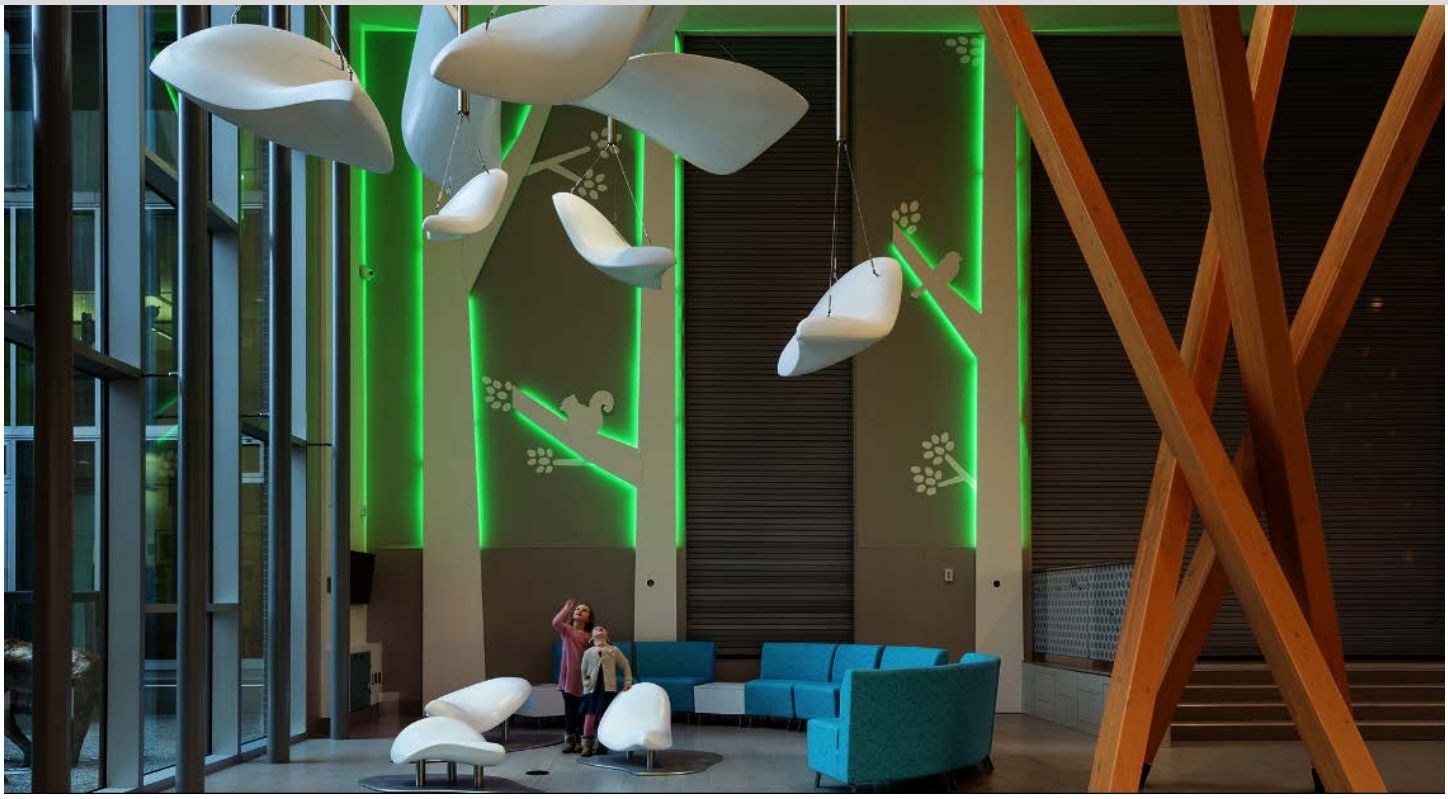
2019 Carbon Neutral Action Report

Provincial Health Services Authority



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Declaration Statement

This Carbon Neutral Action Report for the period January 1, 2019 to December 31, 2019 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2019 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2020 and beyond.

