



Energy Efficiency Update 2014: Economic Benefits of Responsible Energy Use

Energy and Mines Ministers' Conference

Sudbury, Ontario
August 2014



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Introduction

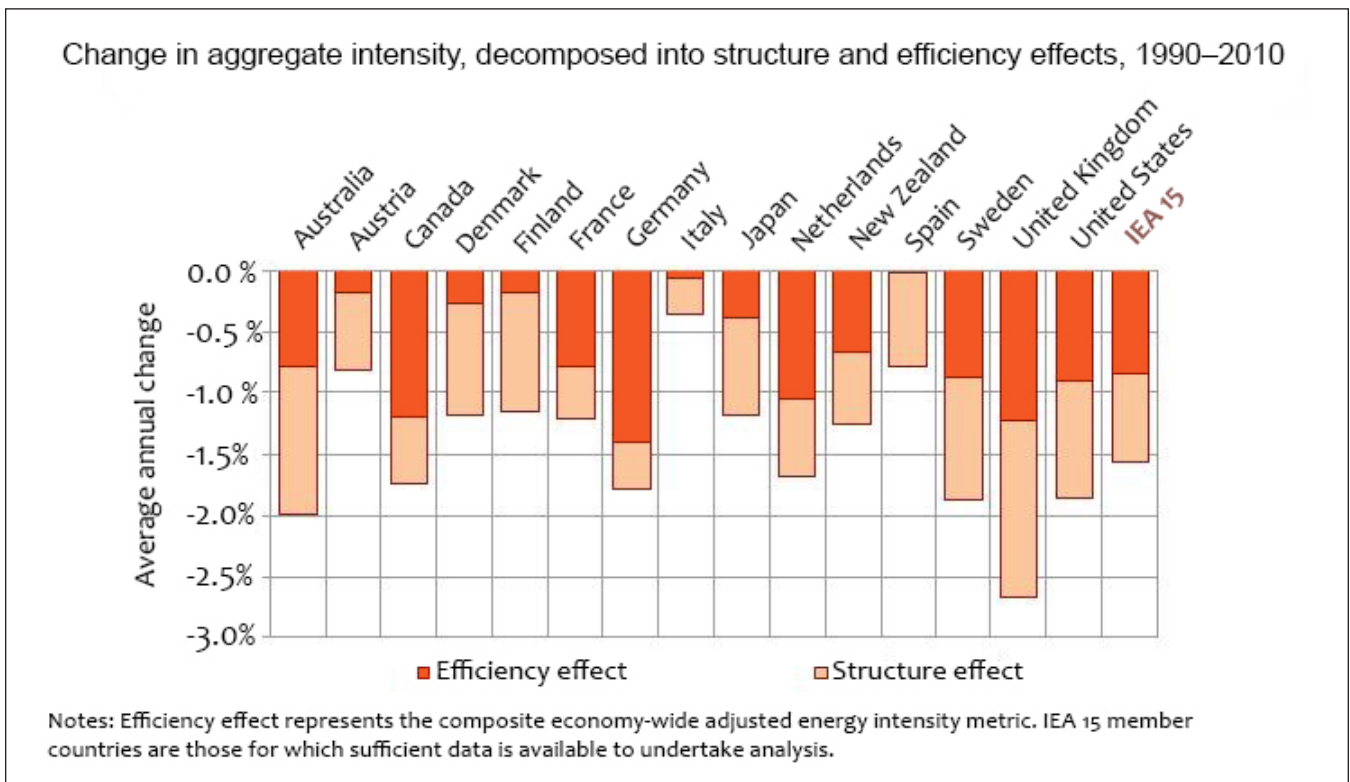
Responsible energy use through energy efficiency is an important component of responsible resource development. It provides significant energy and cost savings to consumers and businesses. Energy efficiency drives economic growth and job creation, enhances industrial productivity and competitiveness, and improves environmental performance across Canada from coast to coast to coast.

Energy efficiency is delivered in Canada through a dynamic, integrated system that involves all levels of government, public and private utilities, industry,

businesses and consumers. By working collaboratively, governments and utilities deliver a wide range of energy efficiency programs that encourage Canadian consumers and businesses to invest in energy-efficient products and services to save energy and money.

Canada’s approach to energy efficiency has been successful. The International Energy Agency (IEA) in a recent report ranked Canada second of 15 countries, tied with the United Kingdom, for its rate of energy efficiency improvement from 1990 to 2010 (see Figure 1). This is despite Canada’s unique challenges – cold climate; small population dispersed over a large landmass; and energy-intensive industrial sector. Canada’s energy intensity improvements are primarily associated with improved efficiency as opposed to structural changes in the economy (e.g. a changing domestic industry from manufacturing to service industries).

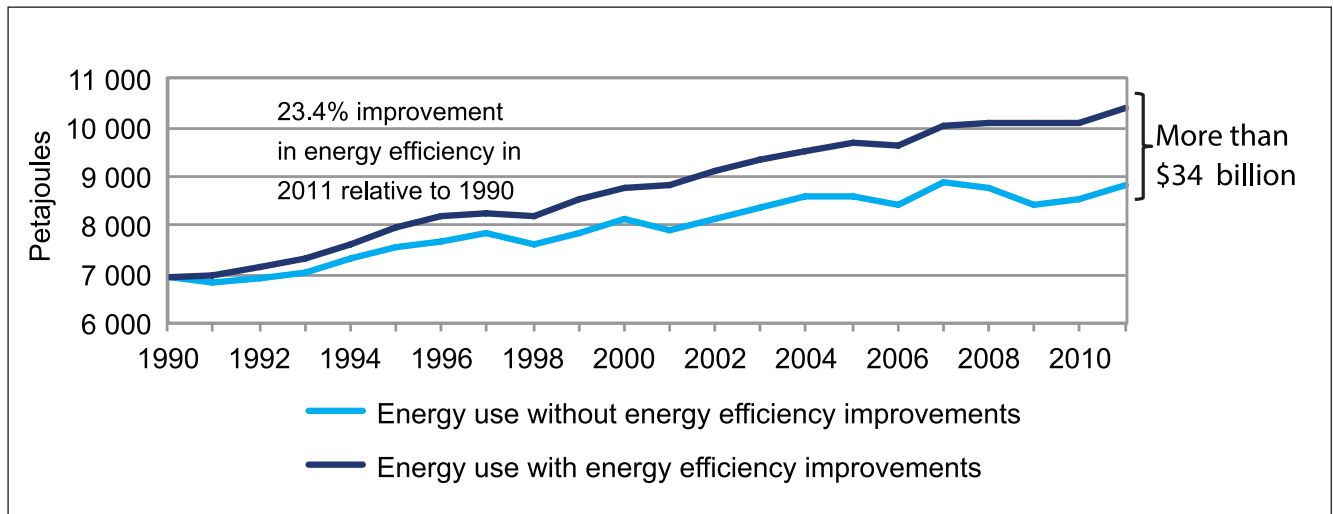
Figure 1: Canada is a world leader in energy efficiency



