



# Creating a Sustainable and Resilient Future

2016 Environmental Performance Accountability Report



TARGETS+  
MILESTONES

KEY  
PERFORMANCE  
INDICATORS

COLLABORATION  
RESILIENT  
WHAT'S GREEN CARE?

CULTURE CHANGE  
SMART ENERGY

ACTIVE+  
CLEAN+  
TRANSPORTATION

HEALTH &  
WELLNESSES

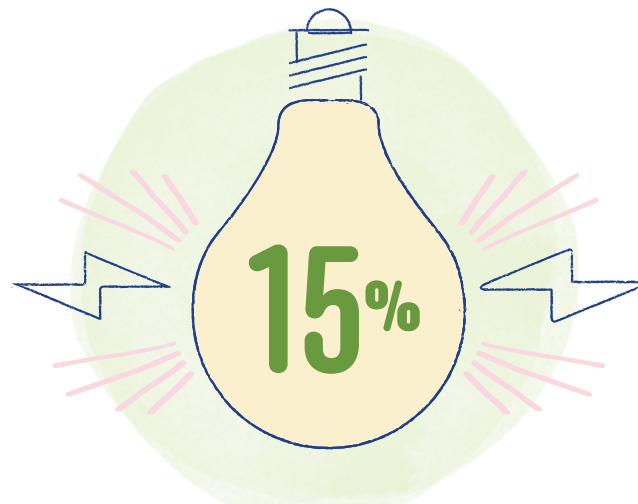
AWARDS  
ZERO WASTE



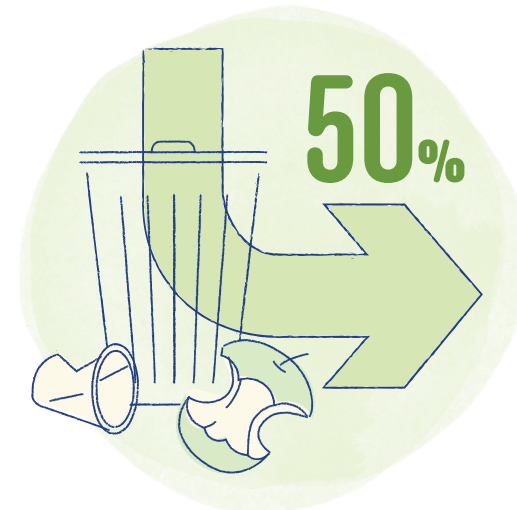


## 2016 Highlights

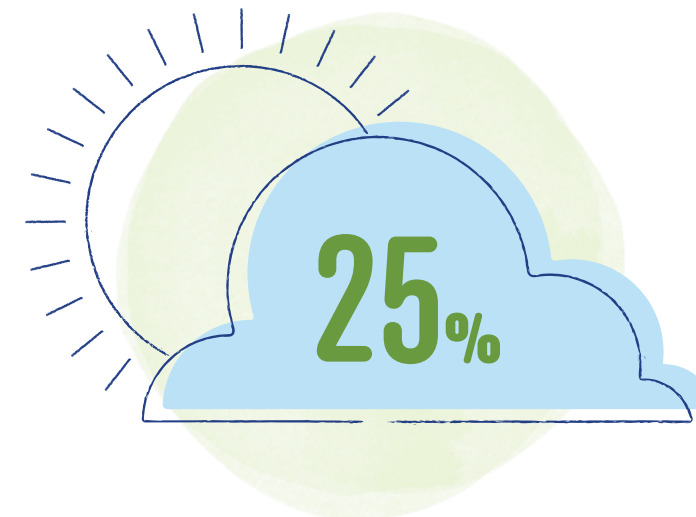
The Lower Mainland Health Care Organizations (LMHOs) have set 2020 and 2030 targets to guide their environmental sustainability work. The following are just some of the key targets set by the various LMHOs.



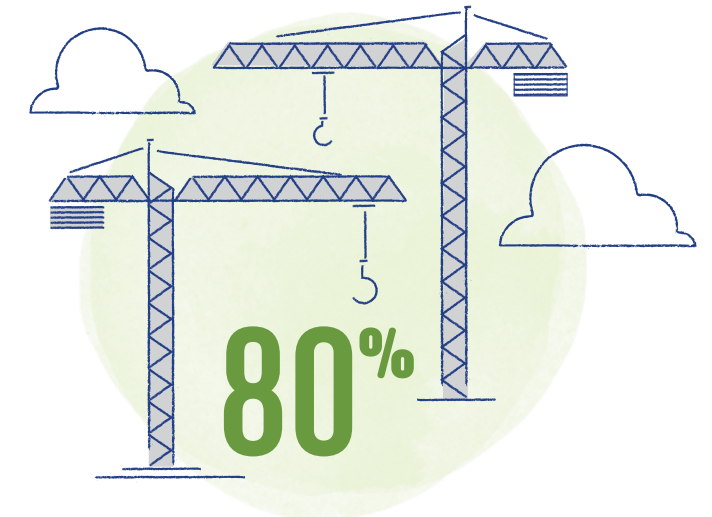
→ **Fraser Health** is committed to reducing energy use intensity (EUI) of core sites by **15% by 2020**.



→ **Providence Health Care** is committed to increasing waste diversion rates at existing acute and residential care sites to **50% by 2020**.



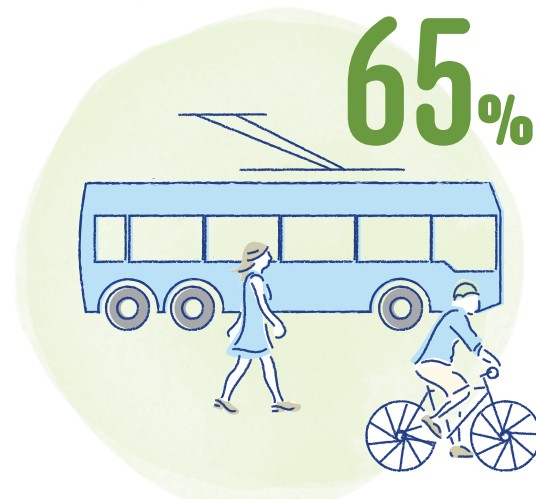
→ **Provincial Health Services Authority** is committed to reducing absolute in-scope GHG emissions by **25% by 2020**.



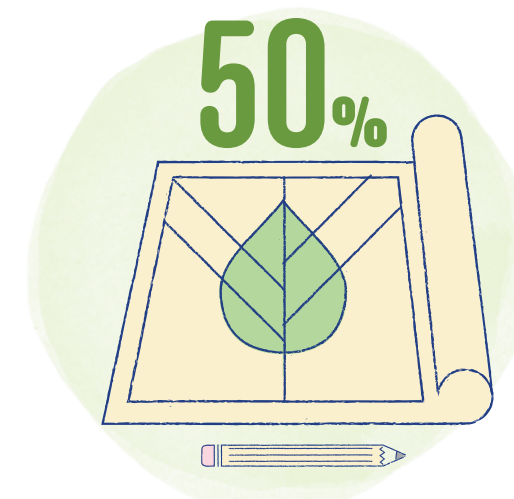
→ **Vancouver Coastal Health** is committed to increasing construction waste diversion rates at all new health care construction projects to **80% by 2020**.



→ **Fraser Health** is committed to reducing water use intensity (WUI) of core sites by **20% by 2020**.



→ **Providence Health Care** is committed to increasing the percentage of health care staff who commute via cleaner and healthier means (i.e., alternatives to single occupancy vehicles) to **65% by 2020**.



→ **Provincial Health Services Authority** is committed to complete climate resilience assessments for **50% of core sites by 2020**.



→ **Vancouver Coastal Health** is committed to producing site-level climate resilience plans for **10% of core sites by 2020**.



# Contents

- 2 2016 Highlights**
- 3 List of Abbreviations**
- 4 Welcome**
- 5 2016 GreenCare Scorecard**
- 8 About This Report**
  - Our Audience
  - Key Reporting Criteria
  - Materiality Review
  - Core sites
- 10 The LMHOs: Who We Are**
  - Fraser Health
  - Providence Health Care
  - Provincial Health Services Authority
  - Vancouver Coastal Health
- 11 The EES Team: Who We Are**
- 13 What is GreenCare?**
  - Embedding Environmental Health & Wellness
  - GreenCare’s Core Purpose
  - GreenCare’s Vision
  - GreenCare Strategic Framework
  - Advisory Committees and Collaborations
- 15 Greencare Milestones and Awards**

## GreenCare Strategy and Focus Areas

- 17 Smart Energy & Water**
  - TARGET #1:** Reduce Energy Use Intensity of core sites
  - TARGET #2:** Reduce absolute in-scope GHG emissions
  - TARGET #3:** Reduce absolute in-scope GHG emissions intensity
  - TARGET #4:** Reduce Water Use Intensity of core sites
  - Good News Story:** Passive House Design
- 23 Zero Waste & Toxicity**
  - TARGET #5:** Increase waste diversion rates at existing acute and residential care health care sites
  - TARGET #6:** Increase waste diversion rates for all new health care construction projects
  - TARGET #7:** Decrease food scraps in the garbage waste stream
  - TARGET #8:** Develop and implement a strategy to reduce overall waste from acute and residential care operations
  - TARGET #9:** Develop and implement a strategy to reduce toxins from products used in acute and residential care operations
  - Good News Story:** Recycle Renewal Complete
- 28 Regenerative Design**
  - TARGET #10:** Ensure all new construction projects achieve performance-based requirements aligned with resilience and regenerative principles (a minimum of LEED Gold for Healthcare)
  - List of LEED projects**
  - TARGET #11:** Complete climate resilience assessments for all core sites
  - TARGET #12:** Produce site-level climate resilience plans for all core sites
  - Good News Story:** Building Resiliency Through Integration and Collaboration

## 32 Active & Clean Transportation

- TARGET #13:** Increase health care staff commute via clean and healthy means
- TARGET #14:** Increase portion of core sites that provide staff with end-of-trip bicycle facilities options
- Good News Story:** Another Successful Clean Commuter and Wellness Challenge

## 35 Culture Change

- TARGET #15:** Increase number of new Green+Leaders trained annually
- TARGET #16:** Increase the number of environmental sustainability stories in Health Authority news
- TARGET #17:** Develop new department-specific green strategies / programs
- TARGET #18:** Ensure that executive leadership refresh and approve sustainability policies
- Good News Story:** Green+Leaders Project Fund

## 39 Assurances and Resources

- Internal Assurances
- External Assurances

## 40 Appendices

- GreenCare Introduction
- Carbon Neutral Action Reports

## List of Abbreviations

|                        |                                                                         |
|------------------------|-------------------------------------------------------------------------|
| <b>CAS</b>             | British Columbia Climate Action Secretariat                             |
| <b>CO<sub>2</sub></b>  | Carbon dioxide                                                          |
| <b>CO<sub>2</sub>e</b> | Carbon dioxide equivalent                                               |
| <b>EUI</b>             | Energy Use Intensity                                                    |
| <b>FH</b>              | Fraser Health                                                           |
| <b>GHG</b>             | Greenhouse gas                                                          |
| <b>GJ</b>              | Gigajoules (one billion joules, or 1 x 10 <sup>9</sup> joules)          |
| <b>G+L</b>             | Green+Leaders                                                           |
| <b>KPI</b>             | Key Performance Indicator                                               |
| <b>kWh</b>             | Kilowatt hour                                                           |
| <b>LEED</b>            | Leadership in Energy and Environmental Design                           |
| <b>LMFM</b>            | Lower Mainland (British Columbia) Facilities Management - Consolidation |
| <b>LMHO</b>            | Lower Mainland (British Columbia) Health Care Organizations             |
| <b>MoH</b>             | British Columbia Ministry of Health                                     |
| <b>PHC</b>             | Providence Health Care                                                  |
| <b>PHSA</b>            | Provincial Health Services Authority                                    |
| <b>RRP</b>             | Recycling Renewal Program                                               |
| <b>VCH</b>             | Vancouver Coastal Health                                                |
| <b>VOC</b>             | Volatile organic compounds                                              |
| <b>WUI</b>             | Water Use Intensity                                                     |

Cover Photo:  
Staff championing sustainability. Melita Konn, Adrian White and Siby Thomas, pictured left to right, with the Fraser Valley Centre - BC Cancer Agency, are key to implementing successful recycling initiatives across health care sites.



## Welcome



### Welcome to the 2016 Environmental Performance Accountability Report, representing British Columbia's Lower Mainland Health Care Organizations (LMHOs): Fraser Health, Providence Health Care, Provincial Health Services Authority and Vancouver Coastal Health.

The LMHOs have always strived for social sustainability by offering a system of care that supports the health and well-being of B.C. residents, and ensures the highest economic value.

In addition, the LMHOs strive to go even wider with their sustainability efforts. They consistently endeavor to minimize and mitigate their environmental impact, while simultaneously creating a health care system that is sustainable in day-to-day operations. All four LMHOs have established Sustainability Policies to help govern this work.

A consolidated Energy & Environmental Sustainability Team (EES Team), under Lower Mainland Facilities Management, is jointly supported by LMHO leadership to facilitate ongoing work in ensuring LMHOs achieve the highest level of environmental sustainability. The EES Team has proactively set a clear vision with goals and measurable targets, and I am proud of their accomplishments and awards over the years.

I welcome you to read this report and find out more about the progress LMHOs have made – both in conservation, and in improving human and environmental health.

#### **Dr. Paul Becker**

*Chief Facilities Management Officer*  
Lower Mainland Facilities Management



### I am proud to present the BC Lower Mainland Health Care Organizations' (LMHOs') fifth annual Environmental Performance Accountability Report (EPAR).

This EPAR provides an overview of the LMHOs' ongoing work and accomplishments in relation to the environmental sustainability projects and strategies being promoted by the EES team.

Looking back on 2016, I see another successful year of energy and environmental sustainability work in health care. The Climate Resilience & Adaptation Program is gaining momentum, and we are preparing the LMHOs to meet the Provincial government's requirements for their public sector 10-year climate adaptation plans (as announced in the 2016 BC Climate Leadership Plan).

I am very proud to report that we have successfully implemented the Recycling Renewal Program at all the LMHOs' core health care sites. Now that the roll-out is complete, we will continue monitoring and improving the program. Accordingly, we expect to see a significant improvement in waste diversion rates.

I'm also pleased to report that we've made further improvements in energy conservation. Collectively, the LMHOs reduced their energy usage by 83,596,269 kWh (from a 2007 baseline), resulting in a combined carbon reduction of 15,257 eCO<sub>2</sub>t.

In addition to this EPAR, we produce annual Carbon Neutral Action Reports for the LMHOs; you'll find them at the end of this report. I encourage you to take a moment to review them, as they contain even more insights into our carbon neutrality work.

As the GreenCare Scorecard indicates, we continue to review and set targets, and undertake challenges, ensuring key internal and external partnerships are in place to achieve our ultimate goals of Healthy Communities, Healthy Workplaces and Healthy Environment. I continue to have the honor of leading the EES Team, and look forward to another year of transforming health care for a thriving environment of health and wellness.

#### **Mauricio Acosta,**

*Interim Executive Director of Business Performance & Corporate Support*  
Lower Mainland Facilities Management



# 2016 GreenCare Scorecard

**2016 GreenCare Scorecard**

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources

The Energy and Environmental Sustainability Team (EES Team) was established in order to lead all GreenCare energy and environmental sustainability work across the LMHOs. To guide this work, the EES Team has established 5 focus areas and 18 key performance indicators with 2020 and 2030 targets. The following scorecard evaluates the 2016 performance towards the 2020 targets.

The status is measured and provided by the Director of Energy and Environmental Sustainability. He has given each target a “traffic light” to indicate their overall direction. For more information on each target, please see the individual chapters of this report.

2020 and 2030 targets, see: <http://bit.ly/2zaRHIL>

## 5 FOCUS AREAS

**SMART ENERGY & WATER**  
Minimize energy & water consumption and GHG emissions to reduce costs and environmental impacts, helping ensure the health and wellness of our living environments.


**ZERO WASTE & TOXICITY**  
Minimize waste generated and toxic chemicals used by the health care system and supporting operations.

**REGENERATIVE DESIGN**  
Achieve a “net-positive” built environment that is climate resilient and enriches health and wellness.

**ACTIVE & CLEAN TRANSPORTATION**  
Ensure a health care system in which employees commute/travel between sites in a manner that reduces GHG-related pollutants, minimizes the need for onsite parking, and increases overall health and wellness

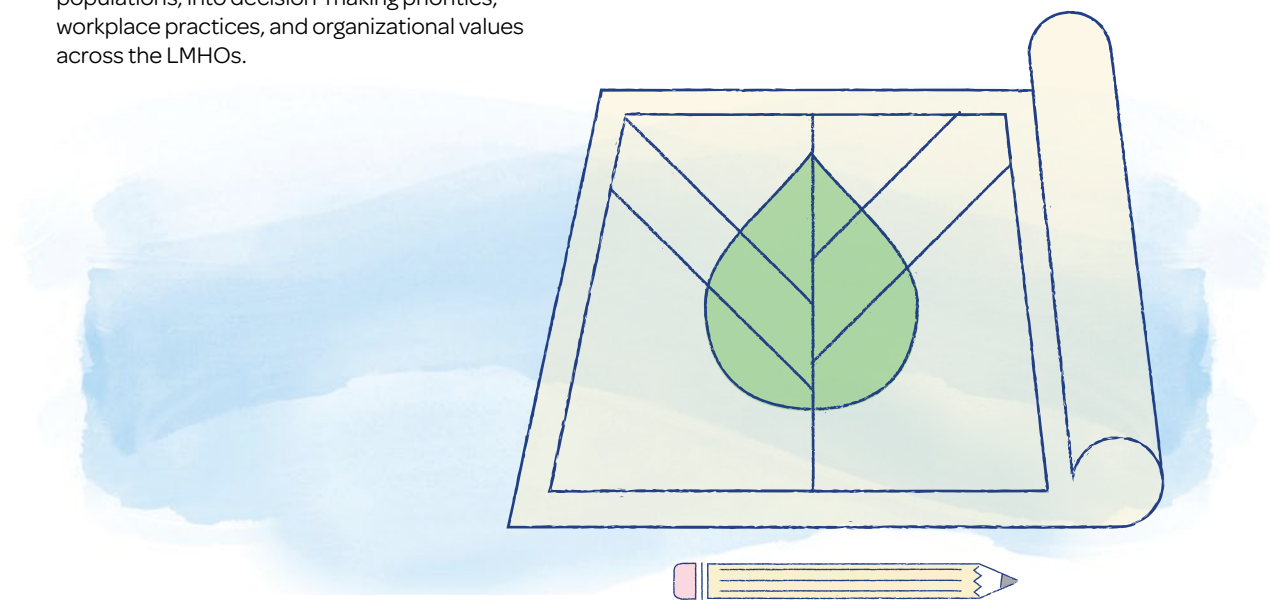
**CULTURE CHANGE**  
Integrate the environmental impact of health care operations, and its connection to the health of populations, into decision-making priorities, workplace practices, and organizational values across the LMHOs.

## 2016 GREENCARE DASHBOARD

 **WORK ON TRACK, AHEAD OF SCHEDULE OR EXCEEDING**

 **WORK ON TRACK, BUT REQUIRES MONITORING**

 **WORK IN PROGRESS, BUT FALLING BEHIND**





**FRASER HEALTH**
**PROVIDENCE HEALTH CARE**
**PROVINCIAL HEALTH SERVICES AUTHORITY**
**VANCOUVER COASTAL HEALTH**

| 5 Focus Areas<br>18 Key Performance Indicators (KPIs) | Metric Baseline<br>(if applicable) | 2016 Results | 2020 Targets | "Traffic Light"<br>Performance | 2016 Results | 2020 Targets | "Traffic Light"<br>Performance | 2016 Results | 2020 Targets | "Traffic Light"<br>Performance | 2016 Results | 2020 Targets | "Traffic Light"<br>Performance |
|-------------------------------------------------------|------------------------------------|--------------|--------------|--------------------------------|--------------|--------------|--------------------------------|--------------|--------------|--------------------------------|--------------|--------------|--------------------------------|
|-------------------------------------------------------|------------------------------------|--------------|--------------|--------------------------------|--------------|--------------|--------------------------------|--------------|--------------|--------------------------------|--------------|--------------|--------------------------------|

**Smart Energy & Water** **GOAL: Minimize energy & water consumption and GHG emissions to reduce costs and environmental impacts, helping ensure the health and wellness of our living environments.**

|   |                                                                            |                                                                                   |       |     |   |       |     |   |       |     |   |       |     |   |
|---|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----|---|-------|-----|---|-------|-----|---|-------|-----|---|
| 1 | Reduce Energy Use Intensity (EUI) of core sites <sup>1</sup>               | EUI (ekWh/m <sup>2</sup> /year) (2007 Baseline)                                   | 13.1% | 15% | ▲ | 1.7%  | 5%  | ■ | 0.1%  | 5%  | ■ | 11.6% | 15% | ▲ |
| 2 | Reduce absolute in-scope GHG emissions <sup>2</sup>                        | GHG emissions (tCO <sub>2</sub> e/year) (2007 Baseline)                           | -1.5% | 5%  | ■ | 4.9%  | 10% | ■ | 23.8% | 25% | ▲ | 19.1% | 25% | ▲ |
| 3 | Reduce absolute in-scope GHG emissions <sup>2</sup> intensity <sup>3</sup> | GHG emissions intensity (tCO <sub>2</sub> e/year/m <sup>2</sup> ) (2007 Baseline) | 20.5% | 33% | ▲ | 6.6%  | 33% | ▼ | 17.4% | 33% | ■ | 29.3% | 33% | ▲ |
| 4 | Reduce Water Use Intensity (WUI) of core sites <sup>1</sup>                | WUI (m <sup>3</sup> /m <sup>2</sup> /year) <sup>4</sup> (Baseline 2010)           | 18.5% | 20% | ▲ | 10.7% | 15% | ■ | -3.9% | 10% | ▼ | 5.5%  | 10% | ▲ |

**Zero Waste & Toxicity** **GOAL: Minimize waste generated and toxic chemicals used by the health care system and supporting operations.**

|   |                                                                                                          |                                  |             |     |     |             |     |     |             |     |     |             |     |     |
|---|----------------------------------------------------------------------------------------------------------|----------------------------------|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|
| 5 | Increase waste diversion rates at existing acute and residential care sites                              | % of waste diverted              | 38.0%       | 50% | ■   | 41.0%       | 50% | ■   | 32.0%       | 50% | ■   | 35.0%       | 50% | ■   |
| 6 | Increase waste diversion rates at all new health care construction projects                              | % of waste diverted              | IN PROGRESS | 80% | TBD | IN PROGRESS | 80% | TBD | IN PROGRESS | 80% | TBD | IN PROGRESS | 80% | TBD |
| 7 | Decrease food scraps in the garbage waste stream                                                         | % of food waste in waste streams | 9.7%        | <5% | ▲   | TBD         | <5% | TBD | 9%          | <5% | ▲   | 16.0%       | <5% | ■   |
| 8 | Develop and implement a strategy to reduce overall waste from acute and residential care operations.     | Completed                        | IN PROGRESS | YES | ▲   | IN PROGRESS | YES | ▲   | IN PROGRESS | YES | ▲   | IN PROGRESS | YES | ▲   |
| 9 | Develop and implement a strategy to reduce overall toxins used in acute and residential care operations. | Completed                        | IN PROGRESS | YES | ▲   | IN PROGRESS | YES | ▲   | IN PROGRESS | YES | ▲   | IN PROGRESS | YES | ▲   |

1 Facilities that are actively monitored for energy and water efficiency (primarily owned and operated sites).

2 In-scope emissions are from owned and leased buildings, fleet travel, and paper use (as defined in relation to the GHG Reduction Targets Act).

3 The Provincial government in B.C. has a mandated 33% reduction over absolute CO<sub>2</sub> emissions. For the LMHOs, it was felt that it was more accurate to place this mandate on intensity.

4 It is recognized that water consumption is more directly influenced by staff count per facility. Due the uncertain and changing nature of staff counts, for the time being we will use facility space for the intensity metric.

5 End of trip facilities must include a minimum of 1 on-site shower/changing facility and a minimum of bicycle secure storage for 5% of on-site staff.

6 Though the Culture Change focus pertains to all targets in all focus areas, specific targets have been set for this topic area.



|                                                       |                                                                                                                                                                         | FRASER HEALTH                                                                                                                                                                                                                 |              |                                | PROVIDENCE HEALTH CARE |              |                                | PROVINCIAL HEALTH SERVICES AUTHORITY |              |                                | VANCOUVER COASTAL HEALTH |              |                                |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------|------------------------|--------------|--------------------------------|--------------------------------------|--------------|--------------------------------|--------------------------|--------------|--------------------------------|
| 5 Focus Areas<br>18 Key Performance Indicators (KPIs) | Metric Baseline<br>(if applicable)                                                                                                                                      | 2016 Results                                                                                                                                                                                                                  | 2020 Targets | "Traffic Light"<br>Performance | 2016 Results           | 2020 Targets | "Traffic Light"<br>Performance | 2016 Results                         | 2020 Targets | "Traffic Light"<br>Performance | 2016 Results             | 2020 Targets | "Traffic Light"<br>Performance |
| <b>Regenerative Design</b>                            |                                                                                                                                                                         | <b>GOAL: Achieve a "net-positive" built environment that is climate resilient and enriches health and wellness.</b>                                                                                                           |              |                                |                        |              |                                |                                      |              |                                |                          |              |                                |
| 10                                                    | Ensure all new construction projects achieve performance-based requirements aligned with resilience and regenerative principles (a minimum of LEED Gold for Healthcare) | 100%                                                                                                                                                                                                                          | 100%         | ▲                              | 100%                   | 100%         | ▲                              | 100%                                 | 100%         | ▲                              | 100%                     | 100%         | ▲                              |
| 11                                                    | Complete climate resilience assessments for all core sites                                                                                                              | 8.0%                                                                                                                                                                                                                          | 50%          | ■                              | 0%                     | 50%          | ■                              | 0%                                   | 50%          | ■                              | 14.0%                    | 50%          | ■                              |
| 12                                                    | Produce site-level climate resilience plans for all core sites                                                                                                          | 0%                                                                                                                                                                                                                            | 10%          | ■                              | 0%                     | 10%          | ■                              | 0%                                   | 10%          | ■                              | 0%                       | 10%          | ■                              |
| <b>Active &amp; Clean Transportation</b>              |                                                                                                                                                                         | <b>GOAL: Ensure LMHO employees commute/travel between sites in a manner that reduces GHG-related pollutants, minimizes the need for onsite parking, and increases overall health and wellness.</b>                            |              |                                |                        |              |                                |                                      |              |                                |                          |              |                                |
| 13                                                    | Increase the % of health care staff who commute via cleaner and healthier means (i.e., Alternatives to single occupancy vehicles)                                       | 26.3%                                                                                                                                                                                                                         | 35%          | ▲                              | 58.2%                  | 65%          | ▲                              | 54.3%                                | 60%          | ▲                              | 51.7%                    | 60%          | ▲                              |
| 14                                                    | Increase portion of core sites that provide end of trip (EOT) bicycle facilities/storage options <sup>5</sup>                                                           | 52.0%                                                                                                                                                                                                                         | 30%          | ▲                              | 29.0%                  | 30%          | ▲                              | 63.0%                                | 30%          | ▲                              | 52.0%                    | 30%          | ▲                              |
| <b>Culture Change<sup>6</sup></b>                     |                                                                                                                                                                         | <b>GOAL: Integrate the environmental impact of health care operations, and its connection to the health of populations, into decision-making priorities, workplace practices, and organizational values across the LMHOs.</b> |              |                                |                        |              |                                |                                      |              |                                |                          |              |                                |
| 15                                                    | Increase number of new Green+ Leaders trained annually                                                                                                                  | 12 TRAINED                                                                                                                                                                                                                    | 25           | ▲                              | 0 TRAINED              | 25           | ▼                              | 24 TRAINED                           | 25           | ▲                              | 4 TRAINED                | 25           | ■                              |
| 16                                                    | Increase the number of EES-themed stories appearing in Health Authority news                                                                                            | -11.0%                                                                                                                                                                                                                        | 25%          | ■                              | -11.0%                 | 25%          | ■                              | -11.0%                               | 25%          | ■                              | -11.0%                   | 25%          | ■                              |
| 17                                                    | Develop new department-specific green strategies/programs. Begin strategy implementation and develop new targets                                                        | IN PROGRESS                                                                                                                                                                                                                   | 2            | ▲                              | IN PROGRESS            | 2            | ▲                              | IN PROGRESS                          | 2            | ▲                              | IN PROGRESS              | 2            | ▲                              |
| 18                                                    | Refresh and obtain Executive Leadership approval of sustainability policies                                                                                             | IN PROGRESS                                                                                                                                                                                                                   | YES          | ▲                              | IN PROGRESS            | YES          | ▲                              | IN PROGRESS                          | YES          | ▲                              | IN PROGRESS              | YES          | ▲                              |



## About This Report

*A healthy environment underpins a healthy population*

— Dr. Margaret Chan,  
WHO Director-General

### OUR AUDIENCE

This report is for both the internal executive leadership (to fully understand health care’s operational impact) and the general public, to increase awareness of the work that LMHOs are doing to improve health care by reducing its environmental impact.

### KEY REPORTING CRITERIA

This report includes the following strategic reporting criteria:

- Materiality Review
- Stakeholder Inclusion
- Strategic Framework
- Organizational Context
- Identified Governance
- Goals, Targets and Performance
- Assurance

### MATERIALITY REVIEW

In 2016, we conducted an informal materiality review to ensure our topic areas remain meaningful and relevant.

With the assistance of Senior Executive Leaders, the Environmental Sustainability Advisory Committee, and survey feedback from over 3,400 health care staff, we continued to identify five topic areas as key strategic areas of environmental stewardship:

- Smart Energy & Water
- Zero Waste & Toxicity
- Active & Clean Transportation
- Regenerative Design
- Culture Change

These topic areas were determined through the following engagement processes:

- Surveys
- One-on-one meetings
- Group discussions
- Final approval from the governing Environmental Sustainability Advisory Committee

### CORE SITES

Collectively, the LMHOs represent over 400 different leased and owned sites, ranging in size from a small office to an entire building. These sites are owned by one of the Health Authorities, or operated by LMFM in conjunction with Public-Private Partnerships (P3).<sup>1</sup> Unfortunately, some of the locations have inadequate metering, while others have implemented differing programs. Thus, these sites are inconsistently monitored for energy, water and waste tracking.

This report contains references to “core sites” in relation to the scope and number of LMHO health care facilities currently being monitored for each topic area. This portfolio of core sites represents over 90% of the total square meters of facility space within the LMHOs.

The official EES definition of core sites is: “Facilities that are actively monitored for energy and water efficiency (primarily owned and operated sites).”

The EES Team has created three lists of core sites: energy (49 sites), water (44) and waste (56). These lists, which have extensive overlap, cover all of the sites currently being monitored and/or metered for each topic area.

As needed, charts and tables indicate the applicable core site list.

This Environmental Performance Accountability Report is voluntarily compiled by the Lower Mainland Facility Management’s (LMFM’s) Energy & Environmental Sustainability Team on behalf of the B.C. Lower Mainland Health Care Organizations (LMHOs): Fraser Health, Providence Health Care, Provincial Health Services Authority and Vancouver Coastal Health.

This report is intended to provide a transparent reporting of the goals, targets and actions being taken by LMHOs to reduce their environmental footprint and create more sustainable and resilient health care operations and services across the Lower Mainland of B.C.

In 2016, a process was undertaken to review and update the GreenCare targets to be more realistic yet aspirational in nature.

<sup>1</sup> P3 refers to public infrastructure where the private sector assumes a major share of the risk in terms of financing and construction. See [www.p3canada.ca](http://www.p3canada.ca).



THE LMHOS:  
**Who We Are**

2016 GreenCare Scorecard

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Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources

**FRASER HEALTH**

Created in 2001, Fraser Health serves a wide region: from the Vancouver suburbs of Burnaby and Delta, to Boston Bar in the Fraser Canyon, and back up the Fraser River Valley.

Serving a population base of 1.6 million residents across the Lower Mainland of B.C., Fraser Health provides primary health care, community home care, acute medical, surgical services, and care for mental health and addictions.<sup>2</sup>

**PROVIDENCE HEALTH CARE**

Providence Health Care was created in 1997. A denominational affiliate of Vancouver Coastal Health, they provide health care services to residents of the Vancouver coastal region and B.C.

Providence Health Care operates eight facilities/campuses (including St. Paul's Hospital, with over 500 acute care beds) and offers acute care, academic/research and residential health care.

Below: Surrey Memorial Hospital



**686,942 m<sup>2</sup>**  
OF USEABLE  
FACILITY SPACE

**153**  
DISTINCT  
BUILDINGS

**18,298**  
FULL-TIME STAFF



**177,159 m<sup>2</sup>**  
OF USEABLE  
FACILITY SPACE

**36**  
DISTINCT  
BUILDINGS

**4,760**  
FULL-TIME STAFF

Above: St. Paul's Hospital (Vancouver) concept design

<sup>2</sup> [https://en.wikipedia.org/wiki/Fraser\\_Health#cite\\_note-fhaquickfacts-1](https://en.wikipedia.org/wiki/Fraser_Health#cite_note-fhaquickfacts-1)



### PROVINCIAL HEALTH SERVICES AUTHORITY

Provincial Health Services Authority is a unique health authority in B.C., as it is the only health authority with a province-wide mandate for specialized health care services.

Through specialized hospitals and centres, Provincial Health Services Authority provides health care and related services such as BC Children’s Hospital, BC Women’s Hospital, BC Emergency Health Services and the BC Cancer Agency.

### VANCOUVER COASTAL HEALTH

Vancouver Coastal Health is a regional health authority that provides health services including acute, tertiary and quaternary care; home and community care; population and preventive health; mental health services; and addictions services to the residents of Greater Vancouver and the Coast Garibaldi area.<sup>3</sup>

<sup>3</sup> [https://en.wikipedia.org/wiki/Vancouver\\_Coastal\\_Health](https://en.wikipedia.org/wiki/Vancouver_Coastal_Health)

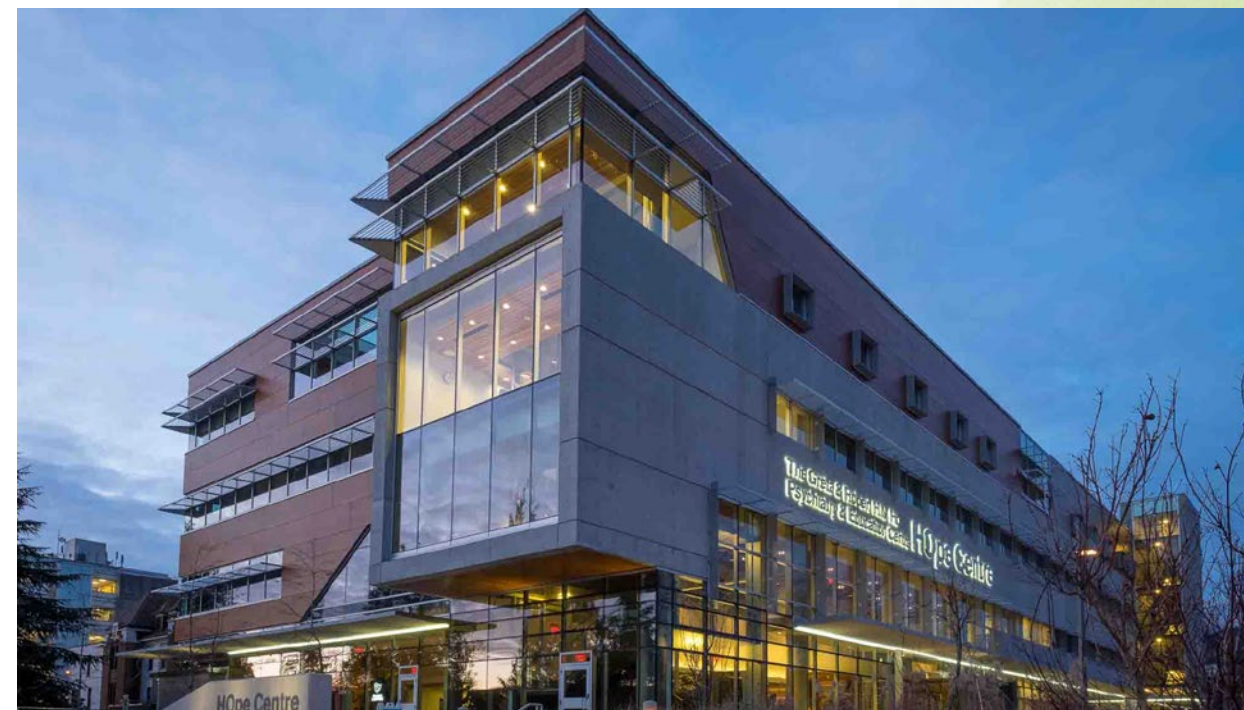
Below: BC Children’s Hospital Research (Vancouver)



**358,995 m<sup>2</sup>**  
OF USEABLE  
FACILITY SPACE

**76**  
DISTINCT  
BUILDINGS

**8,814**  
FULL-TIME STAFF



**690,374 m<sup>2</sup>**  
OF USEABLE  
FACILITY SPACE

**165**  
DISTINCT  
BUILDINGS

**14,568**  
FULL-TIME STAFF

Above: HOpe Centre (North Vancouver)



THE EES TEAM:  
**Who We Are**

The Energy and Environmental Sustainability Team (EES Team) is tasked with reducing the environmental and economic footprint of health care facilities and operations represented by Fraser Health, Providence Health Care, Provincial Health Services Authority and Vancouver Coastal Health.