By June 30, 2020 Provincial Health Services Authority's final Carbon Neutral Action Report will be posted to our website at **bcgreencare.ca**

Retirement of Offsets

In accordance with the requirements of the **Climate Change Accountability Act** and Carbon Neutral Government Regulation, Provincial Health Services Authority (the Organization) is responsible for arranging for the retirement of the offsets obligation reported for the 2019 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment and Climate Change Strategy ensuring that these offsets are retired on the Organization's behalf, the Organization will pay within 30 days, the associated invoice to be issued by the Ministry in an amount equal to $25 per tonne of offsets retired on its behalf plus GST.

Cover photo: lobby of the Teck Acute Care Centre (TACC) on the BC Children's and BC Women's Hospitals campus in Vancouver, BC.

COVID-19 Pandemic Statement

Due to the COVID-19 pandemic, the following directive was issued on March 31, 2020:

"*Under my authority as the Director for the purposes of the Act, and under the authority delegated to me in Section 6 of the Carbon Neutral Government Regulation, I hereby direct that all ministries and Public Sector Organizations covered by the Carbon Neutral Government requirement shall use their 2018 GHG emissions as a temporary estimate for their actual 2019 GHG emissions, for the purposes of the 2019 Carbon Neutral Action Reports and 2019 Carbon Neutral Government reporting required under the Climate Change Accountability Act.*"

- Neil Dobson, Executive Director, Clean BC Implementation Climate Action Secretariat

Although 2018 emissions data will be used as a placeholder for 2019, all other qualitative components of this CNAR are to be completed with information from 2019

This document provides guidance to provincial public sector organizations (PSOs) to help them prepare their 2019 Carbon Neutral Action Report (CNAR) in accordance with BC's Climate Change Accountability Act and the Carbon Neutral Government Regulation.

Executive Summary

Benoit Morin, President & Chief Executive Officer

I am pleased to present the tenth annual Carbon Neutral Action Report, which highlights the Provincial Health Services Authority's (PHSA) actions to reduce our carbon footprint, and link environmental sustainability to public health and wellness.

Over the years, we have worked to raise environmental awareness with our staff, patients and the communities we serve. These efforts have reduced PHSA's operational impact on the natural environment while reducing operational costs.

In 2019, PHSA had a carbon footprint of 19,342 tonnes of carbon dioxide equivalent (tCO_2e), which was offset at a total cost of $507,727.50. This represents a decrease of over 19 per cent relative to the carbon footprint base reporting year, 2007. This decrease is even more significant as we assumed responsibility for more programs, services and staff over the last 12 years.

We continued with two major heat recovery projects in 2019 at the BC Children's Hospital and BC Women's Hospital + Health Centre. When completed, the projects are expected to reduce carbon emissions at the BC Children's and Women's campus by more than 1,000 tCO_2e.

Another highlight of 2019 was the completion of the measurement and verification process ensuring the Teck Acute Care Centre's predicted energy performance was achieved in practice. This process confirmed that actual performance was within the margin of measurement error. Actual performance represents a 19 per cent reduction in energy and an 80 per cent reduction in carbon emissions compared to a code baseline, achieved at zero incremental capital cost.

As we prepare to respond appropriately during our new reality, post-COVID-19, it is important that we pay close attention to actions that reduce our carbon footprint and reduce the spread of infectious agents. PHSA's Energy Manager played a key role in bringing Dr. Stephanie Taylor back to Vancouver for a healthcare-specific audience. Dr. Taylor's research presents compelling evidence highlighting the importance to maintain indoor relative humidity carefully between 40 and 60 per cent to reduce the spread of infection and create a healing indoor environment. Humidification can result in significant energy and carbon emissions; therefore a low carbon approach is essential.

I want to recognize PHSA's energy management team, who work closely with our capital projects as well as facilities maintenance and operations teams to reduce emissions. I would also like to recognize all of our staff, who support these efforts across the province. This ultimately adds to the health and wellness of our patients, employees and the communities we serve.