Source: *Energy Efficiency Market Report 2013*, IEA

Canadian consumers and businesses saved \$34 billion in 2011 as the result of all energy efficiency improvements since 1990 (see Figure 2). This is equivalent to more than 2 percent of Canada's gross domestic product (GDP) in 2011.

Figure 2: Canada has realized a 25 percent improvement in energy efficiency



Source: *Energy Efficiency Trends in Canada, 1990–2011*, Natural Resources Canada (2013)

In economic impact terms this is significant. A recent study¹ indicates that over the 2002–2012 period, energy efficiency improvements across Canada increased GDP by about 1 percent or \$16 billion per year and added roughly 2.5 percent to the overall level of employment.

Improvements in energy efficiency are a long-term benefit to the economy as energy savings are generated every year over the lifespan of a product.

¹ Navius Research, *Macro-economic Effects of Energy Efficiency Improvements*, March 31, 2014

Economic Growth and Job Creation

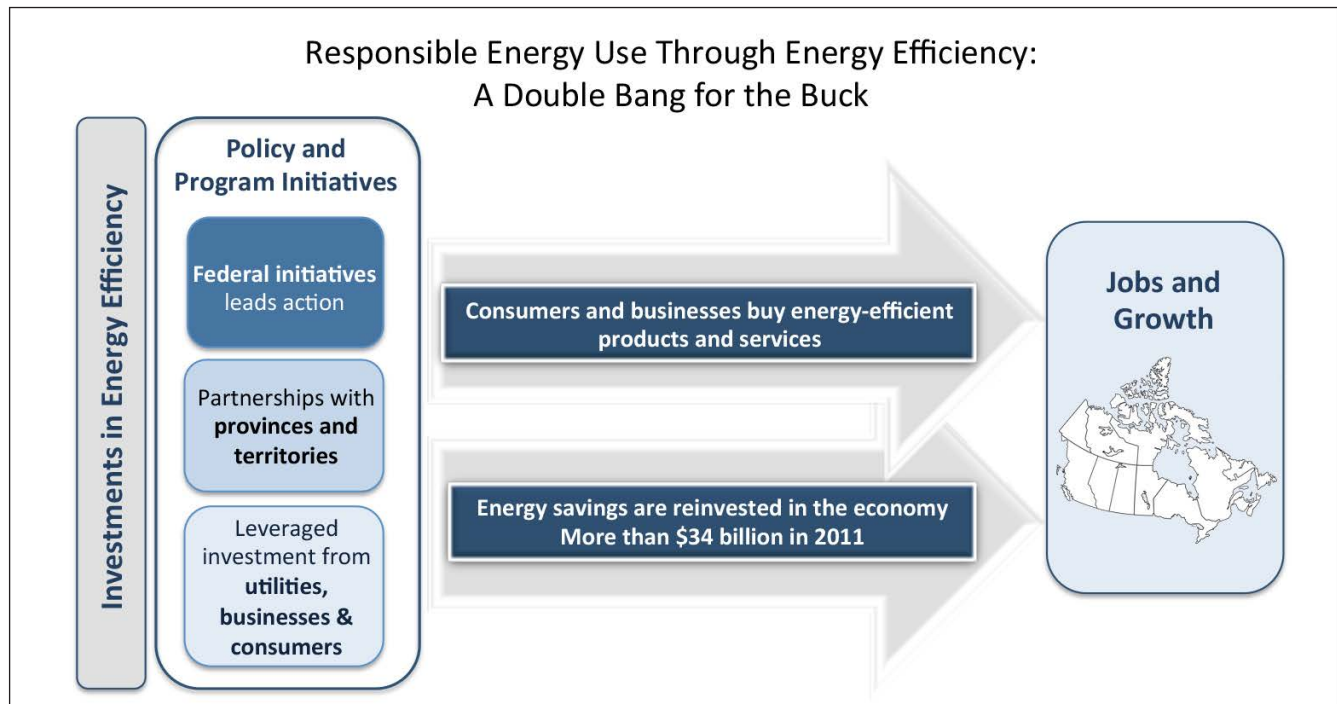
Energy efficiency program spending and public and private sector investment delivers a “double bang for the buck” in the economy (see Figure 3).

When energy users upgrade their windows or add insulation to their homes or replace outdated equipment in their factories, this creates demand for energy-efficient products and services. This demand generates economic growth and creates jobs in the companies that build and supply energy-efficient products and services. As workers spend their earnings in the economy, additional economic growth and job creation is realized. This is the first impact on the economy.

Energy efficiency spending and investment saves Canadian consumers and businesses energy and puts money back into their pockets, similar to a reduction in the federal goods and services tax or another tax measure. When energy users spend their energy savings on consumer goods, recreation, travel and other services, or when they expand their businesses or factories, they create even more demand. This generates additional economic growth and creates more jobs throughout the Canadian economy. This is the second impact on the economy.

The second effect is significant, representing an estimated 75 percent of the total economic growth and job creation impacts from energy efficiency program spending and investments on the Canadian economy.² This suggests that the key economic impact is associated with the level of energy savings rather than the amount of energy efficiency program spending or investment (see Figure 3).