This dynamic team of energy and sustainability focused professionals includes:



**Alex Hutton, Energy Manager**  
“Our health care system must create optimal conditions for health. Similarly, our sustainability and resilience efforts must create conditions for people and the planet to thrive. This includes going beyond cleaning up pollution and reducing other negative environmental impacts, to having a positive impact on people and their ecosystems. Achieving these ‘net-positive’ outcomes requires a new approach, which must continue to evolve as we chart this new course.”



**Glen A. Garrick, Sustainability Manager**  
“To work in sustainability is to work in fluid complexity. You don’t have to know or understand all the solutions. But you have to lead by example and with optimistic passion. You have to be the lead protagonist of current sustainability discourse and decision making. And you have to know when to be the key antagonist in a larger bureaucratic system.”



**Alan Lin, Energy Specialist**  
“The environmental impact from health care facilities, operations and services affects the health of the populations and patients they are meant to serve.”



**Mauricio Acosta, Interim Executive Director of Business Performance & Corporate Support**  
“As noted by the World Health Organization and Healthcare Without Harm, the environmental impact from health care facilities, operations and services influences the health of the populations and patients they are meant to serve. In addition, there is a clear link between the environmental and health outcome of green operations. As such, we have the implicit responsibility to provide health care in the most environmentally sustainable way possible.”



**Robert Bradley, Interim Director of Energy & Environmental Sustainability**  
“A strategic approach to energy management in our health care facilities continues to result in significant environmental and financial benefits for our organizations. These benefits contribute to a healthier environment, improve public perception, and support our local communities, while lowering our operating costs to allow for more resources to be directed towards patient care.”



**Kori Jones, Energy Manager**  
“The health sector plays a critical role in developing and applying an effective response to climate change. Through the integration of low carbon strategies in existing facilities and the intentional design of climate resilient features into new facilities, our organizations can minimize the cycle of environmental degradation affecting the communities we serve while ensuring long-term sustainable health services.”



**Jeson Mak, Interim Energy Manager**  
“To achieve a sustainable and energy efficient environment, we must integrated it into policies and the processes of the organization’s facilities operation. This will dramatically improve energy and water efficiencies and waste reduction within ALL the health care sites.”



**Olive Dempsey, Sustainability Consultant**  
“Improving the environmental performance of organizations with as much influence as the LMHOs is a great opportunity. We’re not only regarded as leaders in our region and province, we’re also some of the Lower Mainland’s largest employers. This means that the changes we make can have a positive impact far beyond the walls of our facilities.”

2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources





**Sonja Janousek**,  
*Sustainability Consultant*

"2016 marked an exciting year for recycling in Lower Mainland hospitals and residential care sites. The implementation of standardized recycling bins for paper and containers was completed! I'm so grateful to all of our recycling champions, and look forward to the next phase of the program where we strengthen recycling efforts and identify further opportunities to divert waste."



**Eiselle Omampo**, *Coordinator, Transportation Demand Management and Commuter Choices*

"Physical inactivity, air pollution and social disconnection have detrimental impacts to one's health. Switching to active and clean transportation modes – such as walking, cycling, transit use, carpooling and car sharing – can improve one's health, well-being and personal safety. Making a conscious effort to choose more responsible transportation options not only benefits our own health, but that of others, as well as the environment."



**Angie Woo**, *Sustainability Consultant, Climate Resilience & Adaptation Lead*

"Climate risks and impacts to B.C.'s health system are already significant and increasing in severity, frequency and unpredictability. Acute shocks and chronic stresses pose complex, long-term challenges to public health, patient care and health service delivery. GreenCare's Climate Resilience & Adaptation Program proactively and collaboratively identifies and embeds measures that will yield resilience dividends and health co-benefits for generations to come."



**Richard Wellwood**, *Energy Specialist*

"In an increasingly complex society and interconnected world, our choices and their consequences are having broader impacts on the environment and our health. The EES Team is an acknowledgment that systems of public health care are being required to change more deeply and rapidly to continue to meet our collective responsibilities. We must mobilize ourselves and our communities to develop and maintain a high level of environmental health and well-being."



**Tess Munro**, *Sustainability Intern*

"Taking small steps during our daily routine can lead to big changes in the long-term health of our communities. Sharing stories about other team members, and giving folks opportunities to get involved in sustainability projects through the GreenCare website and newsletter, provides people with a place to start. This helps create a community where knowledge sharing helps lead to change."



**Claudia Castro**,  
*Sustainability Consultant*

"At one point or another, we all contribute to health care waste, so aiming for Zero Waste is a challenge that shouldn't be taken lightly. EES Team achievements across the LMHOs are an inspiration, but the real inspiration comes from the ripple effects of seeing a variety of health authority staff striving to be sustainable."



**Ryan Galloway**, *Energy Specialist*

"Through energy conservation we can reduce our environmental impacts, while making health care more affordable. Our efforts prove that sustainability is not only an achievable path, but the most logical one for our prosperity. It's our responsibility to leave this world a better place for future generations."



**Sabah Ali**, *Energy Coordinator*

"We know that global warming is creating big challenges for everyone. These challenges make it clear to most people that we do, in fact, have a serious problem, and that we must deal with it as soon as possible. However, we can treat these challenges as opportunities, helping us build a case to the decision makers and re-steer the future in the right direction."



**Evan Hammer**, *Sustainability Intern*

"A core group of employees – who are passionate about sustainability and engaged in making a difference – is the necessary seed for culture change across an organization and beyond."



**Jackie Yip**, *Sustainability Intern*

"Growing scientific evidence projects an increase in the intensity of extreme events, such as flooding and heat waves, which can severely undermine the operations of health care facilities. By systematically assessing the impacts of extreme events, our health care system is positioned to help our communities prepare for climate change, and protect the well-being of our patients and staff."





## What is GreenCare?

2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources

Health Authorities (also known as health regions) are a Canadian provincial governance model used to administer and provide public health care to Canadian residents. Each province is responsible for administering their own governance structure.

Within British Columbia, seven health authorities have been created to cover all of the province’s publicly funded health care operations and providers.

Lower Mainland Health Care Organizations (LMHOs) refer to three B.C. health authorities and one affiliated health care organization in the Lower Mainland of B.C.: Fraser Health, Providence Health Care, Provincial Health Services Authority and Vancouver Coastal Health.

### EMBEDDING ENVIRONMENTAL HEALTH AND WELLNESS

In 2010, the LMHOs consolidated sustainability efforts and created the Energy and Environmental Sustainability Team (EES Team) to lead all energy and environmental sustainability work across the four LMHOs. The EES Team is housed within Lower Mainland Facilities Management, a consolidated department within the LMHOs.

The GreenCare Community was created by the EES Team to establish a more sustainable and collaborative health care system in B.C. Through the GreenCare Community and partnerships, the EES Team coordinates environmental conservation projects across all departments while simultaneously growing a recognizable brand awareness that inspires infrastructure upgrades and a culture of conservation.

### GREENCARE’S CORE PURPOSE

*Systematically embed environmental, economic and social sustainability policies/principles/processes across the LMHOs.*

### GREENCARE’S VISION

*Transforming Health Care for a Thriving Environment of Health and Wellness.*

### GREENCARE SUSTAINABILITY STRATEGIC FRAMEWORK

The EES Team’s GreenCare Sustainability Strategic Framework focuses on aligning GreenCare work with human and environmental health and wellness. In 2015-16, we re-evaluated the framework to ensure it remains relevant, and to make changes to our focus areas with respect to climate change resiliency.

### GREENCARE’S HIGH-LEVEL GOALS:

- Healthy Communities
- Healthy Workplaces
- Healthy Environment

GreenCare has five focus areas that reflect the environmental sustainability topics and strategies most pressing for human health. Each focus area has an associated goal:

Each focus area has an associated goal:

- **Smart Energy & Water:** Minimize energy and water consumption, as well as GHG emissions, to reduce costs and environmental impacts, helping ensure the health and wellness of our living environments.
  - **Zero Waste & Toxicity:** Minimize waste generated and toxic chemicals used by the health care system and supporting operations.
  - **Regenerative Design:** Achieve a “net-positive” built environment that is climate resilient and enriches health and wellness.
  - **Active & Clean Transportation:** Ensure a health care system in which employees commute/travel between sites in a manner that reduces GHG-related pollutants, minimizes the need for onsite parking, and increases overall health and wellness.
  - **Culture Change:** Integrate the environmental impact of health care operations, and its connection to the health of populations, into decision-making priorities, workplace practices, and organizational values across the Lower Mainland Health Care Organizations (LMHOs).
- The EES Team has established various programs to help the LMHOs achieve their GreenCare vision, goals, key performance indicators (KPIs) and targets. These include:
- **Green+Leaders:** Staff mentoring on “greening” work spaces.
  - **Energy & Water Management:** Conservation through infrastructure, behavioural and operational efficiencies.
  - **Commuter Services:** Efficient and active transportation to and from health care sites.
  - **Recycling Renewal Program:** Responsible diversion of recyclable solid and organic waste.
  - **Environmentally Preferable Purchasing:** Reduction of the environmental impact of health care’s supply chain through purchasing decisions.
  - **Climate Resilience & Adaptation:** Reducing climate related risks by increasing infrastructure resilience at site and organizational levels.
  - **GreenCare Community:** Communication and community development through the web.



Our success in these programs is largely influenced by our key stakeholders:

- Support Services (e.g., BISS, BCCSS, IPS<sup>4</sup>)
- Clinical Services (e.g., clinicians, clinical staff)
- External Services (e.g., BC Hydro, FortisBC, municipalities)
- Administrative Services (e.g., Human Resources, Finance, Communications)
- Operational Services (e.g., Capital Projects and Strategic Planning, Operations and Maintenance)

All of this work rests on four key principles:

- Resilient
- Engaged
- Restorative
- Accountable

## ADVISORY COMMITTEES AND COLLABORATIONS

### ENVIRONMENTAL SUSTAINABILITY ADVISORY COMMITTEE (ESAC) – EXECUTIVE COMMITTEE

The Executive Committee consists of executives from across the LMHOs, who provide advocacy, advice and resources to help promote the GreenCare agenda. These executives represent key stakeholder areas such as Human Resources, Finance, IT and Clinical. In addition, this group of environmental sustainability champions provides key leadership and direction to ensure GreenCare's work is balanced, successful and integrated with the LMHOs' core objectives.

### EXTERNAL COLLABORATION: HEALTH CARE WITHOUT HARM

In 2015, the LMHOs joined the Global Green and Healthy Hospitals' 2020 Health Care Climate Challenge, with the aim of mobilizing health care institutions to protect public health care from climate change. Over 9,000 hospitals and health centres from around the world have signed up for the 2020 Challenge.



The 2020 Challenge is based on three pillars:

- **Mitigation:** Reducing health care's carbon footprint
- **Resilience:** Preparing for the impacts of extreme weather and the shifting burden of disease
- **Leadership:** Educating staff and the public while promoting policies to protect public health from climate change

The 2020 Challenge promotes ten goals:

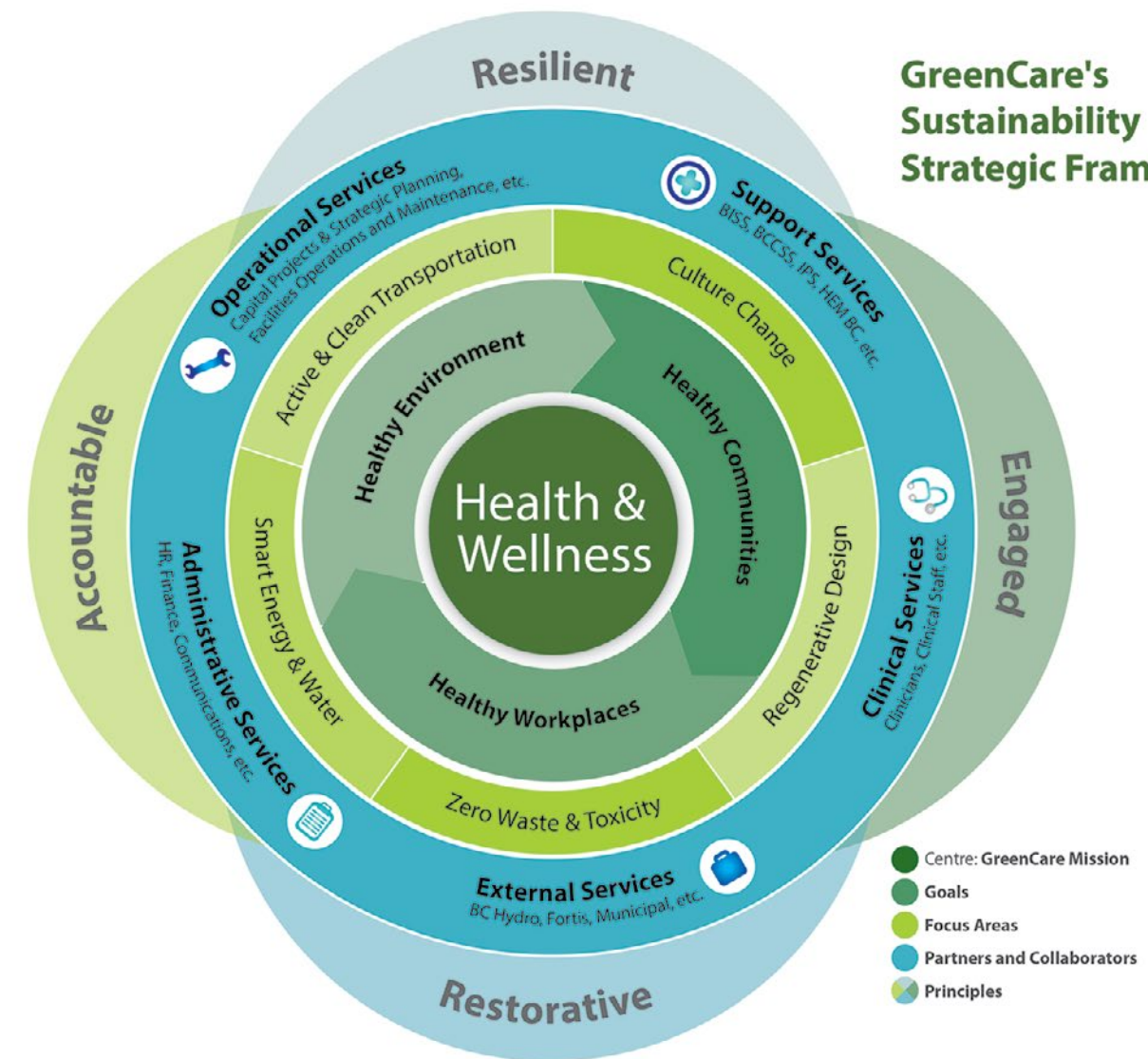
- **LEADERSHIP** Prioritize environmental health as a strategic imperative
- **CHEMICALS** Substitute harmful chemicals with safer alternatives
- **WASTE** Reduce, treat and safely dispose of health care waste
- **ENERGY** Implement energy efficiency and clean, renewable energy generation
- **WATER** Reduce hospital water consumption and supply potable water

- **TRANSPORTATION** Improve transportation strategies for patients and staff
- **FOOD** Purchase and serve sustainably grown, healthy food
- **PHARMACEUTICALS** Prescribe appropriately, safely manage and properly dispose of pharmaceuticals
- **BUILDINGS** Support green and healthy hospital design and construction
- **PURCHASING** Buy safer and more sustainable products and materials

### GREENCARE'S KEY PERFORMANCE INDICATORS AND TARGETS (2020-2030)

EES team has created, on behalf of the LMHOs, key performance indicators (KPIs) and related targets for 2020 and 2030. These KPIs are meant to help provide a path to reaching stated targets while ensuring annual tracking of performance towards those targets.

The full list of KPIs and targets can be found in *Appendix 1: GreenCare Introduction*.



<sup>4</sup> BISS (Business Initiatives & Support Services), BCCSS (BC Clinical and Support Services), IPS (Integrated Protection Services)

- 2016 GreenCare Scorecard
- About This Report
- The LMHOs: Who We Are
- The EES Team: Who We Are
- What is GreenCare?
- GreenCare Sustainability Strategic Framework**
- Greencare Milestones and Awards
- GreenCare Strategy
  - Smart Energy & Water
  - Zero Waste & Toxicity
  - Regenerative Design
  - Active & Clean Transportation
  - Culture Change
- Assurances and Resources





## Greencare Milestones and Awards

The EES Team has achieved significant success, as highlighted through these key milestones and awards:

2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

**Greencare Milestones and Awards**

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources

# 2007

### ENERGY COMMITMENT LETTER ADOPTED

Providence Health Care  
Vancouver Coastal Health

### GREENCARE CREATED

Vancouver Coastal Health

### GO GREEN CAMPAIGN CREATED

Providence Health Care

# 2008

### BC HYDRO POWER SMART WORK-PLACE CONSERVATION AWARD:

Vancouver Coastal Health

### BC HYDRO POWER SMART ENERGY MANAGER OF THE YEAR AWARD

Provincial Health Services Authority

# 2009

### BC HYDRO POWER SMART WORK-PLACE CONSERVATION AWARD

Vancouver Coastal Health

### BC HYDRO POWER SMART LEADER AWARD

Vancouver Coastal Health

### GREEN+LEADERS CREATED

Provincial Health Services Authority

### BC HYDRO POWER SMART EXECUTIVE LEADER AWARD

Provincial Health Services Authority

### BC HYDRO RECOGNIZES ENERGY MANAGER WITH HIGHEST CONTRIBUTIONS TO ELECTRICAL SAVINGS

Fraser Health

# 2010

### BC HYDRO POWER SMART ENERGY MANAGER OF THE YEAR AWARD

Fraser Health

### BC HYDRO POWER SMART LEADER AWARD

Vancouver Coastal Health

### RECYCLING RENEWAL PROGRAM LAUNCHED

Fraser Health  
Providence Health Care  
Vancouver Coastal Health

# 2011

### GREENTECH AWARD

Vancouver Coastal Health

### SUSTAINABILITY POLICY ADOPTED

Fraser Health  
Providence Health Care  
Provincial Health Services Authority  
Vancouver Coastal Health

### RECYCLING RENEWAL PROGRAM LAUNCHED

Provincial Health Services Authority



# 2012

## CANADA'S TOP 100 EMPLOYERS— GREENEST EMPLOYER AWARD

Provincial Health Services Authority

## BC HYDRO POWER SMART LEADERSHIP EXCELLENCE AWARD

Fraser Health  
Vancouver Coastal Health

## LAUNCH OF THE GREEN REVOLVING (FACILITIES) FUND

Vancouver Coastal Health

# 2013

## BC HYDRO OUTSTANDING SERVICE AWARD, “GREEN+LEADERS”

Fraser Health  
Providence Health Care  
Provincial Health Services Authority  
Vancouver Coastal Health

## CANADA'S TOP 100 EMPLOYERS— GREENEST EMPLOYER AWARD

Provincial Health Services Authority

## GREENCARE COMMUNITY WEBSITE LAUNCHED

Fraser Health  
Providence Health Care  
Provincial Health Services Authority  
Vancouver Coastal Health

# 2014

## HUB CYCLING COALITION AWARD— BEST IN HEALTH CATEGORY

Provincial Health Services Authority

## HUB CYCLING COALITION AWARD—THREE BIKE FRIENDLY BUSINESS AWARDS

Vancouver Coastal Health

## BC HYDRO POWER SMART LEADERSHIP EXCELLENCE AWARD

Fraser Health  
Vancouver Coastal Health

# 2015

## CANADA'S TOP 100 EMPLOYERS— GREENEST EMPLOYER AWARD

Provincial Health Services Authority

## ABOVE AND BEYOND “COLLABORATIVE PARTNERSHIPS” AWARD

Fraser Health—Energy &  
Environmental Sustainability Team

## LAUNCH OF THE GREEN REVOLVING (FACILITIES) FUND

Fraser Health,  
Provincial Health Services Authority

## FORTIS BC ENERGY SPECIALIST PROGRAM ACHIEVEMENT AWARD

Vancouver Coastal Health

# 2016

## CANADA'S TOP 100 EMPLOYERS— GREENEST EMPLOYER AWARD

Provincial Health Services Authority

## RECYCLING RENEWAL PROGRAM

100% implementation of the  
Recycling Renewal Program across  
all acute and residential care  
health care sites

## GREEN AND HEALTHY HOSPITALS' CLIMATE CHAMPIONS AWARD (GOLD FOR GHG REDUCTION)

Provincial Health Services Authority

## GREEN AND HEALTHY HOSPITALS' CLIMATE CHAMPIONS AWARD (SILVER FOR GHG REDUCTION)

Vancouver Coastal Health

## WOOD DESIGN AWARDS ENVIRONMENTAL PERFORMANCE AWARD

Vancouver Coastal Health  
(Bella Bella)

## HUB'S BIKE TO WORK AWARD, BEST IN HEALTH CARE

Provincial Health Services Authority  
Vancouver Coastal Health



CHART 1: Energy Consumption (weather adjusted ekWh)<sup>1,2</sup>

2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

**Smart Energy & Water**

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources



**OUR GOAL**

Minimize energy and water consumption, and GHG emissions, to reduce costs and environmental impacts, helping ensure the health and wellness of our living environments.

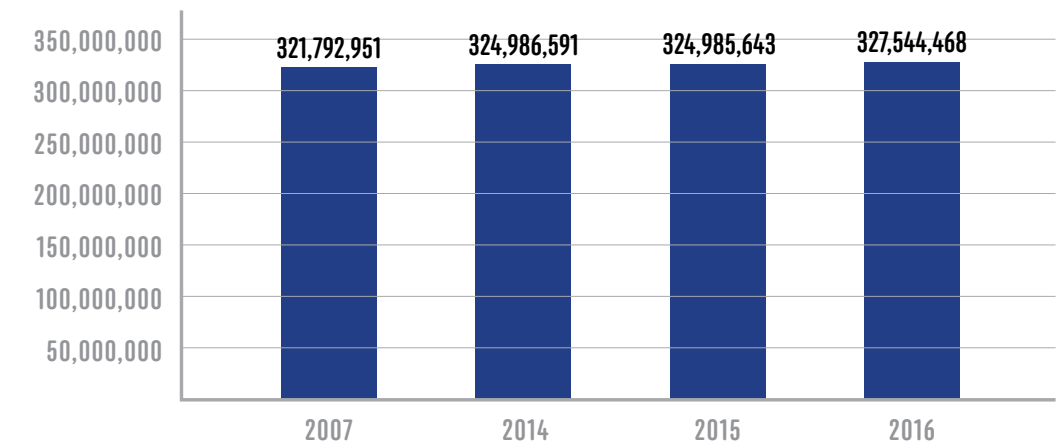
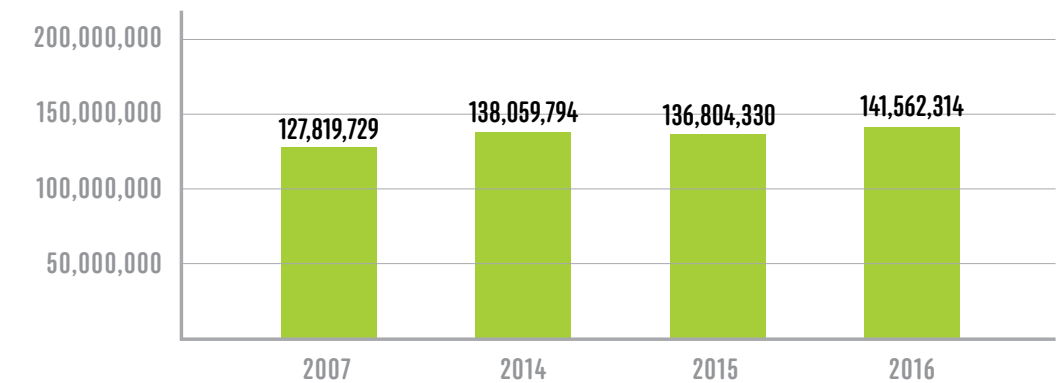
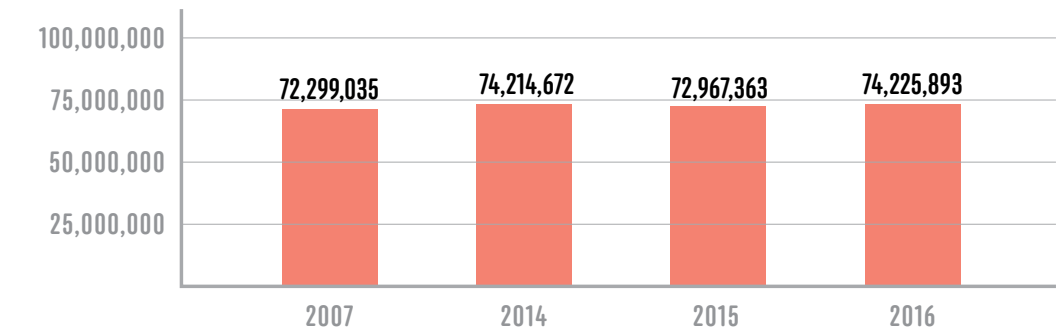
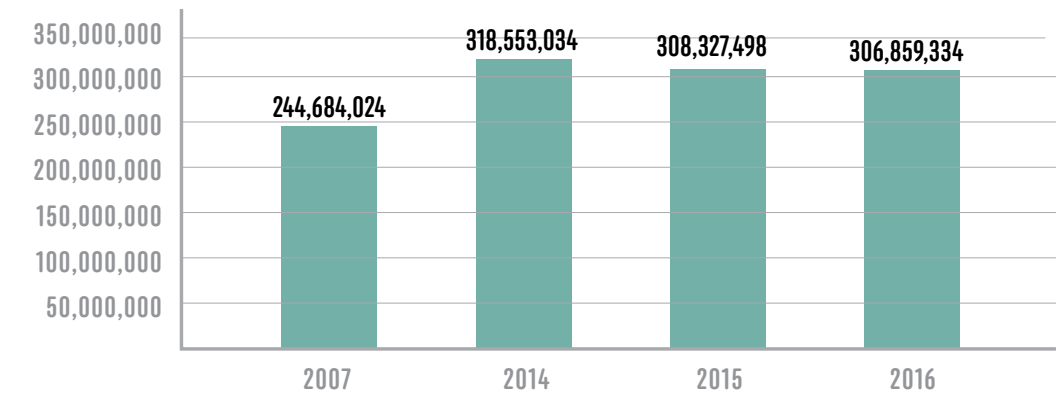
The LMHOs strive to be fiscal and environmental stewards of their utilities. This starts with smart energy and water consumption.

The Energy and Water Management Team monitors, measures and reports on 49 energy and 44 water core health care sites. This covers over 1.2 million square meters, or roughly 90%, of the LMHOs' total facility space.

In 2016, the LMHOs collectively consumed over 850 equivalent (weather adjusted) gigawatt hours (eGWh) in energy. This resulted in a \$35 million cost, and a significant drain on health care funding.

With energy representing 97% of its carbon footprint (as measured by the BC provincial government), the LMHOs' collective carbon footprint in 2016 was 106,887 tCO<sub>2</sub>e.

In the same year, they consumed 3.2 million cubic meters of water (enough to fill 1,286 Olympic-sized swimming pools), resulting in a total cost of over \$5.8 million.

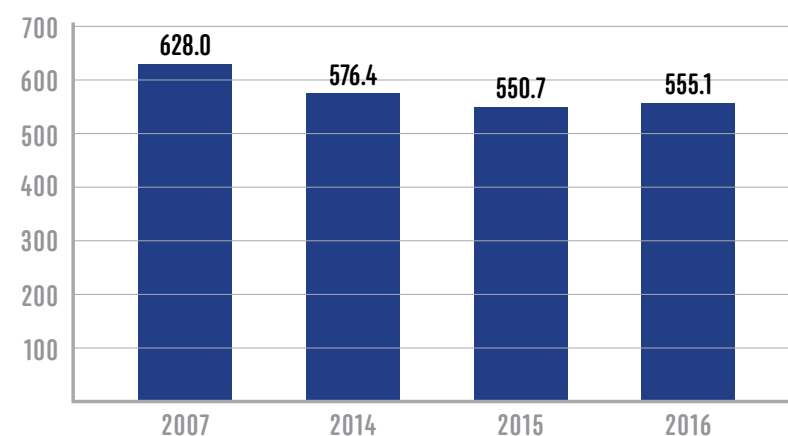
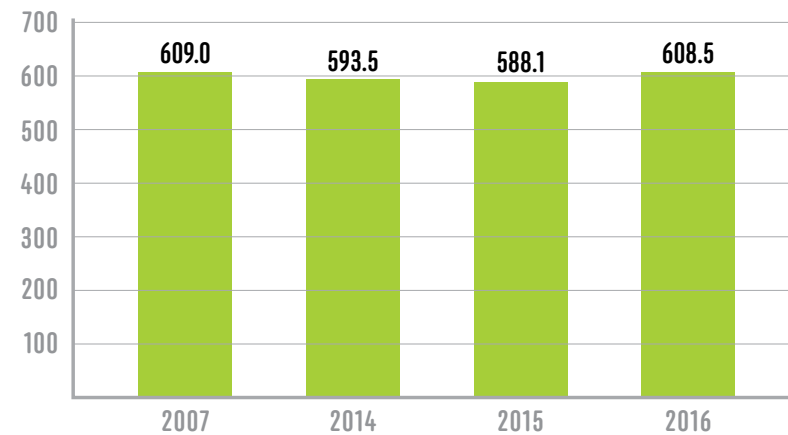
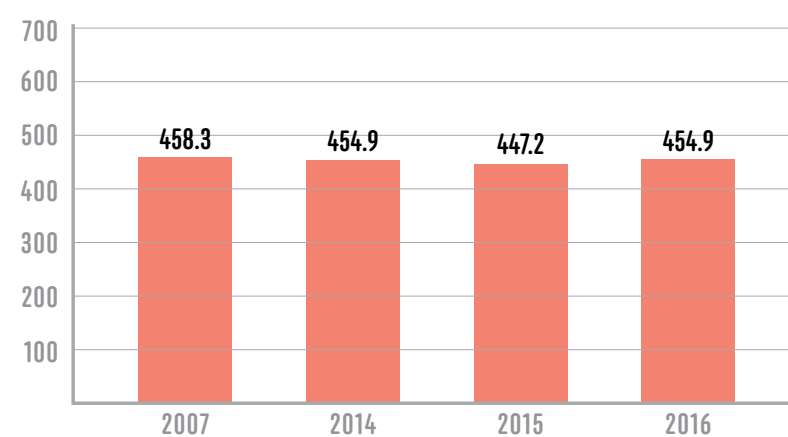
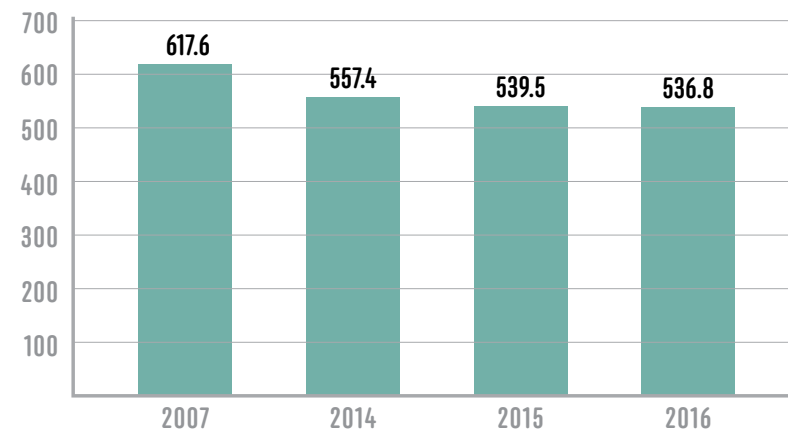


<sup>1</sup> Data includes electrical, natural gas and fuel oil. Data is also normalized according to weather. Data is for core sites only.

<sup>2</sup> Core Sites are those that are actively monitored and reported for energy and water.



CHART 2: Energy Use Intensity (EUI) (ekWh/m<sup>2</sup>)<sup>1</sup>



<sup>1</sup> For core sites only

**TARGET #1**  
**Reduce energy use intensity (EUI) (ekwh/m<sup>2</sup>/year) of core sites.**

This intensity target is measured as equivalent kWh per calendar year and covers all core facilities that are actively monitored for energy efficiency and primarily owned and operated health care sites.

| 2020 EUI TARGETS (2007 BASELINE) |     |
|----------------------------------|-----|
| FH                               | 15% |
| PHC                              | 5%  |
| PHSA                             | 5%  |
| VCH                              | 15% |

**2016 PERFORMANCE**

The Energy & Environmental Sustainability Team experienced another strong year of energy conservation, with all four LMHOs reducing their EUI. (Note: all figures below are relative to the 2007 baseline.)