Date: May 29, 2020

Benoit Morin
President & Chief Executive Officer
Provincial Health Services Authority

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Healthy people
Healthy planet

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Our CO_2 Footprint

As per the Directive issued March 31, 2020, each PSO will **use their 2018 GHG Emissions** as a placeholder for the purposes of their 2019 CNAR.

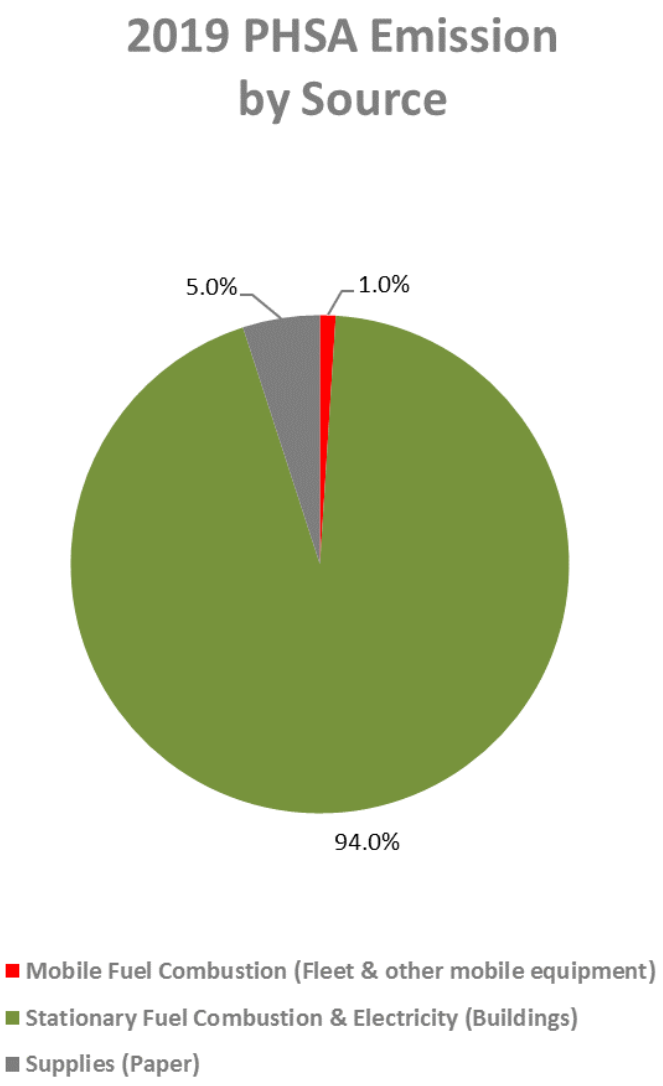
2019 GREENHOUSE GAS EMISSIONS BREAKDOWN AND OFFSETS APPLIED TO BECOME CARBON NEUTRAL

PHSA reports its organizational carbon footprint based on guidelines provided by the Carbon Neutral Government Regulation (CNGR) and the Climate Action Secretariat (CAS).

The CAS developed reporting guidance based on the GHG Protocol Corporate Standard. Based on these guidelines, PHSA's carbon footprint is comprised of six different greenhouse gases, which are converted into a common metric of tonnes of carbon dioxide equivalent (tCO_2e). In scope carbon emissions are grouped in three main categories:

1. Stationary Fuel Combustion
2. Mobile Fleet Combustion
3. Supplies (Paper)

PHSA's 2019 carbon footprint offset was 19,342 tonnes of carbon dioxide equivalent (tCO_2e). That represents a 19.4 per cent decrease in PHSA's carbon footprint since 2007.



Over 90 per cent of PHSA's in-scope emissions are attributed to the building portfolio, and over 90 per cent of those emissions are associated with natural gas consumption. CAS administers the Carbon Neutral Capital Program (CNCP), through which PHSA has access to capital funding that is used to implement capital projects to reduce GHG emissions. These projects are focused on natural gas reduction in buildings.