Figure 3: Energy efficiency generates economic growth and creates jobs



² Environment Northeast, *Energy Efficiency: Engine of Economic Growth in Eastern Canada*, May 2012

Combined, the “double bang for the buck” effect has a significant impact on economic growth and job creation. According to a recent study conducted by four eastern Canadian provinces and Natural Resources Canada (NRCan) in 2012:

- Every \$1 spent on energy efficiency programs generates between \$4 and \$8 of GDP, and;
- Every \$1 million invested in energy efficiency programs creates between 30 and 57 job years (one job for one year).³

The study was extended across Canada using the same parameters from the original study. Results confirm the previous findings. Energy efficiency stimulates economic growth and promotes job creation.

Another study⁴ investigated the size of the energy efficiency industry by using a breakdown of the workforce. In 2011, there were over 100 000 core workers in Canada with total annual wages of \$7.7 billion working in energy efficiency-related occupations. These are jobs that require skills and knowledge in the design, improvement or management of products, technologies and services that reduce energy consumption. Another 500 000 Canadian workers are engaged to some extent in energy efficiency-related goods and services.

Based on this workforce, NRCan has estimated the GDP produced by the energy efficiency industry was \$54 billion in 2013, representing approximately 3 percent of the national GDP. For example, the efficient-home construction industry (comprising over 2 000 builders) generates \$3.8 billion in annual sales.

Savings to Consumers and Ratepayers

Improving energy efficiency of homes and businesses lowers energy use and reduces ratepayers' energy bills. These direct benefits to customers also provide indirect but measurable financial benefits to utilities in the form of reduced administrative costs. Lower energy bills reduce the cost of living and give consumers more disposable income. Lower energy costs make business products and services more price-competitive.

The potential energy savings to consumers and ratepayers are significant. In 2011, Canadian consumers saved more than \$20 billion and businesses more than \$14 billion in energy costs from all energy efficiency improvements since 1990.

Reduced energy use also means that consumers and ratepayers are less sensitive to rapid, significant energy price increases.

Although the gains from energy efficiency improvements are impressive, the cost of improvements can sometimes be a barrier. In the commercial/institutional buildings sector, energy service companies fund retrofits that owners repay through the savings on their energy bills. In Canada, these service providers have access to an approximately \$600 million-pool of capital that is used by energy service companies to fund building improvements for clients in both the public and private sector.

More than 7 000 buildings currently chart progress with the ENERGY STAR Portfolio Manager benchmarking tool. Used by Toronto's Race to Reduce, the tool is helping 30 percent of Toronto's office space to achieve a 9 percent reduction in energy use.

³ Environment Northeast, *Energy Efficiency: Engine of Economic Growth in Eastern Canada*, May 2012

⁴ Environmental Careers Organization, *Energy Efficiency Supply Study*, March 31, 2014

Government and Utility Benefits

Energy efficiency reduces the burden on governments and utilities to build new energy generation capacity and energy-related infrastructure to deliver energy to the domestic market. New capacity and infrastructure is costly, can take a long time to come on stream and often faces a number of social license challenges. Saving energy does not face the same challenges as supply side energy options and is relatively less expensive.

By actively managing demand with energy efficiency, utilities can reduce peak demands that put additional strain on the system and require extra generating capacity that is not fully utilized over time. Utilities have to use equipment that can easily cycle on and off, which can in some cases increase pollution and greenhouse gas (GHG) emissions. The sometimes unpredictable peaks also adversely impact prices because of volatility. More equipment also means more potential points of failure, therefore reducing the overall system reliability.

On average, energy efficiency programs cost 2 to 4 cents to save a lifetime kilowatt-hour of electricity, whereas coal-fired electricity generation costs approximately 10 cents per kilowatt-hour. Energy efficiency reduces the demand on the public purse and saves ratepayers money.

Author Peter Terzokian's asymmetry principle of energy consumption, defined as "a unit of energy saved at the consumer level cascades into multiple units of energy at the source,⁵" provides a strong argument to reduce the amount of energy consumed in the first place.

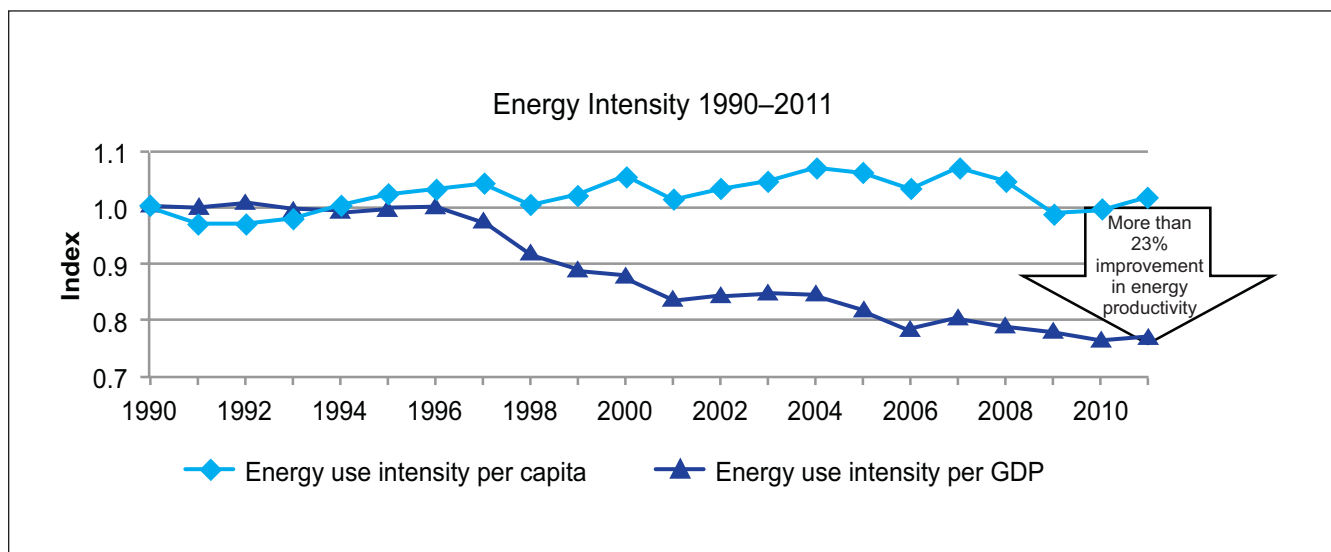
Productivity and Competitiveness

The production of virtually all goods and services requires energy. Many of Canada's industries are energy-intensive – they use a high proportion of energy to produce their goods and services because of the nature of the product (e.g. cement, steel, paper). Reducing energy use per unit of output reduces total energy use and total energy costs and increases productivity. Energy savings can be passed on to consumers in the form of reduced prices, thereby increasing competitiveness in both domestic and foreign markets. Energy savings can also be passed on to shareholders in the form of higher profits and dividends. Energy savings can be reinvested into the organization, thereby increasing production capacity and the range of products and services and creating jobs. Finally, as companies remodel their products to meet higher energy efficiency standards, they often also improve other characteristics, thereby improving the product's overall performance and marketability.