Fraser Health implemented 20 energy conservation retrofit projects, which are estimated to achieve:

- Energy savings of 6.9 eGWh (1,334,000 kWh of electricity and 19,910 GJ of natural gas)
- GHG reductions of 1,005 tCO<sub>2</sub>e
- 13.1% reduction in EUI
- Cost avoidance of ~\$275,000

Providence Health Care completed one energy conservation project and partially completed another. Combined, these will achieve:

- Energy savings of 0.591 eGWh
- GHG reductions of 69 tCO<sub>2</sub>e
- 1.7% reduction in EUI
- Cost avoidance of ~\$20,000

Provincial Health Services Authority completed six energy conservation projects, which achieved:

- Energy savings of 5.795 eGWh
- GHG reductions of 862 tCO<sub>2</sub>e
- From 2015, a 3.4% reduction in EUI
- Cost avoidance of ~\$150,000

Vancouver Coastal Health completed nine energy conservation projects, which are estimated to achieve:

- Energy savings of 15.3 eGWh (3,487,196 kWh of electricity and 42,492 GJ of natural gas)
- GHG reductions of 337 tCO<sub>2</sub>e
- 11.6% reduction in EUI
- Cost avoidance of ~\$655,000

**2017 PLANS**

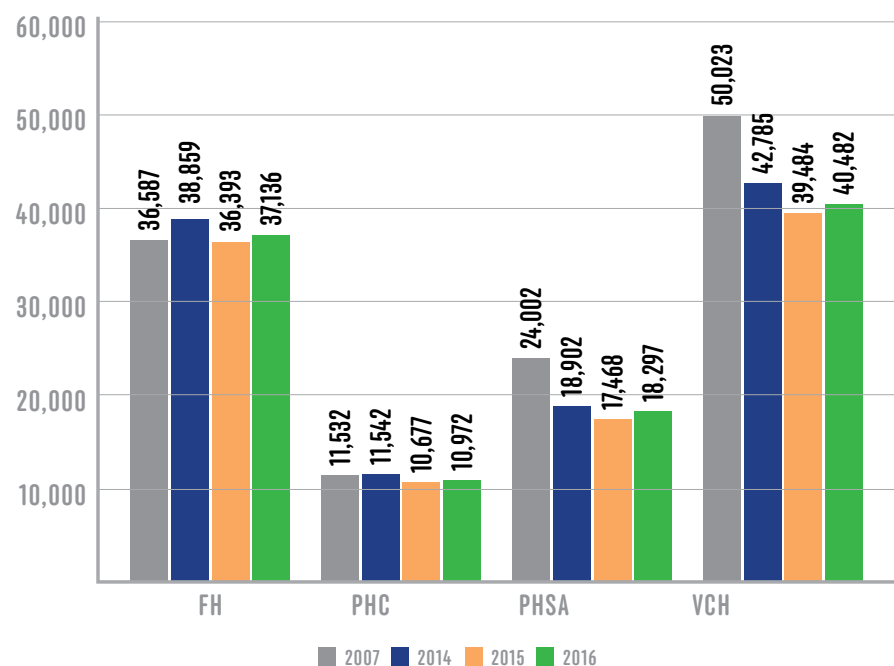
With a strong EES Team, and commitment from senior leadership, the LMHOs aim to continue reducing their EUI to achieve the 2020 target.

They will continue to use a variety of energy conservation strategies, including project identification, business case development and staff engagement. They will also continue to access project funding through the Carbon Neutral Capital Program (Provincial funding) and the Green Revolving Fund (an internal fund supporting environmental conservation projects).

BC Hydro and FortisBC continue to be key partners in efforts to reduce energy conservation.

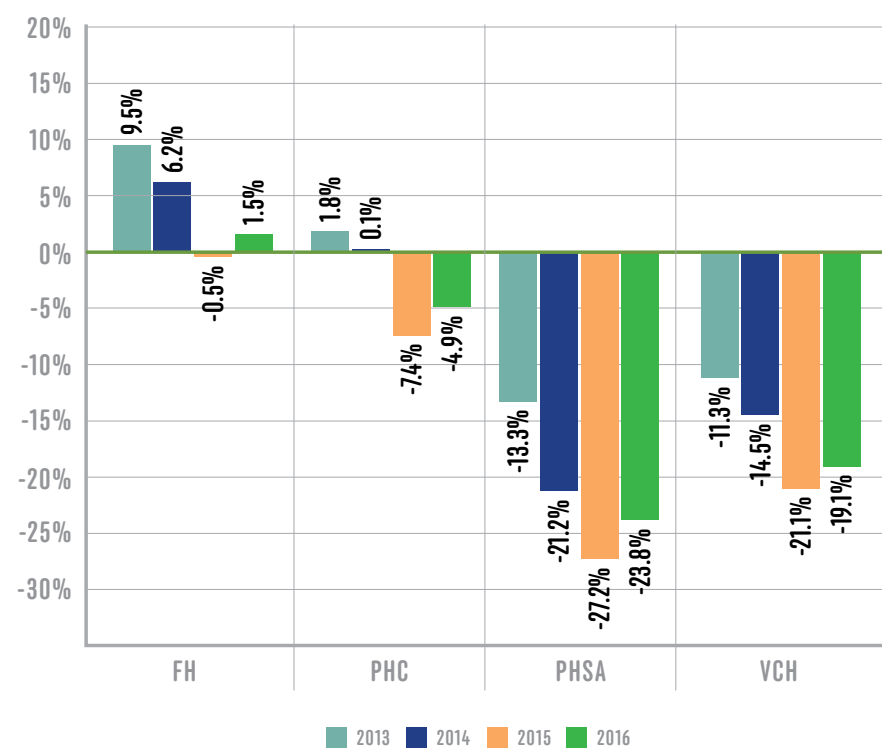


**CHART 3: Carbon Footprint (needing offsetting) in tCO<sub>2</sub>e<sup>1</sup>**



<sup>1</sup> The carbon footprint is derived by analyzing the data from all LMHO sites, not just core sites.

**CHART 4: CO<sub>2</sub> Absolute Change From Baseline**



**TARGET #2**

**Reduce absolute in-scope GHG emissions.**

The scope of this target, measured in total tonnes of CO<sub>2</sub> emissions per calendar year, includes specific emissions from owned and leased buildings, fleet travel and paper use.

**2020 GHG REDUCTION TARGETS (2007 BASELINE)**

|      |     |
|------|-----|
| FH   | 5%  |
| PHC  | 10% |
| PHSA | 25% |
| VCH  | 25% |

The LMHOs measure their CO<sub>2</sub> footprint using mandated guidelines provided by the British Columbia Climate Action Secretariat (CAS). However, the LMHOs' targets for absolute reduction do not match the CAS general sector-wide targets. The LMHOs believe it is more appropriate and accurate to set CO<sub>2</sub> reduction targets based on challenges and realities facing the health care sector. However, the CAS targets are applied to the intensity target (Target #3 below).

**2016 PERFORMANCE**

In 2016, the LMHOs achieved two milestones. First, they produced their ninth annual Carbon Neutral Action Reports (CNARs), which detailed their carbon emissions, and actions taken to reduce their footprint. They also continued to reduce their carbon emissions, becoming carbon neutral for the seventh consecutive year.

The LMHOs CNARs have been included in the appendices:

- Appendix 2: Fraser Health's CNAR
- Appendix 3: Providence Health Care's CNAR
- Appendix 4: Provincial Health Services Authority's CNAR
- Appendix 5: Vancouver Coastal Health's CNAR

Since 2007, Fraser Health has experienced a 1.5% increase in their absolute carbon dioxide footprint. They increased their usable facility space by 28% since 2007, so measuring performance strictly on absolute terms can be misleading. Despite their growth, Fraser Health has decreased their carbon footprint intensity (ekWh/square meter) by 20.5%.

Providence Health Care achieved a 4.9% reduction in their absolute carbon dioxide footprint. The reduction is even greater when looking at their carbon dioxide intensity of -6.6%.

Provincial Health Services Authority achieved the highest reduction (23.8%) in their absolute carbon footprint. Their carbon footprint reduction is significant: their carbon dioxide intensity was -17.4%. With the construction of new facilities at BC Children's Hospital, their usable facility space will increase in the coming years; this will likely result in a negative impact on their absolute carbon footprint.

Vancouver Coastal Health achieved a 19.1% reduction in their absolute carbon footprint. Their carbon dioxide intensity has reduced a leading 29.3%. This is of special note as their overall usable facility space actually grew by 14.5% since 2007.

**2017 PLANS**

With changes in facility space, it can be misleading to view the LMHOs' performance in terms of an absolute CO<sub>2</sub> footprint. However, having an absolute CO<sub>2</sub> footprint helps ensure the LMHOs remain carbon neutral year after year. Therefore, this 2020 target will not change.

**SMART ENERGY & WATER: THE LINK WITH HEALTH & WELLNESS OUTCOMES**

→ Energy conservation can positively influence health simply by reducing energy-produced carbon dioxide. Pollutants can also be reduced through more efficient air exchange in health care facilities. In addition, better, more energy-efficient lighting, can improve occupants' visual stress.<sup>5</sup>

By improving water conservation measures, we improve the quality of health by mitigating the potential disruptions of water supplies through drought or climate change.

<sup>5</sup> <http://bmjopen.bmj.com/content/5/4/e007298.full>



**TARGET #3**

**Reduce absolute in-scope GHG emissions intensity.**

The specific scope of this target includes CO<sub>2</sub> emissions from owned and leased buildings, fleet travel and paper use. The “intensity” is based on usable facility space (tCO<sub>2</sub>e/year/m<sup>2</sup>).

**2020 GHG EMISSIONS INTENSITY TARGETS (2007 BASELINE)**

|      |     |
|------|-----|
| FH   | 33% |
| PHC  | 33% |
| PHSA | 33% |
| VCH  | 33% |

**2016 PERFORMANCE**

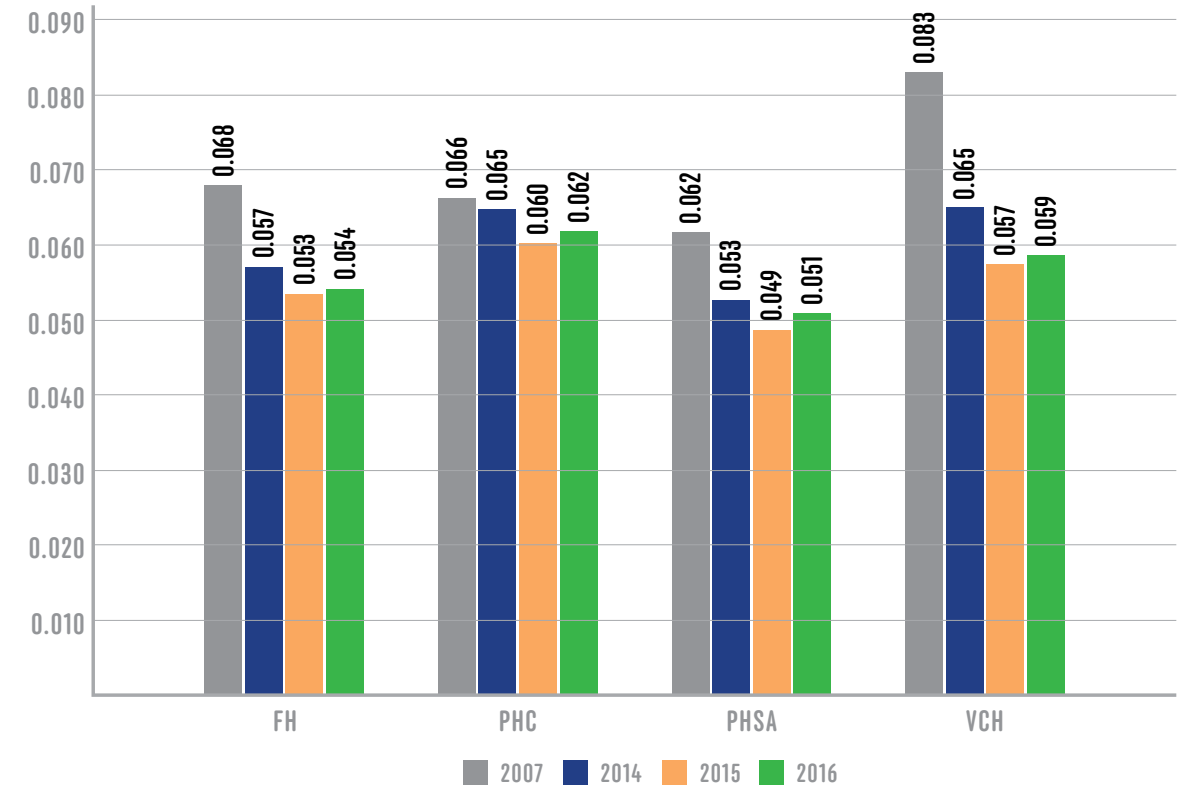
Though the Provincial government has established a sector-wide 33% reduction target on absolute emissions, the LMHOs decided, due to the growing population based being served and thus the need for more health care facilities, this target is more correctly associated with an intensity indicator. Since the 2007 baseline, all four LMHOs have experienced significant decreases in GHG emissions intensity.

To date the LMHOs have focused on reducing GHG emissions through energy conservation projects (see 2016 performance in Target #1), and by establishing aggressive energy design performance guidelines for new construction projects.

**2017 PLANS**

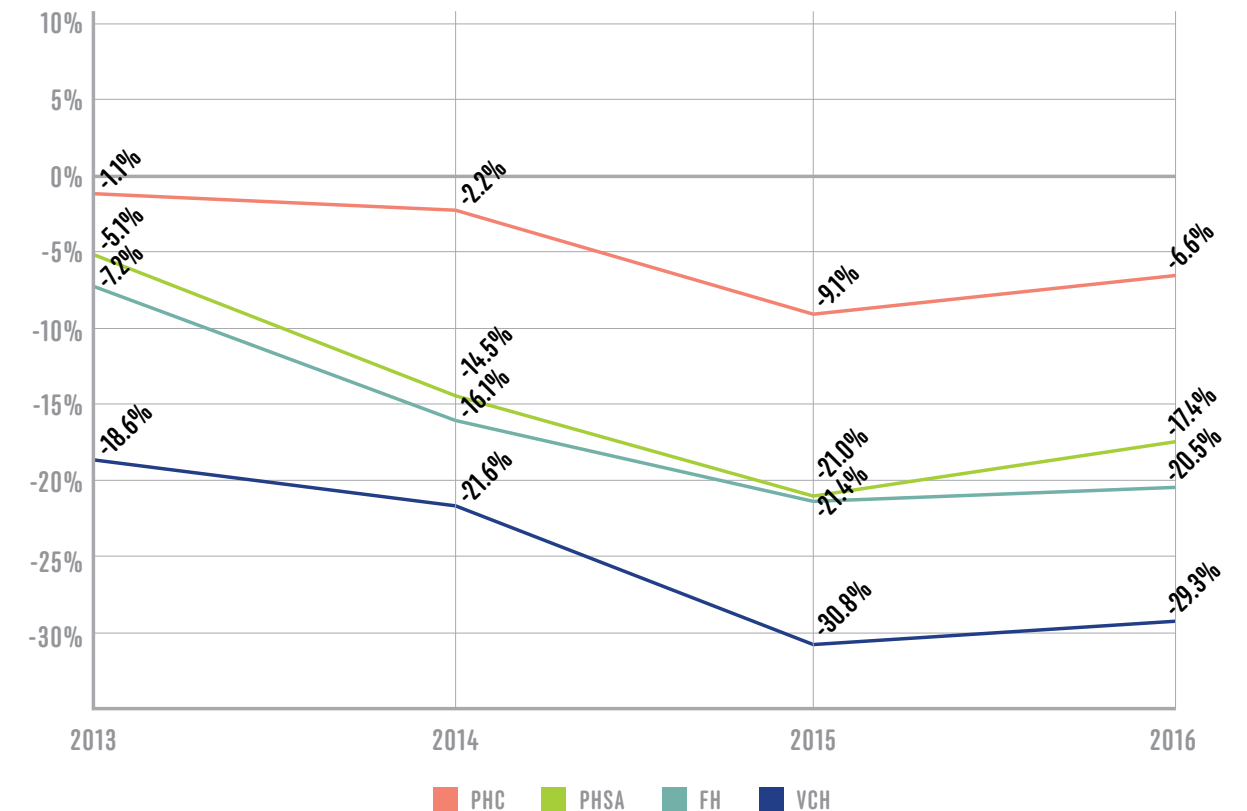
The EES Team will continue to evolve this target with the addition of new projects (as funding is available). Since the CO<sub>2</sub> footprint consists of 97% energy consumption, energy conservation will continue to be the primary objective when reducing the LMHOs’ CO<sub>2</sub> footprint.

**CHART 5: CO<sub>2</sub> Footprint Intensity (tCO<sub>2</sub>e/usable m<sup>2</sup> of facility space)<sup>1</sup>**



<sup>1</sup> The carbon footprint is derived by analyzing the data from all LMHO sites, not just core sites.

**CHART 6: CO<sub>2</sub> Intensity Change from Baseline**





**CHART 7: Building Water Performance Index (BWPI) (m<sup>3</sup>/yr/m<sup>2</sup>)**



**TARGET #4**  
**Reduce water use intensity (WUI) of core sites.**

This target includes a Building Water Performance Index (BWPI) of water use efficiency and performance. A BWPI is determined by multiplying the average daily consumption (cubic meters per day) by 365, then dividing that by the usable facility area (m<sup>3</sup>/yr/m<sup>2</sup>). This results in an “intensity” indicator for usage per cubic metre of facility space per year.

**2020 WATER REDUCTION TARGETS (2010 BASELINE)**

|      |     |
|------|-----|
| FH   | 20% |
| PHC  | 15% |
| PHSA | 10% |
| VCH  | 10% |

**2016 PERFORMANCE**

When managing water and gaining greater water efficiencies, we continue to be challenged by a lack of metering to adequately address potential real-time problems. As well, despite cost increases, the overall cost of water still remains relatively low compared to national standards. This results in long project business case paybacks and correspondingly low approvals for funding of new water conservation projects.

Since the 2010 baseline, Fraser Health’s water use intensity has decreased by 18.5%. This is an exceptional achievement as Fraser Health’s usable core facility space has increased by 21% since 2007.

Providence Health Care achieved a 10.7% reduction in water use intensity. This is largely due to a focus on landscape water use efficiency.

Largely unchanged since 2010, Provincial Health Services Authority experienced a slight increase in water use intensity (3.8%), which corresponded with a major new construction project at BC Children’s Hospital. It is expected that once this project is complete, water intensity data will continue a trend of conservation.

Vancouver Coastal Health achieved a respectful 5.5% decrease in water use intensity. Despite a number of major construction projects at Vancouver General Hospital, they have achieved this decrease due to numerous small projects related to water conservation.

Though the LMHOs continue to implement water conservation improvements, the largest impacts on water conservation are being achieved through replacements and major renovations of large facilities.

**2017 PLANS**

Fraser Health, Providence Health Care and Vancouver Coastal Health are on track to achieving their 2020 targets. While it is expected the water intensity data will normalize after the major construction project at BC Children’s Hospital, it is uncertain if Provincial Health Services Authority will reach their water intensity target by 2020.

All four LMHOs will embark on a detailed analysis of opportunities for replacing once-through cooling units with closed loop units. This, along with landscape water use maintenance, will be key water reduction strategies for the LMHOs. Additional strategies will be implemented as deemed necessary and when aligned with funding.





Above: Bella Bella housing for health care staff.

**GOOD NEWS STORY**  
**PASSIVE HOUSE DESIGN FOR HEALTH CARE**  
**STAFF HOUSING IN BELLA BELLA, B.C.**

In fall 2014, a fire damaged the staff housing complex at R.W. Large Memorial Hospital in Bella Bella, B.C. When rebuilding the complex, Vancouver Coastal Health chose to construct a modular structure to the energy-efficient Passive House standard. As a result, they saved both energy and money, while creating a comfortable housing complex for their dedicated staff.

**Saving Energy**

Passive House buildings typically consume about 80% less energy than traditional construction due to an ultra-efficient building envelope that stays cool in summer and warm in winter. This technology becomes even more significant in remote communities like Bella Bella, which burn diesel fuel to generate electricity, producing far more GHG emissions than hydro-produced energy.

**Saving Funds**

The project team assembled the modular units in Agassiz, B.C., shipped them by barge 700km up the coast to Bella Bella, and finished assembly on site. The project was completed at a cost of \$2.6 million – about \$500,000 less than it would have cost to construct the development on site (due to the remote location).

**Saving Heat**

On the coldest day of the year, each unit in this complex will have a peak heating load of about 600w. This means the entire unit is heated with the equivalent of the heat generated from six 100w light bulbs. No additional heating (e.g., a furnace or boiler) is required. All the air in the building is replaced every three hours or less, and 92% of the heat in that air is recovered and transferred to fresh air. Thanks to the insulation, as well as outstanding sealing and ventilation, the heat of the sun—or even the body heat of the people inside—is enough to keep a Passive House comfortable year-round.


**Making Innovation Accessible**

This innovative project is an excellent example of how high-quality, energy-efficient buildings can be made to work in remote communities. On a long-term basis, this building will use 75%–80% less energy and produce 80% fewer GHG emissions than a similar-sized standard building.



**ZERO WASTE & TOXICITY:  
 THE LINK TO HEALTH AND WELLNESS OUTCOMES<sup>6</sup>**

→ Reducing waste and chemicals in health care leads to better health outcomes. Reducing strain on landfills and incinerators also reduces serious health impacts such as respiratory and gastrointestinal disease, and mental and physiological stress, as a result of soil, air and water contamination and emission of green-house gases. Similarly, reducing the chemical make-up of products used in the health care system and supporting operations can reduce the risk of asthma, birth defects, cancer and other health problems.



**OUR GOAL**  
 Minimize waste generated and toxic chemicals used by the health care system and supporting operations.

The LMHOs recognize the importance of reducing material and food waste, and minimizing the use of toxic chemicals. Achieving Zero Waste and Toxicity is about responsible waste management processes; recycling, reuse and reduction of materials through changes to operational processes; and environmentally preferable purchasing of supplies and equipment.

Waste generated by LMHO facilities can be divided into three general categories:

- **Biomedical waste:** Health care related waste generated during the diagnosis or treatment of human beings, as well as related research activities and the production/ testing of biologicals.
- **Garbage:** Refers to solid waste that is not hazardous, recyclable or compostable, and is not banned from landfill/incineration. It includes various medical items such as gloves, empty IV bags, as well as non-medical items such as coffee cups and paper towels.
- **Recycling:** Refers to a select amount of waste that can be sent to vendors for reprocessing, including mixed paper, mixed containers, cardboard, confidential paper, organics, electronic waste, scrap metal, wood and batteries. Recycling vendors do not currently accept some medical items made from recyclable materials, even when clean or unused, because of the perception that they are unsafe to handle.

**TARGET #5:  
 Increase waste diversion rates at existing acute and residential health care sites.**

| 2020 WASTE DIVERSION TARGETS |     |
|------------------------------|-----|
| FH                           | 50% |
| PHC                          | 50% |
| PHSA                         | 50% |
| VCH                          | 50% |

The waste diversion rate is the percentage of recyclable and organic waste diverted from landfill/incineration but does not include biomedical material. The calculation is based on a combination of actual and averaged weights, not including biomedical waste. Note: This is a revised target. Prior to 2016, the LMHO waste diversion target for hospitals and residential care sites was aligned with Metro Vancouver's all-sector target of 70%. We recognized that a 70% target was unattainable without the inclusion of construction waste data, so the target was revised to 50%. A related but separate target for new health care construction waste was developed (see Target #6).

<sup>6</sup> World Health Organization (2015) Safe Management of wastes from health-care activities: [http://www.searo.who.int/srilanka/documents/safe\\_management\\_of\\_wastes\\_from\\_healthcare\\_activities.pdf?ua=1](http://www.searo.who.int/srilanka/documents/safe_management_of_wastes_from_healthcare_activities.pdf?ua=1)  
 Environment and Climate Change Canada. Municipal Solid Waste and Greenhouse Gases: <http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=6f92e701-1> [Accessed: August 2, 2017]  
 Healthier Hospitals Safer Chemical Challenge: <http://healthierhospitals.org/hhi-challenges/safer-chemicals> [Accessed: August 2, 2017]  
 Canadian Council of Ministers of the Environment (CCME). 2006. A protocol for the derivation of environmental and human health soil quality guidelines. Canadian Council of Ministers of the Environment. Available at: [http://www.ccm.ca/assests/pdf/soil\\_gdln\\_prtcl\\_e/pd](http://www.ccm.ca/assests/pdf/soil_gdln_prtcl_e/pd)

- 2016 GreenCare Scorecard
- About This Report
- The LMHOs: Who We Are
- The EES Team: Who We Are
- What is GreenCare?
- GreenCare Sustainability Strategic Framework
- Greencare Milestones and Awards
- GreenCare Strategy
  - Smart Energy & Water
  - Zero Waste & Toxicity**
  - Regenerative Design
  - Active & Clean Transportation
  - Culture Change
- Assurances and Resources



CHART 8: Waste Diversion Rates (Recyclables & Organics)<sup>1</sup>

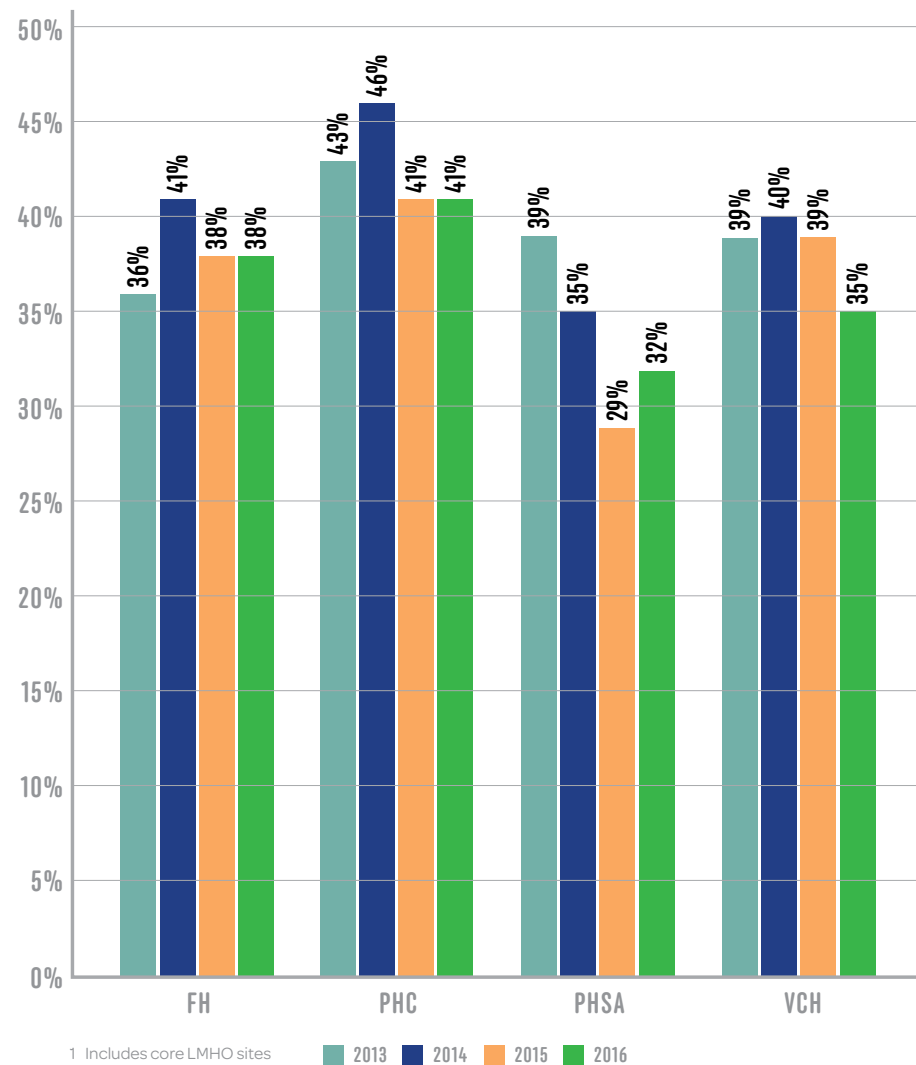
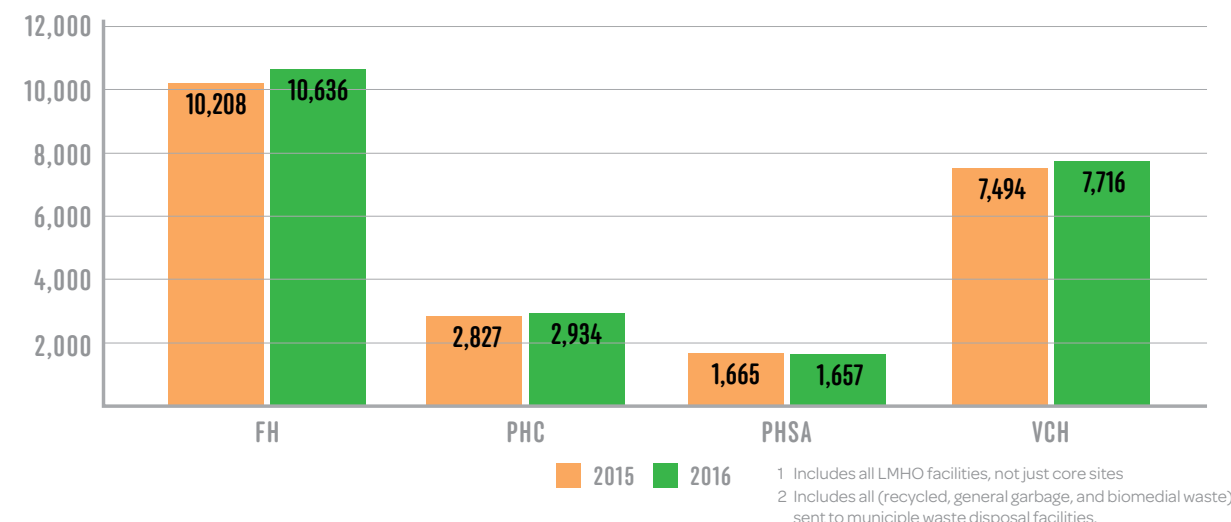


CHART 10: Total Material Waste (tonnes)<sup>1,2</sup>



2016 PERFORMANCE

In 2016, the LMHOs collectively produced 22,943 tonnes of material waste including recyclables, garbage and biomedical waste. All health authorities increased total material waste slightly from 2015, with the exception of Provincial Health Services Authority.

In 2016, Provincial Health Services Authority improved their waste diversion rate by 3% (from 29% in 2015, to 32% in 2016). Vancouver Coastal Health decreased waste diversion by 4% (from 39% in 2015, to 35% in 2016). Both Fraser Health's (38%) and Providence Health Care's (41%) waste diversion rates remained the same in 2016. Providence Health Care continues to have the highest waste diversion rate of all the LMHOs.

Over the years, we have noted variations in diversion rates that can be attributed to:

- Addition of mixed paper and mixed container recycling bins from 2010 to 2016
- Changes and adjustments to the method of measurement
- Discontinuation of soft plastics recycling in 2014
- Addition of organics bins in hospital cafeterias in 2015-16
- Changes in products used in patient care and support services
- Renovations and new construction at health care sites

We are reviewing LMHO waste diversion trends to better understand variations among hospitals, and to identify practices that will support increased diversion rates. At the same time, we are exploring new indicators that will help increase staff ownership of the recycling program.

In 2016, staff compliance with waste segregation was analyzed using a VCH Human Factors analysis. Moving forward, we will use recommendations to develop strategies to strengthen and sustain the program.

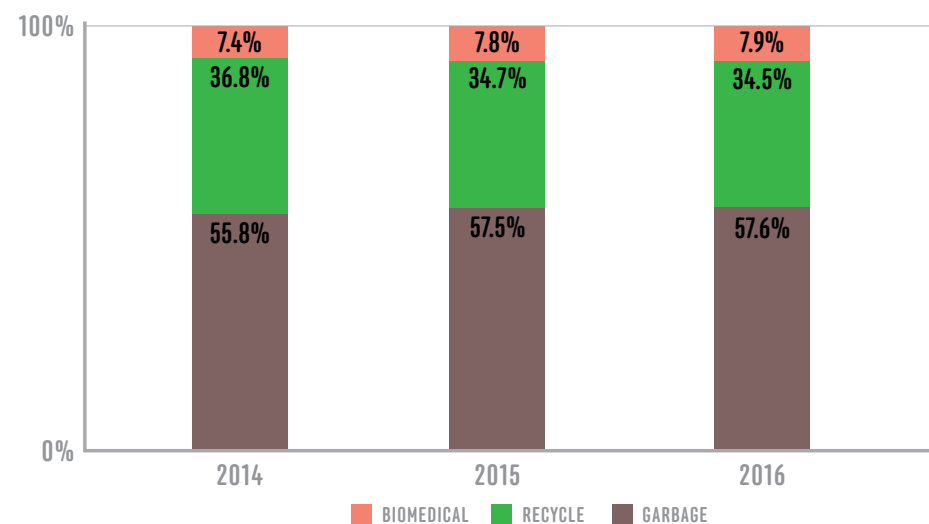
2017 PLANS

Upon the completion of the waste diversion implementation and based on the findings from our VCH Human Factors analysis, the LMHOs will turn their efforts to improving and increasing access to educational training, resources and information, increasing site level ownership, and reviewing clinical needs for more relevant signage and equipment.

In comparison to industry standards, average waste diversion rates for the Ontario Hospital Association<sup>7</sup> range from 20% to 44%, with an overall average of 31%. The LMHOs are currently meeting industry standards but intending to go beyond that to achieve 50% diversion rates by 2020.

<sup>7</sup> OHA. 2015. Greening Health Care Sector Report: Waste Management.

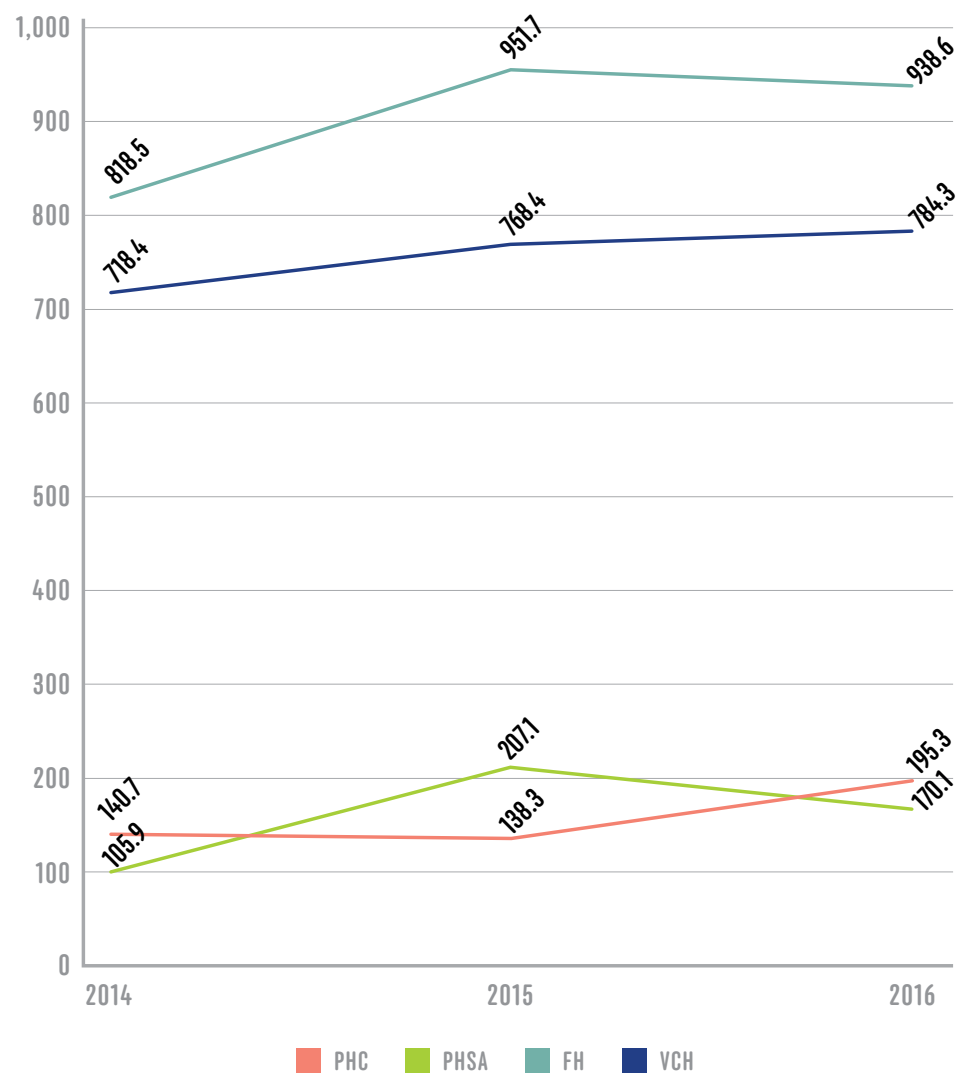
CHART 9: Waste Proportions for LMHO-owned Facilities<sup>2</sup>



<sup>2</sup> Includes all LMHO facilities, not just core sites.