To become carbon neutral in 2019, PHSA purchased carbon offsets at a total cost of $507,727.50.

PHSA GHG Emissions and Offsets for 2019	
As per the directive issued March 31, 2020, each PSO will use their 2018 GHG Emissions as a placeholder for the purposes of their 2019 CNAR.	
Total Emissions (tCO2e)	19,356
Total BioCO2	14
Total Offsets (tCO2e)	19,342
Offset Investment ($25 per tCO2e) [Total Offsets x $25/tCO2e]	$483,550.00 ($507,727.50 including GST)

Notes for above table:

i. Note, BioCO2 is reported in Total Emissions but not Total Offsets

ii. Prior Year Adjustments (PYAs) are not applicable as emissions and offsets are based on 2018 alone

iii. Total emissions and offset invoice amounts will be validated by CAS prior to distributing invoices

iv. Due to a variety of influences including historical data corrections and conversion factors, there may be minor discrepancies between data existing in Clean Government Reporting Tool (CGRT) vs SMARTTool

Actions to Reduce Our CO_2 Footprint

2019 LIST OF ACTIONS TAKEN TO REDUCE CO2 FOOTPRINT

Stationary Emissions (Buildings)

- **Continuous Optimization:** PHSA started the Implementation Phase of BC Hydro's Continuous Optimization Program at two sites in 2019; at Shaughnessy DEF Blocks at C&W campus and at Vancouver Island Cancer Centre.

- **Waste Heat Recovery:** PHSA continued with one major heat recovery project (within the Phase 3 Redevelopment) and started a new one (within Child and Family Research Institute), both at C&W. In both cases a low exergy Thermal Gradient Header (TGH) design approach is being implemented to improve cooling capacity while synergistically recovering waste heat and reducing carbon emissions. In addition, PHSA completed a study at BC Cancer Research Centre that recommended a similar approach.

- **FMO Staff Engagement:** The PHSA energy management team has continued to build an engagement strategy with Facilities Maintenance and Operations (FMO) departments. This was focused initially focused initially at C&W campus, with plans to expand to all major owned sites over time. The outreach focuses on reviewing energy use in buildings, identification of reduction opportunities, and optimization of existing equipment/plants.

- **Design Guidelines:** PHSA's energy management team was involved in further refinements to GreenCare's Energy and Environmental Sustainability Design Guidelines for New Construction and Major Renovation projects with the intent of ensuring health care related new construction and major renovation projects are built to the highest standard of energy efficiency and conservation, within financial constraints. These guidelines informed the approach to environmental sustainability for the Centre for Mental Health and Addictions under construction at the Riverview site.

- **Behaviour Change:** PHSA's energy team continues to promote energy conservation and GHG emissions reduction through awareness and behaviour change programs, such as Green+Leaders and the GreenCare Community website.

Mobile Fleet Combustion (Fleet and other vehicles)

PHSA continues to provide **electric vehicle charging stations** at various sites including regular plug-ins.

In 2019, PHSA continued to improve, promote and establish alternative transportation opportunities for PHSA staff.

PHSA continues to partner with Vancouver Coastal Health and Providence Health Care to provide a shuttle service between sites and continues to operate a staff shuttle between BC Children's and BC Women's Hospitals campus, staff off-site parking lot and King Edward Station.

PHSA sites offer **bike parking stalls** to encourage and enable active transportation by bike.

Supplies (Paper)

As part of the Green+Leaders program, a **paper/waste reduction campaign** supports volunteers with **Paperless Meeting Toolkits** to encourage their colleagues to reduce paper use.

PHSA **encourages teleconferencing** for meetings by installing web- conferencing hardware / software at various sites.

Actions That Fall Outside the Scope of the Carbon Neutral Government Regulations:

The Green+Leaders behaviour change program at PHSA recruits staff volunteers who help improve the environmental sustainability of PHSA operations. In 2019, 27 new staff registered for the program, bringing the total number of Green+Leaders at PHSA to 222 since 2010.