Canada's public and private sectors have been active in reducing energy costs to business, and the results are impressive. Energy productivity in Canada, the amount of goods and services that can be produced per unit of energy, improved by 23 percent from 1990 to 2011 (see Figure 4). In 2011, Canadian businesses and industries saved more than \$14 billion as the result of all the energy efficiency improvements since 1990.

⁵ Peter Terzokian, *The End of Energy Obesity*, 2009

Figure 4: Canada's energy productivity has improved considerably



Source: *Energy Efficiency Trends in Canada, 1990–2011*, Natural Resources Canada (2013)

Canada's energy-intensive industries have been particularly focused on reducing their energy use. For example, governments, utilities and pulp and paper companies have collaboratively made considerable investments over the past 25 years to improve the energy efficiency of Canada's pulp mills. In 2011, pulp mills in Canada saved more than \$2.1 billion in energy costs from energy efficiency improvements – that's \$29 million for each of the 72 pulp mills in Canada or almost \$115 per tonne (t) of pulp. Pulp making is an important subsector of the pulp and paper industry, a mainstay of the Canadian economy. Pulp mills employed more than 13 000 workers in nine provinces in 2011.

An NRCan study⁶ found that generally industrial output, or GDP, in energy-intensive industries improved because of energy efficiency improvements. Over the 2002–2012 period, GDP increased in pulp and paper (+4.7 percent), aluminium (+2.6 percent), other heavy industries (+2.6 percent), other manufacturing (+2.2 percent) and iron and steel (+1.3 percent).

⁶ Navius Research, *Macro-economic Effects of Energy Efficiency Improvements*, March 31, 2014

Promotion of Exports

Energy efficiency can promote exports in three ways. First, energy that is produced but not consumed in Canada can be exported to international markets. Often, exporters can garner higher prices for their energy products in international markets than can be achieved within Canada.

Second, energy savings, if passed onto consumers, will increase the price competitiveness of products or services. Cheaper prices usually result in an increase of market share. Improved product performance will also have a positive impact on market share.

Third, the global demand for energy efficiency-related goods, services and technologies is significant, estimated by the IEA to be as much as \$300 billion in 2011. This market is expected to grow to \$550 billion per year by 2035⁷ as emerging economies, such as China and India, make concerted efforts to reduce their energy use and energy imports through greater energy efficiency investment.

Canada is well positioned to take advantage of existing energy-efficient technologies, products, services and expertise and make greater inroads into the global energy efficiency market. A recent Government of Canada study⁸ identified a number of energy efficiency-related technologies that are ready to take advantage of emerging opportunities. Market access is as important to exporting energy demand management as it is to exporting energy supplies. Government policies that facilitate and support energy efficiency exports can have a significant impact on the future of energy efficiency industries, businesses and exports in Canada.

⁷ International Energy Agency, *World Energy Investment Outlook Special Report*, June 2014

⁸ McKinsey & Co., *Opportunities for Canadian Energy Technologies in Global Markets*, 2013

Conclusion

The benefits of responsible energy use through energy efficiency are clear – economic growth, job creation and prosperity. This is achieved by saving Canadians money, increasing the competitiveness of our businesses and delivering better environmental outcomes. Past federal, provincial and territorial collaboration is already achieving results:

- Five provincial and nine local governments use the federal EnerGuide Rating System to underpin their housing codes, regulations and by-laws, including the cities of Yellowknife and Whitehorse.
 - Approximately \$300 million in utility, municipal, provincial and territorial incentives are based on the same home rating system.
 - Twelve provinces and territories have adopted or are in the process of adopting more stringent building codes based on the model developed by the federal government. The result is that building owners will see \$70 million in cost savings in 2016. The next cycle of code improvement, being developed by the federal government in collaboration with the provinces and territories for 2016, is well advanced.
 - Eleven provinces and territories, including utilities in these jurisdictions, deliver programs and incentives for high efficiency equipment using criteria established by the federal ENERGY STAR® label program.
- One thousand businesses and utilities promote the ENERGY STAR equipment label, including the following:
 - Utilities covering 90 percent of the population offer rebates;
 - Retailer advertisements reach 11 million households weekly; and
 - Utilities such as BC Hydro invested more than \$10 million in energy efficiency programs based on ENERGY STAR to encourage consumers to choose high efficiency lighting, appliances and consumer electronics.

Next Steps

Although considerable progress has been made, significant energy-saving potential remains. Governments can play an important role in breaking down barriers to the adoption of energy-efficient technologies and practices.

The Canadian Energy Efficiency Alliance recently surveyed businesses to better understand their level of energy efficiency awareness as well as how they think about and act on energy efficiency issues. Notably, over 50 percent of businesses indicated they were not familiar with programs to help them become more efficient. However, 67 percent of the businesses have expressed high concern about energy costs.

To complement the many efforts underway across Canada to increase energy savings for consumers and to improve competitiveness for Canadian industry, federal, provincial and territorial governments may wish to consider deepening existing collaborations. Working together, governments can support the private and public sectors to increase awareness of responsible energy use, enhance the global presence of Canadian energy efficiency products, services and technologies, and further Canada's environmental objectives. Suggested actions include:

- expanding tools, policy capacity and partnerships to help energy-intensive industries **increase productivity and competitiveness**, particularly where adoption of energy efficiency technology has been more challenging;

- encouraging market use of innovative technologies and practices that improve productivity and protect businesses and consumers against rising energy costs, while **expanding access** to the \$300 billion and **growing global market** for efficient products, services and technologies;
- improving the availability of information tools and labels to **empower consumers and businesses to make more informed choices**;
- furthering the deployment of natural gas technologies in the transportation sector to leverage the North American energy advantage and lower transportation costs for business while **strengthening environmental outcomes**; and
- providing benchmarking tools to improve business competitiveness so businesses can assess their **energy performance** relative to peers.

