



LEADING BY EXAMPLE

The First Five Years of **Carbon Neutral
Government** in British Columbia - 2010-2014

December 2015



Ministry of
Environment

Table of Contents

Leading by Example.....	1
A Message from the Minister of Environment	1
Climate Leadership in the Public Sector	3
BC Housing.....	6
Becoming Carbon Neutral	7
School District 79.....	11
Catalyzing Change in the Public Sector	12
Building Capacity.....	12
Langara College	14
Shared Services BC	15
Adopting Clean Technology.....	17
Vancouver Coastal Health Authority.....	18
University of British Columbia (UBC)	20
Turning Energy Savings into Cost Savings.....	21
Royal Roads University.....	23
Island Health Authority.....	25
School District 23.....	27
Vancouver Community College.....	28
Generating Economic Activity	29
Capilano University	32
Demonstrating Leadership.....	33
University of Northern British Columbia (UNBC).....	34
Summary	35

LEADING BY EXAMPLE

A message from the Minister of Environment

In 2007, British Columbia made the bold commitment to tackle climate change – the challenge of our generation. The Climate Action Plan was introduced in 2008, and included B.C.'s Greenhouse Gas Reduction Targets Act. This legislation set aggressive targets for carbon emissions across the province.

The Climate Action Plan required government to lead by example, to put its own carbon emission house in order before asking industry and the general public to do the same. The Carbon Neutral Government Regulation required all of B.C.'s public sector organizations to operate at net-zero carbon emissions starting in 2010.

For the past five years, the B.C. public sector has met this goal. We have measured our carbon emissions, and through a combination of emission reductions and offsets, have been the only government at the federal, provincial or state level in North America to operate with net-zero greenhouse gas emissions.

What's become clear over the past five years is that counting the cost of carbon pollution is good for both the environment and the bottom line. Schools are redirecting funds they used to spend on energy directly to education. Post-secondary institutions use energy savings for student programs, and hospitals have reinvested revenues in patient care.

What really identifies Carbon Neutral Government as a successful initiative is the combination of measurable achievements and a strong sense of pride and commitment across the provincial public sector. Public sector organizations have piloted new technologies, developed innovative approaches and assembled an invaluable data collection system.

Today, planning and decisions are based on evidence and information, built and tracked over five years' experience, and B.C.'s public sector organizations are justifiably proud of their achievements. We have highlighted a very small percentage of their successes in this report.



British Columbia is also demonstrating that environmental commitment and economic growth can happen at the same time. Through offset purchases, the government's Carbon Neutral Program is leveraging these dollars to generate even greater private sector investments in clean technologies and jobs as well as preserving B.C.'s environmental capital through forest sequestration projects. During the period of 2010 to 2014, government invested approximately \$53 million into the purchase of emission offsets on behalf of the public sector. This investment has leveraged an estimated contribution to provincial GDP of \$177 million from offset project capital expenditures and \$89 million from project operating expenditures.

As the first jurisdiction in North America to legislate, regulate and administer a carbon neutral government program, British Columbia is proving, day by day, that our actions are making a difference. Over the past five years, the public sector is demonstrating to businesses, communities and individuals across British Columbia that it's possible to do the same.

A handwritten signature in black ink, reading "Mary Polak". The signature is fluid and cursive, with the first name "Mary" and last name "Polak" clearly distinguishable.

*The Honourable Mary Polak,
Minister of Environment*

CLIMATE LEADERSHIP IN THE PUBLIC SECTOR

In 2008, British Columbia released the [Climate Action Plan](#) – a bold commitment to take real and substantive action to reduce the province’s carbon emissions, eliminate government’s net carbon footprint and make significant investments in technologies for the future. The plan echoed the findings of global

climate experts: “our climate is changing, the problem is real, the problem is here, and doing nothing is not an option.” It also issued a direct challenge: “how we respond will shape the future of not just our environment, but also our economy, our society, our communities, and our way of life.”

Effects of climate change

<div>Environmental</div> <div></div>	Longer, drier growing seasons
	Increased frequency and severity of forest fires
	Expanded range of pests and diseases
	Increased extreme weather events
	Saltwater contamination of aquifers and low-lying agricultural lands
	Decreased snow packs and loss of glacier mass resulting in less water for agriculture, fisheries, hydro-electricity generation and communities
<div>Social</div> <div></div>	Sea level rise and storm surges that threaten coastal residences
	Dislocation and property losses from flooding
	Increased air quality issues
	Reduced supply of drinking water
<div>Economic</div> <div></div>	Stresses on summer hydro-electricity supply
	Higher government expenditures for fire assistance and restoration of infrastructure
	Higher insurance costs - payouts from Canadian companies for damages caused by natural disasters have doubled every five years since 1983

The 2008 Climate Action Plan responds to this challenge through action targeted at all sectors of the economy. The plan is built on the principles of:

- ▶ Stimulating a low carbon economy
- ▶ Creating green communities
- ▶ Championing innovation
- ▶ Building on the value of our forests, and
- ▶ Leading the way by walking the talk

As part of its commitment to lead the way, the B.C. government introduced the Carbon Neutral Government Regulation in 2008, which required the entire provincial public sector to be carbon neutral beginning in 2010. Under the regulation, public sector organizations were to measure carbon emissions of every building, vehicle and piece of equipment owned or leased by provincial public sector agencies. They would reduce emissions wherever possible, from simple steps like reducing paper use, to major commitments, such as requiring all new provincial government facilities to achieve LEED Gold certification. Measurements would be verified, emissions would be reduced and carbon offsets purchased to bring emissions to net-zero. All this would be reported out to the public, year after year.

During 2014, British Columbia's 131 provincial public sector organizations generated 46,000 tonnes fewer greenhouse gas emissions compared to their baseline year of 2010, a reduction equivalent to the emissions produced by 9,800 cars in one year. B.C.'s public sector has increased capacity, supported proof-of-concept projects, spurred the development and adoption of clean technology and turned energy savings into cost savings that can be reinvested in public services such as health care and education. By putting its own environmental house in order first, government is showing individuals, business and industry that carbon neutral operations are possible, and that there are significant benefits to reap.

Public sector organizations in B.C. include government ministries, schools, universities and colleges, hospitals, health authorities, and Crown corporations and agencies.

CARBON NEUTRAL:

THE FIRSTS



B.C. has achieved carbon neutrality across the provincial public sector for the fifth consecutive year (2010-14).



B.C. is the first to develop a legislated program for procuring offsets, establishing the foundation for a carbon offset market in B.C.



B.C. is the first government in North America at the state/provincial/territorial level to become carbon neutral and reduce the net environmental impact of its greenhouse gas emissions to zero.

SUCCESS STORY

BC Housing

With 11 million square feet of real estate over 700 buildings across the province, tackling greenhouse gases has been no small undertaking for BC Housing.

Yet through a concerted effort, the social housing corporation succeeded in cutting its emissions by 18 per cent between 2010 and 2014.

