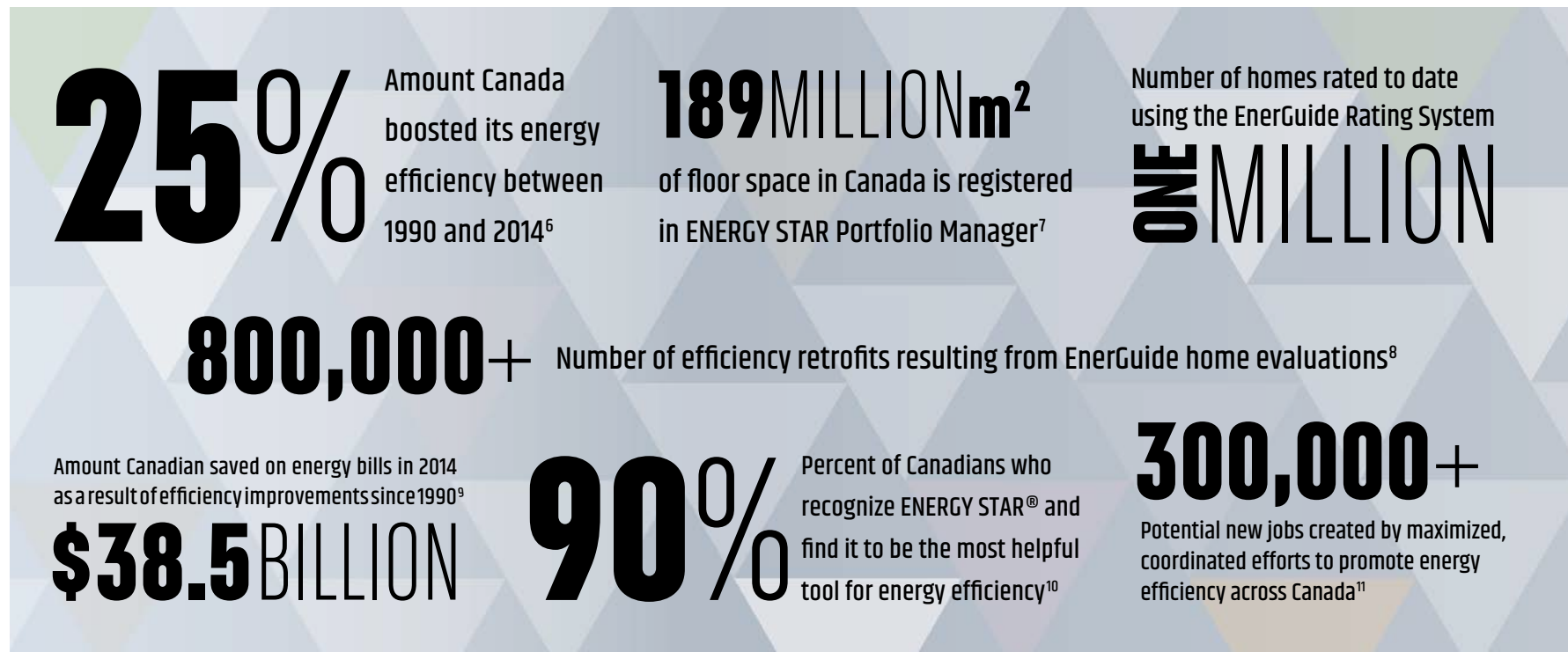


Efficiency. It's No Mystery.

Smarter homes, smarter buildings. We have what it takes to get there.

Efficiency: it's straightforward, practical, and – the best part – eminently doable. In fact, we can put efficiency to work today and start getting significant results in a relatively short time. For example, operators who tracked and benchmarked their buildings' energy performance boosted efficiency by 7% over three years, and poor energy performers saved even more.⁵ If efficiency became a priority

for all of us, imagine the impact. We know how to do this. It starts by setting the efficiency bar high, where it belongs, and ensuring we all have the information, support, and tools to get there. We have these solutions in our hands. All we need to do is apply them. The good news: we've already started.