Our concerted efforts will continue to build on Canada's strong record as an international energy efficiency leader and lead to ever greater energy savings for Canadian consumers and businesses.

Annex: Economic Benefits of Energy Efficiency Case Studies

Economic Growth and Job Creation

Energy efficiency program spending and investment generates economic growth and jobs for suppliers of energy efficiency products and services. Energy savings generated by these investments is money that can be reinvested into the business or broader Canadian economy.

Pork producer funds business expansion with energy savings (Ontario)



Walnut Hill Farm invested \$175,000 in an energy-efficient refrigeration system at their pork processing facility and reduced their energy consumption by 40 percent aided by a financial incentive from Ontario Power Authority (OPA)'s saveONenergy. Walnut Hill Farm also captures the heat generated by its compressors to heat water for cleaning and washing, resulting in more than a 70 percent drop in propane

heating costs – an additional savings of \$700 per year. The energy savings were used to help cover the cost of the company's \$1.3-million business expansion. According to owner John Koch, "the electrical savings we gained by investing in more energy-efficient equipment will be used to pay for the additional electricity we need to expand the business. Electricity bills will be about the same as before, but we've added 40 percent more refrigeration. We'll be paying the same amount, but getting more bang for our buck."

Canadian Tire reduces electricity costs in 129 Ontario stores (Ontario)



By taking advantage of the OPA saveONenergy program to implement demand control ventilation (DCV) projects throughout its Ontario stores, Canadian Tire is expected to collectively improve the energy use across its 129 stores and benefit from savings of 2.5 million kWh per year. A DCV system uses sensors to continually monitor the levels of carbon dioxide (CO₂) in the air. When fewer people are in a building, the volume of ventilation air is reduced, in turn reducing energy consumption while maintaining indoor air quality. The savings allows Canadian Tire owners and operators to invest elsewhere in their businesses.

Greenhouse operator generates growth from recycled waste (Quebec)



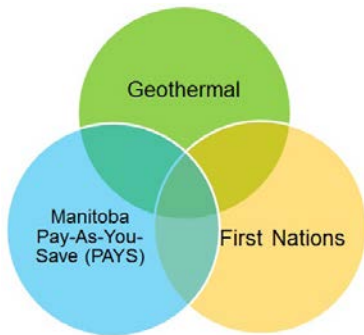
With a grant of \$5 million from Quebec's Ministry of Energy and Natural Resources, the family-run greenhouse Les Productions Horticoles Demers invested \$11.7 million for the recovery of thermal waste from a biogas-fueled power plant resulting in \$3.5 million in annual savings. Demers had built a 5 hectare greenhouse in Saint-Nicéphore as part of its expansion efforts, and the recovery of waste from a biogas-fueled power plant collected from the local landfill has significantly helped the business' bottom line by reducing the need for more than 4.8 million litres of heavy oil. Founded in 1990, Demers is a family-run greenhouse operation that produces greenhouse tomatoes, strawberries and raspberries to supply fresh produce to northeast Quebec year-round, an energy-intensive enterprise for any northern greenhouse.

Energy management "cements" energy efficiency gains (Ontario)



Through certification under the ISO 50001 Energy Management System standard, St. Marys Cement's Bowmanville facility has cut electricity consumption by 10.3 million kilowatt-hours (kWh), saving the company \$1.6 million in 2011. By shifting a number of processes to offpeak hours, the Bowmanville plant has further generated approximately \$750,000 in annual revenue participating in OPA's Demand Response Program, which provides incentives to companies that reduce their peak demand. The Bowmanville facility has the capacity to produce 1.8 million t of cement with more than 100 employees and around the clock operations.

First Nations save thousands in energy costs and create local jobs (Manitoba)



Two pilot projects led by Aboriginal social enterprise Aki Energy with the Fisher River Cree Nation and Peguis First Nation have seen the retrofit of 100 qualified homes with geothermal heating units, resulting in an estimated annual energy reduction of 1.5 million kwh, and approximately \$110,000 in annual energy cost savings) between both communities. As a result of the pilots, approximately 30 band members are trained as certified geothermal installers, with 5 to 10 years of employment expected across both communities. All installation costs are covered by Manitoba Hydro's Pay-As-You-Save Financing Program, which ties the cost of financing energy efficiency retrofits to the property. This initiative will be expanded to other First Nation communities where up to 50 additional Aboriginal workers will be trained and employed in the local energy efficiency industry.

Energy efficiency improvements help keep the lights on at a small business (Nova Scotia)



After years of struggling with rising power costs, Amber Lee's Beautiful Me beauty salon was able to keep its doors open with the help of energy-efficient upgrades. Financial incentives offered by Efficiency Nova Scotia to insulate both the business and her home realized annual combined energy saving of \$3,755. According to the salon's owner, Amber Brewer, "with the money we're saving – and not paying on our power bill – I can invest in maintaining and growing my dream in the small town that I love."

EcoPerformance will create jobs and save energy (Quebec)



In October 2013, the Government of Quebec announced the EcoPerformance financial assistance program for energy efficiency and conservation projects. With a total budget of \$344 million, in the first seven months, the program has allocated almost \$60 million in grants to 50 projects that are expected to create 1 675 jobs and reduce 250 000 t of CO₂ emissions. An additional 100 projects are currently being evaluated. The program's energy management component assists organizations by improving their energy efficiency through financial assistance of up to 50 percent of eligible expenses to a maximum of \$275,000 per site.

Savings to Consumers and Ratepayers

Energy efficiency improvements put money back in the hands of consumers while protecting consumers and ratepayers from energy price increases.