From emergency and short-term shelters to homes for individuals and families, BC Housing provides accommodation across the housing continuum in every corner of British Columbia.

The social housing corporation succeeded in cutting its greenhouse gas emissions by 18% between 2010 and 2014

In 2009, a housing renovation partnership program funded by the provincial and the federal governments allowed the corporation to tackle energy conservation head-on.

Over three years, 103 buildings were retrofitted and upgraded at 51 housing sites. Old boilers and leaky windows were replaced. Building envelopes were repaired and, in some buildings, solar panels were installed. The result was a drop in emissions and more comfortable living space for many of the tenants in the corporation's nearly 8,000 units.

At Greenbrook, a 127-unit public housing complex in Surrey, greenhouse gas emissions dropped by 90 per cent following renovations that included building envelope repairs, energy-efficient heating and the largest solar panel installation in Western Canada.

Greenbrook has gone from rundown to upbeat and residents report they are happier.

With 26 buildings with LEED certification and energy retrofits to its current stock, BC Housing has been able to grow in size, while continuing to decrease emissions and energy use.



LEED Gold certified Christine Lamb Residence

BECOMING CARBON NEUTRAL

To be a carbon neutral government, all provincial public sector organizations (PSO) must operate with net-zero emissions. In British Columbia, this means measuring annual carbon emissions, reducing those emissions year over year, offsetting the remainder by purchasing an equivalent amount of carbon reductions (offsets) and reporting on actions taken to reduce greenhouse gas emissions. This balance of emissions reductions and offsets results in a net-zero emissions from our delivery of public services.

1

Measuring operational greenhouse gas emissions

Each year, provincial public sector organizations collect and compile data across their geographic, organizational and operational boundaries for buildings, fleet and office paper. Ministries track business travel as well.

2

Taking action to reduce emissions

Public sector organizations use their data to identify and capitalize on opportunities to reduce greenhouse gas emissions.

3

Offsetting remaining emissions

While public sector organizations are actively reducing greenhouse gas emissions, it is not yet possible to achieve zero emissions. Therefore, to become carbon neutral each public sector organization reduces their emissions to net zero through the purchase of credible, high-quality offsets. A carbon offset represents a reduction in greenhouse gas emissions that can be used to compensate for, or offset, emissions from other sources.

The Emission Offsets Regulation sets the requirements for offsets including that all offsets purchased for public sector carbon neutrality come from B.C.-based projects. This ensures that social and economic benefits remain within the province.

4

Public reporting

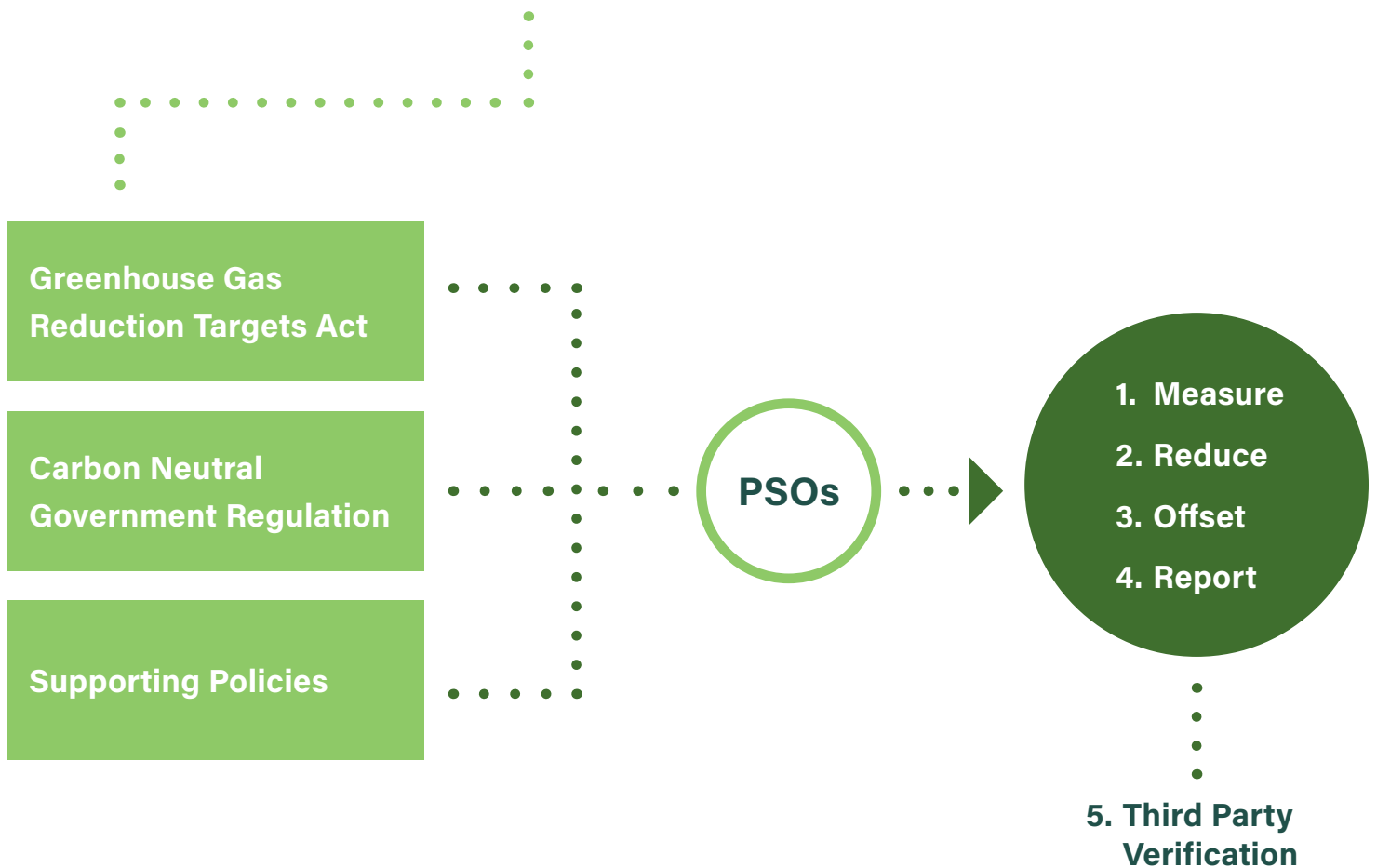
Since 2008, all public sector organizations have reported annually on the actions taken in the previous year and their plans to further reduce greenhouse gases and energy use. Since 2010, they have also reported total carbon emissions and offset investments. All of these reports are available [online](#).

5

Third-party verification

Every year, the emission reports of a sample of public sector organizations are subject to verification by an independent third party. This verification audit assures accuracy in emission reporting and identifies ways to strengthen data collection processes where necessary.

Carbon **Neutral** Government



WAYS OFFSETS REDUCE GREENHOUSE GAS EMISSIONS



Fuel switch projects involve replacing a greenhouse gas-emitting energy source (e.g. natural gas, diesel) with another energy source that emits less or no greenhouse gases (e.g. hydroelectricity, biomass).



