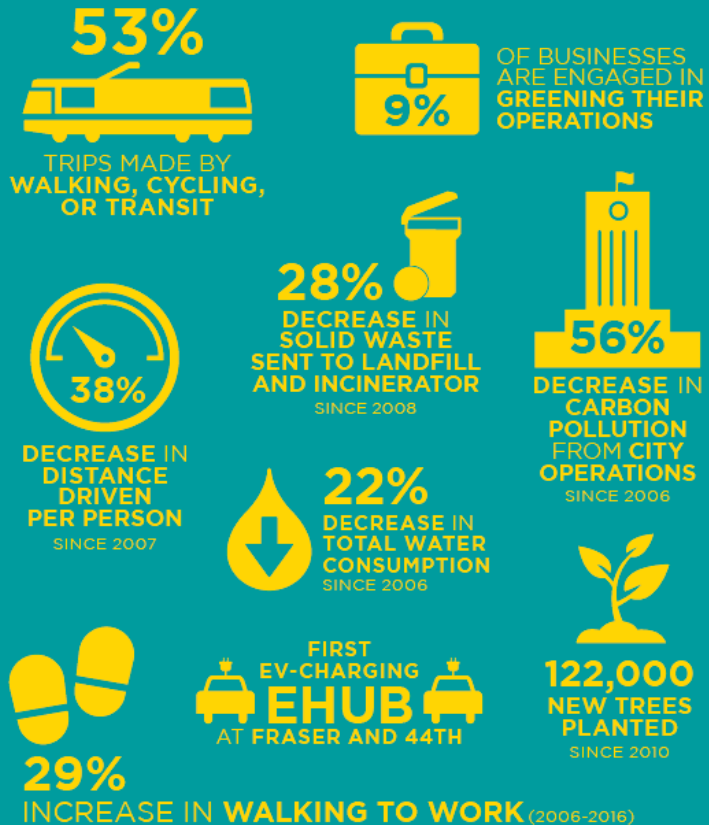




City of Vancouver
Green Bond Annual Update
September 2019

PROGRESS HIGHLIGHTS



AWARDS

- 2018 Arcadis Sustainable Cities Index:**
Sixth Most Sustainable City in North America
- 2018 Economist Intelligence Unit Global Livability Index:**
Sixth Overall Globally
Second in North America
- 2018 World Wildlife Fund One Planet City Challenge:**
Canadian Earth Hour Capital
- 2018 IPA Downtown Achievement Award – Planning:**
Northeast False Creek Plan
- 2018 International Association for Public Participation Canada Core Value Awards – Indigenous Engagement Award:** Britannia Renewal Master Plan
- 2018 International Association for Public Participation Canada Core Value Awards – Dazzling Notice Award (Honourable Mention):**
Arbutus Greenway: Engaging a Diverse and Citywide Audience
- 2019 Mercer Quality of Living Survey:**
Third Overall Globally
First in North America
- 2019 Mediacorp Canada Inc.:**
Canada's Greenest Employers
- 2019 American Planning Association – Pierre L'Enfant International Planning Award:** Northeast False Creek Plan
- 2019 Planning Institute of British Columbia – Gold Award, Research & New Directions in Planning:**
Coastal Adaptation Plan – Fraser River Foreshore
- Green Shores for Coastal Development – Gold Rating:**
New Brighton Park Shoreline Habitat Restoration Project

Source: *City of Vancouver Greenest City 2020 Action Plan*, which can be found at vancouver.ca/GreenestCityActionPlan

Under the City's Green Bond Framework, net proceeds of the City's Green Bond issuances will be used to finance environmentally beneficial green capital projects across the City. Without limitation, capital projects in the following categories are considered:

Renewable Energy

Energy Efficiency

Green Buildings

Clean Transportation

Pollution Prevention and Control

Sustainable Water and Wastewater Management

Environmentally Sustainable Management of Living Resources



In its Second Party Opinion, Sustainalytics viewed the following elements of the City's Green Bond Framework positively, including that the Framework:

- is transparent, robust, credible and impactful
- aligns with the four core pillars of the Green Bond Principles
- contains comprehensive sustainability strategies, which include ambitious time-bound targets and action items.

The City's Green Bond Framework and Sustainalytics' Second Party Opinion can be accessed at the City dedicated Investor Relations web page (<https://vancouver.ca/your-government/investor-relations.aspx>).