5 <https://www.energystar.gov/buildings/about-us/how-can-we-help-you/benchmark-energy-use/benchmarking>
6 Energy Efficiency Trends in Canada, 1990–2014

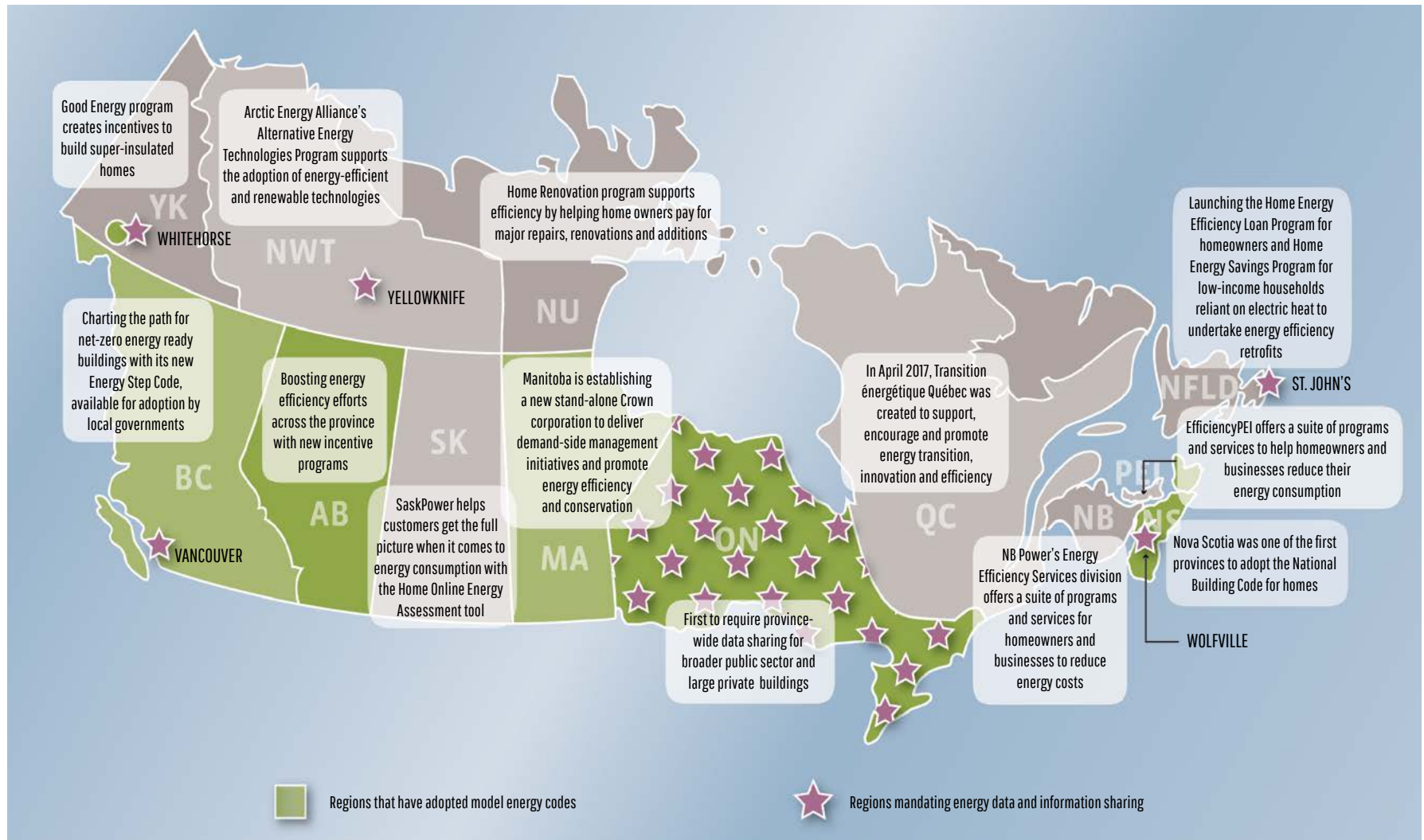
7 Natural Resources Canada, as of December 31, 2016.
8 Improving Energy Performance in Canada, Report to Parliament *Under the Energy Efficiency Act*, 2013–2015

9 Savings across all sectors, Energy Efficiency Trends in Canada, 1990–2014
10 ENERGY STAR in Canada Annual Report 2015
11 Energy Efficiency: Economic Engine of Growth in Canada (March 2014) p. 3



Mapping our Progress.