Northern school board saves energy: Students get the message (Ontario)



The Kenora Catholic School Board energy efficiency retrofit program saves the school board more than \$40,000 in annual energy costs, 20 percent more than originally expected. In 2011, the board initiated an audit of its schools to identify energy efficiency potential in lighting, vending machine controls, programmable thermostats, building automated systems, and heating and cooling systems. The board also installed solar panels on a number of its buildings and is selling the electricity back to the grid. Not only is the project reducing energy costs and generating revenues, it is also influencing students' attitude toward energy use, creating a culture of conservation. According to Director of Education, Phyllis Eikre, "It's a real learning experience for our students to see that we're trying to conserve energy, we're trying to create energy, and we're trying to work toward the future. We're trying to look to the future, when they will be the adults in our community."

Yukoners use a program to save energy and water costs (Yukon)



Since 2007, more than 6 600 Yukon participants have used the Government of Yukon's Good Energy Program to conserve electricity, heat fuel and water, and reduce GHG emissions. Energy-efficient changes made through this program have resulted in lifetime appliance savings for Yukoners of 17 million kWh of electricity – equivalent to approximately \$2.1 million, 430 million litres (L) of water and more than 10 million L of fossil fuels. Good Energy provides incentives for ENERGY STAR heating appliances, woodstoves, clothes washers, dishwashers, refrigerators and freezers, and water-saving lowflush toilets. Through the Refrigerator Retirement Program, a similar program cost-shared with the Yukon Energy Corporation, Yukoners have retired almost 700 older, inefficient fridges, which will result in lifetime energy savings of more than 670 megawatt hours (MWh) and put approximately \$86,000 back in the pockets of residents.

Families in need are assisted in reducing their energy bills (Newfoundland and Labrador)



More than 4 500 low-income households in Newfoundland and Labrador have improved their homes' energy efficiency with the Residential Energy Efficiency Program and saved an average of \$720 on annual heating costs. Since its launch in 2009, the program has assisted homeowners earning less than \$32,500 per year with grants of up to \$3,000 for residents on the island or \$4,000 for residents of Labrador to complete home retrofits. The program has assisted families in need throughout the province to save money and make their homes more comfortable.

Low-income families get help managing their energy use (Prince Edward Island)



Almost 3 000 low-income households have reduced their energy bills by more than \$1 million per year thanks to the help of Prince Edward Island's Home Energy Low-income Program. Introduced in 2008, the program provides low-income residents with a complete and comprehensive air-sealing of their home, free of charge. Eligible households meet with a program-approved tradesperson who undertakes the air sealing process and installs a number of energy efficiency features, including programmable thermostats, low-flow shower heads, and compact fluorescent light bulbs. Participants are also offered a voucher for a free furnace cleaning.

Government and Utility Benefits

Increased energy efficiency reduces the need for costly new energy generation capacity and infrastructure.

National Research Council modernizes its laboratory facilities (Government of Canada)



With help from the Government of Canada's Federal Buildings Initiative, an investment of \$3.7 million to upgrade the laboratory ventilation systems of the National Research Council (NRC) Canada's five-story M12 building will generate annual energy cost savings of \$480,000. The savings exceed original projections by 33 percent and will reduce government operating expenditures. Buoyed by this success, the NRC initiated similar retrofits at its Sussex Drive research facility in Ottawa. The \$8.6-million project is expected to yield energy savings of \$870,000 a year.

A territorial government reduces energy use in public buildings (Nunavut)



The Nunavut Energy Management Program has generated more than \$1.5 million in annual energy savings in 39 public buildings in Iqaluit. Modeled on the Government of Canada's Federal Buildings Initiative, the self-funded program assists the Government of Nunavut when entering into contracts to develop, finance and implement retrofit strategies. Future energy savings are used to repay the investments. When fully implemented across Nunavut, the program is expected to reduce utility expenses by more than 20 percent, while reducing GHG emissions and creating employment opportunities in the North.

Hospital upgrades mean more money for patient care and equipment (Ontario)



As part of its 2011 facility upgrade and conservation program, the Kingston General Hospital energy project replaced aging windows in its 175 year old heritage building with more efficient models and undertook other traditional energy-efficiency upgrades supported by \$474,000 in OPA saveONenergy incentives from Utilities Kingston. The upgrades will save the hospital about \$816,000 in utility costs per year. The installation of seven new air handling systems along with occupancy sensors and rescheduling units that respond to occupancy is estimated to save more than \$100,000 annually. The \$7.5 million program will impact approximately 93 000 square metres (m²) (1 million square feet [sq. ft.]) of space across 27 buildings on the hospital campus and eliminates approximately 2.2 kt of CO₂ emissions per year. The upgrades save nearly 72 000 cubic metres of water annually, enough to fill 29 Olympic-sized swimming pools. Saving will be diverted into patient care programs and essential equipment.

Saskatoon public schools save energy and reduce a maintenance backlog through energy efficiency (Saskatchewan)



Saskatoon public schools are expected to save more than \$13 million over the next 10 years from their environmentally responsible, self-funded program. Faced with aging, costly-to-repair building systems, the Saskatoon Public School division worked with energy efficiency partner, Johnson Controls, to improve the learning environment and energy efficiency of 48 schools encompassing approximately 280 000 m² (3 million sq. ft.) of space. Nearly \$10 million in facility improvements were undertaken at Saskatoon schools. New state-of-the-art building equipment, greater technological control of indoor comfort, and staff training on maintaining optimum conditions have resulted in healthier and more comfortable facilities. The improvements have also reduced the maintenance backlog by more than \$2.3 million.

Off-grid homes take a bite out of their fuel costs (Northwest Territories)



A pilot project to replace electric water heaters with highly efficient propane or oil hot water heaters in 40 off-grid privately owned homes saved homeowners \$400 from their energy bill and the Territorial Power Subsidy Program an additional \$1,200 per year. The Arctic Energy Alliance, working with a grant from the Department of Environment and Natural Resources, replaced water heaters in off-grid homes for the cost of a home energy evaluation. The pilot project increased the value of the homes and decreased community reliance on imported diesel fuel. The projected payback period for the territorial government is less than 5 years.

Productivity and Competitiveness

Lower energy costs can lead to lower consumer prices, increased shareholder profits or new business investments.