CHART 11: Total Organics Recycling Weight (tonnes)<sup>1</sup>



<sup>1</sup> Includes core LMHO sites.

**TARGET #6**

**Increase waste diversion rates for all new health care construction projects.**

The reported construction waste diversion rate is the percentage of recyclable and organic waste diverted from landfill/incineration. The calculation is based on actual weights as noted in waste disposal invoices and tracked for LEED credits.

**2020 WASTE DIVERSION TARGETS**

|      |     |
|------|-----|
| FH   | 80% |
| PHC  | 80% |
| PHSA | 80% |
| VCH  | 80% |

Diverting construction waste not only reduces the LMHOs' waste footprint, but it also ensures compliance with Metro Vancouver and regional bans at landfills and waste disposal facilities, potentially reduces the costs of waste disposal, and supports LEED certification of our health care facilities.

**2016 PERFORMANCE**

Historically, waste diversion rates of health care construction projects were inconsistently reported. In 2016 steps were taken to contact all new construction projects and identify waste diversion practices and rates. Due to the fact that all new construction projects have been, to date, designed to achieve LEED Gold certification, construction waste diversion rates have been consistently high. But challenges remained with inconsistencies in data reporting.

**2017 PLANS**

Starting in 2017, new construction waste diversion rates will be reported on a quarterly basis.

**TARGET #7**

**Decrease food scraps in the garbage waste stream.**

A few years back, the LMHOs conducted solid waste audits to measure food waste in the garbage stream. The proportion of food waste ranged from 5-29%. At Provincial Health Services Authority, only BC Children's and Women's Hospital was audited, revealing 9% of their garbage contained food scraps. At Fraser Health, audits were undertaken at five facilities, revealing 9.7% food waste. And at Vancouver Coastal Health, five facilities were audited, showing 16%. No audits were undertaken at Providence Health Care.

By decreasing food scraps/organics in the garbage waste stream, the LMHOs will reduce both methane gas contributions and pressure on landfills. This target is also key to complying with a Metro Vancouver ban on food scraps in landfill.

**2020 FOOD SCRAP REDUCTION TARGETS**

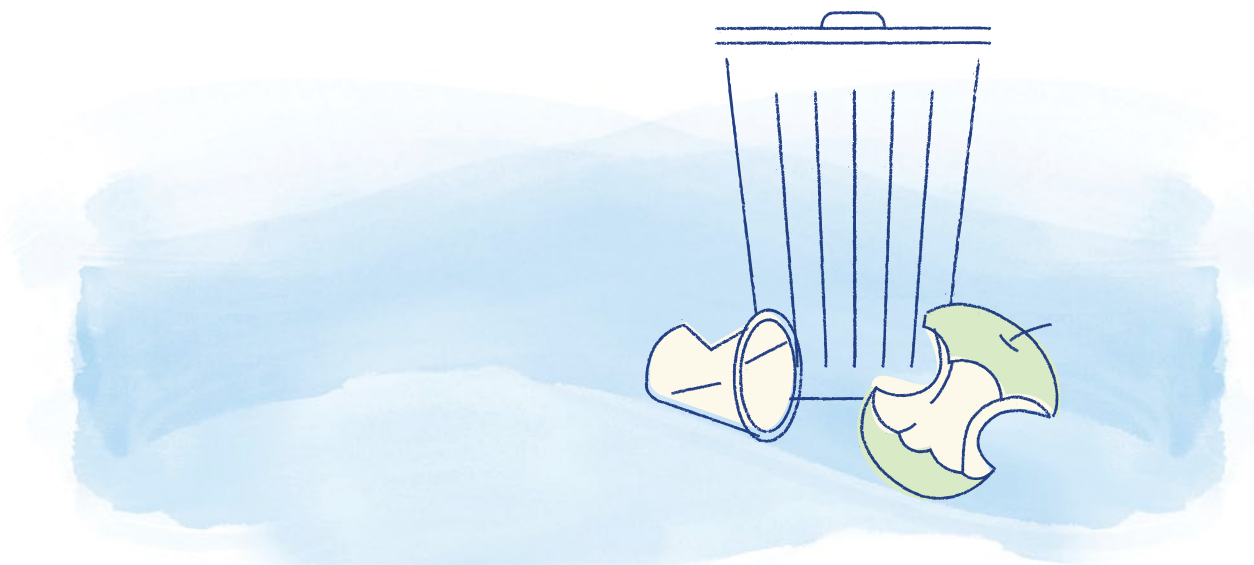
|      |     |
|------|-----|
| FH   | <5% |
| PHC  | <5% |
| PHSA | <5% |
| VCH  | <5% |

**2016 PERFORMANCE**

Work was conducted in 2016 to identify opportunities for organics waste diversion in LMHO hospitals and residential care sites.

**2017 PLANS**

In fall 2017, organics waste diversion programs will expand to include on-site retail coffee vendors. Staff will also be given opportunities to initiate their own organics collection programs in staff dining areas.





**TARGET #8**

Develop and implement a strategy to reduce overall waste production from acute and residential care operations.

**2020 WASTE REDUCTION STRATEGY IMPLEMENTATION TARGETS**

|      |     |
|------|-----|
| FH   | Yes |
| PHC  | Yes |
| PHSA | Yes |
| VCH  | Yes |

(When this strategy is implemented in 2020, it will provide information for setting a 2030 target.)

**2016 PERFORMANCE**

In 2016 initial steps were taken to analyze gaps and challenges with the current processes and results. This information will provide a basis for setting new strategies for waste reduction.

**2017 PLANS**

Research into clinical waste generation and disposal strategies will initiate in 2017. Staff interviews, unit observations and waste audits will inform the development of any new strategies.

It should be noted that recycling is one of a number of strategies that lead to increased waste diversion from landfill/incineration. We will also look at how health care operations, processes and purchases, affect waste diversion rates. In addition, we will identify opportunities to reduce waste production.

**TARGET #9**

Develop and implement a strategy to reduce toxins from products used in acute and residential care operations.

Chemicals are used in health care practices for a variety of reasons: to treat patients (pharmaceuticals and aesthetic agents); to clean, disinfect and sterilize surfaces and supplies (cleansers/disinfectants); and to kill insects and other pests (pesticides).

Though a vast majority of chemicals found in health care products and services are deemed completely safe for human and environmental health, the LMHOs recognize that to support the health of staff and clients, they must continually analyze current practices and take steps to reduce unnecessary use of chemicals. We must also ensure correct disposal of chemical substances, and work to reduce toxins where appropriate.

This target is intended to help the LMHOs go beyond compliance, and to identify current best practices and safer alternatives for health care products and practices, to avoid unnecessary use of chemicals.

**2020 TOXIN REDUCTION STRATEGY IMPLEMENTATION TARGETS**

|      |     |
|------|-----|
| FH   | YES |
| PHC  | YES |
| PHSA | YES |
| VCH  | YES |

(When this strategy is implemented in 2020, it will provide information for setting 2030 targets.)

**2016 PERFORMANCE**

This is a new target. To date, the LMHOs have been compliant with all chemical regulations and health recommendations.

**2017 PLANS**

In 2017, we will commence research into toxins generated in acute and residential care operations. Staff interviews, unit observation and waste audits will inform the development of the strategy.



Left: Teri Guimond of Business Initiatives & Support Services (BISS) gives a presentation to educate staff on waste management.



## The Recycling Renewal Program is now at all Lower Mainland hospitals and residential care sites!



*We did it!*

### GOOD NEWS STORY RECYCLING RENEWAL PROGRAM COMPLETE

We are excited that, in 2016, we completed the roll-out of our Recycling Renewal Program (RRP) at 100% of our core health care sites (57 sites) across the LMHOs. This achievement is the culmination of a six-year program to implement recycling across B.C.'s Lower Mainland health care sites.

Initiated as a pilot in 2009, the RRP covers an LMHO-wide coordinated effort to reduce recyclable materials and organics sent to landfill. Over the last several years, standardized recycling bins have been rolled out at hospitals and residential care sites in the region, enabling staff, patients and visitors to recycle paper, plastic, metal containers and organics.

Over 500 recycling champions were recruited, helping to educate fellow staff, and to inform placement of recycling bins, signage and resource materials.

Our thanks go out to our recycling champions, and LMHO staff, for helping us continue to reduce waste across our sites.

2016 GreenCare Scorecard

About This Report

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Greencare Milestones and Awards

GreenCare Strategy

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## REGENERATIVE DESIGN



### OUR GOAL

Achieve a “net-positive” built environment that is climate resilient and enriches health and wellness.

Regenerative Design refers to the creation of sustainable and resilient built environments that enhance the health and wellness of building occupants. For the LMHOs, there are two components to regenerative design: a net-positive environment, and climate resilience.

Unlike other GreenCare topic areas, the outcomes of Regenerative Design are not quantitative in nature. Instead, Regenerative Design consists of an iterative process in which we consistently seek to create healthy environments that are resistant to the negative effects of climate change.

## REGENERATIVE DESIGN: THE LINK TO HEALTH & WELLNESS OUTCOMES

→ In the short term, sustainable design efforts (largely through LEED certification) can positively influence air quality, thermal comfort and acoustic properties. These can positively impact occupants’ physical health, comfort and mental well-being.

Climate change resiliency goes further by ensuring services and environments are not disrupted or negatively impacted by climate-related events (e.g., extreme heat, wildfires, floods).

Longer term, as we evolve towards a regenerative built environment, buildings will integrate natural systems back into human systems, providing cleaner air, cleaner water and healing environments that reduce climate risks and increase resilience.

### NET-POSITIVE

The design and operation of a net-positive facility goes well beyond a reduction in environmental impact; it also enhances the positive impacts of the facility for staff and clients (e.g., natural daylight, access/views to green space, fresh air).<sup>8</sup>

### CLIMATE RESILIENCE

Climate Resilience is an emerging field impacting facility design and operations. The goal is to ensure existing buildings are resilient to climate risks and impacts, and new buildings incorporate low carbon resilient design.<sup>9</sup>

### TARGET #10

**Ensure all new construction projects achieve performance-based requirements aligned with resilience and regenerative principles (a minimum of LEED Gold for Healthcare).**

#### 2020 REGENERATIVE STANDARDS TARGET

|      |      |
|------|------|
| FH   | 100% |
| PHC  | 100% |
| PHSA | 100% |
| VCH  | 100% |

### 2016 PERFORMANCE

In 2016, the EES Team focused on integrating regenerative and climate resilient design principles and performance standards into their Energy & Environmental Sustainability Design Guidelines. These guidelines will be used by planners, designers and architects when developing health care facilities for LMHOs.

In addition, significant progress was made in building a foundation to address climate risks and impacts to health and service delivery in the next decades.

By taking a pragmatic approach to expanding adaptation options at the health facility level, and exploring innovative collaborations with thought leaders, GreenCare is positioning itself to develop robust organization-level plans aligned with the 2016 B.C. Climate Leadership Plan.

### 2017 PLANS

In 2017, the EES Team will continue to refine their design guidelines with project planners and architects to ensure regenerative and climate resilient design features are integrated into all new construction and major renovation projects.

<sup>8</sup> <http://www.net-positive.org/our-story/what-is-netpositive/>

<sup>9</sup> <http://www.wri.org/our-work/topics/climate-resilience>



# LEED Projects – Lower Mainland Health Care Organizations (LMHOs)

(Certified by the Canadian or United States Green Building Council)

● FH Fraser Health  
● PHC Providence Health Care  
● PHSA Provincial Health Services Authority  
● VCH Vancouver Coastal Health

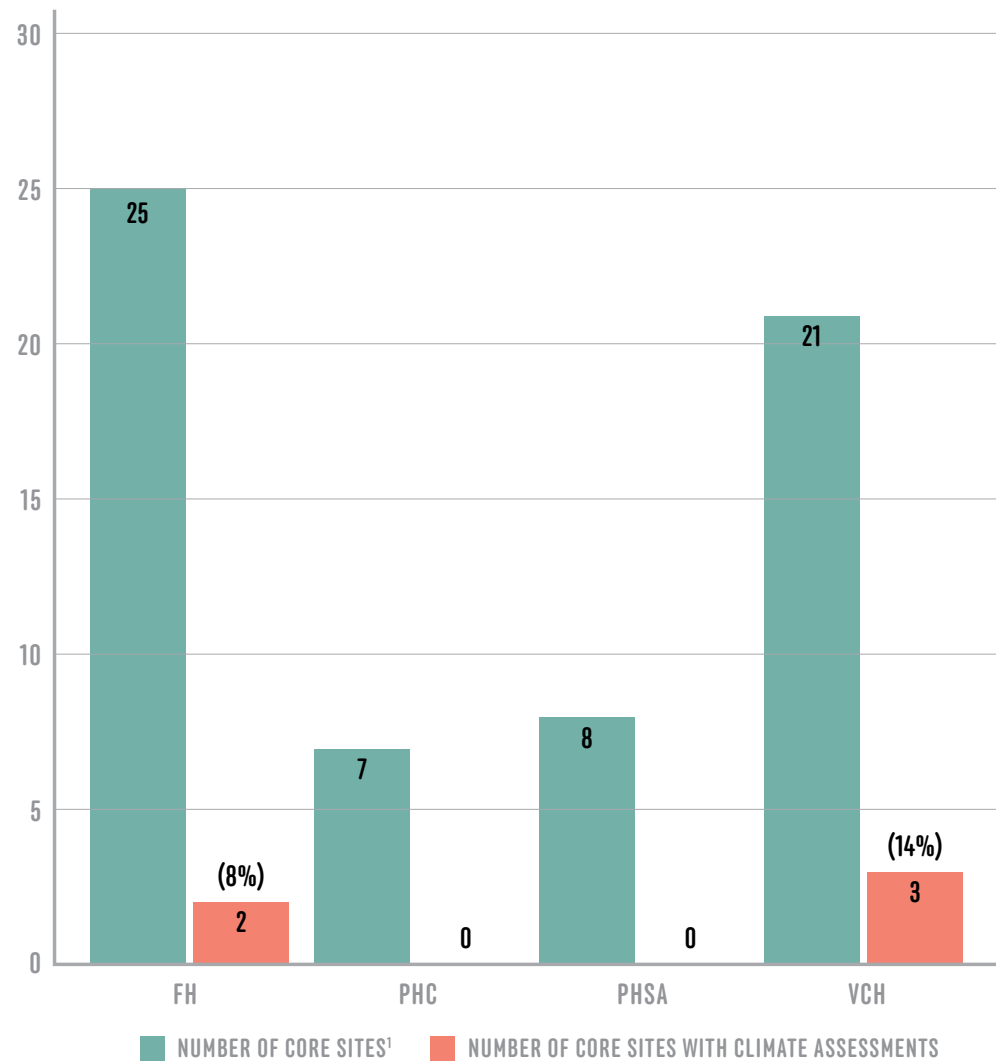
● 13 GOLD  
● 2 SILVER  
● 5 CERTIFIED  
● 9 TBD

29 TOTAL

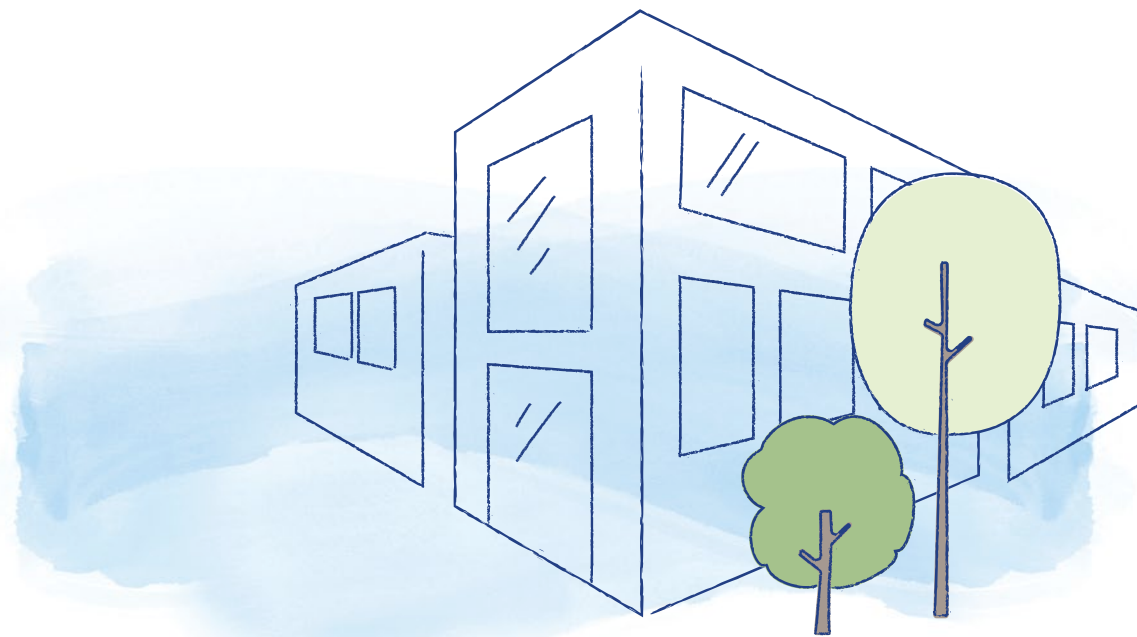
| LMHO | Site Name                                                                  | Site City        | Rating System                                   | Project Size (M <sup>2</sup> ) | Project Type                        | LEED Certification Date | Certification Level                              |
|------|----------------------------------------------------------------------------|------------------|-------------------------------------------------|--------------------------------|-------------------------------------|-------------------------|--------------------------------------------------|
| FH   | Czorny Alzheimer Centre                                                    | Surrey           | LEED NC: New Construction and Major Renovations | 6,280                          | Hospital/Clinic                     | 2010-03-19              | Certified <span style="color: #4682B4;">●</span> |
| FH   | Abbotsford Regional Hospital and Cancer Centre                             | Abbotsford       | LEED NC: New Construction and Major Renovations | 21,677                         | Laboratory                          | 2009-09-10              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | Cottonwood Lodge - A Fraser Health Residential Mental Health Facility      | Coquitlam        | LEED NC: New Construction and Major Renovations | 2,319                          | Office building                     | 2007-09-14              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | CareLife Maple Ridge                                                       | Maple Ridge      | LEED NC: New Construction and Major Renovations | 60,000                         | Hospital/Clinic                     | 2008-12-17              | Silver <span style="color: #808080;">●</span>    |
| FH   | Creekside Withdrawal Management Centre                                     | Surrey           | LEED NC: New Construction and Major Renovations | 9,777                          | Nursing home/Extended care facility | 2012-10-11              | Certified <span style="color: #4682B4;">●</span> |
| FH   | Good Samaritan Canada, Victoria Heights Assisted Living                    | New Westminster  | LEED NC: New Construction and Major Renovations | 8,668                          | Mixed-use                           | 2010-06-23              | Certified <span style="color: #4682B4;">●</span> |
| FH   | Jim Pattison Outpatient Care & Surgery Centre                              | Surrey           | LEED NC: New Construction and Major Renovations | 2,415                          | Hospital/Clinic                     | 2012-09-19              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | Maxxine Wright Place                                                       | Surrey           | LEED NC: New Construction and Major Renovations | 5,226                          | Nursing home/Extended care facility | 2012-10-11              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | Chilliwack Hospital Redevelopment                                          | Chilliwack       | LEED NC: New Construction and Major Renovations | 4,406                          | Mixed-use                           | 2011-04-19              | Certified <span style="color: #4682B4;">●</span> |
| FH   | Czorny Alzheimer Centre - Phase 2                                          | Surrey           | LEED NC: New Construction and Major Renovations | 5,035                          | Hospital/Clinic                     | 2013-04-22              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | Surrey Memorial Hospital Critical Care Tower                               | Surrey           | LEED NC: New Construction and Major Renovations | 3,158                          | Nursing home/Extended care facility | 2014-11-26              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | Cypress Lodge CTR                                                          | Coquitlam        | LEED NC: New Construction and Major Renovations | 1,371                          | Nursing home/Extended care facility | TBD                     | TBD                                              |
| FH   | Mission Community Health Project - Complex Residential Care                | Mission          | LEED NC: New Construction and Major Renovations | 12,428                         | Nursing home/Extended care facility | 2015-07-20              | Gold <span style="color: #FFD700;">●</span>      |
| FH   | Delta Hospital Lab & Medical Imaging Expansion Project                     | Delta            | LEED NC: New Construction and Major Renovations | 1,770                          | Hospital/Clinic                     | TBD                     | TBD                                              |
| FH   | Royal Columbian Hospital Redevelopment Project - Phase One                 | New Westminister | LEED BD+C: Healthcare v4                        | 18,115                         | Hospital/Clinic                     | TBD                     | TBD                                              |
| PHC  | St. Paul's Hospital 9A Mental Health Unit (Providence Health Care Society) | Vancouver        | LEED ID+C: Commercial Interiors                 | 799                            | Hospital/Clinic                     | 2006-11-09              | Certified <span style="color: #4682B4;">●</span> |
| PHC  | PHC BCCFE West Wing Renovation                                             | Vancouver        | LEED ID+C: Commercial Interiors                 | 636                            | Hospital/Clinic                     | TBD                     | TBD                                              |
| PHSA | BC Cancer Research Centre                                                  | Vancouver        | LEED NC: New Construction and Major Renovations | 4,470                          | Hospital/Clinic                     | 2005-07-22              | Gold <span style="color: #FFD700;">●</span>      |
| PHSA | Child, Adolescent and Women's Mental Health Building                       | Vancouver        | LEED NC: New Construction and Major Renovations | 6,280                          | Hospital/Clinic                     | 2011-11-03              | Silver <span style="color: #808080;">●</span>    |
| PHSA | British Columbia Cancer Agency Centre for the North                        | Prince George    | LEED NC: New Construction and Major Renovations | 3,278                          | Hospital/Clinic                     | 2014-06-19              | Gold <span style="color: #FFD700;">●</span>      |
| PHSA | BC Children's & BC Women's Redevelopment Project Clinical Support Building | Vancouver        | LEED NC: New Construction and Major Renovations | 5,300                          | Hospital/Clinic                     | 2013-06-20              | Gold <span style="color: #FFD700;">●</span>      |
| PHSA | BC Children's and Women's Health Centre Child Care Center                  | Vancouver        | LEED NC: New Construction and Major Renovations | 7,000                          | Daycare                             | 2015-03-17              | Gold <span style="color: #FFD700;">●</span>      |
| PHSA | Children's and Women's Redevelopment Project - Teck Acute Care Centre      | Vancouver        | LEED NC: New Construction and Major Renovations | 55,000                         | Hospital/Clinic                     | TBD                     | TBD                                              |
| VCH  | St. Mary's Hospital                                                        | Sechelt          | LEED NC: New Construction and Major Renovations | 5,300                          | Hospital/Clinic                     | 2014-01-13              | Gold <span style="color: #FFD700;">●</span>      |
| VCH  | Lions Gate Hospital - HOpe Centre                                          | North Vancouver  | LEED NC: New Construction and Major Renovations | 8,986                          | Hospital/Clinic                     | 2016-04-15              | Gold <span style="color: #FFD700;">●</span>      |
| VCH  | Joseph and Rosalie Segal Family Centre                                     | Vancouver        | LEED NC: New Construction and Major Renovations | 12,251                         | Hospital/Clinic                     | TBD                     | TBD                                              |
| VCH  | Creekstone Residential Care Facilities                                     | North Vancouver  | LEED NC: New Construction and Major Renovations | 13,354                         | Nursing home/Extended care facility | TBD                     | TBD                                              |
| VCH  | Hamilton Village Residential Care Facility                                 | Richmond         | LEED NC: New Construction and Major Renovations | 8,200                          | Nursing home/Extended care facility | TBD                     | TBD                                              |
| VCH  | Silverstone Residential Care & Hospice Facility                            | Sechelt          | LEED NC: New Construction and Major Renovations | 8,600                          | Nursing home/Extended care facility | TBD                     | TBD                                              |



CHART 12: Climate Resilience Assessments



<sup>1</sup> Includes all energy, water, and waste monitored (core) LMHO health care acute and residential care facilities.



**TARGET #11**

**Complete climate resilience assessments for all core sites.**

Before commencing our pilot resilience assessments, we reviewed all available health care-specific tools for assessing sites' preparedness for climate shocks and stresses. We selected the Sustainable and Climate Resilient Health Care Facilities toolkit (based in part on the Canadian Coalition for Green Healthcare's Health Care Climate Change Resiliency Toolkit), and modified this tool to B.C.'s context.

**2020 CLIMATE RESILIENCE ASSESSMENTS TARGET**

|      |     |
|------|-----|
| FH   | 50% |
| PHC  | 50% |
| PHSA | 50% |
| VCH  | 50% |

**2016 PERFORMANCE**

In 2016, preliminary work was conducted on climate resilience assessments at five different health care facilities across the LMHOs. Neither Providence Health Care nor Provincial Health Services Authority completed any climate resilience assessments in 2016.

**2017 PLANS**

The LMHOs are committed to assessing 50% of their facilities by 2020. In 2017, the EES team plans to continue working with the LMHOs in establishing final climate resilience assessments at various sites. In addition, work will be conducted to identify strategic external partners to collaborate with in creating more climate resilient health care facilities.

**TARGET #12**

**Produce site-level climate resilience plans for all core sites.**

Climate resilience plans are intended to outline specific measures to reduce climate risks and increase resilience, synergies with emissions reduction and sustainability measures, and co-benefits for human and environmental health.

**2020 SITE-LEVEL CLIMATE RESILIENCE PLAN TARGETS**

|      |     |
|------|-----|
| FH   | 10% |
| PHC  | 10% |
| PHSA | 10% |
| VCH  | 10% |

**2016 PERFORMANCE**

The EES Team continued to fine-tune the climate resilience assessment and stakeholder engagement process. As this process evolves, the EES Team will be in a better position to define and begin work on site-level climate resilience plans.

**2017 PLANS**

The EES Team will continue to review climate resilience assessment processes while maintaining a dialogue with key stakeholders across health care.



## GOOD NEWS STORY BUILDING RESILIENCY THROUGH INTEGRATION AND COLLABORATION

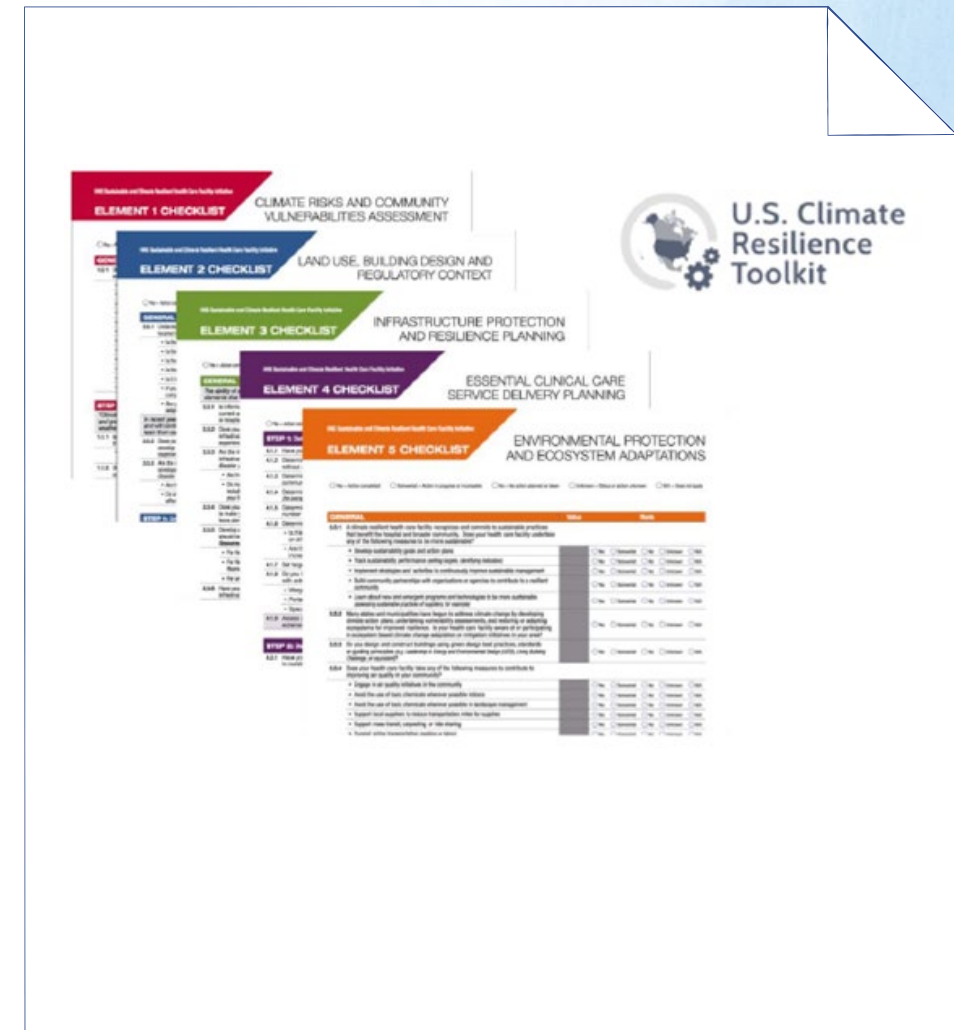
Like our work in sustainability, we believe our climate resilience efforts will make the most progress when we collaborate and work with other organizations and agencies.

By collaborating with federal and provincial agencies, including Health Canada, the B.C. Climate Action Secretariat and B.C. Housing, we have leveraged experience and expertise beyond our service borders to develop an informed and iterative approach to strengthening hospital and organization level resilience. At the same time, our program is a gateway to better understanding lived experiences, and

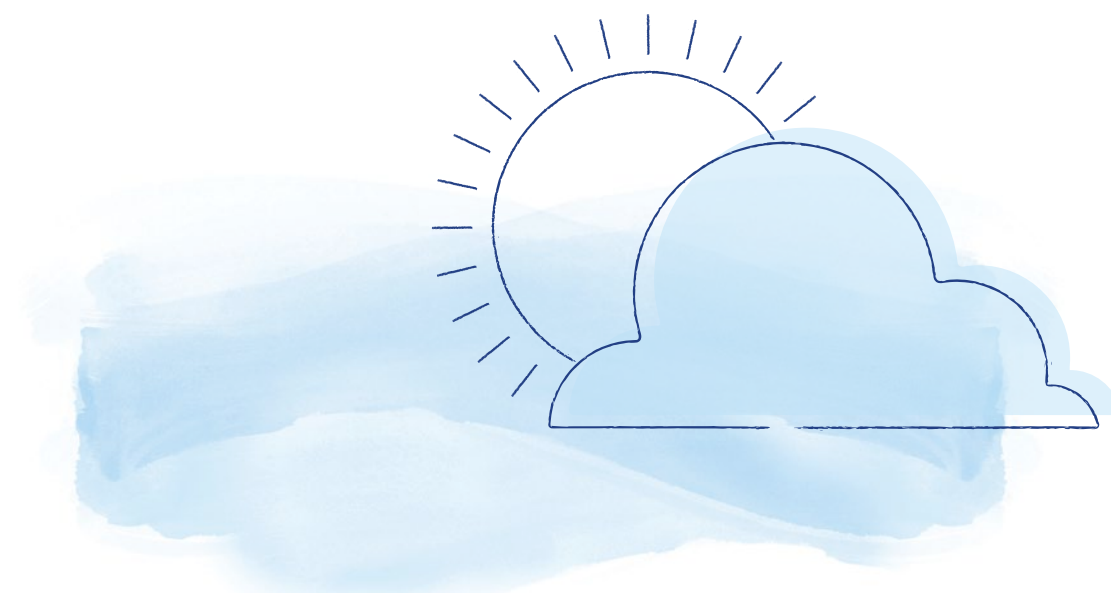
to developing new tools and resources, on local and regional levels that may be scaled-up for broader impact.

Similarly, the Canadian Coalition for Green Health Care (CCGHC) and Health Care Without Harm (HCWH) bring together forward-thinkers and future champions in sustainability and resilience, through mentorship, capacity building and knowledge-sharing. In this context, our respective programs and initiatives are continually challenged and enriched while creating positive cascading impacts within the health sector.

**Key Resource: Primary Protection: Enhancing Health Care Resilience for a Changing Climate**, published by the U.S. Department of Health and Human Services in 2014.  
<https://toolkit.climate.gov/topics/human-health/building-climate-resilience-health-sector>



Above: The U.S. Climate Resilience Toolkit is one possible resource for doing assessments.





## ACTIVE & CLEAN TRANSPORTATION



### OUR GOAL

Ensure LMHO employees commute/travel between sites in a manner that reduces GHG-related pollutants, minimizes the need for onsite parking, and increases overall health and wellness.

Each day, thousands of LMHO staff commute to and from work via single occupancy vehicles (SOVs).

The LMHOs recognize the environmental and personal health impact from SOV commuting. According to the iCANwalk's Canadian Vehicle Survey, the average vehicle emits four tonnes of CO<sub>2</sub> per year. If LMHO staff were to commute to work one day a week in an active and clean manner (e.g., bicycling, walking), the EES Team estimates that 3,000 fewer tonnes of CO<sub>2</sub> would enter the environment.

We are committed to supporting staff to commute and travel between sites in an active and clean manner. This includes bicycling, walking, using a shuttle, carpooling and transit use. In addition (though not necessarily recognized as support for "active" transportation), LMHOs are installing electric vehicle charging stations to encourage the use of electric vehicles and help reduce air pollution.

### TARGET #13:

**Increase health care staff who commute via clean and healthy means (i.e., not single occupancy vehicles).**

Due to their CO<sub>2</sub> production and the physical inactivity of the occupant, SOVs are considered the unhealthiest option for commuting. (The EES Team makes exceptions for electric and hybrid SOVs as they dramatically reduce or eliminate their negative impact on the environment. However, since they promote a level of inactivity, they are the least favourable option compared to walking, bicycling or even taking transit or carpooling.)

This target is a measure of the percentage of time staff commute via clean and healthy means (e.g., bicycling, walking, transit, carpooling).

#### 2020 HEALTHY COMMUTE TARGETS 2016 BASELINE

|      |     |
|------|-----|
| FH   | 35% |
| PHC  | 65% |
| PHSA | 60% |
| VCH  | 60% |

#### 2016 PERFORMANCE

In 2016, the Active & Clean Transportation coordinators gained a better understanding of the current commute practices by LMHO staff. Three strategies were used to gather information on current practices: on-site observational studies, on-site written surveys and an organization-wide high-level digital survey.

EES has been measuring staff commuting methods since 2010, and previously created separate targets for various alternative commuting methods. However, due to the uniqueness of each LMHO, we realized it would be far more effective to consolidate the targets into one, and create more individualized approaches for each LMHO. Therefore, in 2016 we conducted research to gain a better understanding of current commute practices. This included on-site observational studies, written surveys and an organization-wide digital survey.

From the results of this research, a new baseline of behaviours was established for each LMHO.

**Fraser Health:** Because the majority of Fraser Health sites are located in smaller, geographically dispersed regions of the Lower Mainland, it is more effective to focus on strategies that encourage staff to take public transit or carpools to work. (Though walking and bicycling are still encouraged, and infrastructure for bicycling will remain, these are not seen as having the highest potential for change.) As of 2016, 26.3% of Fraser Health staff take healthy commutes.

**Providence Health Care:** With only eight core sites in Vancouver, Providence Health Care has a high percentage of staff who take public transit to work. This is considered positive; however, it is determined that there are still opportunities for more staff to cycle or walk to work. As of 2016, 58.2% of Providence Health Care staff take healthy commutes.