Energy efficiency projects involve implementing technologies to reduce fuel or energy consumption.



Sequestration projects remove greenhouse gases from the atmosphere or avoid the release of greenhouse gases through activities such as planting trees, protecting forests that would otherwise be harvested and other forest management practices.



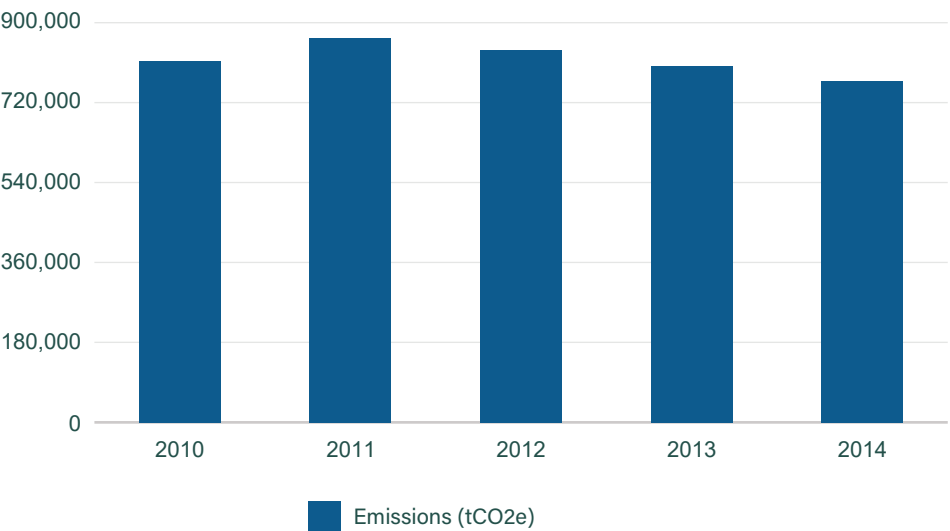
Greenhouse gas destruction activities convert one or more greenhouse gases to reduce their global warming potential (e.g. converting methane produced in a landfill into CO₂ through flaring).

ENSURING SUCCESS WITH SUPPORTING INFRASTRUCTURE

The Ministry of Environment has legislative responsibility under the Greenhouse Gas Reduction Targets Act, the Emission Offsets Regulation and the Carbon Neutral Government Regulation for the Carbon Neutral Government program. It fulfills this responsibility through:

- ▶ Continuing to research and develop policies on the measurement, reduction, offsetting, reporting and verification of greenhouse gas emissions from public sector operations.
- ▶ Providing oversight of public sector organizations to ensure their reports and emissions data are accurate and complete.
- ▶ Providing guidance, tools and support services to help public sector organizations fulfil their obligations.
- ▶ Purchasing high quality made-in-B.C. offsets that are independently validated and verified, and managing the province’s offsets inventory on behalf of the public sector.

Total Emissions Across the Public Sector 2010 - 2014



SUCCESS STORY

School District 79

The rewards of energy reduction in Cowichan Valley School District 79 are evident in schools and classrooms, where money saved on energy has translated into extra funding for students.

By tackling inefficiencies project-by-project, the school district has significantly reduced its greenhouse gas emissions. It also reduced its energy budget by \$100,000 per year. The cost-avoided savings of \$750,000 for the 2014/2015 school year have gone to education.

To energy manager Brian Branting, becoming carbon neutral “was the logical thing to do” in a largely rural school district where many schools were built long before natural gas was available. While several schools have made the switch to natural gas from oil, natural gas is still not available in the town of Lake Cowichan. That meant the district had to look at alternatives. The old high school, parts of which are 70 years old, got a 21st century heating upgrade with the installation of a biomass system that burns wood chips and pellets manufactured from waste wood. The system was installed in 2013: the following year, greenhouse gas emissions were down 84 per cent and fuel costs by 60 per cent compared to the average of the previous three years.

Building and heating retrofits have been the greatest contributors to energy reduction, but sustainability is practiced across the school district. To reduce fuel and emissions, 31 school bus routes have been altered to



Technician Ben Weber and Brian Branting with the SD79 biomass boiler

economize time on the roads. Automatic shut-down systems mean buses don't idle, and the fleet maintenance team works with bus manufacturers on energy saving innovations. In fact, one major bus manufacturer has incorporated program alterations developed by one of the School District 79 mechanics.

But real sustainability encompasses every activity. Branting recalls that not so long ago, school lights were left on in classrooms all the time. Now, he says, sometimes the lights are off even when a classroom is occupied.

“Everyone is getting on board,” said Branting. “Government legislation was not the single reason for all the projects we did to reduce our greenhouse gas emissions, but it played a large part.

The most important thing is to have good functioning school facilities and still try to reduce operating expenses wherever possible. It's not a coincidence that the projects that moved to the top of the priority list had a positive impact on both the district's operating costs and on greenhouse gas emissions.”

CATALYZING CHANGE IN THE PUBLIC SECTOR

Achieving carbon neutral operations has created the basis for substantial improvements to operating efficiency in the delivery of public services - a recalculation of operating costs, a fundamental shift in the way operating decisions are made, and in some cases, significant short-term investments for long-term benefits.

Five years later, B.C.'s public sector is realizing those benefits. Increasing energy efficiency allows organizations to cut heating costs and reinvest those funds in public services. These successes have created a groundswell of enthusiasm and built expertise – and consequently, the capacity to do more.

BUILDING CAPACITY

In receiving feedback over the past five years, many public sector employees underlined the importance of the Carbon Neutral Government legislation and policies to catalyze change. This change began with the business case - considering climate action in every operational and capital spending decision.

The public sector now has considerable expertise and knowledge about the technologies and approaches that can be used to reduce both emissions and costs. B.C.'s Carbon Neutral Government framework and other climate policies have demonstrated that:

- ▶ Viable clean energy technologies exist, and they are good for the economy.
- ▶ Innovative environmental designs are now expected in new and retrofit construction plans.
- ▶ The demand for skilled and experienced workers in biofuels/biomass, building control systems, lighting and professional environmental services is increasing.¹
 - ▶ B.C.'s policy requiring new provincial government facilities to achieve LEED Gold certification has contributed to an increase in the number of accredited green building professionals.
 - ▶ Fifty-three energy or sustainability manager positions are funded by BC Hydro or FortisBC in the public sector in B.C. These dedicated positions ensure that the cost of pollution and benefits of energy savings are captured in long-term plans.
 - ▶ Under agreements between the Province of B.C., BC Hydro and FortisBC, both utilities provided public sector organizations with funding to undertake energy efficiency projects.