PHSA continues to support the GreenCare Community website, which provides tips and toolkits on using less paper, as well as other environmental sustainability initiatives linked to health and wellness.

PHSA offers in-person staff education on **waste management processes** in collaboration with Business Initiatives and Support Services (BISS)[1].

PHSA also offers a **Waste Management Basics online learning module**.

[1] For more information, please contact BISS Hazardous Waste Coordinator, Teri Guimond, teri.guimond@phsa.ca

FUTURE ACTIONS TO REDUCE CO_2 FOOTPRINT

PHSA's plans to continue reducing GHG emissions and energy in the following ways:

- **Optimize our existing buildings:** Planning and implementing GHG and energy reduction projects in our existing building portfolio by utilizing the Carbon Neutral Capital Program (CNCP) as our primary funding source.

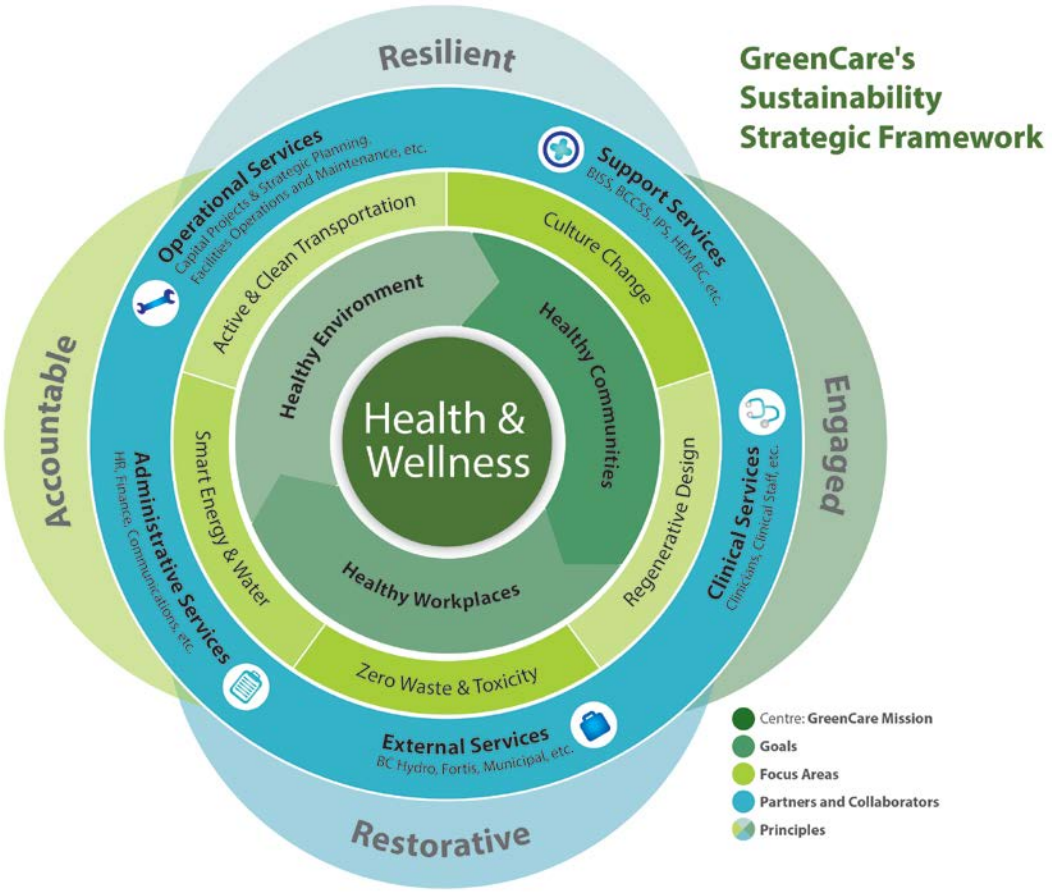
- **Efficient new construction:** Implementing project-specific energy and carbon performance targets to ensure that our new buildings are as energy and carbon efficient as possible.