From new energy codes to sharing energy data, cities, provinces and territories are taking the right steps.



Getting Net-Zero Energy Ready

Raising the efficiency bar for new builds

Imagine if every new house in Canada was so efficient that it could actually power and heat itself. This isn't a sci-fi fantasy – it's an attainable reality. In fact, over the past three years, a number of leading construction companies partnered with Natural Resources Canada and other organizations to build 23 net-zero energy ready homes in three provinces – demonstrating that this is doable. In September 2016, the final homes were finished and put on the market, and all of the net-zero communities are already sold out.¹² This innovation isn't just for homes. In 2015, Canada's first net-zero energy commercial office building opened its doors in Edmonton.¹³ The city of Varennes, Quebec built the country's first net-zero institutional building, a library, in 2014.¹⁴

Now that we know net-zero energy ready is possible, how do we get this innovation to scale for all new builds? The answer: set the energy efficiency bar much higher. The aspirational goal is for these buildings to ultimately offset their own energy use with the renewable energy they generate. To get there, buildings must eventually become at least twice as efficient as the average home or office is today. That's an ambitious target, and an achievable one: especially if we start inching the bar up now.

GOAL: Federal, provincial, and territorial governments will work to develop and adopt increasingly stringent model building codes, starting in 2020, with the goal that provinces and territories adopt a “net-zero energy ready” model building code by 2030.

Net-Zero Energy Ready – The Path Forward

Getting “net-zero energy ready” will take collaboration between all orders of government and the buildings sector as a whole. Here are some of the ways we will make progress together:

- Starting in 2018, fund research, development and demonstration projects to lower the cost of building high-performance and net-zero energy ready homes and buildings.
- Launch a new program to support code adoption and compliance in 2018–19.
- Publish first tier of more stringent model codes for buildings and homes in 2020.
- Publish additional tiers of increasing stringency, with the aim of establishing net-zero energy ready codes in 2022.

¹² <http://www.zeroenergy.ca/>

¹³ <http://themosaiccentre.ca/>

¹⁴ http://www.acec.ca/events_awards/cce_awards/2016/awards_excellence/a6.html



Making the “LEEP” to Net-Zero Energy Ready

Getting Net-Zero Energy Ready is an ambitious journey, but Natural Resources Canada offers a number of programs to help all of us get there together. For example, the ENERGY STAR for New Homes and R-2000 certification programs help prospective home buyers choose the most efficient homes on the market. ENERGY STAR certified homes are, on average, 20% more efficient than those built to code, while R-2000 homes go even further with energy efficiency and include clean air and environmental features.

Meanwhile, programs like LEEP (Local Energy Efficiency Partnerships) are geared to support builder groups and manufacturers in making high-performance homes a reality. The program uses business-to-business collaboration to accelerate the innovation cycle. Groups of local builders work together to evaluate, select, and drive the use of new technologies through the supply chain. Already, more than 200 builders, representing 8,000 new home starts, have participated in LEEP partnerships through their home building associations, utilities and provincial and municipal governments.



“The LEEP process... was a success because it gave the builders the opportunity, through their participation, to steer the wheel in regards to what we believe will work locally instead of having solutions created elsewhere and having them pushed onto us.”

*– Dale Verville, Production Manager,
Qualico Single Family Homes, Winnipeg, Manitoba¹⁵*



¹⁵ <http://www.nrcan.gc.ca/energy/efficiency/housing/leep/case-studies/19318>



Bringing Buildings Into the Future

Modern energy codes for existing buildings

Fact: 75% of the homes and buildings we'll live with in 2030 have already been built. But that doesn't mean we're necessarily stuck with energy relics of the past. We can bring these buildings with us into the future through retrofits and requirements that meet smart and modern model energy standards.