¹ West Coast Clean Economy: 2010-2014 Update, <http://www.pacificcoastcollaborative.org/Pages/Welcome.aspx>

100 GREENEST

EMPLOYERS

In 2014, six B.C. public sector organizations were recognized by Canada's 100 Greenest Employers: BC Hydro, BC Public Service, Insurance Corporation of British Columbia (ICBC), Provincial Health Services Authority, University of British Columbia and University of Northern British Columbia.

SUCCESS STORY

Langara College

Location, timing and opportunity are propelling Langara College, already successful at cutting its energy consumption, further along its carbon neutral road.

The Vancouver college has continually and conscientiously cut its emissions by 29 per cent over the past five years – equal to taking 2,400 cars off the road. But new projects could help it far surpass early expectations.

The situation:

The existing central heating plant is housed in Langara's oldest building. The heating plant has been identified as "end of life" and the old building needs a seismic upgrade. By putting the central heating plant elsewhere, the upgrade to the building can go ahead.

Meanwhile, a LEED Gold science and technology building that is under construction will need to be heated. Next to it is the library, also LEED Gold, and with its own energy efficient boiler that has excess capacity.

The solution:

The college administration proposed that the existing library boiler plant be expanded into a new, more energy-efficient central heating plant that will serve the

whole campus. The new plant is designed to connect to the low carbon district energy source proposed for this part of the city - all part of Vancouver's greenest city by 2020 initiative.²

Langara has received funding for the second phase of the new central heating plant's multi-year plan, and construction is underway.

Patricia Baker, manager of building operations and energy, says there is excitement to greening the campus in step with the city.

“With the infrastructure in place to connect to the district energy source, the city has helped this process. In time, the low carbon district energy source could help Langara reduce its emissions in a significant way, which would not otherwise be feasible.”



Langara Science and Technology Building construction

² <http://vancouver.ca/green-vancouver/greenest-city-action-plan.aspx>

SUCCESS STORY

Shared Services BC



Left to right: Keleigh Annau, Bernie Gaudet, John Berry, Crystal Kashman and Ana Grisales

In legislating public sector organizations to reduce, measure and report emissions, the B.C. government set a special challenge for itself.

Of the 18 million square feet of real estate occupied by the provincial government, 70 per cent of office space is leased. Opportunities to increase efficiency can be tricky when a landlord is involved.

The core government's buildings portfolio also includes special-purpose facilities such as correctional institutions, courthouses, and heritage buildings. However,

with so much leased space, the government has limited control over the nearly 1,700 buildings within its purview.

Still, it has met the challenge . . . and then some. With \$40 million per year in across-government energy costs, the real property division at Shared Services BC (SSBC), which manages the provincial real estate portfolio, has a one per cent year-over-year energy reduction target that directly impacts greenhouse gas emissions.

It has far exceeded that goal. From 2010 to 2014, SSBC reduced emissions from government buildings by 18 per cent.

Christine French, senior manager of sustainability initiatives in the real property division, says energy conservation efforts across government focus inter-dependently on occupant behavior, building operations, ministry program alignment and building infrastructure.

Matching a ministry's program delivery with the right building is key. The government's Leading Workplace Strategy puts this into practice by creating flexible workspaces that allow ministries to use fewer square feet of real estate and reduce the energy intensity of their program.

"We're setting up workspaces in ways that support collaboration and allow concentrated work to occur

**From 2010 to 2014,
SSBC reduced
emissions from
government
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where it makes sense," says French. It's a culture shift towards providing employees with choices about their workspaces while encouraging engagement, work/life balance, knowledge transfer and cost reduction, as well as reducing the environmental impact of government operations. There are a number of reasons to pursue this and one is energy efficiency. It's definitely the future of work."

Building operations and maintenance efficiency is a common denominator across government. One firm – Brookfield Global Integrated Solutions-Workplace Solutions Incorporated – is contracted for all government building operations and tasked with finding efficiencies and identifying opportunities. In buildings where government is a tenant, infrastructure upgrades and retrofits are typically more feasible when their tenancy has been long-term. "We're actively working in all areas to improve our energy performance and we are seeing results in all of them, big and small," says French.

ADOPTING CLEAN TECHNOLOGY

The path to emission reduction in the provincial public sector relies on adopting clean and energy-efficient technologies and practices. These range from renewable forms of energy, leading edge equipment and highly skilled professional services to better operations management practices. Significant reductions in emissions can also come from readily available off-the-shelf clean technologies such as high-efficiency condensing boilers, variable speed fans and building automation controls/systems.

Most public sector carbon emissions are facility-related (77 per cent), offering significant opportunities for emission reductions through retrofits and replacements. Many incorporate and pilot innovative technologies such as solar photovoltaic, biomass and geo-exchange systems. British Columbia's first health sector Passive House project is on the province's central coast.

Some of the public sector building retrofits undertaken include:

- ▶ Lighting: replacing existing lighting fixtures with high efficiency LEDs or energy-efficient fluorescent systems.
- ▶ Ventilation/air distribution: upgrading fan systems and optimizing air delivery.
- ▶ Heating and cooling system upgrades: replacing existing end-of-life/over-sized boilers, installing heat recovery systems and upgrading domestic hot water systems.
- ▶ Direct Digital Control (DDC): introducing or updating automated building controls.
- ▶ Solar: installing solar hot water systems to replace existing domestic hot water systems and using rooftop solar photo voltaics to supplement electricity.

SUCCESS STORY

Vancouver Coastal Health Authority

In tiny Bella Bella on B.C.'s central coast, Vancouver Coastal Health Authority (VCH) is leading the way in energy-efficient construction.

VCH's staff housing in this remote community of 1,500, home to the Heiltsuk Nation, was beyond repair. After a devastating fire in 2014, it had to be replaced. The health authority was committed to long-term sustainability and, when Bella Bella's Passive House-designed residence opened in September 2015, it was a first in B.C. in health care construction – and the first to be built in a First Nations community.

Passive House is a rigorous and bar-setting standard in energy-efficient construction that reduces energy demand for heating and cooling by 80 to 90 per cent compared to traditional construction. The ultra-efficient building shell is key to constructing a building that will stay cool in summer and warm in winter.

Vancouver Coastal Health has set the energy-efficiency bar high in other parts of its community of care as well.

On B.C.'s Sunshine Coast, a recently-completed expansion of Sechelt Hospital has been declared Canada's greenest health care facility, with energy savings 40 per cent greater than other health centres meeting the LEED Gold standard. Innovations in the new hospital include a geo-exchange system, a high-performance building envelope, solar shading and operable windows that allow for natural ventilation.

A green roof reduces storm water run off, increases energy efficiency, and provides a nesting habitat for birds.

Staff and visitors have access to 14 alternative fuel vehicle charging stations, and bike racks and showers encourage hospital staff to commute by bicycle.

VCH completed 12 energy conservation projects in 2014, with a further 29 scheduled to be completed in 2015. The newly completed HOpe Centre - a 14,000 square metre acute mental health facility at North Vancouver's Lions Gate Hospital campus - is a shining example of one of these efficient new locations. The HOpe Centre features natural daylight, better air circulation and a significant reduction in greenhouse gas emissions by using an energy provider that includes renewable sources such as solar and geothermal energy.