**Provincial Health Services Authority:** Though geographically dispersed across B.C., Provincial Health Services Authority's largest sites—BC Children's & Women's Hospital and BC Cancer Agency & Research Centre—are located in Vancouver. The staff of these sites are seen as a key target for encouraging more bicycling/walking to work. As of 2016, 54.3% of Provincial Health Services Authority staff take healthy commutes.

**Vancouver Coastal Health:** Vancouver General Hospital (VGH) is the largest hospital in B.C., and the only health care site with a dedicated cycle centre (with bike racks, repair room, lockers and showers). These staff are seen as a primary target for bicycle and walking initiatives. This health authority also has a number of remote sites (e.g., Bella Bella, Powell River, Pemberton), which have a small but surprisingly strong network of active bicycle commuters. As of 2016, 51.7% of Vancouver Coastal Health staff take healthy commutes.

2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

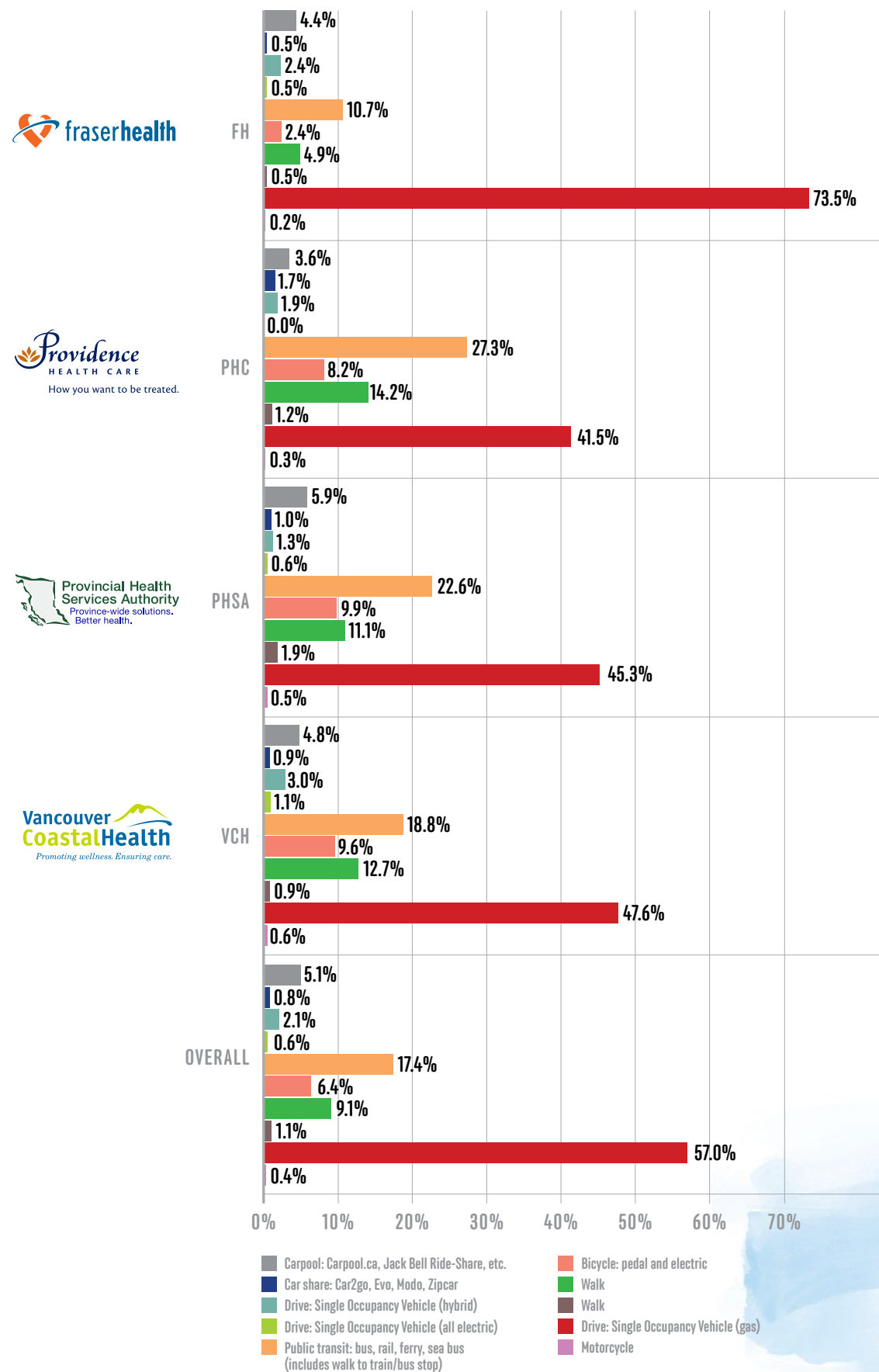
Active & Clean Transportation

Culture Change

Assurances and Resources



CHART 12: Staff Commute: Percentage of Time Per Mode<sup>1</sup>



**2017 PLANS**

The LMHOs will continue to host programs and campaigns—such as the “Clean Commuter and Wellness Campaign” and the BC Bike to Work and Bike Hub sponsored “Bike to Work” campaign—to encourage staff to walk, bicycle, take public transit and carpool.

In addition, more surveys will be conducted to get a clearer picture of site-level behaviours and the associated barriers to committing to healthier options for commuting to work. Once a better sense of behaviours and barriers are identified for each LMHO, strategies can be customized to address them specifically.

**TARGET #14**

**Increase portion of core sites that provide staff with end-of-trip bicycle facilities options.**

End-of-trip facilities (EoTs) refer to storage options for bicycles, and include amenities such as showers, lockers and bike maintenance areas. This target refers to the percentage of health care sites that have adequate EoTs for staff. These facilities must include at least one on-site shower/changing facility, and secure bicycle facilities for a minimum of 5% of on-site staff.

**2020 EOT TARGETS**

|      |     |
|------|-----|
| FH   | 30% |
| PHC  | 30% |
| PHSA | 30% |
| VCH  | 30% |



**2016 PERFORMANCE**

Over the last few years, the LMHOs have renewed their effort to offer EoTs. This is supported by LEED design efforts for new buildings, which specifically include EoTs.

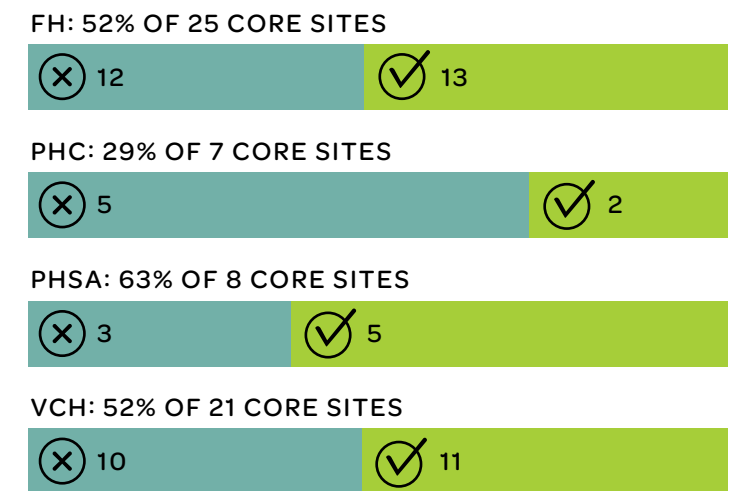
In 2016, the LMHOs conducted an analysis of all core sites to determine what percentage have EoTs. The following results were determined:

**2017 PLANS**

While Fraser Health, Providence Health Care and Provincial Health Services Authority have all achieved this target, the LMHOs will conduct a more robust analysis of EoTs to ensure data accuracy.

In addition, work will continue on establishing EoTs at additional sites.

CHART 13: Number of Health Care Sites with End of Trip (EOT) Bicycle Facilities<sup>1</sup>



<sup>1</sup> Includes all energy, water, and waste monitored (core) lower mainland health care acute and residential care facilities.

- 2016 GreenCare Scorecard
- About This Report
- The LMHOs: Who We Are
- The EES Team: Who We Are
- What is GreenCare?
- GreenCare Sustainability Strategic Framework
- Greencare Milestones and Awards
- GreenCare Strategy
- Smart Energy & Water
- Zero Waste & Toxicity
- Regenerative Design
- Active & Clean Transportation
- Culture Change
- Assurances and Resources





**ACTIVE & CLEAN TRANSPORTATION: THE LINK WITH HEALTH & WELLNESS OUTCOMES**

→ Research continues to highlight the impact of transportation on environment and human health.

In particular, clear evidence shows that cycling and walking reduce health issues such as obesity. Studies also illustrate that the health benefits of cycling outweigh the risks (e.g., accidents).

**GOOD NEWS STORY ANOTHER SUCCESSFUL CLEAN COMMUTER AND WELLNESS CHALLENGE**

The LMHOs hold an annual Clean Commuter and Wellness Challenge (CCWC) to encourage staff to commute to work in a healthier manner. This includes walking, biking, taking transit, carpooling and other alternatives to single occupancy vehicles.

The 2016 campaign had 30 teams, representing 585 health care staff, who competed against each other to see who could avoid the most CO<sub>2</sub>, burn the most calories, or bike/walk the most kilometers.

Providence Health Care staffer Jeffrey Danielson takes part in the Challenge every year. We asked him why he thinks clean commuting is so important.



Above left: Health Care staff take advantage of unused floor space to create a bicycle storage rack.

Above: Providence Health Care staffer Jeffrey Danielson leads by example.

**Q. Where do you work? What's your role?**

I am a registered nurse at St. Paul's Hospital in the Mental Health Program. I am currently working on a project looking to standardize care for inpatients with early psychosis.

**Q. Why do you participate in the CCWC?**

I participate in the CCWC every year because I think it is important to reflect what you care about in what you do. I think alternate ways of commuting are important to our community, so I look for ways to show support for it. CCWC is one effective and fun way to do that.

**Q. Tell us about your commute.**

I commute to work each day by bike along Vancouver's on-street bike routes. I have only about 500 meters of unprotected or non-bike route riding during my entire 15km commute! It's a fun ride through residential neighbourhoods, by the beach and across the Burrard Bridge!

**Q. Have you been commuting by bicycle for a while, or is this new to you?**

I have been commuting by bike to St. Paul's since I started working here over four years ago. I have been riding bikes as my main means of transportation since I was a child!

**Q. Do you have any advice for other individuals participating in the Challenge, or keen to try a clean/active commute?**

Preparation is key! Have as much of your gear ready as you can the night before, so when you wake up in the morning and it's pouring rain (rain pants and booties), or blisteringly sunny (shorts, sunscreen and sunglasses), you have fewer excuses to drive or hop on the bus.



## CULTURE CHANGE



### OUR GOAL

*Integrate the environmental impact of health care operations, and its connection to the health of populations, into decision-making priorities, workplace practices and organizational values across the LMHOs.*

Culture Change involves building internal capacity and leadership to integrate sustainability values into organizational decision-making, and the resulting actions.

Culture Change cuts across all topic areas in the GreenCare portfolio. It refers to the integration of environmental sustainability and resilience principles and priorities within decision-making and operations across the LMHOs. As a result, successes in other GreenCare topic areas also contribute to the culture change goal.

### CULTURE CHANGE: THE LINK WITH HEALTH & WELLNESS OUTCOMES

→ Research shows that enabling employees to act on their values improves morale, engagement, recruitment and retention.<sup>1</sup> This, in turn, improves the quality of care provided to patients and clients. In addition, behavioural changes in staff have the potential to influence other areas of their working lives, which can positively influence their health and wellness objectives.

<sup>1</sup> Jenny Davis-Peccoud, James Allen and Melissa Artabane, "The Big Green Talent Machine", 3 Bain & Company Inc., <http://bit.ly/2BjY7oS>

CHART 14: Number of Trained Green+Leaders (2009 – 2016)

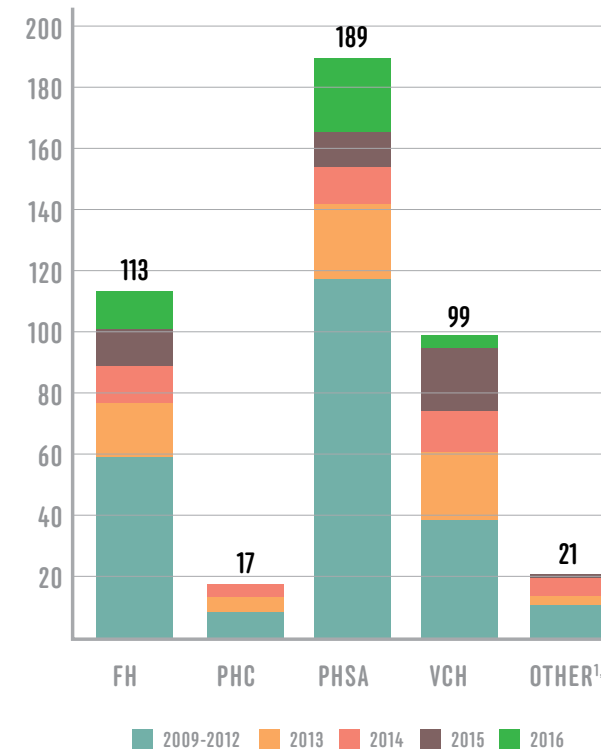
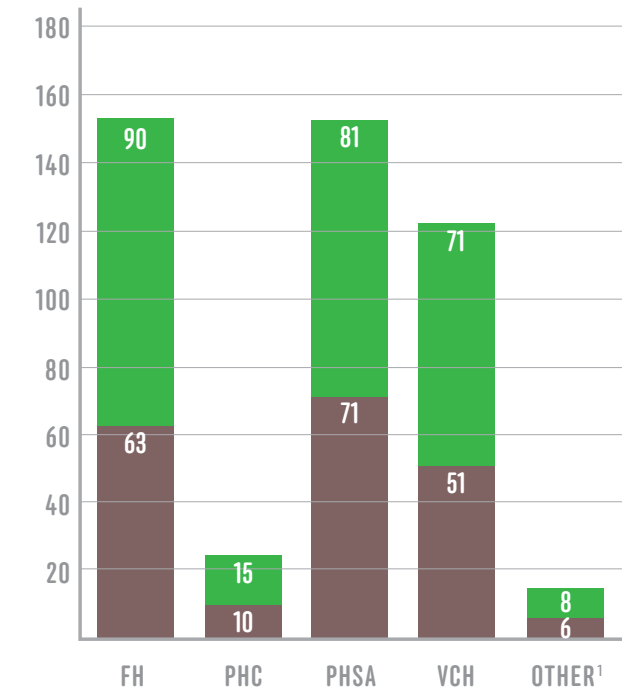


CHART 15: Number of (Active) Green+Leaders (2016)



<sup>1</sup> Includes contracted staff from Sodexo and Brookefield/Johnson Controls.

Source: Green+Leaders Coordinator

<sup>2</sup> Starting in 2015, this will also include newly trained BCCSS staff

The EES Team's strategy for achieving culture change includes supporting Green+Leaders and Recycling Champions to implement programs and strategies that align with our EES strategic framework. In addition, news about environmental sustainability successes and opportunities is shared regularly through the Health Authority Newsletters and other internal communication channels, including the GreenCare Community website.

The EES Team also supports the development of department-specific green strategies across the LMHOs that improve environmental performance at the level of systems and practices.

**Green+Leaders (G+Ls)** are employee volunteers who support the creation of healthy workplaces by improving environmental conservation and performance of health care operations. They engage co-workers in behaviour change campaigns and identify opportunities within their worksites to improve processes. G+Ls focus their activities on zero waste, energy conservation, active and clean transportation, and culture change in the workplace. In many ways they act as the 'eyes and ears' of environmental sustainability, supported by training, tool kits and connection with a community of like-minded colleagues.

**Recycling Champions** have played an integral role in the successful implementation of the Recycling Renewal Program (RRP) across acute and residential sites in the Lower Mainland. They are employee volunteers who informally educate coworkers about waste reduction and diversion practices in their workplaces.

### TARGET # 15 Increase number of new Green+Leaders trained annually.

#### 2020 GREEN+ LEADERS TARGET (BASELINE 0)

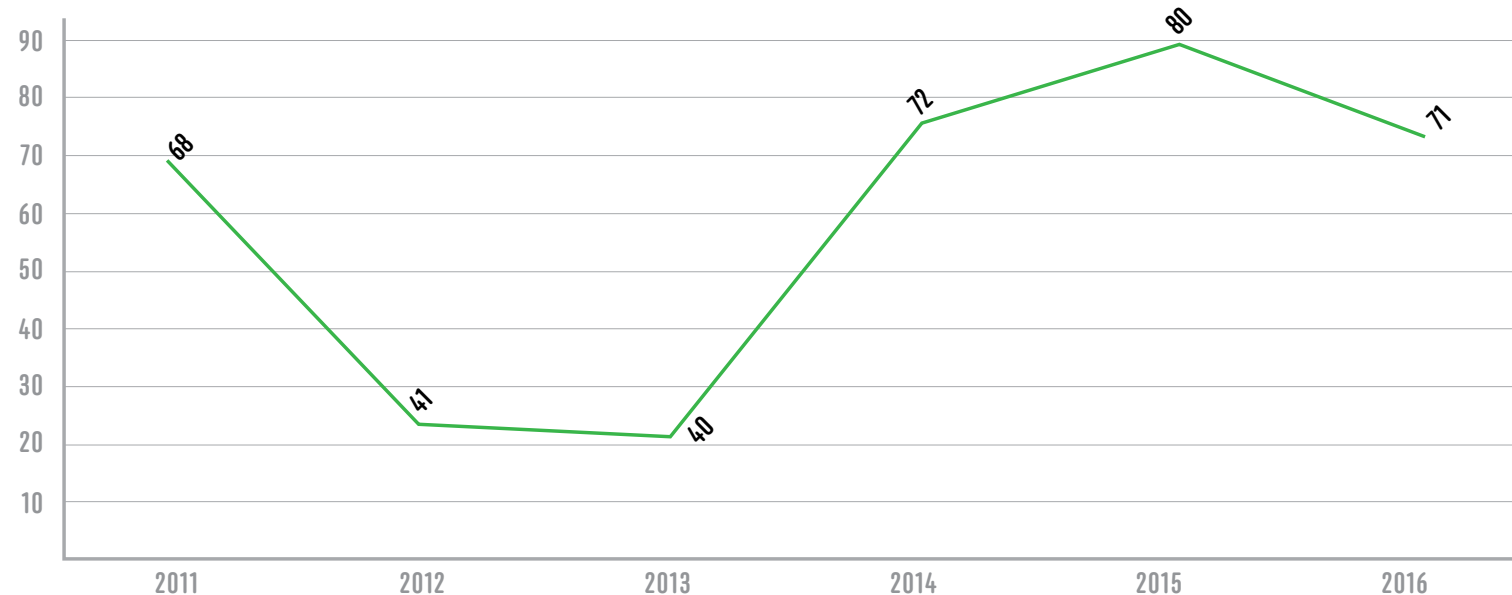
|      |    |
|------|----|
| FH   | 25 |
| PHC  | 25 |
| PHSA | 25 |
| VCH  | 25 |

#### 2016 PERFORMANCE

In 2016, 40 new Green+Leaders joined the program, bringing the total number of Green+Leaders (who have been trained since 2009) to 439. Despite natural attrition and roll-over of staff, the total number of active Green+Leaders in 2016 was 265.

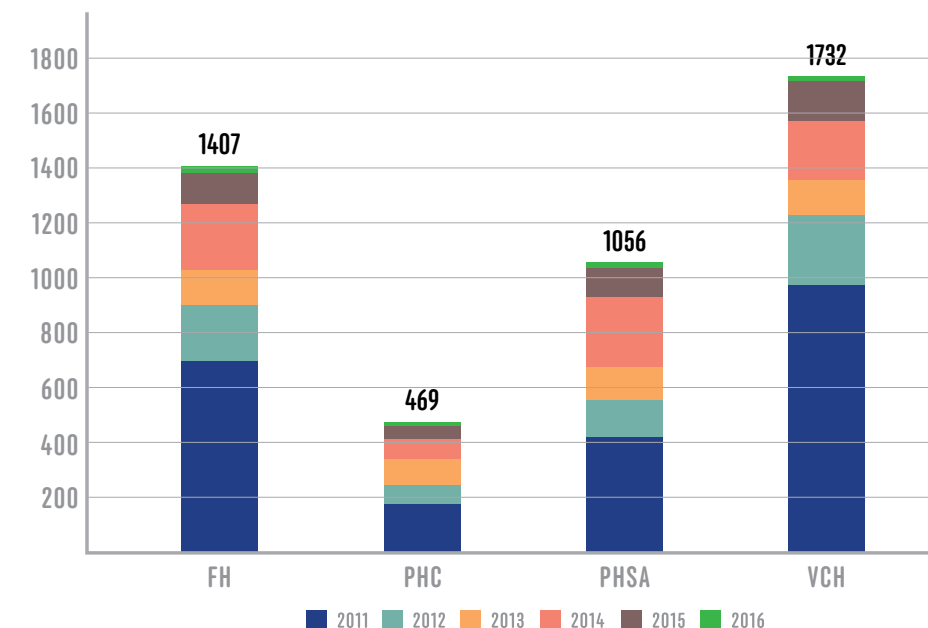


CHART 16: Number of GreenCare Related Published Stories<sup>1</sup>



<sup>1</sup> A vast majority of stories are replicated across all four LMHOs newsletters

CHART 17: Number of Registrations on the GreenCare Community Website



2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources

Provincial Health Services Authority continued to have the largest number of staff who have been trained as G+Ls; 24 new G+Ls were trained in 2016. To date, 189 PHSA staff have been trained as G+Ls. The G+L program also contributed to PHSA's selection as one of Canada's Greenest Employers.

In 2016, Fraser Health surpassed Provincial Health Services Authority with the largest number of active G+Ls. They currently have 90 active G+Ls; 12 new G+Ls were trained in 2016.

Vancouver Coastal Health is not far behind: they trained 4 new G+Ls in 2016, bringing their total number of active G+Ls to 71.

Providence Health Care currently has 15 active Green+ Leaders. No new G+Ls were trained at PHC in 2016.

In 2016, new toolkits, including the Green Workplace Guide (an evaluation and measurement tool), were rolled out to help Green+Leaders work more collaboratively with coworkers and identify the most strategic avenues to effect change.

**2017 PLANS**

In 2016, a G+L Program Evolution process started, which will continue into 2017. This includes surveys and focus groups with Green+Leaders and their managers. The goal is to ensure the program continues to be responsive to the changing needs of participants, the evolving realities of the workplace, and the multiple demands on limited resources within the EES Team. The program's core elements – recognition, community building and networking, ongoing support and tools, and thorough recruitment processes – will continue to be integrated.

**TARGET #16**  
**Increase the number of environmental sustainability stories in Health Authority news.**

By 2020, the EES Team will expand their communication efforts, to keep a consistent presence in the weekly health authority enews, by increasing the number of published stories by 25% per LMHO.

**2020 EES-THEMED STORY TARGET (BASELINE 2015)**

|      |      |
|------|------|
| FH   | +25% |
| PHC  | +25% |
| PHSA | +25% |
| VCH  | +25% |

**2016 PERFORMANCE**

In 2016, the EES team published 71 unique LMHO stories across the various internal newsletters. Some stories are posted across multiple LMHOs but only counted as one LMHO story.

Though only a slight reduction, 71 overall unique stories was a 11.0% dip from the previous year.

**NUMBER OF PUBLISHED STORIES PER LMHO IN 2016:**

|      |    |
|------|----|
| FH   | 38 |
| PHC  | 34 |
| PHSA | 35 |
| VCH  | 38 |

The two primary topics for stories involved the Clean Commuter & Wellness campaign in the spring, as well as ongoing Recycling Renewal Program updates and news.

Of special note was a series of stories titled, "Ask Sonja and Helen," which featured various waste reduction and recycling news and updates.

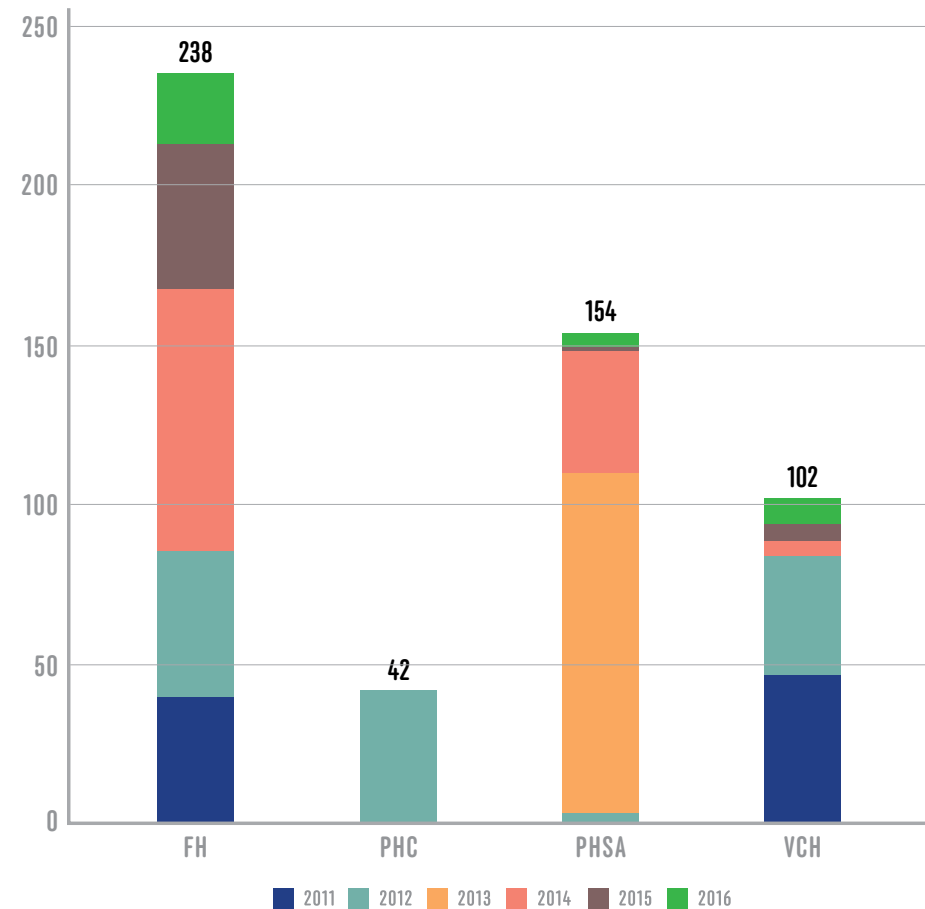
**2017 PLANS**

Due to budget challenges, the EES Team was unable to fill a vacated communication role in 2016. Without this support, it is expected the number of stories submitted to LMHO newsletters will decrease in 2017. We hope to have the resources to fill this role in 2017; however, the EES Team will continue to find creative ways to bridge communication gaps with available resources.

In 2017, the GreenCare Community website will be re-evaluated and potentially refreshed to ensure it maintains a high level of functionality and usability in engaging health care staff.



CHART 18: Total Number of Recycling Champions Trained (2011–2016)



**TARGET #17**

**Develop new department-specific green strategies/programs.**

By 2020, the EES Team, in partnership with key stakeholders, aims to develop two new strategies or programs to promote energy and environmental sustainability across the LMHOs. These strategies may be region-wide in scope, or may focus specifically on individual LMHOs.

**2020 GREEN STRATEGY TARGET (BASELINE 2016)**

|      |   |
|------|---|
| FH   | 2 |
| PHC  | 2 |
| PHSA | 2 |
| VCH  | 2 |

In 2010, the LMHOs initiated the consolidation of the various EES teams. At that point three legacy programs were launched across the LMHOs (Green+Leaders, Energy & Water Management, and Commuter Services).

Over the following five years, those four programs were enhanced while three new programs were launched across the LMHOs (Recycling Renewal Program, Environmentally Preferable Purchasing, Climate Resilience & Adaptation, and GreenCare Community).

This signals a shift from an emphasis on behaviour change campaigns to the higher leverage points within the systems and practices of the health care sector.

**2016 PERFORMANCE**

In 2016, to support initial work on this goal, the EES Team embedded environmental improvements through department-specific engagement and planning processes.

**PLANS FOR 2017**

In 2017, the programs and strategies, around achieving organizational culture change, will be re-evaluated. A special focus will be made to determine if any new programs / strategies can be created and implemented across health care.

This special focus will include working with Green+Leaders and other contacts in the Medical Imaging and Pharmacy departments to identify key challenges and opportunities.

**TARGET #18**

**Ensure that executive leadership refresh and approve sustainability policies.**

In September 2010, Fraser Health adopted the first LMHO sustainability policy, followed by Provincial Health Services Authority in December 2010. In 2011 and 2013, respectively, Providence Health Care and Vancouver Coastal Health adopted sustainability policies.

By 2020, all four LMHOs will refresh their sustainability policies to ensure they are up to date with current priorities, goals and trends in health care energy and environmental sustainability.

**2020 SUSTAINABILITY POLICY APPROVAL TARGETS**

|      |     |
|------|-----|
| FH   | y/n |
| PHC  | y/n |
| PHSA | y/n |
| VCH  | y/n |

**2016 PERFORMANCE**

In 2016, preliminary meetings were held with LMHO staff in charge of general policy reviews, to begin the process of refreshing the policies.

**2017 PLANS**

In 2017, we plan to commence a review to refresh LMHO sustainability policies. We expect that the main body of the policies will remain unchanged, with addendums added to provide more clarity in definitions, deliverables and governance. It is hoped that the policy refresh will be completed in 2018.





Left: Green+Leaders and an active Green Committee at the Burnaby Centre for Mental Health and Addiction take advantage of the G+L Green Fund to purchase recycling and compost bins for their cafeteria areas.

### GOOD NEWS STORY GREEN+LEADERS PROJECT FUND

During the Green+Leaders (G+L) Program Evolution process, G+Ls identified the challenge of bringing new project ideas to life with limited funding support. In response, the G&L Program piloted an Engagement Green Fund, to help fund regional projects.

Reusable dishware was a common theme of many of these projects. Several G+Ls have since outfitted their kitchens and cafeterias with reuseable dishware, which eliminates waste on a daily basis, and gives staff the opportunity to have 'waste-free' lunches and events.

Gardening was another common project theme. The VCH CFO Transformations Team is worked to transform their patio space into a garden area, where they can grow food and connect with co-workers. At Sumac Place, a tertiary mental health facility on the Sunshine Coast, they are building a greenhouse to create more opportunity for residents to grow food and spend time in the garden. At two different leased sites (Burnaby Centre for Mental Health and Addiction and PHC Health Information Management), much needed recycling and compost bins have been rolled out to help divert waste from the landfill.

The Sustainability Team at the Fraser Valley Cancer Centre (FVCC) hosted two different guest speakers at the FVCC site, and connected them via video link to a number of other healthcare sites. The first guest speaker spoke about the Blue Dot movement that aims to see the right to a healthy environment enshrined in the Canadian Constitution. The second presenter spoke about the Village Surrey Transition Initiative which works towards fostering community connections, food security, and the development of skills, knowledge and technologies to transition to a less energy intensive and healthier way of life.

The BCCDC Public Health Labs and Pharmacy is giving a much needed thanks to employees who have been storing and distributing styrofoam and cooler packs for years, diverting them from the landfill. And lastly, Sunny Hill Health Centre for Children is sourcing a number of prizes, such as gardening seed packages and reuseable mugs, to serve as incentives for the different green initiatives they work on every year.



Above: As a Green+Leader for BC Clinical and Support Services (BCCSS), Dave Ambrose has taken advantage of GreenCare resources to help make his work space more environmentally friendly.





# Assurances and Resources

2016 GreenCare Scorecard

About This Report

The LMHOs: Who We Are

The EES Team: Who We Are

What is GreenCare?

GreenCare Sustainability Strategic Framework

Greencare Milestones and Awards

GreenCare Strategy

Smart Energy & Water

Zero Waste & Toxicity

Regenerative Design

Active & Clean Transportation

Culture Change

Assurances and Resources

## INTERNAL ASSURANCES

Lower Mainland Facilities Management has built in a level of internal controls and monitoring systems as part of their internally verified assurances for the Environmental Performance Accountability Report.

The Energy & Environmental Sustainability Team uses a database run by a third party (E-Factor Engineering) to capture and analyze all energy and water data.

Data on material/solid waste, including organics, is tracked and reported accordingly by Business Initiatives & Support Services.

Data associated with sustainable supply chain is owned and maintained by BC Clinical and Support Services.

## EXTERNAL ASSURANCES

Data in the Carbon Neutral Action Reports (CNAR) is verified through an internal and external assurance process governed by the Provincial Climate Action Secretariat. This assurance is subject to external audits by an independent third party. Historically, Deloitte, a major consulting firm, has conducted external audits on the Vancouver Coastal Health and Fraser Health energy and carbon reporting. Each time, Deloitte reviewed and verified the internal assurances process as being transparent and accurate.

### STRATEGIC PARTNERS

- BC Hydro
- FortisBC
- Health Care Without Harm
- Canadian Coalition for Green Health Care
- Natural Resource Council of Canada
- Health Canada

### LOWER MAINLAND HEALTH CARE ORGANIZATIONS

- Fraser Health
- Providence Health Care
- Provincial Health Services Authority
- Vancouver Coastal Health

### EXTERNAL RESOURCES

- British Columbia Public Sector Carbon Neutral Action Reports
- Healthier Hospitals Initiative
- Bill 44-2007; Greenhouse Gas Reduction Targets Act
- ASHRAE 189.1 Standard for New Buildings and Renovations
- Practice GreenHealth Health Care Without Harm
- Canadian Association of Physicians for the Environment
- Canadian Green Building Council
- US Green Building Council
- International Living Future Council



# Appendices

## **GreenCare Introduction**

### **Fraser Health**

Carbon Neutral Action Report

### **Providence Health Care**

Carbon Neutral Action Report

### **Provincial Health Services**

Carbon Neutral Action Report

### **Vancouver Coastal Health**

Carbon Neutral Action Report





## Healthy People need a Healthy Planet Our Health Care Commitment

### Sustainable Health Care in British Columbia

In 2010, the Lower Mainland Health Care Organizations (LMHOs) consolidated sustainability efforts and created the Energy and Environmental Sustainability Team (EES Team) to lead all energy and environmental sustainability work across the four LMHOs. The EES Team is housed within Lower Mainland Facilities Management, a consolidated department within the LMHOs, reports directly to the Fraser Health Vice President, Facilities Management and Chief Financial Officer.

While the EES Team are leading many of the sustainability efforts, all departments have a role to play. The GreenCare brand was created to promote a more collaborative and sustainable health care system across BC and to connect the internal and external network of partners engaged in this effort. The GreenCare Community is an online portal created by the EES Team to enable better communication and cooperation on environmental sustainability efforts within health care. Through the GreenCare Community and partnerships, the EES team coordinates environmental conservation projects across all departments while simultaneously growing a recognizable brand awareness that inspires infrastructure upgrades and a culture of sustainability, resilience and innovation.

### GreenCare's Core Purpose

To systematically embed environmental, economic, and social sustainability policies, principles, and processes across the LMHOs.

### GreenCare's Vision

Transforming Health Care to ensure thriving people and environments.

### 2020-2030 Goals & Targets

The EES Team has worked with various internal stakeholders to form 2020-2030 strategic goals and measurable targets, which provide governance and guidance on establishing a more sustainable British Columbia health care system in the Lower Mainland.