Simple home and building upgrades like improving insulation and draft-proofing not only keep the heat from slipping through our windows and walls, they also keep the money from slipping out of our pockets. A good retrofit can help people save substantially on their electricity and water bills – for some, that can add up to more than \$800 per year.¹⁶ Large building operators who invest in efficiency upgrades can add tens of thousands of dollars annually to their bottom lines.

Ultimately, this is about making all of the buildings we use and depend on work better and harder to meet our needs. It means fresher, cleaner air in our apartments, offices, long-term care homes, and hospitals. It means cozier living spaces and safer living conditions for all of us, including the most vulnerable people in our communities.

GOAL: Federal, provincial, and territorial governments will work to develop a model code for existing buildings by 2022, with the goal that provinces and territories adopt the code.

Modern Energy Codes – The Path Forward

Right now, there is no national model energy code that applies to existing buildings. Canada spans multiple climate zones, and each province and territory has its unique energy mix, building stock, and electricity demands – differences that will need to be considered in any national approach. Here's how we can work together to bring our old buildings into the future:

- Launch development of a recommissioning framework to optimize existing buildings starting in 2018.
- Fund research, development, and demonstration projects to lower the cost of building deep energy retrofits starting in 2018.
- Support efforts to ensure that new model energy codes are implemented properly when they are adopted.
- Publish model energy requirements/codes for existing homes and buildings in 2022.

¹⁶ https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework/complementary-actions-reduce-emissions.html#3_2



A House is a Structure. A Home is Comfortable.

HomeWarming is a unique partnership between Efficiency Nova Scotia, Clean Foundation, Nova Scotia Power, and the Government of Nova Scotia to ensure that everyone, regardless of income, can live comfortably in their own homes. The program provides no-cost efficiency upgrades to those in need – keeping people safe and relieving the stress and burden of higher energy bills.

The process starts with a whole home energy assessment by a certified energy advisor. This allows the HomeWarming team to develop a fully customized efficiency solution for each home. Upgrades focus on the building envelope to improve comfort and air quality. These typically include draft proofing and improving insulation levels within attics, basements, and exterior walls. The only part qualified participants have a hard time accepting? The fact that – seriously – all of it is free.

More stories available at homewarming.ca/stories.





Setting Energy Data Free

Measuring and sharing energy use data

What gets measured gets managed. If we want to increase the efficiency of our homes and our buildings, first we have to know where we're starting from and second, we have to track our progress. Sharing this information is critical too, because it helps us make better decisions. When you buy a new home or property, the last thing that you want is hidden costs. Energy benchmarking, labelling, and disclosure ensure you see the big picture of your investment, including what you can expect to pay in power and heating bills.

But there's an even bigger reason to make transparent energy data the new norm: it gets results. After New York City made it mandatory for large buildings to release their energy data, 77% of building operators responded by making tangible changes to boost efficiency. That's good news for tenants and operators, too, because sharing data also means saving money.¹⁷

Ontario is the first province to make it mandatory for all large commercial buildings to release their energy data. Research shows that tax payers could save as much as \$450 million and one megatonne of GHG emissions if all of the province's public sector buildings performed as well as those in the top quarter of their respective categories.¹⁸

GOAL: Federal, provincial, and territorial governments will work together with the aim of requiring labelling of building energy use by as early as 2019.

Sharing Data and Information – The Path Forward

Right now, buildings across Canada, representing more than one fifth of our commercial floor space, are already tracking and sharing their energy performance using ENERGY STAR Portfolio Manager. This tool provides an apples-to-apples comparison of buildings' energy performance while at the same time adjusting for regional differences like weather. Similarly, the EnerGuide home energy rating system provides homeowners with information about the energy performance of their homes through certified energy evaluations. We now have the opportunity to share more information more broadly across the country to help all of us perform better. To get there, we'll:

- Work collaboratively through a federal, provincial and territorial working groups building on existing resources, to develop an online platform and framework for home and building energy labelling and disclosure by 2019.
- Expand ENERGY STAR Portfolio Manager in Canada starting in 2017.
- Complete a national survey of commercial and institutional building energy use in 2020.