The health authority reduced its emissions by seven per cent over five years, a significant accomplishment for a region where the demand never declines.



Entrances to the six row-house style homes that comprise the Bella Bella Passive House

PUBLIC SECTOR LEED GOLD BUILDINGS

Since 2008, every facility built by the government of British Columbia is required to achieve LEED Gold certification. As a result, there are more LEED Gold certified public sector buildings in B.C. than anywhere else in Canada. Every day, these buildings showcase innovative and environmentally responsive design and clean energy solutions for hundreds of thousands of British Columbians who enter the buildings to work, attend class or access government services.

Public sector LEED Gold buildings constructed since 2008

British Columbia	86
Ontario	74
Alberta	30
Quebec	15
Manitoba	7
Nova Scotia	5
New Brunswick	4
Saskatchewan	4

BUILDING A REPOSITORY OF ENERGY USE DATA

One of the most significant results of British Columbia’s carbon neutral government legislation is the rich collection of emission data, creating a solid foundation for evidence-based decision making. Prior to the implementation of the Carbon Neutral Government program, there was no requirement for the public sector to track and monitor energy use and emissions annually.

Since 2010, organizations have tracked and used energy use data to improve their asset management, measure the footprint of the entire operation, track the changes year over year, and compare their performance to others and identify areas for improvement.

These data allow public sector organizations to better identify the sources and impacts of greenhouse gas emissions and determine the most effective way to reduce emissions. It not only helps them demonstrate accountability for the environmental impact of their operations, it can also inform how they’re doing compared to their peers.

For government, these data inform public policy and programs, and are also useful in exploring opportunities to purchase bulk and regional energy and fuel supplies.

SUCCESS STORY

University of British Columbia (UBC)

Tackling climate change for the University of British Columbia's Vancouver campus has been akin to a small city committing to becoming carbon neutral.

The Vancouver campus is home to 10,000 students, and UBC has five residential neighbourhoods. It has 15 million square feet of building real estate and it owns and operates all the underground piping for services such as heat, water and sewer.

In striving to meet its greenhouse gas reduction targets by 2015, UBC has significant challenges. As a research university, UBC receives funding that drives construction of new laboratories, many of which require consistent temperature and atmospheric conditions twenty-four hours a day, seven days a week throughout the year.

Since 2008, seven major buildings – more than 1 million square feet - have been added to the campus, all of them LEED Gold.

In 2010, the university's board of governors approved three major projects in their climate action plan:

1. Convert UBC's academic district energy system from steam to hot water. By replacing aging heating infrastructure with an efficient hot water heating system, UBC will substantially reduce greenhouse gases.
2. Build a bioenergy research and demonstration facility to generate renewable energy. Operational since 2012, UBC's \$27.4 million bioenergy facility is the



GE Jenbacher engine at the UBC Bioenergy Research and Demonstration Facility

first biomass cogeneration – combined heat and power – project of its kind in North America.

3. Re-commission all major buildings to reduce the energy they need to operate.

Orion Henderson, director of energy planning and innovation, credits carbon neutral legislation in helping the university in its long term climate action planning.

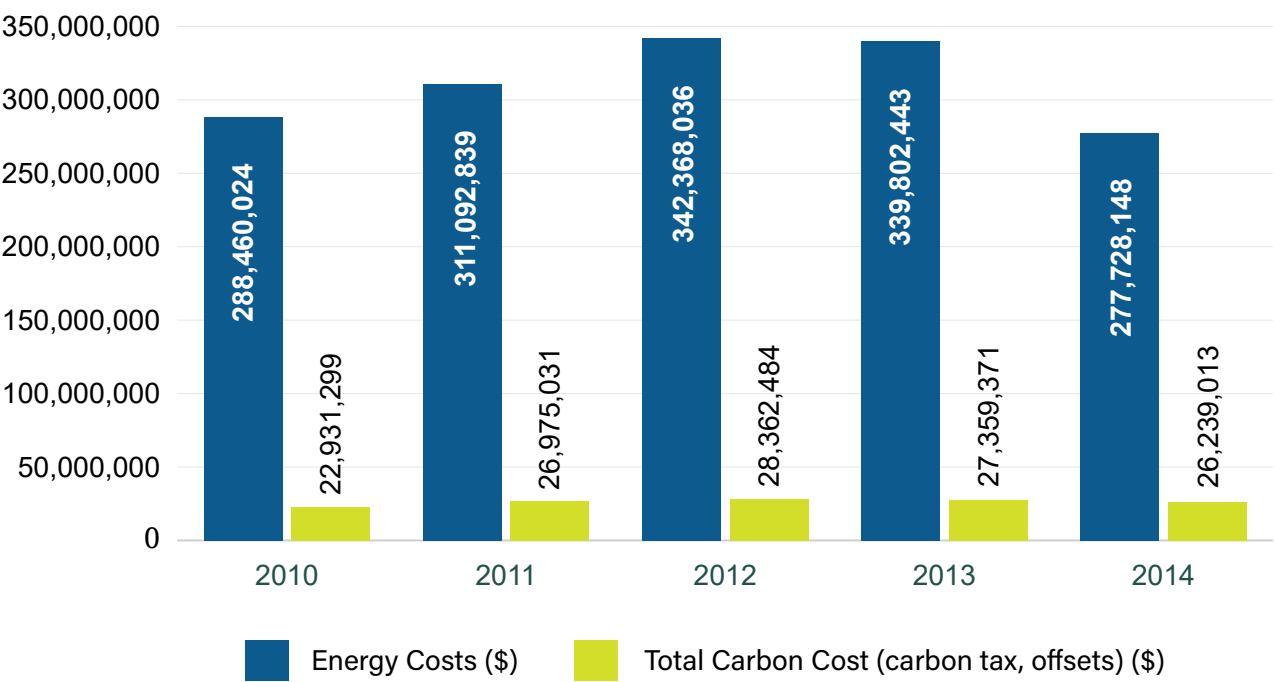
"The legislation has been a powerful tool in helping us make long range decisions that consider total cost of ownership. It forces us to put on our thinking caps and invest time and resources in considering alternatives to the way our energy is purchased and consumed."

The university is on pace to achieve the 2015 target of a 33 per cent reduction, and is now setting its sights on the aspirational target set for 2020: UBC is consulting the campus community in considering actions to achieve a 67 per cent emissions reduction from 2007 levels.

TURNING ENERGY SAVINGS INTO COST SAVINGS

For B.C.'s public sector, saving energy saves money. Between 2010 and 2014, public sector organizations in British Columbia cut energy costs by approximately \$11 million - at a time when utility rates rose by an average 10 per cent, and when the carbon tax increased from \$10 to \$30 per tonne.