A bioenergy project creates local employment and strengthens the competitiveness of the forest industry (Alberta)



In a first for Canada's forestry sector, Millar Western Forest Products is installing a \$42-million bioenergy facility at its pulp mill in Whitecourt, Alberta, that will cut power consumption by an additional 1.7 MW of power, saving the facility approximately \$2.3 million. Moreover, the mill will reduce its purchase of natural gas by 11 percent, reduce the costs of the existing effluent removal system, and cut GHG emissions directly associated with on-site production by 17 percent. The project is proceeding with funding from NRCan's Investments in Forest Industry Transformation program, the Government of Alberta and Millar Western. The mill will convert organic waste to biogas that is used to generate an additional 5.2 MW of renewable power. The project is responsible for an estimated additional \$6 million of investment into the

local economy and the generation of 40 000 hours of employment in construction. In the longer term, the facility will reinforce the economic viability of the Whitecourt mill by optimizing its production and giving the company a marketing advantage as an innovative and sustainable producer.

Energy efficient condos are a hit with buyers (New Brunswick)



Owners of new energy-efficient condominiums built at Wilshire Development's The Woods condominium complex realize immediate benefits with average monthly electricity bills of between \$75 and \$100 per unit. For the builder, sales are brisk for the units equipped with ENERGY STAR qualified windows and doors, ENERGY STAR qualified appliances, water-conserving toilets, energy-efficient lighting, high efficiency heat recovery ventilation and better insulation throughout the complex. "We build this way to increase energy efficiency and help the environment; we see ourselves as pushing the standards, and we also do it to help sell the condominiums," according to Brian Steeves, president and owner of Wilshire Development. The Woods project, located in Moncton, is the recipient of the Efficiency New Brunswick's Outstanding Energy Efficiency Project - Residential Multi-Unit New Construction Award for 2013. Wilshire Development has plans to build another two projects in the area.

An integrated management system helps an Eastern beverage manufacturer and distributor reduce energy costs (Newfoundland and Labrador)



A three-year, \$25-million project was supported by the Government of Canada and the Government of Newfoundland and Labrador's Green Fund has realized energy savings of 825 000 kWh per year, annual savings of \$80,000 and a reduction of GHG emissions by an estimated 660 t per year. Browning Harvey Limited is the only soft drink bottler in Newfoundland and Labrador, with 140 full-time and 50 part-time employees. Since 2000, they have implemented several operational enhancements to reduce energy use. In 2009, the firm began installing an integrated management system to reduce energy requirements in its manufacturing process by using waste energy to heat the interior of their plant in St. John's. They also replaced an old heating and ventilation system with a single set of shared air source heat pumps.

Big energy savings spurs Sobeys to apply efficiency measures regionally (Atlantic Canada)



Approximately 60 percent of Sobeys stores across Atlantic Canada have benefitted from energy-efficient retrofit and installations, allowing the grocer to achieve energy savings of more than 4.9 gigawatt hours – or about \$500,000 in annual electrical costs – and reduce 3 700 t of CO₂ emissions. To maintain and improve competitiveness, Sobeys Atlantic completed a company sustainability review in 2009 and partnered with Efficiency Nova Scotia on energy efficiency initiatives to achieve its sustainability goals. Based on the results, comparable initiatives were launched at Sobeys stores elsewhere in Atlantic Canada and by other chains under Sobeys ownership, including Needs, a convenience store chain. According to Keith Ross, Sobeys' senior manager of engineering, "the actual savings were far greater than anticipated. We almost doubled our reduction in emissions."

Lighting changes strengthen the competitiveness of a Cambridge firm (Ontario)



In 2011, with assistance from Cambridge and North Dumfries Hydro's Electricity Retrofit Incentive Program for businesses, Rockwell Automation undertook the first of two phases of lighting retrofits at its 900-employee, approximately 28 000-m² (300 000-sq. ft.) Cambridge warehouse that resulted in an annual reduction of 1.6 million kWh. With savings of about \$200,000, the resulting 43 percent electrical costs reduction had a payback of about 28 months. The second phase of the lighting project was completed in May 2012, with expected energy use reductions of almost 200 000 kWh per year, worth about \$24,000, and emissions reductions of more than 200 t of CO₂. The instant strike light fixtures selected by Rockwell, the world's largest industrial automation and information company, have the added advantage of no wait time to warm up in the event of a power outage, a valuable consideration in a facility that runs 24 hours a day, 7 days a week. The lighting environment from the retrofit has been a boon for employees who report better visibility and a more enjoyable work environment.

A pulp and paper mill increases its competitiveness by reducing energy costs (British Columbia)



Canfor's mill in Prince George has reduced its annual energy bill by more than \$500,000 by significantly improving the energy efficiency of its pulp and paper machines. A paper machine vacuum system optimization and energy reduction audit led to reduced electricity consumption since the project's completion in 2011. According to Don McNeil, Machine Paper Specialist at the Prince George facility, "this project delivered better results than anyone expected, resulting in significant energy savings and in less sheet water going into the press." In addition to reduced electricity use, the mill and its 1 200 employees have also benefitted from related efficiencies such as improved felt life (fabric used to remove moisture from paper in the paper machine), reduced steam consumption and seal water savings.

Alberta farmers benefit from an energy management program (Alberta)

Growing Forward 2 | Cultivons l'avenir 2

A federal-provincial-territorial initiative
Une initiative fédérale-provinciale-territoriale

Approximately \$17 million worth of high-efficiency farm systems have been installed on Alberta farms with the assistance of 500 grants provided through the Growing Forward 2 On-Farm Energy Management Program. The federal-provincial-territorial funded program provides up to \$50,000 per eligible farm to reduce their energy use – using mechanisms such as LED lighting, 95 percent-efficient boilers, insulation and more efficient drives on pumps and fans – helping farmers improve the profitability of their operations while reducing their carbon footprint. The return on investment for producers ranges between one and three years depending on the technology adopted. The program also encourages energy awareness and active energy management by offering electrical and natural gas submeters valued at up to \$2,000 free of charge. The submeters allow farmers to measure and manage their energy use for continuous efficiency improvement.