*The LMHOs consist of all health care staff and facilities maintained under Fraser Health, Providence Health Care, Provincial Health Services Authority, and Vancouver Coastal Health. The British Columbia Ministry of Health works with the LMHOs to ensure that health services are appropriate, efficient, and cost effective across British Columbia.*

### Our Goals

Through GreenCare initiatives, the EES Team strives to achieve:



Healthy Environments



Healthy Workplaces



Healthy Communities

### Our Focus



#### Smart Energy & Water

Minimize energy & water consumption and greenhouse gas emissions to reduce costs and environmental impacts, helping ensure the health and wellness of our living environments.



#### Zero Waste & Toxicity

Minimize waste generated and toxic chemicals used by the health care system and supporting operations.



#### Regenerative Design

Achieve a "net-positive" built environment that is climate resilient and enriches health and wellness.



#### Active & Clean Transportation

Ensure a health care system in which employees commute/travel between sites in a manner that reduces greenhouse gas-related pollutants, minimizes the need for onsite parking, and increases overall health and wellness.



#### Culture Change

Integrate the environmental impact of health care operations, and its connection to the health of populations, into decision-making priorities, workplace practices, and organizational values across the Lower Mainland Health Care Organizations.





## Our GreenCare Programs

The EES team has established various programs to help the LMHOs achieve their GreenCare vision, goals, key performance indicators (KPIs), and targets. These programs do not entail all the work being conducted but provide structure to key areas of prioritization.

### Green+Leaders

Direct staff mentoring on how to “green” work spaces.

### Energy & Water Management

Conservation through infrastructure, behavioural, and operational efficiencies.

### Commuter Services

Efficient and active transportation to and from health care sites.

### Recycling Renewal Program

Responsible diversion of recyclable solid and organic waste.

### Environmentally Preferable Purchasing

Reducing the environmental impact of health care’s supply chain through purchasing decisions.

### Climate Resilience & Adaptation

Site level mitigation and adaptation to potential climate change factors.

### GreenCare Community

Communication and community development through the web.

[bcgreencare.ca/programs](http://bcgreencare.ca/programs)

## Glossary: Key Stakeholders

|                                                        |       |
|--------------------------------------------------------|-------|
| Energy & Environmental Sustainability team             | EES   |
| BC Clinical and Support Services Society               | BCCSS |
| BC Hydro (electricity provider)                        | BCH   |
| Business Initiatives & Support Services (consolidated) | BISS  |
| Communications (per health care organization)          | Comms |
| FortisBC (natural gas provider)                        | FBC   |
| General Health Care Staff                              | GHCS  |
| Human Resources (per health care organization)         | HR    |
| Infection Control (per health care organization)       | IC    |
| Integrated Protection Services (consolidated)          | IPS   |
| Local Municipalities                                   | LM    |
| Lower Mainland Facilities Management (consolidated)    | LMFM  |
| Medical Imaging (Imaging Techs)                        | MI    |
| Nursing (Nurses)                                       | N     |
| Pharmacy (Pharmacists)                                 | P     |
| Fraser Health                                          | FH    |
| Providence Health Care                                 | PHC   |
| Provincial Health Services Authority                   | PHSA  |
| Vancouver Coastal Health                               | VCH   |
| B.C. Ministry of Health                                | MoH   |
| B.C. Ministry of Environment                           | MoE   |

## Glossary: Key Ministry of Health and Health Authority Priorities / Goals / Strategic Directions

### Fraser Health (FH)

- FH1: Preventing Disease, Protecting Health and Promoting Wellness
- FH2: Engaging Staff and Physicians
- FH3: Balancing the Budget

### Providence Health Care (PHC)

- PHC1: Lead Through Exceptional Care, Service Teaching & Research
- PHC2: Engage & Develop Our People
- PHC3: Foster a Culture of Innovation & Improvement

### Provincial Health Services Authority (PHSA)

- PHSA1: Ensure the delivery of other key government priorities for high quality and appropriate health services
- PHSA2: Pursue innovative approaches to service delivery and manage the performance of your organization through continuous improvement across service and operational accountabilities, with quarterly reporting to the Ministry.

### Vancouver Coastal Health (VCH)

- VCH1: Support the health and wellbeing of VCH residents
- VCH2: Deliver a system of responsive and effective health care services across VCH
- VCH3: Innovate to ensure value for money and sustainability

### BC Ministry of Health (MoH)

- MoH1: Support the health and wellbeing of BC residents
- MoH2: Deliver a system of responsive and effective health care services across BC
- MoH3: Ensure value for money



The LMHOs have established aggressive key performance indicators (KPIs) and 2020-2030 targets to continuously drive the health care organizations and associated health care staff towards a more sustainable, resilient, and innovative delivery of health care services for the residents of British Columbia. These targets are intended to provide

direction and focus work resources for the GreenCare Community. The KPIs will be reported on and re-evaluated periodically to ensure they are driving change and directed towards the most relevant and high impact areas of efficiency and stewardship within health care.



| FOCUS AREA & KPIS                                                                                                                                                         | METRIC / BASELINE (IF APPLICABLE)                                                                                                                 | 2020 TARGET                                                                                    |                        |                                      |                          | 2030 TARGET   |                        |                                      |                          | KEY STAKEHOLDERS | SUPPORTS LOWER MAINLAND HEALTH CARE ORGANIZATION'S AND MINISTRY OF HEALTH'S (PRIORITIES, GOALS, STRATEGIC DIRECTIONS) |                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------|--------------------------------------|--------------------------|---------------|------------------------|--------------------------------------|--------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------|
|                                                                                                                                                                           |                                                                                                                                                   | Fraser Health                                                                                  | Providence Health Care | Provincial Health Services Authority | Vancouver Coastal Health | Fraser Health | Providence Health Care | Provincial Health Services Authority | Vancouver Coastal Health |                  |                                                                                                                       |                              |
| <b>Smart Energy &amp; Water</b>                                                                                                                                           |                                                                                                                                                   |                                                                                                |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                              |
| Goal: Minimize energy & water consumption and GHG emissions to reduce costs and environmental impacts, helping ensure the health and wellness of our living environments. |                                                                                                                                                   |                                                                                                |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                              |
| 1                                                                                                                                                                         | Reduce Energy Use Intensity (EUI) of core sites <sup>1</sup>                                                                                      | EUI (ekWh/m <sup>2</sup> /year) (2007 Baseline)                                                | 15%                    | 5%                                   | 5%                       | 15%           | 25%                    | 15%                                  | 15%                      | 25%              | LMFM, BCH, FBC                                                                                                        | FH3; PHC3; PHSA2; VCH3; MoH3 |
| 2                                                                                                                                                                         | Reduce absolute in-scope GHG emissions <sup>2</sup>                                                                                               | GHG emissions (tCO <sub>2</sub> e/year) (2007 Baseline)                                        | 5%                     | 10%                                  | 25%                      | 25%           | 10%                    | 20%                                  | 40%                      | 40%              | LMFM, BCH, FBC, MoE                                                                                                   | FH1, FH3; PHSA2; VCH1, VCH3  |
| 3                                                                                                                                                                         | Reduce absolute in-scope GHG emissions <sup>2</sup> Intensity <sup>3</sup>                                                                        | GHG emissions intensity (tCO <sub>2</sub> e/year/m <sup>2</sup> ) <sup>4</sup> (2007 Baseline) | 33%                    | 33%                                  | 33%                      | 33%           | 50%                    | 50%                                  | 50%                      | 50%              | LMFM, BCH, FBC, MoE                                                                                                   | FH1, FH3; PHSA2; VCH1, VCH3  |
| 4                                                                                                                                                                         | Reduce Water Use Intensity (WUI) of core sites <sup>1</sup>                                                                                       | WUI (m <sup>3</sup> /m <sup>2</sup> /year) <sup>4</sup> (2010 Baseline)                        | 20%                    | 15%                                  | 10%                      | 10%           | 25%                    | 20%                                  | 20%                      | 20%              | LMFM, LM                                                                                                              | PHC3; VCH3                   |
| <b>Zero Waste &amp; Toxicity</b>                                                                                                                                          |                                                                                                                                                   |                                                                                                |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                              |
| Goal: Minimize waste generated and toxic chemicals used by the health care system and supporting operations.                                                              |                                                                                                                                                   |                                                                                                |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                              |
| 5                                                                                                                                                                         | Increase waste diversion rates at existing acute and residential care sites.                                                                      | % of waste diverted                                                                            | 50%                    | 50%                                  | 50%                      | 50%           | TBD                    | TBD                                  | TBD                      | TBD              | BISS, LMFM, GHCS                                                                                                      | VCH3                         |
| 6                                                                                                                                                                         | Increase waste diversion rates at all new health care construction projects.                                                                      | % of waste diverted                                                                            | 80%                    | 80%                                  | 80%                      | 80%           | TBD                    | TBD                                  | TBD                      | TBD              | BISS, LMFM, GHCS                                                                                                      | VCH3                         |
| 7                                                                                                                                                                         | Decrease food scraps in the garbage waste stream.                                                                                                 | % of food waste in waste streams                                                               | <5%                    | <5%                                  | <5%                      | <5%           | TBD                    | TBD                                  | TBD                      | TBD              | BISS, LMFM, GHCS                                                                                                      | FH1, FH2, PHC2, VCH1         |
| 8                                                                                                                                                                         | Develop and implement a strategy to reduce overall waste from acute and residential care operations. The strategy will identify 2030 targets.     | completed                                                                                      | Yes                    | Yes                                  | Yes                      | Yes           | TBD                    | TBD                                  | TBD                      | TBD              | BISS, LMFM, IC, N, GHCS, BCCSS                                                                                        | FH1, PHC1, PHC3, VCH1        |
| 9                                                                                                                                                                         | Develop and implement a strategy to reduce overall toxins used in acute and residential care operations. The Strategy will identify 2030 targets. | completed                                                                                      | Yes                    | Yes                                  | Yes                      | Yes           | TBD                    | TBD                                  | TBD                      | TBD              | BISS, LMFM, IC, GHCS, BCCSS, N                                                                                        | FH1, PHC1; PHC3, VCH1        |

**Footnotes**

<sup>1</sup>Facilities that are actively monitored for energy and water efficiency (primarily owned and operated sites).

<sup>2</sup>In-scope emissions are from owned and leased buildings, fleet travel, and paper use (as defined in relation to the GHG Reduction Targets Act).

<sup>3</sup>British Columbia Provincial government has a 83% reduction mandate over absolute CO<sub>2</sub> emissions. EES felt this mandate should more accurately, due to the growth of health care, be placed on an INTENSITY measure.

<sup>4</sup>It is recognized that water consumption is more directly influenced by staff count per facility. Due the uncertain and changing nature of staff counts, for the time being EES will use facility space for the intensity metric.

<sup>5</sup>End of trip facilities must include a minimum of 1 on-site shower / changing facility and a minimum of bicycle secure storage for 5% of on-site staff.

<sup>6</sup>Though the Culture Change focus pertains to all targets in all focus areas, specific targets have been set for this topic area.



| FOCUS AREA & KPIS                                                                                                                                                                                                                                                                                      | METRIC / BASELINE (IF APPLICABLE)                                                                                                                                        | 2020 TARGET                                                               |                        |                                      |                          | 2030 TARGET   |                        |                                      |                          | KEY STAKEHOLDERS | SUPPORTS LOWER MAINLAND HEALTH CARE ORGANIZATION'S AND MINISTRY OF HEALTH'S (PRIORITIES, GOALS, STRATEGIC DIRECTIONS) |                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------|--------------------------------------|--------------------------|---------------|------------------------|--------------------------------------|--------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                          | Fraser Health                                                             | Providence Health Care | Provincial Health Services Authority | Vancouver Coastal Health | Fraser Health | Providence Health Care | Provincial Health Services Authority | Vancouver Coastal Health |                  |                                                                                                                       |                                  |
| <b>Regenerative Design</b><br>Goal: Achieve a “net-positive” built environment that is climate resilient and enriches health and wellness.                                                                                                                                                             |                                                                                                                                                                          |                                                                           |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                                  |
| 10                                                                                                                                                                                                                                                                                                     | Ensure all new construction projects achieve performance-based requirements aligned with resilience and regenerative principles (a minimum of LEED Gold for Healthcare). | % of projects with requirements                                           | 100%                   | 100%                                 | 100%                     | 100%          | 100%                   | 100%                                 | 100%                     | 100%             | LMFM                                                                                                                  | PHSA1                            |
| 11                                                                                                                                                                                                                                                                                                     | Complete climate resilience assessments for all core sites                                                                                                               | % of sites assessed                                                       | 50%                    | 50%                                  | 50%                      | 50%           | 100%                   | 100%                                 | 100%                     | 100%             | LMFM, LM                                                                                                              | FH1, PHC1; VCH3; MoH3            |
| 12                                                                                                                                                                                                                                                                                                     | Produce site-level climate resilience plans for all core sites.                                                                                                          | % of sites with plan                                                      | 10%                    | 10%                                  | 10%                      | 10%           | 100%                   | 100%                                 | 100%                     | 100%             | LMFM, LM                                                                                                              | FH1, PHC1; PHC3, VCH3; MoH3      |
| <b>Active &amp; Clean Transportation</b><br>Goal: Ensure a health care system in which employees commute/travel between sites in a manner that reduces GHG-related pollutants, minimizes the need for onsite parking, and increases overall health and wellness.                                       |                                                                                                                                                                          |                                                                           |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                                  |
| 13                                                                                                                                                                                                                                                                                                     | Increase the % of health care staff that commute via cleaner and healthier means (ie; Alternatives to single occupancy vehicles).                                        | % of annual staff commute via cleaner and healthier means (2016 Baseline) | 35%                    | 65%                                  | 60%                      | 60%           | 50%                    | 80%                                  | 75%                      | 75%              | LMFM, HR, IPS                                                                                                         | FH1; PHSA1; VCH1; MoH1           |
| 14                                                                                                                                                                                                                                                                                                     | Increase portion of core sites that provide end of trip (EOT) bicycle facilities / storage options 5                                                                     | % of Core sites with EOT facilities                                       | 30%                    | 30%                                  | 30%                      | 30%           | 100%                   | 100%                                 | 100%                     | 100%             | LMFM, HR, IPS                                                                                                         | FH1; PHSA1; PHC3, VCH1; MoH1     |
| <b>Culture Change<sup>6</sup></b><br>Goal: Integrate the environmental impact of health care operations, and its connection to the health of populations, into decision-making priorities, workplace practices, and organizational values across the Lower Mainland Health Care Organizations (LMHOs). |                                                                                                                                                                          |                                                                           |                        |                                      |                          |               |                        |                                      |                          |                  |                                                                                                                       |                                  |
| 15                                                                                                                                                                                                                                                                                                     | Increase number of new Green+Leaders participating in the program.                                                                                                       | # of staff recruited by target year (2016 Baseline)                       | 25                     | 25                                   | 25                       | 25            | 75                     | 75                                   | 75                       | 75               | GHCS                                                                                                                  | FH1, FH2; PHC2, PHC3, VCH1, MoH1 |
| 16                                                                                                                                                                                                                                                                                                     | Increase the number of EES-themed stories appearing in Health Authority news.                                                                                            | % increase in the # of stories (2016 Baseline)                            | 25%                    | 25%                                  | 25%                      | 25%           | 50%                    | 50%                                  | 50%                      | 50%              | CD                                                                                                                    | FH1, FH2; PHC2, PHC3             |
| 17                                                                                                                                                                                                                                                                                                     | Develop new department-specific green strategies/programs approved by senior leadership. Begin strategy implementation and develop new targets.                          | # of strategies/programs (2016 Baseline)                                  | 2                      | 2                                    | 2                        | 2             | 5                      | 5                                    | 5                        | 5                | MI, P, GHCS                                                                                                           | FH1, FH2; PHC2, PHC3, VCH1, MoH1 |
| 18                                                                                                                                                                                                                                                                                                     | Refresh and obtain Executive Leadership approval of Sustainability Policies.                                                                                             | Yes/No                                                                    | Yes                    | Yes                                  | Yes                      | Yes           | Yes                    | Yes                                  | Yes                      | Yes              | LMFM, BISS, BCCSS, HR                                                                                                 | FH2; PHC2, PHC3                  |

**Footnotes**

<sup>1</sup>Facilities that are actively monitored for energy and water efficiency (primarily owned and operated sites).

<sup>2</sup>In-scope emissions are from owned and leased buildings, fleet travel, and paper use (as defined in relation to the GHG Reduction Targets Act).

<sup>3</sup>British Columbia Provincial government has a 83% reduction mandate over absolute CO<sub>2</sub> emissions. EES felt this mandate should more accurately, due to the growth of health care, be placed on an INTENSITY measure.

<sup>4</sup>It is recognized that water consumption is more directly influenced by staff count per facility. Due the uncertain and changing nature of staff counts, for the time being EES will use facility space for the intensity metric.

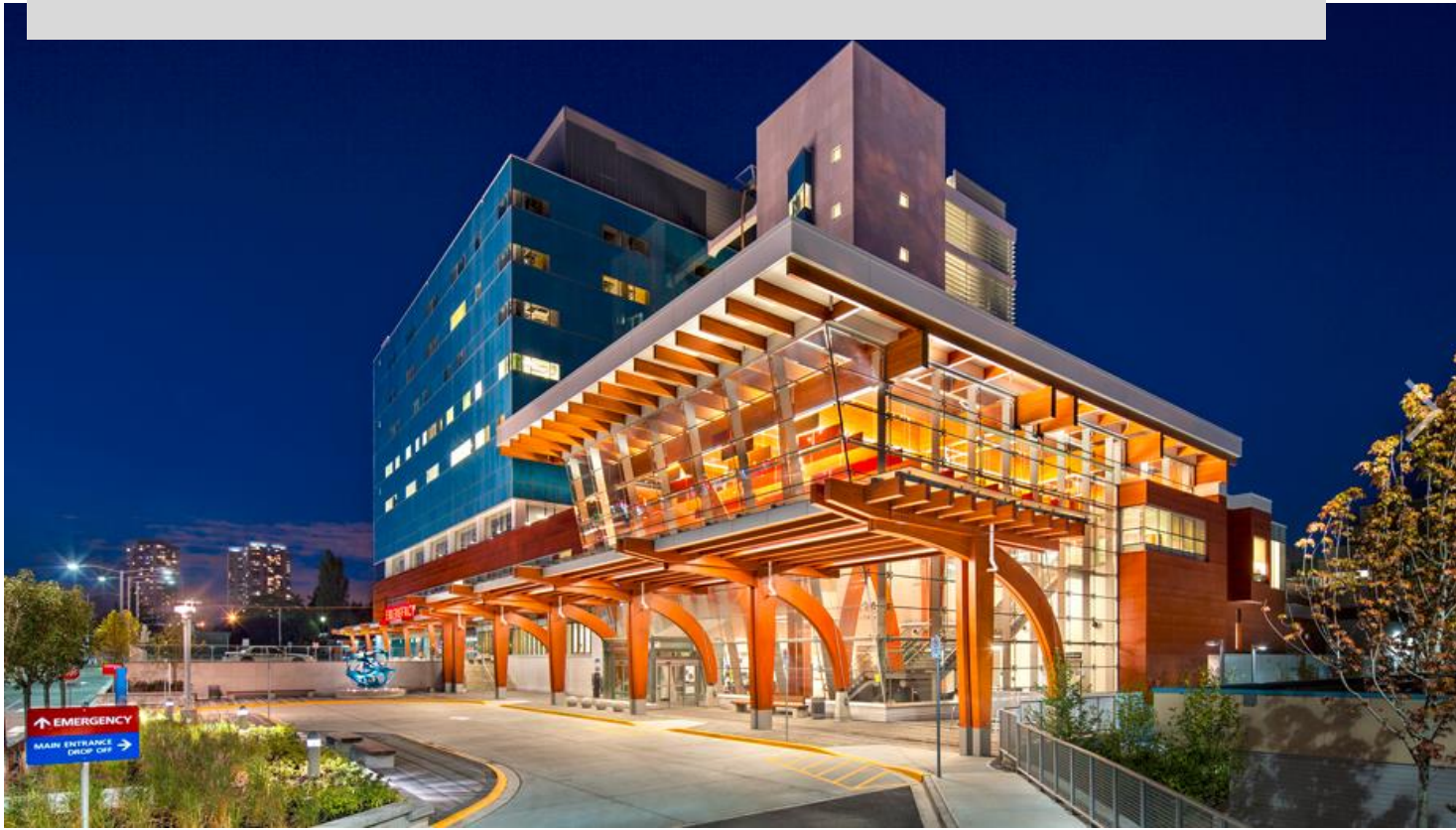
<sup>5</sup>End of trip facilities must include a minimum of 1 on-site shower / changing facility and a minimum of bicycle secure storage for 5% of on-site staff.

<sup>6</sup>Though the Culture Change focus pertains to all targets in all focus areas, specific targets have been set for this topic area.





# Fraser Health's 2016 Carbon Neutral Action Report



## Declaration Statement

This Carbon Neutral Action report for the period January 1st, 2016 to December 31st, 2016 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2017 Fraser Health's final Carbon Neutral Action report will be posted to our website at [bcgreencare.ca](http://bcgreencare.ca)

The cover photo is of the LEED Gold Critical Care Tower at Surrey Memorial Hospital





## Executive Summary



### Executive Summary: Fraser Health Carbon Neutral Action Report 2016

Michael Marchbank, President and Chief Executive Officer

I am proud to present Fraser Health's 2016 Carbon Neutral Action Report.

This marks the seventh consecutive year we have achieved carbon neutrality as part of the Province of British Columbia's public sector commitment to net-zero emissions.

Fraser Health's 2016 carbon footprint was 37,136 tonnes of carbon dioxide equivalent. Health care is an energy-intensive industry that continues to grow with expanding and aging populations.

Despite increases in facility space (27 per cent increase) and people (23 per cent increase), Fraser Health has managed to reduce the tonnes of CO<sub>2</sub> equivalent per square meter of facility space by 21 per cent.

We accomplished this in 2016 by initiating 20 retrofit projects that saved Fraser Health an estimated 6.9 gigawatt hours of energy - reducing our carbon footprint by 1,005 tonnes of CO<sub>2</sub>.

In addition, we reduced our fleet vehicles from 43 to 37 and continued to support staff engagement programs, such as the Clean Commuter and Wellness Campaign and Green+Leaders, which encourage a work culture of energy conservation.

To counteract the CO<sub>2</sub> emissions which we were unable to reduce through conservation measures, we purchased carbon offsets from the Ministry of Environment at a total cost of \$974,820.

Thank you to all our employees, physicians and volunteers - as well as key external partners - for their hard work to reduce Fraser Health's environmental and carbon footprint. We know every individual can make a difference. By working together we are able to provide both quality care and a greener health care environment for our patients and our community.

## Our CO<sub>2</sub> Footprint

### 2016 Greenhouse Gas Emissions Breakdown and Offsets Applied to Become Carbon Neutral

We report our carbon footprint based on guidelines provided by the Carbon Neutral Government Regulation and B.C. Climate Action Secretariat.

The B.C. Climate Action Secretariat uses various elements of reporting, based on the Greenhouse Gas Protocol Corporate Standard, which has classified carbon reporting into three scopes. Of these three scopes and various elements within each, the Climate Action Secretariat has determined Fraser Health's carbon footprint to comprise of six different greenhouse gases, which are converted to tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). The main sources of emissions are categorized into three main groups:

- Mobile Fleet Combustion (Fleet)
- Stationary Combustion and Purchased Energy (buildings)
- Supply (Paper)

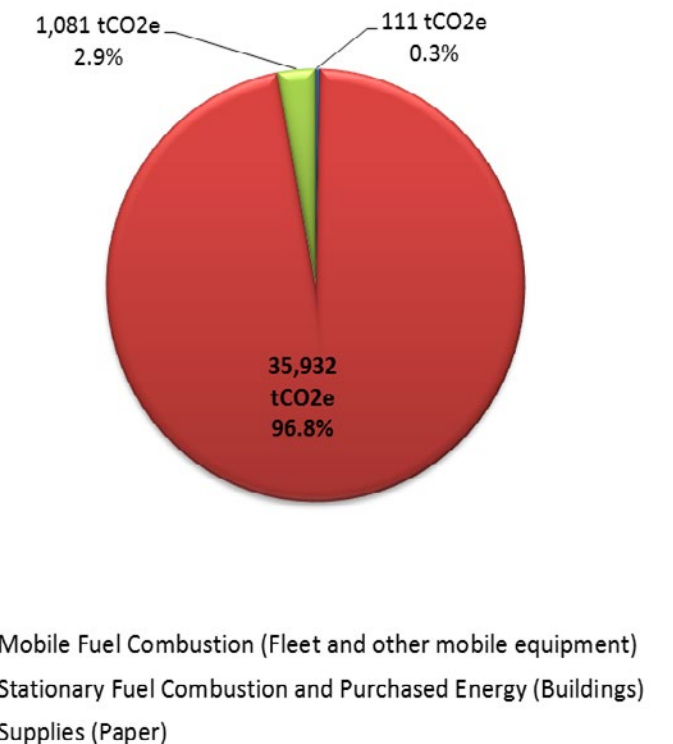
As shown in the chart on the right, 97 per cent of Fraser Health's in-scope emissions are attributed to the stationary fuel combustion and purchased energy from our buildings. This is the largest area to focus our mitigation efforts on.

Fraser Health's 2016 carbon emissions were 37,136 tCO<sub>2</sub>e, including a 12 tCO<sub>2</sub>e adjustment from 2015. This represents a two per cent increase from 2015 and an estimated 1.5 per cent increase in the carbon footprint since 2007. This is a great achievement since the Fraser Health facilities and staffing portfolios have grown significantly during the same time period. Fraser Health's useable facility space has increased by 28 per cent and full time equivalent positions have increased by 30 per cent.

To become carbon neutral in 2016, Fraser Health purchased carbon offsets from the Ministry of Environment at a total cost \$974,820.

**"The environmental impact from health care facilities, operations, and services affects the health of the populations and patients they are meant to serve."** - Adapted from World Health Organization and Health Care without Harm

### Fraser Health 2016 Greenhouse Gas (In-Scope) Emissions





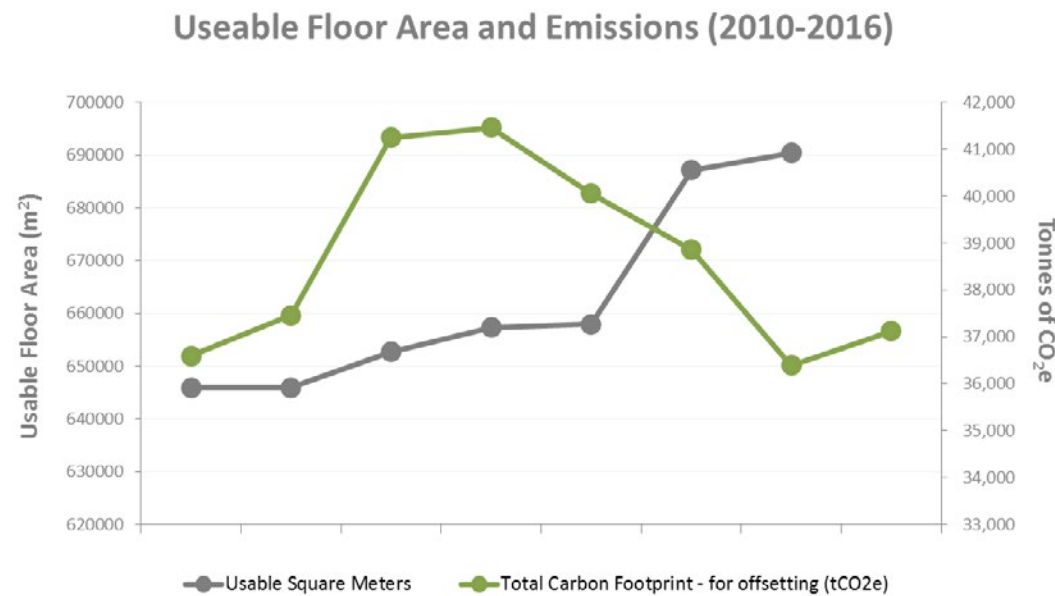
## Changes to Fraser Health's Portfolio

The carbon emissions reported are not adjusted for changes in weather temperature. Vancouver and the Fraser Valley have a climate which predominately requires heating to satisfy internal building temperatures. The use of Heating Degree Days is a method designed to reflect the demand for energy required to heat a building. The Heating Degree Days stated in the table above for 2016 indicate a two per cent increase in the heating energy demand compared to 2015. This will have a direct effect on the carbon emission, due to the increased natural gas consumption from the stationary combustion plant.

| Fraser Health                                 |         |         |         |         |         |
|-----------------------------------------------|---------|---------|---------|---------|---------|
| BUILDINGS, FTE AND WEATHER                    | 2007    | 2013    | 2014    | 2015    | 2016    |
| Distinct FHA Buildings:                       | n/a     | 150     | 153     | 151     | 153     |
| % Owned:                                      | n/a     | 80%     | 82%     | 82%     | 81%     |
| % Leased:                                     | n/a     | 20%     | 18%     | 18%     | 19%     |
| Usable Square Meters <sup>1</sup> :           | 538,274 | 635,226 | 681,528 | 681,264 | 686,942 |
| Full-Time Employee Equivalents <sup>2</sup> : | 14,029  | 16,964  | 17,584  | 17,997  | 18,298  |
| Weather (Heating Degree Days) <sup>3</sup> :  | 2,870   | 2,820   | 2,627   | 2,490   | 2,537   |

Fraser Health has been able to achieve significant energy and greenhouse gas reductions despite the fact that our overall floor area has been growing for the last few years with the addition of several new sites. This has largely been due to the energy retrofit and conservation programs in our existing buildings and the integration of high energy efficiency guidelines standards in new buildings.

Taking into consideration the portfolio growth, the overall emissions per useable floor area in 2016 has actually decreased by 21 per cent since 2007.



<sup>1</sup> Usable area excludes roof tops, interstitial spaces and parking areas

<sup>2</sup> FTE data provided by Ministry of Health

<sup>3</sup> The Heating Degree Days are taken from Vancouver Airport using a base temperature of 18°C

Nearly 97 per cent of Fraser Health's carbon footprint is related to stationary fuel combustion and purchased energy from the energy consumed in its owned and leased buildings. Natural gas is the predominant fossil fuel used for space heating, hot water and process loads in our stationary combustion plants. Carbon emissions associated with our use of natural gas make up 95 per cent of building emissions.

| FRASER HEALTH   |                                                |               |               |               |               |               |
|-----------------|------------------------------------------------|---------------|---------------|---------------|---------------|---------------|
|                 | Our Carbon Footprint (in tCO2e)                | 2007          | 2013          | 2014          | 2015          | 2016          |
| CO <sub>2</sub> | Mobile Fuel Combustion:                        | 136           | 126           | 124           | 106           | 114           |
|                 | Stationary Fuel Combustion:                    | 35,404        | 38,622        | 37,736        | 34,875        | 35,948        |
|                 | Supplies (paper):                              | 1,056         | 1,320         | 1,010         | 1,434         | 1,081         |
|                 | Carbon Footprint <sup>4</sup> :                | 36,596        | 40,067        | 38,870        | 36,415        | 37,143        |
|                 | Emissions not requiring Offsets <sup>5</sup> : | - 8           | - 17          | - 12          | - 19          | - 20          |
|                 | <b>Total Carbon Footprint:</b>                 | <b>36,587</b> | <b>40,050</b> | <b>38,859</b> | <b>36,396</b> | <b>37,124</b> |
|                 | Adjustments / Corrections <sup>6</sup> :       | 0             | 5             | 0             | - 3           | 12            |
|                 | <b>Carbon Offsets (tCO2e):</b>                 | <b>36,587</b> | <b>40,055</b> | <b>38,859</b> | <b>36,393</b> | <b>37,136</b> |
| \$              | Purchased Carbon Offsets <sup>7</sup> :        | n/a           | \$1,043,543   | \$1,020,128   | \$955,001     | \$974,820     |
| KPI             | Emissions per FTE:                             | 2.61          | 2.36          | 2.21          | 2.02          | 2.03          |
|                 | Emissions per usable space:                    | 0.068         | 0.063         | 0.057         | 0.053         | 0.054         |

Although our priority actions are to focus on our natural gas combustion plant, we are still motivated to reduce purchased energy (electricity) and other in-scope emission sources.



Figure 1: Fraser River in New Westminster by the Royal Columbian Hospital

<sup>4</sup> It was estimated that Fugitive Emissions from cooling equipment do not comprise more than 0.01% of Fraser Health's total emissions and have been deemed out-of-scope and have not been included in our total greenhouse gas emissions profile.

<sup>5</sup> As outlined in the Carbon Neutral Government Regulation of the Greenhouse Gas Reductions Target Act, some emissions do not require offsets.

<sup>6</sup> Carbon Footprint adjustments due to building data corrections from the Climate Action Secretariat.

<sup>7</sup> Purchased Carbon Offsets represent the actual invoice amount to purchase offsets in the specific calendar year and include taxes.



# Actions Taken To Reduce Our CO<sub>2</sub> Footprint

## 2016 List of Actions Taken to Reduce CO<sub>2</sub> Footprint

### Stationary Emissions (Buildings):

- In 2016, Fraser Health continued its effort to further reduce our environmental impact by initiating 20 retrofit projects with a total estimated energy savings of 6.9 eGWh (24,700 GJ), resulting in greenhouse gas savings of 1,005 tCO<sub>2</sub>e.
- Fraser Health fully utilized the Carbon Neutral Capital Program to fund several energy / greenhouse gas emission reduction projects at Felburn Care Centre, Mission Memorial and Ridge Meadows Hospitals. Over \$1 million of Carbon Neutral Capital Program funds, combined with internal capital funds and incentives were invested and 43 per cent of the above greenhouse gas savings are a result of this program.
- Fraser Health completed the second year of the Green Revolving Fund; a successful initiative which allows us to re-invest funds created through electricity energy savings.
- Fraser Health completed a Fortis Custom Study at Burnaby Hospital and commenced with three further studies at Chilliwack General, Eagle Ridge and Ridge Meadows Hospitals.
- Fraser Health implemented over 35 optimization energy conservation measures at Chilliwack General, Eagle Ridge and Mission Memorial hospitals, as part of the BC Hydro / Fortis BC Continuous Optimization Program.
- Fraser Health continued to roll out an engagement strategy with facilities maintenance and operations, adding Burnaby Hospital to four existing sites. The strategy focuses on energy use in buildings, identification of reduction opportunities and optimization of existing equipment/plants.
- Fraser Health continues to embed sustainability across the organization by supporting staff engagement initiatives such as the Green+Leaders program, the GreenCare community website, and the BC Hydro Energy Wise program.
- Fraser Health updated our *Energy and Environmental Sustainability Design Guidelines for New Construction and Major Renovation Projects* with the intent to ensure health care related new construction and major renovation projects are built to the highest standard of human, environmental health, performing efficiency and financial investment.

### Mobile Fleet Combustion (Fleet and other vehicles)

- In 2016, Fraser Health reduced its fleet vehicles from 43 to 37.
- Eight electric vehicle charging stations were installed and activated, making a total of 50 at eight Fraser Health sites.
- Fraser Health continued the shuttle transport service for ambulatory patients, family members and courier packages between three facilities and the Sky Train station at Surrey City Centre. In 2016, the shuttle facilitated the transfers of 40,969 passengers and 46 packages.
- Fraser Health now has 509 bike parking stalls.
- In 2016, 65 Fraser Health employees registered with the carpool / ride-match program (Carpool.ca), connecting health care staff to carpool with colleagues at the same Fraser Health site.

### Supplies (Paper)

- In 2016, 15 volunteers joined the Fraser Health Green+Leader program, making a total of 91 active Green+Leaders in Fraser Health. As part of the waste reduction campaign, they were supplied with toolkits to reduce paper use through double-sided printing, paperless meetings and more.
- Fraser Health continued to provide inspiration, tips and toolkits to reduce waste, including paper use, on the GreenCare Community website. Fraser Health currently has 1,400 staff registered for the GreenCare Community.