**Estimated Public Sector Building Energy Costs
Commodity (Cost per unit) Vs. Carbon 2010 - 2014**



This graph illustrates that, compared to energy costs, carbon tax and offsets represent a small fraction of their direct energy bill. This is why the Carbon Neutral Government commitment focuses on reducing emissions and the amount the public sector spends on energy.

\$4 MILLION

SAVED FOR EVERY 1% IMPROVEMENT

The B.C. public sector spends more than \$400 million on energy each year. For every one per cent improvement in energy efficiency, we save more than \$4 million in annual fuel costs.

Facility managers and capital planners take costs and benefits of the carbon tax and offsets into consideration with every decision they make. Investments in energy efficiency not only save costs in the short term, but also provide a measure of protection against a future rise in energy prices.

SUCCESS STORY

Royal Roads University

For a university on a National Historic Site with a castle as its crown jewel, becoming carbon neutral presents unique challenges. With its baronial Hatley Castle and other century-old buildings, there has been no shortage of energy reduction challenges for Royal Roads University near Victoria.

The castle was built in 1908 for Vancouver Island coal magnate James Dunsmuir. It is a key tourist and event attraction, much loved by the community - and very energy inefficient.

All projects involving the castle require a heritage assessment. Some projects, such as ductwork and insulation, can be undertaken if the historic significance is unhindered. Windows, on the other hand, cannot be changed.

An initial energy audit provided the roadmap to address inefficiencies across the campus.

Upgrades to the newer and most heavily used buildings have made a marked difference in reducing both energy and utility bills.

**Emissions
were reduced
by 27% from
2010 to 2014**



Hatley Castle

Royal Roads has established a culture of sustainability that reaches across academics, operation and executive. Emissions were reduced by 27 per cent from 2010 to 2014 – the equivalent of removing nearly 2,000 cars from the road - by updating boiler controls, installing a solar hot water system and conducting building and lighting refits. As a result, the university is paying \$160,000 less annually for utilities.

With its two-storey ceilings and great rooms, Hatley Castle is historically significant, and maintaining its integrity is a prime responsibility for the university. In winter, sweaters are advised.

REPORTING AND MEASUREMENT

Accurate measurement and reporting is an essential part of the Carbon Neutral Government program. Every year, each public sector organization must determine, report and prepare for verification of their greenhouse gas emissions. This requires annual self-certification by all organizations and risk-based verification of a representative sample of data.

Reporting makes the public sector accountable for meeting its carbon emission reduction targets. It also provides a forum for sharing best practices. Some 600 Carbon Neutral Action Reports are posted [online](#) - a rich repository of experience that shows examples of changes made and ensuing results.



One of four solar sites at Island Health, Victoria B.C.

SUCCESS STORY

Island Health Authority

Becoming carbon neutral is a delicate process for a health authority. Surgeons continue to operate, diagnostic labs are always open and patient care must continue uninterrupted.

Still, Island Health saw the requirement to reduce emissions as an opportunity and a challenge. Many of the health authority's more than 220 buildings are 50 and 60 years old, built with the energy technologies of the day. The legislation caused it to take a hard look at where it could create efficiencies.

BC Hydro and Fortis BC have been essential partners in identifying inefficiencies. Carbon emissions have been steadily decreasing across the organization, one project at a time. Island Health is now recognized as one of the nation's greenest employers. Between 2010 and 2014 its emissions decreased by six per cent - an accomplishment in a system that is always growing and always operating.

Among the projects:

► Waste heat recovered by a new high-efficiency chiller at Nanaimo Regional General heats domestic water. The hospital is also due for an energy efficient heating plant replacement.

“Carbon Neutral Government has been an amazing program. It's caused us to look and see how much waste there is and we've really just begun.”

► At Victoria's Royal Jubilee Hospital a waste heat recovery project is saving 3,973 GJ annually, enough gas to heat 400 homes.

► Solar thermal installations heat domestic water at four facilities. By using the sun to preheat water, Island Health reduced natural gas use in 2014.

Across the Health Authority, and starting with the Patient Care Centre at Royal Jubilee, new buildings are built to LEED Gold standard, with building energy targets to follow.

Deanna Fourt, Island Health's director of energy efficiency and conservation, says the carbon neutral requirement was a daunting prospect at first. “Without the legislation it would have been hard for us to get the level of support needed. Public sector organizations, utilities, municipal governments and private companies all got on board and started working to reduce emissions. We talk to other jurisdictions and realize, this doesn't happen anywhere else.”



Old boiler being removed at Victoria General Hospital to make way for new high efficiency model.

CAPITAL FUNDING FOR EFFICIENCY UPGRADES

Schools and hospitals across British Columbia have upgraded heating and cooling systems and achieved other energy efficiencies with funds from the Province's Carbon Neutral Capital program.

Established in 2012, the Carbon Neutral Capital Program has allocated \$50 million to be used over five years to help schools, hospitals, colleges and universities with projects and initiatives to cut carbon emissions and energy costs.

These include everything from boiler, lighting and HVAC upgrades to installation of solar, geo-exchange and heat recovery systems.

Funding available each year is equivalent to the amount public sector organizations pay for carbon offsets. To date, the fund has distributed \$39 million for energy efficiency projects that reduce emissions and save money.



Royal Jubilee Hospital Patient Care Centre atrium

SUCCESS STORY

School District 23

Incentives have been a big catalyst in building a carbon neutral culture across Central Okanagan School District 23.

It started with utility costs. If the school district reduced its electricity use, BC Hydro would decrease its bill. District energy manager Harold Schock considered how this incentive could harness a program that would mobilize schools, staff and students to reduce emissions.

Schock developed a district Green STAR Energy program in which the money saved on energy would be returned to the schools for equipment and programs.

"We take a holistic view of energy reduction," says Schock. "We needed buy-in from the schools. The director of operations told them if we act now, you save now, and this is what's in it for you."

Twenty-one of the district's 45 schools signed on to Green STAR. Schock audited the energy use in each school to find ways to shave emissions and create efficiencies. Boilers were upgraded in some schools and in others geo-exchange systems were installed. Central Okanagan School District is unique in using geo-exchange systems at four schools.

As well, there was a heightened awareness of energy use in the Green STAR schools. Students were attentive, turning out lights in unused classrooms and sparking 'sweater days.'

Between 2010 and 2014, School District 23 emissions dropped by 13 per cent, in large part due to upgrades, as well as staff and student commitment to energy reductions in the 21 schools.

Schock notes a Green STAR school sees savings of 11 per cent more than a non-Green-STAR school. The program is paying dividends and money saved is going back to the schools.

**Between 2010
and 2014,
School District
23 emissions
dropped by 13%**



School District 23 district energy manager Harold Schock

SUCCESS STORY

Vancouver Community College

Environmental sustainability is central to both the culture and curriculum at Vancouver Community College (VCC). When students graduate, they not only leave with skills in their chosen field, but also with the ability to take a leadership role in the low carbon economy.