A 3M plant saves thousands through ISO 50001 certification (Ontario)



With investment from NRCan, Enbridge, Hydro One and the company itself, 3M Canada's Brockville plant participated in an ISO 50001 certification pilot in 2011 that resulted in energy cost savings of \$350,000 between September 2011 and September 2013, with savings are expected to grow annually. A key part of the certification was offering NRCan's Dollars to \$ense workshops, funded by the OPA, to the plant's approximately 170 employees, creating a culture of conservation. Equipment upgrades and retrofits also contributed to the successful certification.

Process integration finds efficiencies you may not know you had



Between 2004 and 2010, 53 process integration (PI) studies were completed in various industry sectors, with follow-up assessment determining fuel savings worth \$54 million annually and direct GHG emission reductions of 311 kt per year. The impact of the changes increased production and led to water and electricity conservation, increased revenue because of power production by \$15 million per year, and resulted in other benefits worth an additional \$6 million annually. In order to increase the use of PI in Canadian industries, the PI Incentive Program was established in 2004 to offer industry the opportunity to share the cost of PI studies of their facilities. A PI study performs a global analysis of the entire process to significantly lower energy and water consumption by 10 to 35 percent and identifies cost-effective opportunities where conventional energy assessments fail to do so. Under the program, a financial incentive of up to 50 percent of the PI study cost, representing an expenditure of \$1.95 million in support from NRCan for the 53 studies undertaken, is made available to companies participating in the Canadian Industry Program for Energy Conservation (CIPEC), the long-standing voluntary partnership between government and business that champions industrial energy efficiency across Canada.

SmartWay Transport Partnership tools brings significant savings to participating carriers



By using SmartWay benchmarking tools, participating SmartWay Transport Partnership freight carriers can save an average of \$1,500 per truck in annual fuel costs. More than 3100 shippers and freight carriers in Canada and the United States are registered in SmartWay, working together to save fuel and money and reduce emissions. SmartWay facilitates business-to-business partnerships between freight carriers and shippers who share a mutual interest in reducing fuel use and emissions in the distribution supply chain. Fuel savings by SmartWay freight carriers can translate into lower fuel charges for manufacturer and retailer clients, reducing costs across the Canadian supply chain. By expanding to include marine barge and multimodal firms in 2014, SmartWay will allow even more Canadian business and transport supply chains to benchmark their operations against their peers across North America, making efficiency opportunities more visible while maintaining competitiveness.

Promotion of Exports

Energy saved in Canada can be exported to other markets and enhance the price competitiveness of goods, while new technologies can offer new export opportunities for Canadian firms.

Nova Scotia lights the way by illuminating its streets with leading-edge LED products (Nova Scotia)



In 2009 and 2010, NRCan partnered with ecoNova Scotia, Conserve Nova Scotia and LED Roadway Lighting Limited (LRL), the largest supplier of LED street lights in Canada, in a pilot project to retrofit 1 100 existing street lights with LED street lights in 19 communities throughout Nova Scotia, a move expected to save Nova Scotians \$5 million in annual costs, while reducing the amount of power required by almost 60 percent and saving 32 million kWh annually. In speaking of the contributions of NRCan, LRL said the project “was the proverbial ‘pebble in the pond’ that started the true adoption of LED street lighting in Canada. It was the stepping stone from which we built our future successes upon. So as the largest

supplier to the Canadian market, it is fair to say that the NRCan funding of our demonstration contributed in a meaningful way to kick-starting of the adoption of LED street lighting in Canada.” LED street lighting continues to be adopted throughout Canada and beyond. LRL’s previous success in demonstration projects has led to the company signing contracts to install close to 200 000 fixtures in places such as New Brunswick, Nova Scotia, the United Kingdom and the Dominican Republic. The firm currently has more than 300 municipal, utility and commercial clients in 37 countries, and sales have grown more than 48 percent per year over the past few years.

Energy efficiency projects boost the competitiveness of an Ontario steel producer (Ontario)



In 2011, DJ Galvanizing took steps, with the help of local electric utility through the OPA’s saveONenergy program, to significantly strengthen its competitive position with a \$280,000-investment in a new lighting system for its approximately 22 300-m² (240 000-sq. ft.) manufacturing and storage facility, resulting in annual electricity savings of approximately \$140,000. DJ Galvanizing, one of North America’s leading auto steel maker, produces 420 000 t of galvanized steel for shipment to North America’s five major car manufacturers: Chrysler, Ford, General Motors, Honda and Toyota. The company continues to identify energy-savings projects, including new projects in 2013 that have allowed the company to increase its competitiveness.

Energy-efficient storage saves money and opens new markets to Lobsters 'R' Us Seafood (Nova Scotia)



With the help of Efficiency Nova Scotia incentives and rebates, Nova Scotia wholesaler Lobsters 'R' Us Seafood has built an energy-efficient \$1.5-million live seafood storage facility capable of holding up to 450 000 pounds of lobster and snow crab for 150 days, saving the firm more than \$90,000 in electrical costs and allowing for future reinvestment in the plant, higher prices for local catches and a better economic outlook for surrounding communities. By implementing this new energy-efficient technology and reaping the resulting energy savings, the firm, located in Lower L'Ardoise, Cape Breton, is able to develop new export markets beyond Canada and the United States to become a direct supplier to China, India and Europe.

Canada leads the way in the development of high performance windows



New technology and processes such as low-e coatings used by the window and door industry in Canada has led to a 400 percent increase in the energy efficiency of windows over the past 20 years – an important contribution to an innovative and competitive industry that exports about \$4 billion worth of product annually. CanmetENERGY, a division of NRCan, aided innovation in the industry by developing a non-metal spacer, designing computer-aided design and performance evaluation software programs called FRAMEplus and VISION, and facilitating the development of standards for rating energy performance and the proper installation of windows. Since 2003, the ENERGY STAR labeling program, administered by NRCan, has made these highly efficient windows more visible in the marketplace so that consumers can make informed choices about higher performing windows. ENERGY STAR continues to raise the bar on window performance to allow unique innovations such as vacuum glazing and aero-gel technology to become commercially viable and the new norm in the near future.