¹⁷ Building Energy Benchmarking: How Measurement Prompts Management - A Survey of New York City Facility Managers (April 2017)

¹⁸ Environmental Commissioner of Ontario released the 2015/2016 Energy Conservation Report: Let's Get Serious, Environmental Commissioner of Ontario



A Race Where Everyone Wins

From 2011–2014, 196 buildings in the Greater Toronto Area competed in Civic Action’s Race to Reduce – a challenge to track, report, and collectively cut their energy use by 10% using ENERGY STAR Portfolio Manager. The results were unprecedented. Together, the competing firms blew through their goal, reducing energy by more than 12% in total – the equivalent of taking 4,200+ cars off the road and adding close to \$14 million to their bottom lines. The Race to Reduce proves that, when it comes to efficiency, all it takes to win is the willingness to compete.



“The Race to Reduce demonstrated what we can achieve when landlords, tenants, service providers, and energy providers see the market benefits of smart energy use, and take an all-hands-on-deck approach to making it happen.”

– Brad Henderson, former Senior Managing Regional Director, CBRE Limited



Being Equipped for the Future

Holding our appliances and equipment to a higher standard

We may find the rattle of a traditional radiator quaint (and the hum of a window air-conditioning unit less so), but appliances and equipment are evolving by leaps and bounds. Considering the fact that heating represented as much as 61% of energy use in homes and buildings in 2014 and windows account for up to 35% of the heat loss in our homes, upgrading these systems presents a huge opportunity. As we replace old technologies with new ones, it makes sense (and cents) to invest in the most efficient appliances and equipment on the market. But to do that, we first need to know what products to buy. Then we need to be able to buy them – which means ensuring those products are both accessible and affordable.

That's where improved standards come in. Focusing efforts to raise the bar for technologies that have the greatest potential to boost building efficiency will literally offer the best bang for our buck. Raising standards while taking the market to the next level of efficiency at the same time is key.

GOAL: The federal government will set new standards for heating equipment and other key technologies to the highest level of efficiency that is economically and technically achievable.

Equipment Standards – The Path Forward

Working together, federal, provincial, and territorial governments have agreed to advance the transformation of markets for high-performance equipment. Short-, medium- and long-term goals have been developed to increase the energy performance of key equipment to 2030 and beyond. Over the next two years, we'll work together to raise the bar by:

- Launching stakeholder-government technical groups to develop roadmaps in 2017.
- Completing detailed Equipment Roadmaps to identify key activities, timelines, and roles to 2030 in 2018.
- Implementing activities in support of short-, medium- and long-term goals starting in 2019.
- Completing short-term goals through updated energy efficiency regulations for products and equipment by 2021.

To find out more: *Market transformation strategies for energy-using equipment in the buildings sector – Supporting the transition to a low-carbon future*, www.nrcan.gc.ca/publications/11102.



Super-Efficient Windows

We don't replace windows very often, so when we do it's an important choice – one we'll want to live happily with for many years. That's why it's important to know that not all windows are created equal. ENERGY STAR certified windows, for example, are up to 40% more efficient than regular windows. How do they do it? With features like low-emissivity glass, sealing units with inert gas, and using high-tech spacer materials – it's a combination of both technology and design.

While high-performance windows ultimately pay for themselves in energy savings, incentives like Hydro-Québec's rental properties program have helped property owners get over the hump of an upfront investment. The two-year program (which concluded in 2016) covered about half of the average cost difference between ENERGY STAR certified and conventional windows, enabling building owners to make meaningful efficiency upgrades.¹⁹ With lower energy costs, improved comfort, and a quieter space to live or work, tenants are the program's biggest winners.



*Find out what energy efficiency programs
are available near you at
www.nrcan.gc.ca/energy/funding/efficiency/4947.*

¹⁹ <http://www.hydroquebec.com/residential/energy-wise/services-initiatives/discount-offers/multi-housing-windows.html>



Financial Incentives

Making efficiency affordable, accessible, and fair

Getting our homes and buildings from where they are today to where they can be is a big transition. That's especially true since the aim is to move on a scale and at a pace required to meaningfully address climate change. Smart financial incentives and supports remove the barriers to efficiency upgrades so that no one is left out in the cold.