From the culinary and pastry arts program and campus cafeterias, some 40 tonnes of organics are collected each month. These are sent to a ranch where they are composted and used to grow certified organic alfalfa, which is then sold to dairy farms for feed. Both the culinary arts and automotive services departments also train students to properly dispose of used oil so that it never goes down the drain.

Sustainability is practiced outside the classroom too. Bottled water is not available at VCC. Instead the college has upgraded and installed drinking fountains, resulting in over 590,000 personal water containers being filled in only two years.

Through infrastructure, lighting upgrades and building retrofits, as well as behaviour change, the college has cut its greenhouse gas emissions by 22 per cent between 2010 and 2014 - the equivalent of taking more than 3,000 cars off the road.



Vancouver Community College

Simple tweaks, like ensuring air handling units are in synch with room bookings so empty rooms aren't being cooled or heated, help to reduce emissions. Waste reduction and recycling means garbage compactors are now emptied every other week instead of weekly.

The practices at the college ripple across the Lower Mainland as VCC graduates become sustainability leaders in their workplaces and communities.

GENERATING ECONOMIC ACTIVITY

The Province of B.C. acquires billions of dollars of goods and services annually. With provincial public sector facilities representing about 20 per cent of the emissions from B.C.'s commercial and institutional facilities, changing the composition of the goods and services it buys can have a profound impact on the demand for clean tech services and equipment.

Government procurement can expedite broader commercialization and export of clean technologies. The clean tech sector often uses local markets as a trial for newly commercialized technology, making adjustments and developing use cases before expanding to other markets. For example:

- ▶ Provincial green procurement can have wider impacts within the province. Government's adoption of LED technology through the LED Street Lights Across B.C. program has resulted in 15 communities, including one-third of Burnaby, making the switch to LED lighting.
- ▶ Upgrade and retrofit materials - from windows and insulation to solar photovoltaic panels - are produced right here, supporting B.C. businesses and employing British Columbians.

LEVERAGING

OFFSETS

Government's investments in offsets have also had a ripple effect through the economy. Through offset purchases made on behalf of the public sector, British Columbia invests in projects that reduce greenhouse gas emissions or store carbon in the atmosphere through forest protection and management.

Since 2008, the government of B.C. has invested in 23 offset projects spanning the province's economic regions and sectors, including: agriculture, industrial and land-based forestry, oil and gas, waste management and transportation. These projects utilize clean technologies and spur a demand for green products and services. This demand has resulted in capital investments and operating expenditures from offset projects, creating positive economic impacts.

Between 2008 and 2014, the purchase of offsets has contributed \$372.5 million to the provincial GDP and 4,438 jobs in person-years.³

Total Economic Impacts from Offset Projects, 2008-2014

Impact	Direct	Indirect	Induced	Total
GDP (millions)	\$233.1	\$93.5	\$46	\$372.5
Government revenues (millions)	\$45.4	\$16.3	\$14.9	\$76.6
Federal government (millions)	\$20.8	\$8.1	\$6.6	\$35.5
Provincial government (millions)	\$19.2	\$6.7	\$6.9	\$32.8
Municipal government (millions)	\$5.3	\$1.6	\$1.4	\$8.3
Employment (person-years)	2,492	1,292	653	4,438

³ Economic Impacts Analysis of B.C.'s Carbon Neutral Government Program, ÉcoRessources, 2015

PURCHASING OFFSETS SERVES TWO PURPOSES:

- ▶ At \$25 per tonne of carbon dioxide equivalent (tCO₂e), offset payments can be significant, so there is an incentive to reduce carbon emissions as much as possible.
- ▶ Every year, funds invested in carbon offsets support B.C. projects that reduce emissions or store atmospheric carbon, encourage innovation and use of clean technologies, and create jobs.

BENEFITS OF OFFSET DEMAND

Since the beginning of the Carbon Neutral Government program, the provincial public sector's emissions reduction activities, coupled with the demand for B.C.-based offset projects, have resulted in numerous social, environmental and economic benefits:



A cleaner environment



Support for B.C.'s clean tech sector



More efficient and competitive industries



Increased demand for green jobs



Emissions reductions

SUCCESS STORY

Capilano University

People power is behind energy reduction at Capilano University, where environmental awareness is integral to their culture. The three-campus institution is on track to meet its carbon neutral targets.

The university began making strides to reduce its carbon footprint in 2007. Between 2010 and 2014 alone it reduced emissions by 23 per cent, the equivalent of taking nearly 1,200 cars off the road.

"I would argue our biggest successes come from our people," says facilities director Susan Doig. "We look at the university as a living lab, taking what our students bring forward as passion and ideas, and turning them to practical applications."

The university has created five student positions that lead initiatives to reduce waste and embed sustainability into the curriculum and campus behaviours. When hundreds of student lab computers were left on all night for software upgrades, monitors were left on as well. Students recognized that shutting off monitors could cut energy use, and the IT department implemented a shut-off-monitors protocol.

"It wasn't originally a huge priority for IT, but with student engagement, we looked at solutions together," said Doig. "Energy conservation has provided a platform for us as teams to work together."

A student-led challenge to change behaviours – such as taking the stairs instead of an elevator – meant creating an appealing stairwell environment. Musical instruments will soon hang in one stairwell, an irresistible "play-me" feature that makes the stairs a preferred choice.



Capilano University students performing a waste audit

“The Carbon Neutral Government legislation has been fabulous. It’s been pivotal in moving the organization forward. Even though you know you should do the right thing, when you have a driver that requires you to reduce emissions, the result is better buy-in.”

DEMONSTRATING LEADERSHIP

Sharing our learnings, successes and best practices leverages our influence beyond our borders. This is one of the key objectives of B.C.'s climate leadership: acting as a catalyst for global action.

- ▶ B.C. and Washington State entered into an agreement to help the state government become carbon neutral by 2020, sharing information and drawing on B.C.'s success in achieving a carbon neutral public sector. Other Canadian jurisdictions are working on Carbon Neutral Government programs, including the Yukon, Ontario and Manitoba.
- ▶ The Province works closely with all B.C. municipal governments through the Climate Action Charter and a range of other programs to increase energy efficiency and reduce greenhouse gases.
- ▶ Through joint initiatives such as the Pacific Coast Collaborative, Compact of States and Regions and the Carbon Pricing Leadership Coalition, B.C. has had an unprecedented opportunity to collaborate closely with other jurisdictions. This can help harmonize policies – magnifying the benefits of climate action initiatives and eradicating or minimizing potential competitive barriers.



7,000
BUILDINGS

B.C. became the first jurisdiction in North America to take full responsibility for its emissions, achieving carbon neutral operations in more than 7,000 public buildings in 2010.

SUCCESS STORY

University of Northern British Columbia (UNBC)

A forestry seedling greenhouse started the University of Northern BC on the road to using renewable energy.

Now the Prince George university, the first in Canada with its own wood-fueled district heating system, has been branded as “Canada’s Green University.”