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

- One hundred and sixty Fraser Health staff participated in the 2016 Clean Commuter and Wellness Challenge, a campaign which encouraged staff to choose healthier transportation, such as walking, biking, carpooling or taking transit.
- Education and awareness communications via the GreenCare Community website, as well as stories published on Fraser Health's internal communication channels, continued to promote behavior change and celebrate environmental sustainability success.
- Training, resources, toolkits, and recognition support staff champions through the Green+Leaders program.
- The Lower Mainland Energy Environment and Sustainability team educated 208 employees on waste management process and trained 22 to become recycling champions.



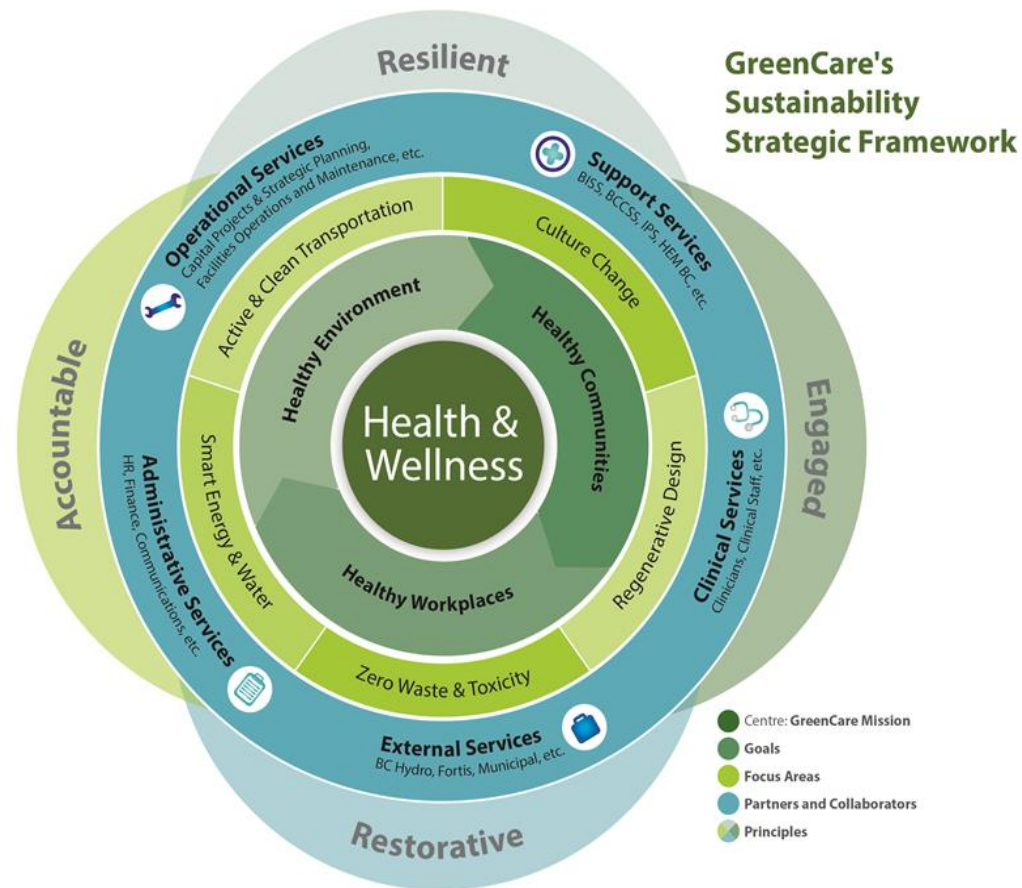
# Future Actions to Reduce Our CO<sub>2</sub> Footprint

## Fraser Health Plans to Continue Reducing Greenhouse Gas Emissions and Energy Use By:

- **Planning and implementing greenhouse gas / energy reduction projects** in our existing building portfolio by using the Carbon Neutral Capital Program and supplementing with internal capital funds and incentives from BC Hydro and Fortis BC.
- **Continuing the optimization of mechanical plants and controls** in our existing building portfolio.
- **Reinvesting 90 per cent of electricity savings** from F17 fiscal year to supplement our Green Revolving Fund and invest into electricity reduction projects.
- **Engaging with design engineers** to ensure our new buildings adopt energy efficient design principles.
- **Undertaking site energy studies**, with support from facilities maintenance operations employees and external consultants, to identify greenhouse gas / energy reduction opportunities.
- **Engaging and educating Fraser Health employees**, through the Green+Leaders program, GreenCare Community and the BC Hydro Energy Wise program.
- **Developing a roadmap for a strategic adaption climate resilience plan.**
- **Building partnerships with cities and municipalities** to investigate

district energy systems opportunities with alternative energy solutions.

- **Working with GreenCare's refreshed strategic framework** to advance health care practices that respect environmental stewardship, in recognition that the environmental impact from health care facilities, operations, and services influence the health of the populations and patients we serve. Fraser Health 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.



# Success Story: Project Collaboration

Reducing energy can be a challenge for health authorities with heavy demand related to 24-hour operations, specialized equipment, and service requirements for hospital operations. Fraser Health's energy management team uses a collaborative and coordinated approach to combat this challenge.

In 2016, Fraser Health celebrated the success of these coordinated efforts at Ridge Meadows Hospital. The facilities maintenance and operations team including Doug Davis, Shaun Keech and Rick Molnar worked closely with the energy management team including Robert Bradley, Kori Jones and Jeson Mak, to install a new condensing boiler, and upgrade the controls on the ventilation systems.



Figure 2: Ridge Meadow's Maintenance and Operations Staff and Corporate Energy Management Staff

The installation of these measures was completed in March 2016. External funding sources including the Carbon Neutral Capital Program and financial incentives from both Fortis BC and BC Hydro were instrumental in completing these measures. A full year of measurement and verification confirmed the estimated energy savings were achieved. The total natural gas and electricity savings are respectively 5,000 GJ and 183,000 kWh, resulting in a greenhouse gas emission savings of over 250 tCO<sub>2</sub>e.

"We were approached by our energy team to investigate the possibility of a boiler expansion at Ridge Meadows Hospital. I found the whole process to be incredibly collaborative. They included us in decisions with regards to types of equipment, location, scope adjustments, schedule and implementation of the project. I am glad we have an energy management team that is proactive and always looking for ways to improve our facilities and are willing to invest in infrastructure to make those improvements. This project is a great example of what happens when we work together." says Rick Molnar, facilities maintenance and operations team manager for Ridge Meadows Hospital.

The collective efforts continued after the initial project with implementation of new chillers, heat pumps, and cooling towers by the end of 2016. In addition to capital upgrades, energy management and facilities maintenance and operations teams continued to collaborate on a new energy study aimed at building on the momentum gained from the 2016 projects. The newly identified measures will include hot water heat exchangers and a boiler stack economizer. The goal is to improve the efficiency of the condensing boiler and heat pumps implemented through the first two phases. These measures, targeted for completion in 2017, will move Ridge Meadows Hospital further towards optimal energy efficiency.

Fraser Health demonstrates a shared commitment to reducing our carbon footprint through improvements in energy efficiency. Through the coordinated efforts of the energy management and facilities maintenance and operations teams, the positive momentum is continuing forward. Our multi-phased collective approach is estimated to drop annual emissions by 450 tCO<sub>2</sub>e, which correlates to a 25 per cent reduction in greenhouse gas emissions from 2015. Incorporating energy saving projects prior to 2015, Ridge Meadows Hospital greenhouse gas emissions has dropped by 36 per cent (750 tCO<sub>2</sub>e) since 2010.



# Providence Health Care's 2016 Carbon Neutral Action Report



## Declaration Statement

This Carbon Neutral Action Report for the period January 1st, 2016 to December 31st, 2016 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2017 Providence Health Care's final Carbon Neutral Action Report will be posted to our website at [bcgreencare.ca](http://bcgreencare.ca)

The cover photo is the exterior of the existing St. Paul's Hospital in Downtown Vancouver.





# Executive Summary



## Executive Summary: Providence Health Care, CNAR 2016

Dianne Doyle, President & Chief Executive Officer

It gives me great pleasure to present Providence Health Care's (PHC) seventh annual Carbon Neutral Action Report (CNAR) for 2016.

For seven consecutive years, PHC has been proud to be carbon neutral. As an organization driven by innovation and social justice, we believe that our role as health care providers goes beyond caring for individuals and to caring for the environment, too.

With over one hundred years of service to the local community, we consider our role as stewards to be one of our most deeply held responsibilities. For us, that includes taking personal responsibility for the carbon footprint produced by our operations and facilities.

In 2016, PHC had a carbon footprint of 10,972 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e), which was offset at a total cost of \$288,015. This represents a 4.9 percent decrease from the 2007 PHC carbon footprint. Compared to the first year we paid offsets (2010), PHC's carbon offset cost has decreased by \$40,229.

In 2017, we will continue to improve our environmental performance through improved energy efficiency, coordinated efforts, and education. These projects have a positive impact; saving energy, decreasing air pollution, and ultimately adding to the health and wellness of facilities, workplaces and the communities we serve.



Date: May 25<sup>th</sup> 2017

Dianne Doyle  
President & Chief Executive Officer  
Providence Health Care

Healthy people  
Healthy planet



# Our CO<sub>2</sub> Footprint

## 2016 GREENHOUSE GAS EMISSIONS BREAKDOWN AND OFFSETS APPLIED TO BECOME CARBON NEUTRAL

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

CAS uses various elements of reporting, based on the GHG Protocol Corporate Standard, which has classified carbon reporting into three scopes. Of these three scopes and various elements within each, CAS has determined Providence Health Care carbon footprint to comprise of six different greenhouse gases, which are converted to tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). These gases are categorized in three main categories:

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

### Providence Health Care

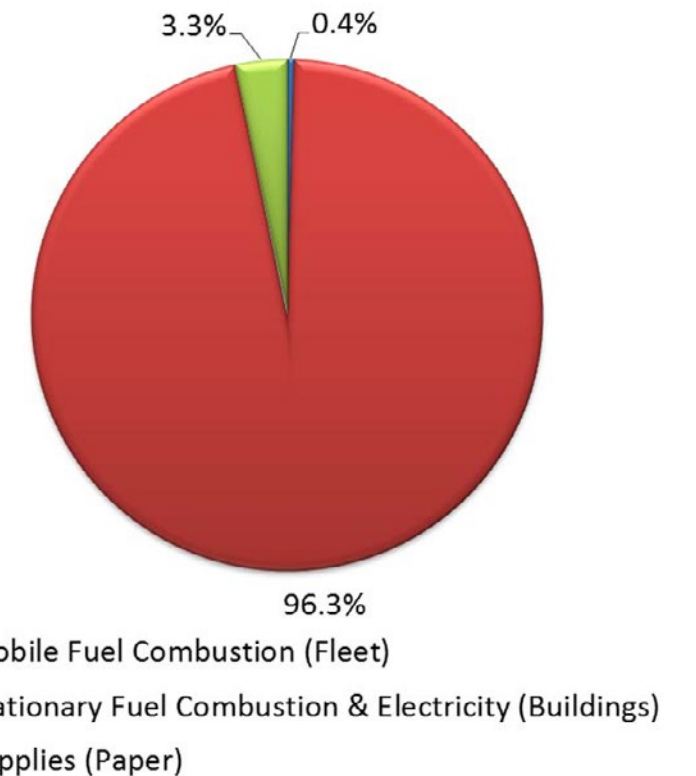
PHC's 2016 Carbon footprint offset was 10,972 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). That represents a 4.9% decrease in PHC's carbon footprint since 2007.

Over 95% of Providence Health Care's in-scope emissions are attributed to the building portfolio.

To become carbon neutral in 2016, Providence Health Care purchased carbon offsets at a total cost of \$288,015.

"The environmental impact from healthcare facilities, operations, and services affects the health of the populations and patients they are meant to serve." - Adapted from World Health Organisation & Healthcare without Harm

## 2016 Providence Health Care's Greenhouse Gas (In-Scope) Emissions by Source





## CHANGES TO PROVIDENCE HEALTH CARE'S PORTFOLIO

PHC's useable facility space (measured in usable square meters) has increased by almost 2% since 2007. During the same time, the number of staff (measured in full time equivalents) has increased by 15%.

| Providence Health Care                                         |                 |         |         |         |         |         |         |         |         |
|----------------------------------------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|
| BUILDINGS, FTE AND WEATHER                                     |                 | 2007    | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    |
| <b>Distinct PHC Buildings</b>                                  |                 | n/a     | 35      | 39      | 37      | 40      | 37      | 36      | 36      |
|                                                                | <b>% Owned</b>  | n/a     | 94%     | 93%     | 93%     | 91%     | 92%     | 92%     | 92%     |
|                                                                | <b>% Leased</b> | n/a     | 6%      | 7%      | 7%      | 9%      | 8%      | 8%      | 8%      |
| <b>Usable Square Meters<sup>1</sup></b>                        |                 | 174,002 | 182,161 | 182,994 | 176,186 | 179,222 | 178,157 | 177,216 | 177,159 |
| <b>Full-Time Employee Equivalents<sup>2</sup></b>              |                 | 4,038   | 4,208   | 4,490   | 4,977   | 4,748   | 4,580   | 4,686   | 4,760   |
| <b>Weather (summarized in Heating Degree Days)<sup>3</sup></b> |                 | 2,870   | 2,621   | 2,963   | 2,859   | 2,820   | 2,627   | 2,489   | 2,537   |

<sup>1</sup> Usable area excludes roof tops, interstitial spaces, and parking areas.

<sup>2</sup> Full-Time Employee data was provided by the Ministry of Health.

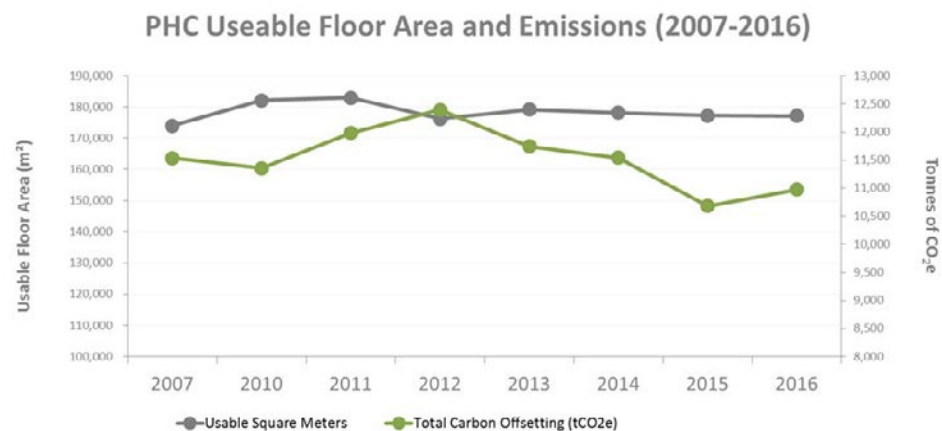
<sup>3</sup> Heating Degree Days (HDD's) is a measurement designed to reflect the demand for energy needed to heat a building.

Despite increases in floor area and staff, PHC's carbon footprint has decreased since 2007. PHC's 2016 emissions per full-time employee (2.30 tCO<sub>2</sub>e/FTE) have decreased by 17% since 2007. PHC's 2016 emissions per unit of floor area (0.06 tCO<sub>2</sub>e/m<sup>2</sup>) have decreased 6% since 2007.

The carbon emissions reported are not adjusted for changes in weather. The use of Heating Degree Days (HDD's) is a metric designed to reflect the demand for energy required to heat a building. The HDD's for 2016 were 12% below those recorded in 2007, which reduced the demand for space heating and associated natural gas usage compared to 2007; this was a factor contributing to PHC's GHG reduction results.

| Providence Health Care                            |                                                        |               |                   |                   |                   |                   |                   |                   |                   |
|---------------------------------------------------|--------------------------------------------------------|---------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Our Carbon Footprint (in tCO <sub>2</sub> e)      |                                                        | 2007          | 2010              | 2011              | 2012              | 2013              | 2014              | 2015              | 2016              |
| CO <sub>2</sub>                                   | Mobile Fuel Combustion (Fleet)                         | 15            | 15                | 21                | 47                | 47                | 43                | 45                | 48                |
|                                                   | Stationary Fuel Combustion & Electricity (Buildings)   | 11,448        | 11,265            | 11,892            | 12,081            | 11,440            | 11,145            | 10,267            | 10,569            |
|                                                   | Supplies (Paper)                                       | 70            | 70                | 72                | 271               | 260               | 358               | 371               | 359               |
|                                                   | <b>Total Carbon Footprint (tCO<sub>2</sub>e)</b>       | <b>11,533</b> | <b>11,351</b>     | <b>11,985</b>     | <b>12,400</b>     | <b>11,747</b>     | <b>11,546</b>     | <b>10,682</b>     | <b>10,975</b>     |
|                                                   | Emissions Which Do Not Require Offsets <sup>1, 2</sup> | -1            | -1                | -4                | -7                | -5                | -5                | -5                | -4                |
|                                                   | <b>Total Carbon Footprint (tCO<sub>2</sub>e)</b>       | <b>11,532</b> | <b>11,350</b>     | <b>11,981</b>     | <b>12,393</b>     | <b>11,742</b>     | <b>11,542</b>     | <b>10,677</b>     | <b>10,972</b>     |
|                                                   | Adjustments / Corrections                              | 0             | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| <b>Total Carbon Offsetting (tCO<sub>2</sub>e)</b> |                                                        | <b>11,532</b> | <b>11,350</b>     | <b>11,981</b>     | <b>12,393</b>     | <b>11,742</b>     | <b>11,542</b>     | <b>10,677</b>     | <b>10,972</b>     |
| \$                                                | Purchased Carbon Offsets                               | \$ -          | \$ 293,075        | \$ 289,550        | \$ 309,575        | \$ 294,525        | \$ 288,550        | \$ 266,925        | \$ 274,300        |
|                                                   | <b>Purchased Carbon Offsets +HST / GST</b>             | <b>\$ -</b>   | <b>\$ 328,244</b> | <b>\$ 324,296</b> | <b>\$ 325,054</b> | <b>\$ 309,251</b> | <b>\$ 302,978</b> | <b>\$ 280,271</b> | <b>\$ 288,015</b> |
| KPI                                               | Emissions per Full-Time Employee                       | 2.86          | 2.70              | 2.67              | 2.49              | 2.47              | 2.52              | 2.28              | 2.30              |
|                                                   | Emissions per Meter Square Facility Space              | 0.066         | 0.062             | 0.065             | 0.070             | 0.066             | 0.065             | 0.060             | 0.062             |

Overall since 2007, PHC's carbon footprint has decreased, while usable floor area has increased.



## Actions Taken To Reduce Our CO<sub>2</sub> Footprint

### 2016 LIST OF ACTIONS TAKEN TO REDUCE CO<sub>2</sub> FOOTPRINT

#### Stationary Emissions (Buildings)

- PHC initiated the implementation phase of BC Hydro's Continuous Optimization Program at two sites in 2016; at St. Vincent's Langara and Holy Family Hospital as well as the investigation phase at St. Paul's Hospital campus, specifically focused on the Providence Phase I and Phase II buildings
- PHC completed a heat recovery project at St. Paul's Hospital campus, which was initiated in 2015 using the Carbon Neutral Capital Program (CNCP) funding
- PHC initiated a boiler replacement project at St. Vincent's Youville residential care facility in 2016 using CNCP funding
- The PHC energy management team began to roll out an engagement strategy with Facilities Maintenance and Operations (FMO) departments, focused initially at St. Paul's Hospital, 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.
- PHC's Energy Management team were 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.
- PHC's energy team continue to promote energy conservation and GHG emissions reduction through awareness and behaviour change programs, such as Green+Leaders, GreenCare Community website, the BC Hydro Energy Wise Network program, and FortisBC's Communication Education and Outreach program.



## Mobile Fleet Combustion (Fleet and other vehicles)

- PHC has one 120v electric vehicle charging station at St. Paul's Hospital, which is located downtown Vancouver in the West End (51 regular plug-ins are also available throughout the parkade).
- PHC partners with Provincial Health Services Authority and Vancouver Coastal Health to provide a shuttle service between sites. In 2016, 22,861 PHC staff used the shuttle from various Vancouver sites.
- 56 PHC staff participated in the 2016 Clean Commuter & Wellness Challenge (CCWC); a campaign to motivate PHC staff to leave their car at home and commute in an active and clean way.
- PHC added 9 new bike parking stalls, for a total of 235.

## Supplies (Paper)

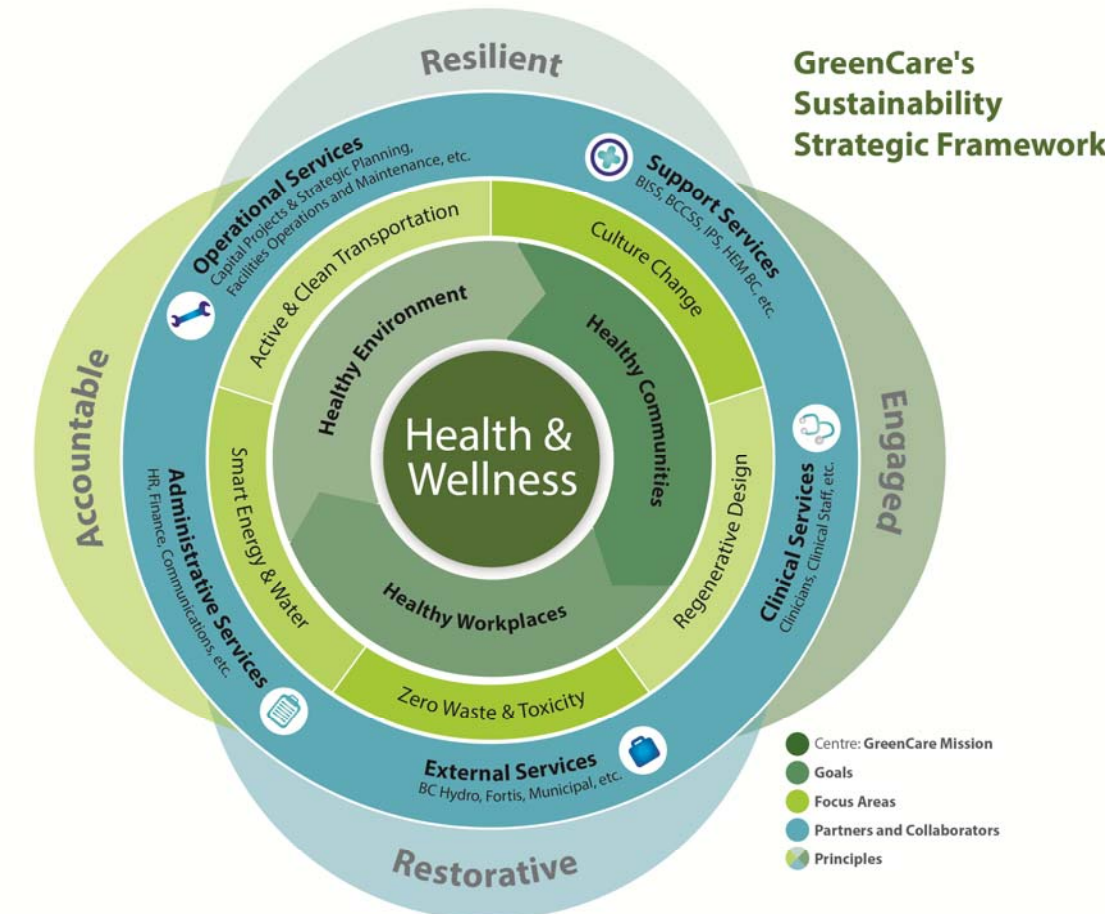
- As part of the Green+Leader program, a paper/waste reduction campaign supports volunteers with Paperless Meeting Toolkits to encourage their colleagues to reduce paper use.
- PHC encouraged teleconferencing for meetings by installing web- conferencing hardware / software at various sites.

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

- The Green+Leaders (G+L) behaviour change program at PHC now has a total of 16 active staff volunteers who help improve the environmental sustainability of PHC operations, and a total of 22 have been trained over the years.
- PHC continues to support the GreenCare Community (GCC) site, which provides tips and toolkits on using less paper, as well as other environmental sustainability initiatives linked to health and wellness. In 2016, PHC had 467 staff registered on the site.
- Education and awareness communication via the GreenCare Community, as well as stories published in PHC news and various internal communication channels, continue to champion behaviour change and celebrate environmental sustainability success.

## Providence Health Care plans to continue reducing GHG emissions and Energy in the following ways:

- **Optimizing our Existing Buildings:** Planning and implementing GHG / 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 performance targets to ensure that our new buildings are as energy efficient as possible.
- **Systemic Change:** Leveraging and promoting our Sustainability Policy, and 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 the BC Hydro Energy Wise Network and FortisBC's Communication, Engagement and Outreach program.
- **Innovation and Demonstration:** Promoting innovative approaches and taking other small "seedling actions" to prepare for larger innovation as appropriate opportunities arise.
- **Align with our Core Mandate:** Working with GreenCare's refreshed Strategic Framework; Providence Health Care 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. Providence Health Care 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.





# Success Story

## Bobbie Bees, 4th Class Power Engineer at St. Paul's Hospital.

The Facilities Maintenance and Operations (FMO) staff at Providence Health Care are pivotal in their role of supporting energy efficiency projects and upgrades that contribute to healthier facilities, stronger communities and a healthier environment.

Read our interview between PHC's Energy Manager, Alex Hutton (AH) and Bobbie Bees (BB). You'll learn how Bobbie, a 4th Class Power Engineer working at the St. Paul's Hospital campus, is using his knowledge and passion for efficiency is helping to ensure patient comfort and simultaneously identify energy saving opportunities.

**AH: "Tell us about yourself and describe your role within health care."**

**BB:** "I'm a former military dependant and I moved around a lot as a kid. I've made my home in Vancouver since 1992. I've been involved with commercial property management since back in the '90s when I started off performing maintenance for a small property management firm in Richmond. Since then it's been a steady climb up the ladder. The most prominent building that I was responsible for was the Vancouver Block at 736 Granville St. As I was the Chief Engineer with the management company I had direct input into the \$13.5 million dollar upgrades that were undertaken at the building.

My current role in health care is to ensure that the St. Paul's Hospital facility is as safe and as comfortable as possible by ensuring that the HVAC systems run as intended at all times."

**AH: "As a 4th Class Power Engineer at SPH, what do you do?"**

**BB:** "My job is primarily to ensure that our large ventilation systems run as intended with the least amount of downtime. I've also been given the responsibility of ensuring that all of our combination fire and smoke dampers are operating as required so that in the event of an emergency they will function as required and hopefully prevent injuries and minimize property damage. I have also been involved with recent upgrades to the HVAC equipment in order to bring as much efficiency and reliability to the physical plant as is feasible."

**AH: "What support do you receive for energy management at PHC?"**

**BB:** "I am asked to participate in meetings to voice my ideas and concerns. I am also encouraged to increase my knowledge of advancements in energy management by attending seminars."

**AH: "What are you proud of in your work?"**

**BB:** "I am the most proud of being the "go to" guy whenever the managers of the other departments need straight answers. My opinions and ideas are often taken into account, such as the recent cooling tower replacement project and the heat recovery project."

*Bobbie's input into the review of a potential cooling tower replacement project at SPH was invaluable in helping to ensure that the team arrived at an optimal solution that would replace aging equipment while also helping to solve some existing challenges while also improving energy efficiency.*

*Bobbie's input was also critical to the heat recovery project at SPH that was completed using Carbon Neutral Capital Program (CNCP) funding.*

**AH: "What do you see as the benefits of the recent heat recovery project at SPH, aside from the energy savings?"**

**BB:** "Chiller #2 is not functioning optimally, primarily due to the fact that too many different chilled water loops were attached to the machine. Separate to the heat recovery upgrade, but triggered none the less by the heat recovery upgrade, the chiller's chilled water loop will be re-piped in such a manner that it will have specific loads that it will be responsible for, and it will no longer be directly tied into the main loops.

This should allow for us to utilize the recovered heat energy that currently is discharged into the atmosphere to instead to pre-heat our supply air in the Phase I building. This also means that we will be able to shut down chillers #1 and #3 during the winter months."

**AH: "Are there any other comments or anecdotes that would like to share regarding energy management at SPH?"**

**BB:** "I would love to see more green technologies put to use in the facilities. The Phase I and Phase II roofs would be perfect for either a photovoltaic farm or a solar hot water heating farm. Even if the photovoltaics didn't power the entire facility, they should be able to handle the 120 volt lighting in the towers. Or if a Hot water solar array was put in, it should be able to contribute significantly to the DHW systems in Phase I and Phase II which would hopefully reduce our steam consumption from Cascadia Energy."

**AH: "Thanks again for your active engagement in our efforts towards improving energy management."**

*Bobbie's ideas regarding installation of a solar photovoltaic and solar hot water arrays are something the energy management team has on their radar and which we intend to explore further at sites which are more certain to remain in Providence's portfolio for the foreseeable future. Such projects are more likely to be viable now that the CNCP enables funding for carbon reduction projects that would otherwise be virtually impossible to fund within the constraints of other funding streams that are focused on meeting immediate clinical needs.*





# Provincial Health Services Authority's 2016 Carbon Neutral Action Report



## Declaration Statement

This Carbon Neutral Action Report for the period January 1 to December 31, 2016 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2017 Provincial Health Services Authority's final Carbon Neutral Action Report will be posted to our website at [bcgreencare.ca](http://bcgreencare.ca)



The cover photo is of the BC Cancer Agency Centre for the North, Prince George, BC.  
This new facility was certified LEED Gold in 2014.





# Executive Summary



## Executive Summary: Provincial Health Services Authority

Carl Roy, President & Chief Executive Officer

I am pleased to present the seventh annual Carbon Neutral Action Report, which highlights PHSA actions to reduce our carbon footprint, and link environmental sustainability to public health and wellness.

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

In 2016, PHSA had a carbon footprint of 18,297 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e), which was offset at a total cost of \$480,296. This represents a 24 per cent decrease from the 2007 PHSA carbon footprint. This decrease is even more significant given that PHSA assumed responsibility for added services, programs and staff during this period.

In 2016, PHSA completed six energy conservation projects, with a total estimated savings of 1,061,847 kilowatt-hours of electricity and 17,039 gigajoules of gas, which equates to a greenhouse gas reduction of 862 tCO<sub>2</sub>e.

I want to recognize PHSA's Energy Management team, who work closely with Facilities Maintenance and Operations teams to reduce emissions, and our entire staff who support their efforts. Thanks to their work, PHSA was recognized in 2016, as one of the Greenest Employers in Canada for a fourth consecutive year. This ultimately adds to the health and wellness of our patients, employees and the communities we serve.

Date: May 31<sup>st</sup> 2017

Carl Roy  
President & Chief Executive Officer  
Provincial Health Services Authority



# Our CO<sub>2</sub> Footprint

## 2016 GREENHOUSE GAS EMISSIONS BREAKDOWN AND OFFSETS APPLIED TO BECOME CARBON NEUTRAL

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

CAS uses various elements of reporting, based on the Greenhouse Gas (GHG) Protocol corporate standard, which has classified carbon reporting into three scopes. Of these three scopes and various elements within each, CAS has determined PHSA's carbon footprint to comprise of six different greenhouse gases, which are converted to tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). These gases are categorized in three main categories:

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

PHSA's 2016 carbon footprint offset was 18,297 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). That represents a 27 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 95 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 2016, PHSA purchased carbon offsets at a total cost of \$480,296.25.



## CHANGES TO PROVINCIAL HEALTH SERVICES AUTHORITY'S PORTFOLIO

PHSA's useable facility space has decreased 7.7 per cent since 2007, which is largely due to the decommissioning of the Riverview property. During the same time, the number of staff (measured in full time equivalents) has increased by 37.9 per cent. PHSA has controlled increases in facility space to accommodate increased staff by seeking opportunities to optimize existing space use while maintaining safety and efficiency.

| PHSA                                                     |         |         |         |         |         |         |         |         |
|----------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| BUILDINGS, FTE AND WEATHER                               | 2007    | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    |
| Distinct PHSA Buildings                                  | n/a     | 78      | 80      | 69      | 68      | 74      | 73      | 76      |
| % Owned                                                  | n/a     | 57%     | 57%     | 57%     | 69%     | 69%     | 69%     | 68%     |
| % Leased                                                 | n/a     | 43%     | 43%     | 43%     | 31%     | 31%     | 31%     | 32%     |
| Usable Square Meters <sup>1</sup>                        | 388,990 | 389,883 | 392,728 | 400,444 | 355,437 | 358,082 | 358,455 | 358,995 |
| Full-Time Employee Equivalents <sup>2</sup>              | 6,391   | 6,440   | 6,127   | 6,511   | 7,812   | 8,122   | 8,455   | 8,814   |
| Weather (summarized in Heating Degree Days) <sup>3</sup> | 2,870   | 2,621   | 2,963   | 2,859   | 2,820   | 2,627   | 2,489   | 2,537   |

<sup>1</sup> Usable area excludes roof tops, interstitial spaces, and parking areas.

<sup>2</sup> Full-Time Employee data was provided by the Ministry of Health.

<sup>3</sup> Heating Degree Days (HDD's) is a measurement designed to reflect the demand for energy needed to heat a building. Although PHSA's facilities are located across BC, the majority of buildings in the metro Vancouver area, so Heating Degree Days for Vancouver were used for the comparison.

As of 2016, emissions per full-time equivalent (2.08 tCO<sub>2</sub>e/FTE) have decreased by 44.7 per cent since 2007, and emissions per unit of floor area (0.05 tCO<sub>2</sub>e/m<sup>2</sup>) have decreased 17.4 per cent since 2007. The carbon emissions reported are not adjusted for changes in weather. Heating Degree Days (HDDs) is a metric that reflects the demand for energy required to heat a building. The HDDs for 2016 were 12 per cent below those recorded in 2007, which reduced the demand for space heating and associated GHG emissions compared to 2007.

| Provincial Health Service Authority                          |        |        |        |        |                   |        |        |        |
|--------------------------------------------------------------|--------|--------|--------|--------|-------------------|--------|--------|--------|
| Our Carbon Footprint (in tCO <sub>2</sub> e)                 | 2007   | 2010   | 2011   | 2012   | 2013 <sup>2</sup> | 2014   | 2015   | 2016   |
| Mobile Fuel Combustion (Fleet & other mobile equipme         | 189    | 195    | 180    | 203    | 153               | 159    | 159    | 390    |
| Stationary Fuel Combustion & Electricity (Buildings)         | 22,930 | 20,413 | 22,497 | 24,950 | 19,890            | 17,923 | 16,426 | 17,029 |
| Supplies (Paper)                                             | 891    | 891    | 912    | 839    | 771               | 828    | 882    | 893    |
| Total Carbon Footprint (tCO <sub>2</sub> e)                  | 24,010 | 21,499 | 23,590 | 25,992 | 20,815            | 18,911 | 17,467 | 18,312 |
| Emissions Which Do Not Require Offsets <sup>1</sup>          | -9     | -9     | -9     | -10    | -10               | -9     | -10    | -15    |
| Total Carbon Footprint (tCO <sub>2</sub> e)                  | 24,002 | 21,490 | 23,581 | 25,981 | 20,805            | 18,902 | 17,458 | 18,297 |
| Adjustments / Corrections                                    | 0      | 0      | 0      | 0      | 0                 | 0      | 10     | 0      |
| Total Carbon Footprint - for offsetting (tCO <sub>2</sub> e) | 24,002 | 21,490 | 23,581 | 25,981 | 20,805            | 18,902 | 17,468 | 18,297 |

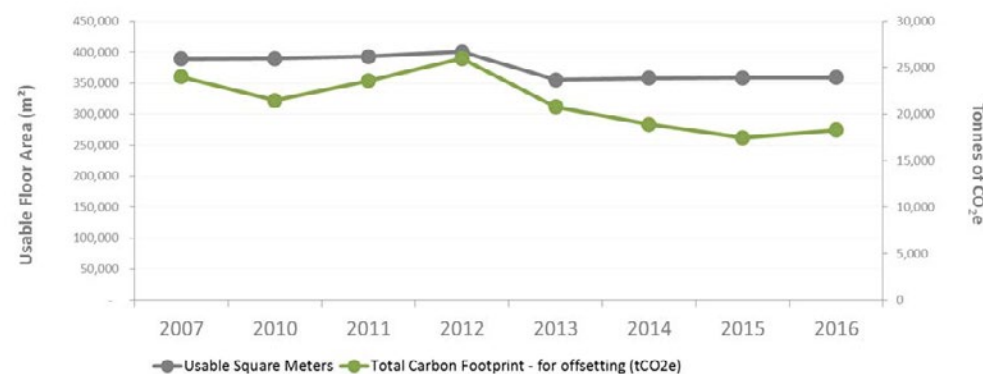
|    |                                     |      |            |            |            |            |            |            |            |
|----|-------------------------------------|------|------------|------------|------------|------------|------------|------------|------------|
| \$ | Purchased Carbon Offsets            | \$ - | \$ 628,000 | \$ 485,700 | \$ 644,750 | \$ 538,025 | \$ 472,625 | \$ 436,700 | \$ 457,425 |
| \$ | Purchased Carbon Offsets +HST / GST | \$ - | \$ 703,360 | \$ 543,984 | \$ 676,988 | \$ 564,926 | \$ 496,256 | \$ 458,535 | \$ 480,296 |

|     |                                           |       |       |       |       |       |       |       |       |
|-----|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| KPI | Emissions per Full-Time Employee          | 3.76  | 3.34  | 3.85  | 3.99  | 2.66  | 2.42  | 2.07  | 2.08  |
| KPI | Emissions per Meter Square Facility Space | 0.062 | 0.055 | 0.060 | 0.065 | 0.059 | 0.053 | 0.049 | 0.051 |

<sup>1</sup> As outlined in the Carbon Neutral Government Regulation of the Greenhouse Gas Reductions Target Act, emissions do not require offsets.