We know that well-designed financial incentives work. The ecoENERGY Retrofit-Homes program, which provided modest rebates for home efficiency upgrades from 2007–2012, motivated homeowners to undertake renovations that, in many cases, went beyond their initial plans. Analysis of the program shows that 84% of energy savings experienced by participants were directly attributable to the incentive offering.²⁰ The majority of homeowners also reported taking further efficiency measures outside of the program. In addition to rebates, other tools work, too. From green bonds to creative financing mechanisms, there are many different ways governments can design incentives to help those who need it most and to accelerate action and impact on a large scale.

GOAL: Provincial and territorial governments will work to sustain and expand efforts to retrofit existing buildings by supporting energy efficiency improvements and by accelerating the adoption of high-efficiency equipment while tailoring their programs to regional circumstances.

Efficiency Incentives – The Path Forward: 2017 - 2019

A number of federal programs already exist to support provinces and territories in scaling up efficiency efforts on the ground. Over the next two years, federal, provincial, territorial, and local governments will collaborate to fully leverage these opportunities:

- Green Infrastructure Funding will help offset the costs of upgrading public infrastructure.
- Low Carbon Economy Fund will complement provincial and territorial efficiency programs targeting commercial and residential buildings, as well as industrial facilities.
- Newly expanded federal income tax incentives for business investments in clean energy generation and energy conservation equipment.

²⁰ Building Value – Federal Policy Priorities for Advancing Energy Efficiency Across Canada (November 2015), Toronto Atmospheric Fund

Build Smart Together

Let's Put All Our Energy in the Right Place

Decision-makers, city-leaders, industry professionals, home owners, renters, building owners, and operators: we all want a lot of the same things. We want to lower our costs and see jobs grow. We want to live and work in safe, comfortable spaces – and we want these things for everyone else in our community, too. We want an environment where we can raise healthy kids who will experience the same wonders of nature that generations of Canadians did before them.

That's why working together to make Canada's Build Smart plan a reality is one of the best ways we can all invest our energy. Efficiency is a strategy that punches above its weight in rewards. Will we punch above our weight to pursue them?

The opportunity is ours.



Come On In. The Future Feels Fine.

Together, we can create homes and buildings that are designed for living and for life.

Learn more about Canada's Building Strategy, and check out our critical path.

Visit www.nrcan.gc.ca/pathwayto2030

More Efficiency Resources

For Builders and Manufacturers

- Energy Efficiency Alberta Contractor Network
- Guide to Better Building Envelopes for Large Buildings (Newfoundland and Labrador)
- Guide to Building Energy Efficiency Homes and Small Buildings (Newfoundland and Labrador)
- Local Energy Efficiency Partnerships
- Market Transformation Strategies for Energy-using Equipment in the Buildings Sector: Supporting the Transition to a Low-Carbon Future
- Natural Resources Canada Energy Efficiency Housing Initiatives

For Property Owners and Operators:

- Energy Efficiency Alberta Business, Non-for-Profit, Institutional Programs
- Getting Started with ENERGY STAR Portfolio Manager

For Everyone:

- Arctic Energy Alliance (NWT)
- BC Hydro Power Smart
- BOMA Canada
- Canada Green Building Council
- Canadian Energy Efficiency Alliance
- Canadian Home Builders Association
- Efficiency Nova Scotia
- Efficiency PEI
- Energy Efficiency Alberta Residential Programs
- Fortis BC – Saving Energy
- Good Energy Yukon
- Manitoba Hydro Power Smart

- Natural Resources Canada Research, Development, and Demonstration Programs
- NB Power Energy Efficiency Programs
- Ontario Energy and Water Reporting and Benchmarking Program
- The Pan-Canadian Framework on Clean Growth and Climate Change
- Passive House Canada
- Pembina Institute – Buildings and Urban Solutions
- REALpac
- SaskPower
- Save on Energy (Ontario)
- Transition énergétique Québec
- Turn Back the Tide (Newfoundland and Labrador)

Energy and Mines Ministers' Conference

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