- **Systemic change:** Implementing standards, guidelines, and processes to embed energy management principles further into standard operations.

- **Behaviour change:** Engaging and educating our staff, via the existing Green+Leaders program, GreenCare Community and through collaboration with the PHSA's Health Promotions Team.

- **Innovation and demonstration**: Leveraging the innovative Green Revolving Fund approach that has been initiated for PHSA to support ongoing investment in energy conservation through utility cost avoidance achieved through conservation. In addition, taking small steps now (such as learning about new technologies) to pave the way for larger innovations when an appropriate opportunity arises.

- **Align with our core mandate:** Working with GreenCare's refreshed Strategic Framework; PHSA will strive to advance health care practices that respect environmental stewardship, noting that the environmental impact from health care facilities, operations and services influence the health of populations and patients we serve. PHSA will engage in a collaborative approach to create a sustainable and environmentally responsible health care system, which continues to advance health and wellness in its broadest sense.



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Feature Project

TACC Delivers on Energy & Carbon Promises

The Teck Acute Care Centre (TACC), opened in October 2017, and part of a phased project to significantly update hospital facilities at the BC Children's and BC Women's campus (C&W campus); however, planning for the facility was already underway in 2012.

In addition to providing comprehensive medical services, the vision for the building included creation of a healing environment for occupants and a sustainability mandate (LEED Gold Certification).

PHSA's current Energy Manager, Alex Hutton, joined the healthcare Energy and Environmental Sustainability (EES) team in 2012, just in time to leverage her extensive experience influencing the design of sustainable buildings. She embedded an aggressive and achievable energy target for the project, as well as a mandatory requirement to implement a comprehensive measurement and verification (M&V) protocol to ensure the promised performance is achieved in theory (based on the energy modeling) as well as in practice (based on measured data).

In 2019 this M&V process, led by Eoghan Hayes of Edge Consultants, was completed, which demonstrated that the project was within 0.2 per cent (which is within the margin of error) of the agreed target. Through the M&V process, actual energy consumption was analyzed and reconciled to account for Authority-controlled changes to address clinical needs (such as rapid cooling in operating rooms); these changes represented a 45 kWh/m2/year impact. In other words, the original target was increased by this amount to reflect actual clinical operation.

Teck Acute Care (TACC) Project

Technology: Accountability mechanisms to drive improved energy performance

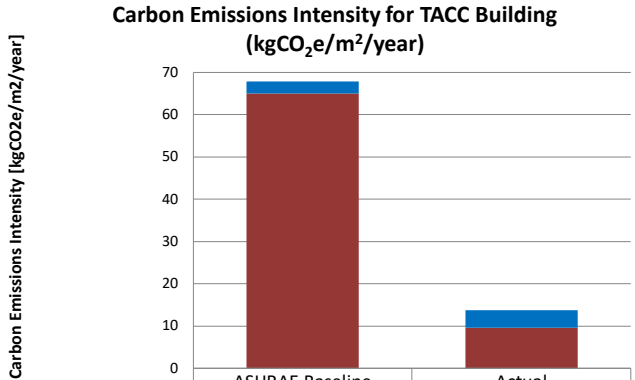
Energy Performance*: 425 kWh/m^2/year with savings of 100 kWh/m^2/year, equal to 5,690 MWh or 19 per cent

GHG Performance*: 14 kg/m^2/year with savings over 3,000 tCO_2e/year or 80 per cent reduction (equivalent to removing 648 passenger vehicles from the road)

Incremental Project Cost*: Zero incremental cost compared to base scope which includes the LEED Gold mandate

Benefits/Co-Benefits: $500,000 incentive achieved from BC Hydro New Construction Program

*Savings and incremental cost are based on comparison to a baseline which complies with minimum code requirements of ASHRAE 90.1-2007 and CSA Z317.2-10. Note that the project is required to meet the LEED minimum energy performance as part of the LEED Gold mandate, which equates to an 18 per cent improvement over ASHRAE 90.1-2007. The incremental cost is relative to the LEED baseline, since the actual performance was achieved within the base project budget.