Overall since 2007, PHSA's usable floor area and emissions have both reduced.

PHSA Usable Floor Area and Emissions (2007-2016)



## Actions Taken To Reduce Our CO<sub>2</sub> Footprint

### 2016 LIST OF ACTIONS TAKEN TO REDUCE CO<sub>2</sub> FOOTPRINT

#### Stationary Emissions (Buildings)

In 2016, PHSA substantially<sup>1</sup> completed six projects, with a total estimated savings of 1,061,847 kWh of electricity and 17,039 GJ of gas, which equates to GHG reduction of 862 tonnes of carbon (tCO<sub>2</sub>e). These projects included the following:

- **TRB Optimization:** An optimization project at the Translational Research Building on the BC Children's and Women's Hospitals campus (C&W).
- **MHB Optimization:** An optimization project at the Mental Health Building on the C&W campus consisting mainly of hydronic adjustments.
- **BCCHRI Cooling Towers:** Two cooling towers were replaced that serve the BC Children's Hospital Research Institute (BCCHRI) on the C&W campus. The new cooling towers are "induced draft" towers that consume one eighth as much energy.
- **BCCHRI Retro-Commissioning:** Phase 2 of a retro-commissioning project for the BCCHRI was largely completed, consisting primarily of ventilation adjustments.
- **BCCRC Heat Recovery Chiller:** A major heat recovery chiller project spanning two fiscal years at the BC Cancer Research Centre with significant projected energy savings through an innovative mechanical design. Refer to the Feature Project at the end of this document for more details.

In addition, four other energy savings projects were in progress at PHSA during 2016, with estimated savings once complete of 0.16 GWh of electricity, and 19,409 GJ of gas, which equates to GHG reduction of 970 tCO<sub>2</sub>e. These projects include the following:

- **TACC New Construction:** An energy efficient design for the new Teck Acute Care Centre building at C&W campus was under construction during 2016.
- **C&W Heat Recovery:** A CNCP-funded heat recovery project at C&W campus.
- **FVCC Optimization:** An optimization project at the BC Cancer Agency's Fraser Valley Centre consisting mainly of controls optimization measures.
- **VCC Optimization:** An optimization project at the BC Cancer Agency's Vancouver Centre consisting mainly of controls optimization measures.

Other initiatives taken to reduce emissions from buildings:

- PHSA's Energy Management team made further refinements to GreenCare's **Energy and Environmental Sustainability Design Guidelines** for New Construction and Major Renovation projects intended to ensure that new buildings are built to the highest standard of energy efficiency within financial constraints.
- The PHSA Energy Management team began to roll out an **engagement strategy** with Facilities Maintenance and Operations departments, focused initially at C&W campus, with plans to expand to all major owned sites over time. The focus is to identify reduction opportunities.

<sup>1</sup> One of the projects is in the final stages of commissioning





## Mobile Fleet Combustion (fleet and other vehicles)

In 2016, PHSA's Transportation Demand Management Coordinator worked to improve, promote and establish alternative transportation opportunities for PHSA staff.

- PHSA has six (5-120v; 1-240v) **electric vehicle-charging stations** across two core sites.
- PHSA partners with Vancouver Coastal Health and Providence Health Care to provide a **shuttle service** between sites. In 2016, the shuttle provided transportation for 19,628 staff to and from PHSA facilities, reducing up to this number of single occupancy vehicle trips.
- PHSA continues to operate a staff shuttle between C&W campus, staff off-site parking lot and King Edward Station that transported **117,172 passengers** in 2016.
- PHSA has **739 bike parking stalls**.
- PHSA **encourages teleconferencing** for meetings using web-conferencing hardware and software available at various sites.

## Supplies (Paper)

Initiatives to reduce paper consumption include:

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

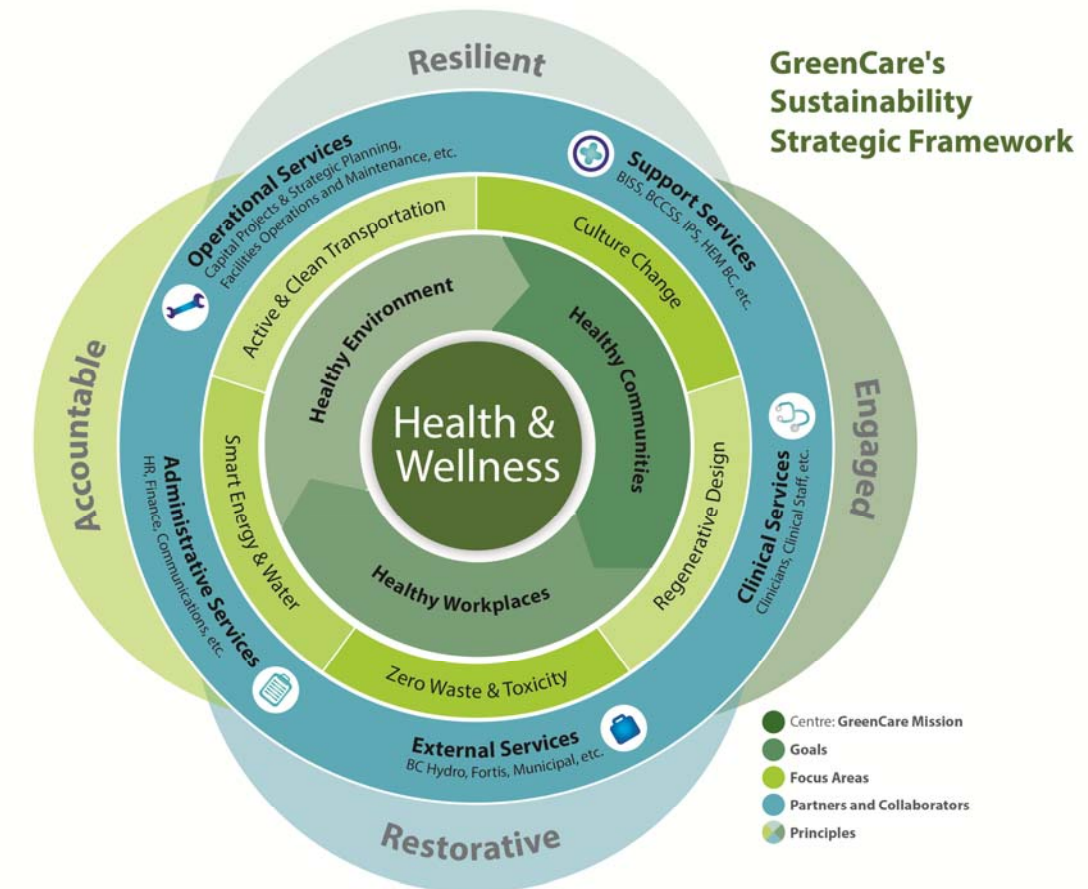
## Actions that fall outside the scope of the Carbon Neutral Government Regulations:

Other actions that fall outside the scope of CNG regulations include:

- PHSA provided **training, resources, toolkits and recognition** to support the Green+Leader program and various green teams in PHSA.
- The **Green+Leaders** behaviour change program recruited **25 new volunteers** for PHSA in 2016, making a total of **99 active staff volunteers** across PHSA, and a total of 199 PHSA staff trained since the program began in 2007.
- PHSA has at least four active "**Green committees**" or green teams, which are led by Green+Leaders at those sites; these committees explore and implement a broader variety of sustainability initiatives going beyond the Green+Leaders toolkits
- 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 had **1052 staff registered** on the site in 2016
- **Education and awareness** communication via the GreenCare Community is supplemented by stories published in PHSA news and various internal communication channels; these efforts continue to champion behaviour change and celebrate environmental sustainability successes.
- PHSA supports professional development through workshops and educational sessions sponsored by **BC Hydro** and **Fortis BC**

## Provincial Health Services Authority'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 the BC Hydro and FortisBC engagement programs.
- **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.





# Feature Project

## BC Cancer Research Server Room Heat Recovery Project

The BC Cancer Agency Research Centre houses scientists and researchers conducting research perform various types of research to find the causes of cancer and develop better treatments. The facility has direct links to the cancer centers across the province, so discoveries at the Research Centre can be translated into clinical applications.

The chiller plant serving this building was in need of additional cooling capacity to meet the peak temperature on warm summer days and the increasing cooling load of its evolving server room.

The Energy and Environmental Sustainability team partnered with the BCCRC Facility Maintenance and Operation team to move toward a solution that considered both the operational requirements while minimizing the environmental impact. A detailed energy study was commissioned and a clear opportunity was proposed by the consultant.

The study identified that the cooling for the server room was mainly provided by the two existing less efficient large chillers CH-1 and CH-2, while the smaller heat recovery chiller CH-3 was not working as originally intended. Through extensive trend analysis additional opportunities to optimize the operation and chiller sequencing of the remaining chiller plant were uncovered. In this complex building with a variety of lab environment needs and heat generating equipment there is a year round cooling load; the heat from this process was being rejecting through the cooling towers.

The integration of new rear door cooling racks in the server room and a new two modules heat recovery chiller CH-4 into the central cooling plant was proposed in addition to several other energy optimizing measures. The project design moved forward and had a high level of project support and engagement from the BCCRC Facility Maintenance and Operation team and senior leadership; this collaborative approach assisted with early risk identification and improved overall project coordination.

Several different heat recovery chiller configurations were assessed and the installation of an 80 ton dedicated heat recovery chiller was prioritized to take advantage of the heat recovery to reduce steam consumption; this ensures the greatest operational savings and GHG mitigation.

**Technology:** Heat Recovery Chiller with server room rear door cooling racks and heating water heat exchangers.

**Energy Savings:** An estimated 14,889 GJ per annum of natural gas (due to reduced steam consumption)

**GHG Reductions:** An estimated 741 tCO<sub>2</sub>e/year

**Business Case:** \$1,753 per tonne GHG reduction (excellent use of CNCP funding with comparable projects up to \$5,000/ tCO<sub>2</sub>e)

**Benefits/Co-Benefits:** Additional cooling for the server room; reduced cooling tower maintenance and water consumption

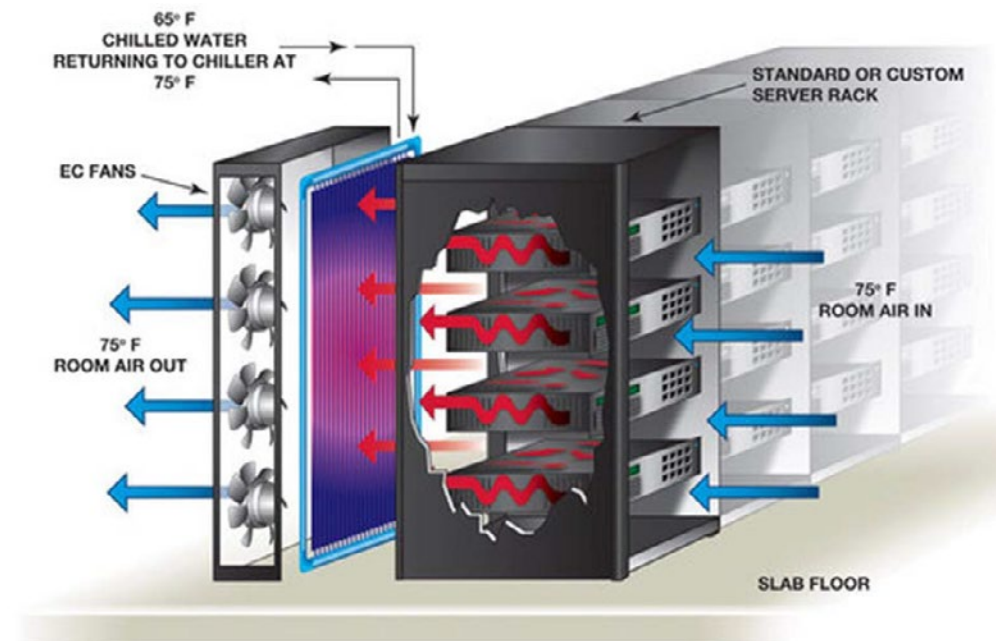
**Total Project Cost:** \$1.3 million

**Operational Cost Savings:** \$100,000 (estimated energy cost savings)

The other integral project measures were a repair of the existing heat recovery chiller CH-3 in order to have it operate as originally designed and the installation of new heat exchangers that utilize recovering the wasted heat from the server room and the repaired existing heat recovery chiller CH-3 and use it to assist with heating the domestic hot water and the heating water loop.

Considering the complexity of this cooling plant a commissioning and optimization plan was developed to ensure the plant operates as designed. The energy and emission savings will be monitored and verified after one full year of data is available.

The figure below shows how waste heat is extracted from the server via the chilled water return.



Source: <http://www.coolcentric.com/>



# Vancouver Coastal Health Authority's 2016 Carbon Neutral Action Report



## Declaration Statement

This Carbon Neutral Action Report for the period January 1st, 2016 to December 31st, 2016 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2017 Vancouver Coastal Health Authority final Carbon Neutral Action Report will be posted to our website at [bcgreencare.ca](http://bcgreencare.ca)

The cover photo is of the interior of the Greta and Robert H.N. HO Psychiatry & Education Centre, (The HOpe Centre) at Lions Gate Hospital.





# Executive Summary



## Executive Summary:

### Carbon Neutral Action Report 2016 Vancouver Coastal Health

Mary Ackenhusen, President and Chief Executive Officer

I am pleased to present Vancouver Coastal Health's 2016 Carbon Neutral Action Report.

As part of the provincial public sector commitment to achieve net-zero emissions, Vancouver Coastal Health (VCH) has achieved carbon neutrality for a seventh consecutive year.

In 2016, VCH's carbon dioxide equivalent (tCO<sub>2</sub>e) emissions footprint was 40,482 tonnes. Our 2016 footprint was a 19.1 percent decrease from the 2007 baseline.

We managed to achieve this by implementing 18 energy savings projects, which are estimated to achieve a 3.5 gigawatt hours of electricity and 42,492 gigajoules of natural gas savings. This has reduced our carbon footprint by 2,149 tCO<sub>2</sub>e.

Concerning the CO<sub>2</sub> footprint, beyond conservation measures, VCH purchased carbon offsets from the Ministry of Environment at a total cost of \$1,062,652 to maintain a carbon neutral status.

I am proud to state that I, along with over 1,700 other Vancouver Coastal Health staff, have joined our internal GreenCare Community in pursuit of reducing our operational energy and environmental impact. Reducing our impact will ultimately add to the health of our clients, staff, facilities, benefit the wellbeing of the extended communities we serve.

As 2017 progresses, I will continue to support our innovative and collaborative approach towards reducing VCH's environmental and carbon footprint, which drives our commitment to create sustainable health care.



# Our CO<sub>2</sub> Footprint

## 2016 GREENHOUSE GAS EMISSIONS BREAKDOWN AND OFFSETS APPLIED TO BECOME CARBON NEUTRAL

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

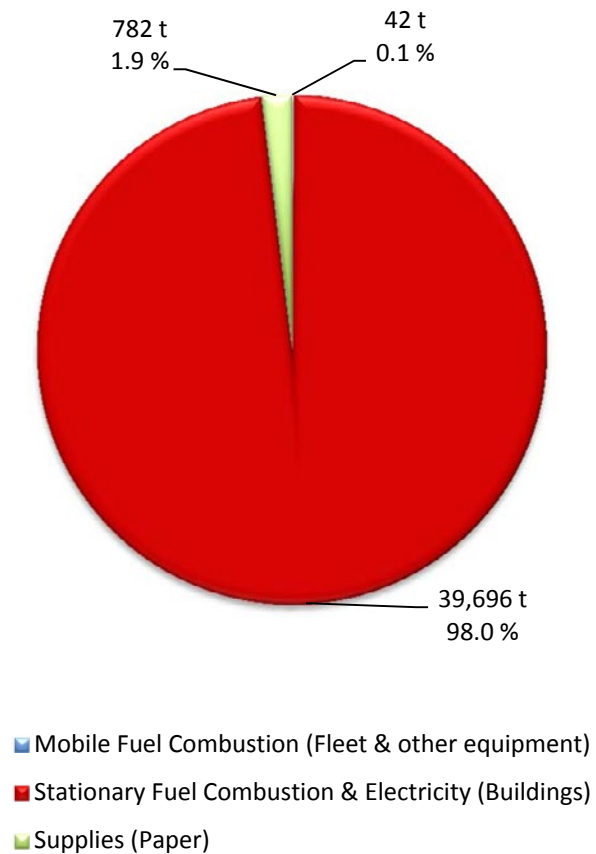
CAS uses various elements of reporting, based on the GHG Protocol Corporate Standard, which has classified carbon reporting into three scopes. Of these three scopes and various elements within each, CAS has determined Vancouver Coastal Health's carbon footprint to comprise of six different greenhouse gases, which are converted to tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). These main sources of emissions are categorized in three main groupings: Stationary Combustion and Purchased Energy (buildings), Mobile Combustion (Fleet), and Supply (Paper).

As shown in the chart on the left, 98 percent of Vancouver Coastal Health's in-scope emissions are attributed to the owned and leased buildings stationary combustion, and purchased energy; the largest area to focus our mitigation efforts.

Vancouver Coastal Health's 2016 carbon emissions were 40,496 tCO<sub>2</sub>e. To become carbon neutral in 2016, Vancouver Coastal Health purchased carbon offsets from the Ministry of Environment at a total cost \$1,062,653.

"The environmental impact from healthcare facilities, operations, and services affects the health of the populations and patients they are meant to serve." - Adapted from World Health Organisation & Healthcare without Harm

### Vancouver Coastal Health's 2016 Greenhouse Gas (In-Scope) Emissions by Source





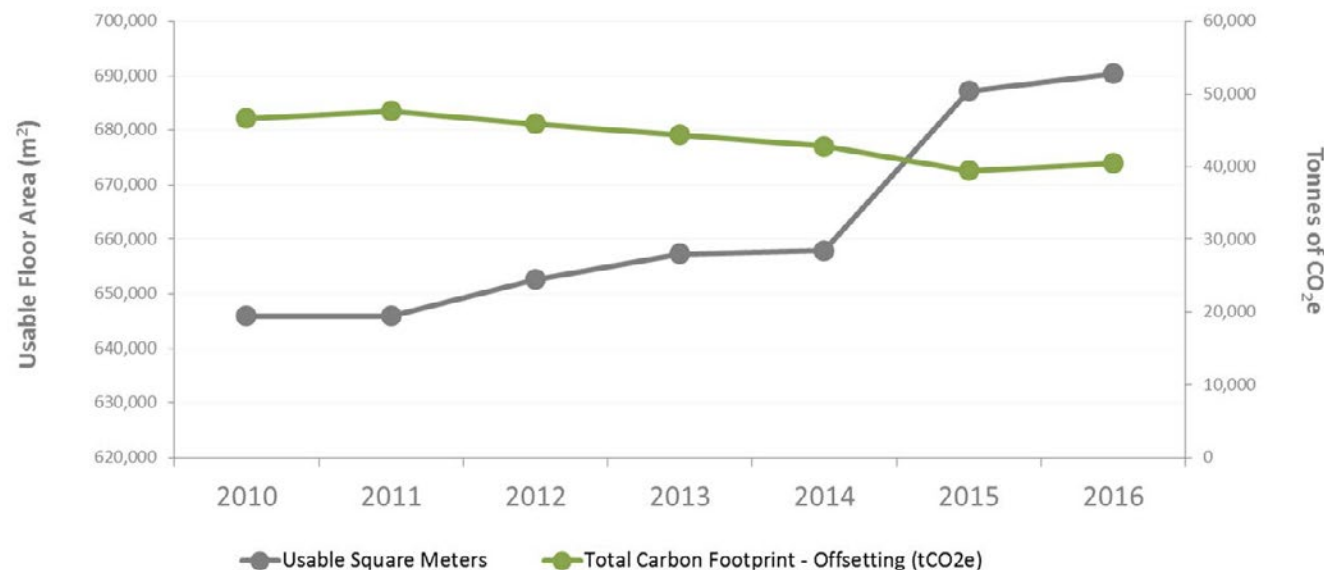
## CHANGES TO VANCOUVER COASTAL HEALTH'S PORTFOLIO

Vancouver Coastal Health has been able to maintain significant energy and GHG reductions while increasing our portfolio and expanding our services to serve our growing regional population. This success has largely been due to the energy retrofit and conservation programs in our existing buildings and the integration of high energy efficiency guidelines standards in the new buildings. Vancouver Coastal Health has increased its useable facility area growth since 2007 by 14.5 percent; a growth of 6.9 percent has occurred since 2010 and this trend is presented in the following graph.

| Vancouver Coastal Health (includes Bella Coola and RW Large) |         |         |         |         |         |
|--------------------------------------------------------------|---------|---------|---------|---------|---------|
| BUILDINGS, FTE AND WEATHER                                   | 2007    | 2013    | 2014    | 2015    | 2016    |
| Distinct VCH Health Buildings                                | n/a     | 164     | 163     | 165     | 165     |
| % Owned                                                      | 84%     | 85%     | 85%     | 88%     | 88%     |
| % Leased                                                     | 16%     | 15%     | 15%     | 12%     | 12%     |
| Usable Square Meters <sup>1</sup>                            | 602,766 | 657,356 | 657,905 | 687,180 | 690,374 |
| Full-Time Employee Equivalents <sup>2</sup>                  | 12,738  | 14,262  | 14,343  | 14,355  | 14,568  |
| Weather (Heating Degree Days) <sup>3</sup>                   | 2,870   | 2,820   | 2,627   | 2,490   | 2,537   |

Vancouver Coastal Health had a staff population of 14,568 full-time equivalent (FTE) staff in 2016, a 1.5 percent increase from the previous year as shown in the table below. The FTE count has been growing steadily since 2012 and compared to 2007 there has been an FTE increase of 14.4 percent.

### Useable Floor Area and Emissions (2010-2016)



Natural gas is the predominant fossil fuel used for space heating, hot water and process loads. The carbon emissions associated with our natural gas use is approximately 93.4 percent of the total building emissions. Although our priority actions are to focus on our natural gas combustion plant, there are many drivers to continue reducing purchased energy (electricity) and other in-scope emission sources.

There has been a 19 percent decrease in the carbon footprint since 2007, as show in the table below, and it should be noted that with absolute emissions there is no consideration to weather impacts or other external drivers that impact emissions. Depending on these independent variables the year over year change in emissions may not fully reflect the mitigation efforts, emission avoidance projects and initiatives, across the portfolio.

| Vancouver Coastal Health (including Bella Coola and RW Large) |               |                   |               |               |               |
|---------------------------------------------------------------|---------------|-------------------|---------------|---------------|---------------|
| Our Carbon Footprint (in tCO <sub>2</sub> e)                  | 2007          | 2013 <sup>3</sup> | 2014          | 2015          | 2016          |
| Mobile Fuel Combustion (Fleet)                                | 104           | 59                | 57            | 61            | 42            |
| Stationary Fuel Combustion & Electricity (Buildings)          | 48,536        | 43,873            | 42,768        | 38,618        | 39,696        |
| Supplies (Paper)                                              | 1,402         | 871               | 797           | 824           | 782           |
| <b>Total Carbon Footprint (tCO<sub>2</sub>e)</b>              | <b>50,042</b> | <b>44,804</b>     | <b>43,623</b> | <b>39,503</b> | <b>40,520</b> |
| Emissions Which Do Not Require Offsets <sup>1,2</sup>         | -19           | -25               | -23           | -19           | -24           |
| <b>Total Carbon Footprint (tCO<sub>2</sub>e)</b>              | <b>50,023</b> | <b>44,779</b>     | <b>43,600</b> | <b>39,484</b> | <b>40,496</b> |
| Adjustments / Corrections                                     | 0             | -399              | -815          | 0             | -14           |
| <b>Total Carbon Offsetting (tCO<sub>2</sub>e)</b>             | <b>50,023</b> | <b>44,380</b>     | <b>42,785</b> | <b>39,484</b> | <b>40,482</b> |

|    |                                                       |      |                     |                     |                   |                     |
|----|-------------------------------------------------------|------|---------------------|---------------------|-------------------|---------------------|
| \$ | Purchased Carbon Offsets <sup>4</sup>                 | \$ - | \$ 1,128,875        | \$ 1,089,325        | \$ 939,275        | \$ 1,012,050        |
|    | <b>Purchased Carbon Offsets + HST/GST<sup>5</sup></b> | \$ - | <b>\$ 1,185,319</b> | <b>\$ 1,143,791</b> | <b>\$ 986,239</b> | <b>\$ 1,062,653</b> |

|     |                                           |       |       |       |       |       |
|-----|-------------------------------------------|-------|-------|-------|-------|-------|
| KPI | Emissions per Full-Time Employee          | 3.93  | 3.11  | 3.00  | 2.75  | 2.78  |
|     | Emissions per Meter Square Facility Space | 0.083 | 0.068 | 0.065 | 0.057 | 0.059 |

The carbon emissions reported are not normalized annual weather fluctuations. The use of Heating Degree Days (HDD) is a metric designed to reflect the demand for energy required to heat a building. The HDD's for 2016 were 1.9 percent greater than those recorded in 2015, therefore, natural gas and resultant emissions were in part influenced due to HDD.



# Actions Taken To Reduce Our CO<sub>2</sub> Footprint

## 2016 LIST OF ACTIONS TAKEN TO REDUCE CO2 FOOTPRINT

### Stationary Emissions (Buildings)

- In 2016, Vancouver Coastal Health continued its effort to further reduce our environmental impact by initiating 18 energy savings projects for a total estimated savings of 3.5 GWh of electricity and 42,492 GJ of natural gas for a reduction of 2,149 tCO<sub>2</sub>e of GHG.
- Vancouver Coastal Health fully utilized the Carbon Neutral Capital Program (CNCP), to fund an energy and emission reduction project. Over \$1.1m of CNCP funds, combined with incentive funding was invested into an energy efficiency upgrade project, which resulted in 1968 tCO<sub>2</sub>e emission savings.
- Vancouver Coastal Health completed the fifth year of the Green Revolving Fund (GRF), a successful project that re-invests funds created through energy savings.
- Vancouver Coastal Health continues to embed sustainability across the organization by supporting staff engagement initiatives such as the GreenCare Community site and provides tips and toolkits on energy reduction and other environmental initiatives. As well, the Green+Leaders program continues to train Vancouver Coastal Health staff as sustainability champions, along with the BC Hydro Workplace Conservation Agreement program.
- Vancouver Coastal Health updated our Energy and Environmental Sustainability Design Guidelines for New Construction and Major Renovation projects with the intent to ensure health care related new construction and major renovation projects are built to the highest standard of human, environmental health, performing efficiency, and financial investment.

### Mobile Fleet Combustion (Fleet and other vehicles)

- In 2016, Vancouver Coastal Health's Transportation Demand Management Coordinator and Active Transportation Facilitator worked to improve, promote and establish alternative transportation opportunities for Vancouver Coastal Health staff.
- The VGH Cycling Centre provided access to a state-of-the-art end-of-trip facility, with more than 170 indoor bicycle parking spots, including 12 electric bicycle spots, lockers, showers, towel service, a lounge and a bike repair room for maintenance and tune-ups. In 2016, VGH's Cycling Centre grew its user base and expanded its services to include more workshops and events.
- An active and clean commute is supported across Vancouver Coastal Health with the 1,151 bike parking stalls; an increase of 18 during 2016.

- Vancouver Coastal Health now has six electric vehicle-charging stations across three core sites; an increase of 2 stalls in 2016.
- 196 Vancouver Coastal Health staff participated in the 2016 Clean Commuter &

Wellness Challenge, a campaign to encourage staff to try an active commute.

- In 2016, 46,122 health care staff were shuttled between Vancouver Coastal Health sites, using the internally organized Jack Bell shuttle service.



Figure 1: The exterior of the Greta and Robert H.N. HO Psychiatry & Education Centre,(The HOpe Centre) at Lions Gate Hospital.

### Supplies (Paper)

- As part of the Green+Leaders program, a paper/waste reduction campaign supported volunteers with Paperless Meeting Toolkits to encourage their colleagues to reduce paper use. The Paperless Meeting Toolkit brief is shown below.
- In 2016, Vancouver Coastal Health encouraged teleconferencing for meetings by installing

web-conferencing hardware and software at various sites.

- In collaboration with BCSS (HSSBC), Vancouver Coastal Health has started to discuss the procurement of wheat based paper supplies will explore a proposal to convert the bulk of paper purchased to 30% recycled content



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

- **Continued with the successful Green+Leaders (G+L) behavior change program**, with a focus on fostering sustainable behaviors in four key areas: Zero Waste, Energy Conservation and Climate Neutral, Active & Clean Transportation and Social Sustainability. In 2016, Vancouver Coastal Health had 93 active G+L in the program.
- **Vancouver Coastal Health continues to support the GreenCare Community (GCC) site**, which now has 1,731 Vancouver Coastal Health staff registered and provides inspiring articles, toolkits and resources. This website is used to communicate all EES projects and initiatives, as well as engage health care staff with the EES themes and offer a place for staff to collaborate.
- **Education and awareness communication via the various internal communications**, including stories published on Vancouver Coastal Health News and other communication channels, continues to champion behavior change and celebrate environmental sustainability success.
- **Continued with the sponsored BC Hydro Energy Wise Network Program (EWN)**. This program supports the G+L program and also provides tools and resources for other awareness initiatives, such as our Facilities Maintenance and Operations (FMO) engagement strategy.
- **25 Vancouver Coastal Health employees were educated on Waste Management** processes and 8 new Recycling Champions were trained.

## Vancouver Coastal Health plans to continue reducing GHG emissions and Energy in the following ways:

- **Planning and implementing energy and emission reduction projects** in our existing building portfolio by utilizing the Carbon Neutral Capital Program (CNCP), and supplementing with internal capital funds and incentives from BC Hydro and Fortis BC.
- **Engaging with design engineers** to ensure our new builds adopt energy efficient design principles.
- **Continue to explore low emission energy supply options**, demand reduction opportunities, and leading technology applications.
- **Continuing to engage with site operations staff** and external consultants to identify GHG / Energy opportunities.
- **Engaging and educating our staff**, via the existing Green+Leaders program, GreenCare Community and the BC Hydro Workplace Conservation Agreement.
- **Developing a roadmap for climate adaptation**, including resiliency assessment for three Vancouver Coastal Health site.

- **Working with GreenCare's refreshed Strategic Framework**, Vancouver Coastal Health 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 the populations and patients we

serve. Vancouver Coastal Health 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.



Figure 2: Vancouver City Scope <http://design-environment.com/news/archives/2775>



# Feature Project

## Vancouver General Hospital Heat Recovery Chiller Project

Vancouver General Hospital (VGH) offers specialized health care services to residents in Vancouver and across the province. The chiller plant serving two main buildings on the VGH campus – Jim Pattison Pavilion and Centennial Pavilion - were in need of additional cooling capacity to meet the peak temperature on warm summer days and minimize the use of a low efficiency steam absorption chiller.

The Energy and Environmental Sustainability team partnered with the VGH Facility Maintenance and Operation team to move toward a solution that considered both the operational requirements while minimizing the environmental impact. A detailed energy study was commissioned and a clear opportunity was proposed by the consultant.

The study identified that the absorption chiller consumed 43 percent of the total chiller plant energy even though it was only in operated a quarter of the time of the other two main chillers. Through extensive trend analysis additional opportunities to optimize the operation and chiller sequencing of the remaining chiller plant were uncovered. In this complex environment with a variety of acute care needs and heat generating equipment there is a year round 300 ton cooling load; the heat from this process was being rejecting through the cooling towers.

The integration of two new heat recovery chillers into the central cooling plant was proposed in addition to several other energy optimizing measures. The project design moved forward and had a high level of project support and engagement from the VGH Facility Maintenance and Operation team and senior leadership; this collaborative approach assisted with early risk identification and improved overall project coordination.

“This smart and low risk design is an ideal application of this heat recovery technology. The complete design will support the peak cooling load and recover waste heat from the cooling process; improving the plants operation and minimizing our environmental impact. ” – Kori Jones, Energy Manager, Lower Mainland Facilities Management

**Technology:** Low Risk Heat Recovery Chiller Application, Dedicated Chiller Control System

**Energy Savings:** An estimated 39,600 GJ; a net energy saving of 35,000 GJ per annum

**GHG Reductions:** An estimated 1,968 tonnes mitigation

**Business Case:** Project < 6 year payback, NPV of \$1.2 million

**Benefits/Co-Benefits:** Water Savings; Influenced decision to move towards site chiller plant strategy; Reduced cooling tower maintenance

**Total Project Cost:** \$1.4 million

**Operational Cost Savings:** \$265,000 (energy, water, and offsets savings)

Several different heat recovery chiller configurations were assessed and the installation one 250 ton dedicated heat recovery chiller was prioritized to take advantage of the heat recovery to offset the steam generation; this ensures the greatest operation savings and GHG mitigation.

The other integral project measures were an upgrade to a variable speed drive on the lead chiller condenser pump and the addition of a dedicated cooling plant control system to automatically stage on chillers, pumps, and cooling towers at their most efficient operating points. The design included the tie-in connections for the second chiller, to be installed later this year, to minimize the install costs and potential shutdown requirements.

Considering the complexity of this central cooling plant a commissioning and optimisation plan was developed to ensure the plant operates as designed over the shoulder seasons. The energy and emission savings will be monitored and verified after one full year of data is available. Our phased approach, drawing on the instrumental site knowledge of the VGH Facility Maintenance and Operation team will result in an estimated annual savings of 35,000 GJ and \$265,000 in operation savings; this will mitigate 1,968 tCO<sub>2</sub>e per year going forward minimizing the environmental impact of Vancouver General Hospital on the populations this facility serves.



Figure 3: Heat recovery chiller and pumps installed at Vancouver General Hospital.