The greenhouse was pegged as the right spot to pilot a bioenergy project fueled by wood pellets. Made from

waste wood such as sawmill shavings and sawdust, wood pellets provide a renewable and sustainable fuel source. Forestry and sawmills help drive the Prince George economy. The university saw an opportunity to harness energy from a local product and a downtown Prince George sawmill was engaged to provide fuel.

It worked. The greenhouse heating system didn’t just show the university what was possible using waste wood as fuel, it showed the city. People came by the hundreds to see an efficient modern wood-based heating system that didn’t produce plumes of smoke.

With the introduction of carbon neutral government legislation and following the success of the greenhouse bioenergy project, the university looked for more ways to reduce its carbon footprint and save money. It began planning to replace the natural gas that heated the campus with a bioenergy system, using

waste wood and technologies similar to those of the greenhouse.

Vancouver-based Nexterra, a leader in energy-from-waste gasification systems, was hired to design the gasifier for a system that converts waste wood from that same downtown sawmill - two truckloads a day in winter - into useable heat in the form of hot water. The hot water is distributed through the existing hot water district heating system and heats almost all of the campus.

The bioenergy plant went into operation in 2011 and has reduced fossil fuel consumption at UNBC by 72 per cent - or 3,700 tonnes of avoided carbon emissions each year.

Canada’s Green University has become a destination for both students and faculty interested in sustainability and energy reduction.

The bioenergy plant has reduced fossil fuel consumption by 72%



UNBC Bioenergy Plant in winter

SUMMARY

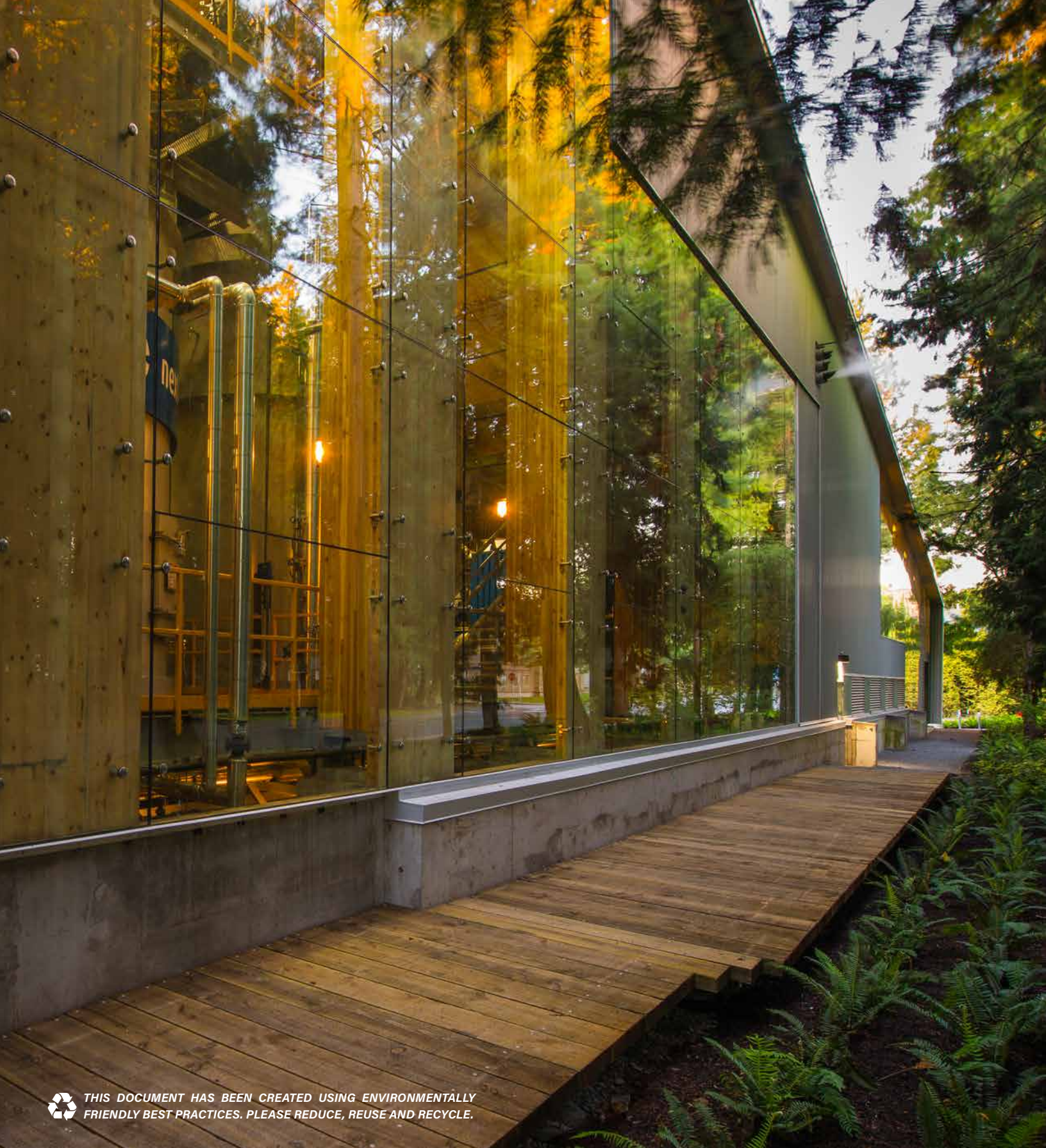
With climate change broadly recognized around the world as a concern and a reality, British Columbia's public sector organizations are setting an example in taking responsibility for their carbon footprint. Across the 131 public sector organizations, emission reduction and energy efficiency are built into the business practices of public schools and post-secondary institutions, health authorities, hospitals, Crown agencies and core government ministries.

Organizations see becoming carbon neutral as an opportunity as much as a requirement; one in which they can make a tangible contribution to B.C.'s greenhouse gas reduction commitments. Over the past five years, our public sector has built internal capacity in energy use tracking and environmental management. Organizations have developed technical expertise and learned how to turn energy savings into cost savings that can be reinvested in core public services. Five years of reporting have created an important repository of energy use and emissions data that will inform both operational and capital planning over the next five years and beyond.

The public sector's contributions to British Columbia's climate action goals have in turn contributed to the broader economy, creating a demand for environmental and technical expertise and clean tech services and equipment. As well, the demand for offsets has leveraged economic activity in regions throughout our province, contributing 177 million to the GDP from offset project capital expenditures and \$89 million from project operating expenditures between 2010 and 2014.

Beyond these many economic benefits, reducing greenhouse gases is the right thing to do. Over the next five years and beyond, the Carbon Neutral Government Program will continue to focus on emission reduction, while also recognizing the importance of adaptation as we prepare for future climate impacts.

As the first jurisdiction in North America to legislate, regulate and administer a carbon neutral government program, British Columbia's public sector continues to act as a catalyst for global action, demonstrating that our actions are making a difference.



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Leading by Example

Carbon **Neutral** British Columbia - 2010-2014



Ministry of
Environment