	ASHRAE Baseline	Actual
TOTAL	68	14
Carbon from Electricity	3	4
Carbon from fossil fuels	65	10

Figure 1: TACC Carbon Emissions Intensity ($kgCO_2e/m^2$/year)

Achieving this goal represents a 19 per cent reduction in energy consumption and an 80 percent reduction in annual carbon emissions for the building as compared to an ASHRAE code baseline building.

The success of the various accountability mechanisms embedded into the TACC project, including mandatory M&V, have informed current best practice across BC for new construction projects. This project is proof that achieving higher performance on energy and sustainability does not need to increase capital cost and can be done in synergy with creating a healing environment.

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Feature Initiative

Collaborative Approach Explores the Intersection of Healing Environments and Low Carbon Resilience

A small group of attendees from a November 2019 ASHRAE event were so impressed by Distinguished ASHRAE Lecturer Dr. Stephanie Taylor and her research that they organized for her to return to Vancouver for a healthcare specific audience. Dr. Taylor's research presents compelling evidence that highlights the importance of maintaining indoor relative humidity carefully between 40 and 60 per cent to reduce the spread of infectious agents and to create a healing indoor environment.

This small group, included Alex Hutton, Energy Manager responsible for PHSA's portfolio, saw the potential to explore how these important findings might intersect with our context of a declared Climate Emergency and the associated necessity to achieve low carbon climate resilience.

Dr. Taylor delivered a wealth of information within just 30 minutes, leaving 50 minutes for a facilitated breakout session and talk-back. The hypothesis behind the activity was that if we explore the potential at the intersection of healing environments and low carbon resilience, we will arrive at different and better solutions than exploring either in isolation, or exploring both through a purely risk management lens.

Each of the four groups was led by a facilitator through a contemplation and exploration of an optimistic future state in which we have responded appropriately as climate change has progressed. The future state imagines for example that our healthcare facilities being designed and operated to new standards defined by parameters that reflect the intersection of a healing, resilient and sustainable built environment (including carefully controlled indoor relative humidity). This would include taking a low carbon approach to humidity control.

"[The group] in Vancouver, BC organized one of the most forward thinking events I have ever experienced. They brought together health, regulatory, scientific, engineering and architecture professionals to brainstorm design approaches to integrate the goals of supporting occupant health while conserving carbon-based energy use. Bravo!" – Dr. Taylor

PHSA's Energy Manager (Alex Hutton, Left) with Distinguished Lecturer Dr. Stephanie Taylor (Right)

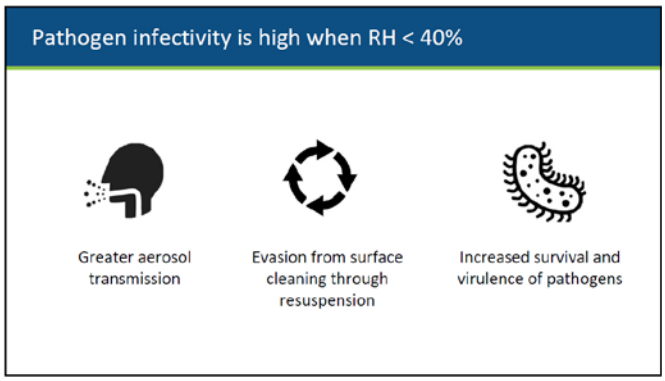

Figure 1: Slide from Dr. Taylor's presentation

The energy in the room was palpable and evidenced by the challenge of silencing the group discussions in order to reconvene for a brief talk-back. A wide variety of ideas, solutions, and new questions arose from the discussion.

These ideas are especially relevant as we prepare to response appropriately to our new reality, post COVID-19. As summarized in Figure 1, low relative humidity increases pathogen infectivity via several mechanisms.