City of Vancouver 2018 Green Bond Update on Use of Proceeds

Summary of Use of Proceeds (1/2)

The following are the Eligible Projects to be financed from the proceeds of the inaugural City of Vancouver 2018 Green Bond:

Project Name (Capital Budget item)	Project Description	Eligible Criteria	Expected allocation from 2018 Green Bond	Completion Date ⁽¹⁾ (Current Stage % Estimates to date)	Amount Used ⁽²⁾ from Green Bond (to date)
Fire Hall 17 Renewal (Public Safety Facilities)	To replace the existing Fire Hall 17 located at 7070 Knight Street with a new building. The new Fire Hall 17 is being designed to be LEED Gold and Passive House certified and as a pilot for the new CaGBC Zero Carbon building Standard	Green Buildings	\$14,300,000	Q4 2020 (35%)	\$5,000,000
Roddan Lodge Redevelopment (Community Facilities)	New building to provide replacement self-contained units for the existing Roddan Lodge residents and low-end-of-market rental units. The unit mix will be studios and one and two bedroom units. The new building will also contain a replacement facility for the Evelyn Saller Centre, a social service agency for low income and at risk adults living in the Downtown Eastside, and includes a low-cost cafeteria, showers, laundry services and a variety of social and recreational programs.	Green Buildings	\$26,650,000	Q2 2021 (22%)	\$6,000,000
Neighbourhood Energy Utility (NEU) system expansion (Neighbourhood Energy)	Expansion of the NEU system to serve new customers in False Creek area. The program includes: 1) Engineering and construction activities to expand the distribution system to 12 new large customer buildings, 2) Completion of minor heating plant boiler and controls upgrades, and; 3) Engineering analysis and design for expansion of sewage heat recovery system at the False Creek Energy Centre. For NEU, the projects comprise of CEN-00005 (2015 NEU System Extension), CEN-00006 (2019 NEU System Extension), and CEN-00009 (NEU Waste Heat Recovery Expansion)	Renewable Energy	\$6,023,000	Q4 2021 (24%)	\$1,460,000

Notes:

(1) Completion % Assumption is "Total Actual spend / Total Multi-year Budget"

(2) Amount Used : Assumption is "Total actual spend multiplied by the proportion of Green Bond funding to total funding"

Summary of Use of Proceeds (2/2)

The following are the Eligible Projects to be financed from the proceeds of the inaugural City of Vancouver 2018 Green Bond:

Project Name (Capital Budget item)	Project Description	Eligible Criteria	Expected allocation from 2018 Green Bond	Completion Date (Current Stage % Estimates to date)	Amount Used ⁽¹⁾ from Green Bond (to date)
Sewer & Water Main Reconstruction (Sewer & Water)	This program replaces the sewer infrastructure from a combined system (single pipes that carry storm water and sewage mixed together) to a separated system (separate storm pipes and sanitary pipes), which provides a higher service level, reduces flooding risk and prevents combined sewage overflows into receiving water bodies.	Sustainable Water and Wastewater Management	\$32,550,000	On-going (54%)	\$32,550,000
Sidewalk rehabilitation & curb ramp program (Streets and bridge infrastructure)	Installation/reconstruction of curb ramps at street and lane intersections to provide easier access to the sidewalks. This program benefits many pedestrians including persons with disabilities, persons who use mobility aids and persons with strollers and shopping trolleys. There has been an increase in the demand for curb ramps as the City endeavours to complete the sidewalk network for seamless travel throughout the pedestrian environment.	Clean Transportation	\$3,477,000	Completed (100%)	\$3,477,000
Pedestrian and bike signal rehabilitation (Street lighting, signals and communication systems)	Rehabilitate and modify existing pedestrian / bicycle traffic signals. Activities typically include the replacement / upgrade of aging equipment to bring signals up to current standards, as well as modifications such as the installation of countdown timers, cyclist push buttons, automated detection and accessible pedestrian signals for the sight and hearing impaired.	Clean Transportation	\$2,000,000	Completed (100%)	\$2,000,000

Notes:

(1) Amount Used : Assumption is "Total actual spend multiplied by the proportion of Green Bond funding to total funding"



City of Vancouver Green Bond Update on Key Eligible Projects

Vancouver's Fire Hall 17 to become the world's first Passive House Certified fire hall

- The construction of the world's first Passive House certified fire hall is underway at Vancouver Fire Hall 17. The demolition of the old building is now complete and we diverted 91% of waste from landfill.
- The Passive House high-performance building standard is the only internationally recognized, proven, science-based energy standard in construction. Passive House buildings consume up to 90 percent less heating and cooling energy than conventional buildings. The certification is recognized as the proven best way to build for comfort, affordability and energy efficiency of residential, institutional and commercial buildings, through all stages of design, construction, and livability.
- The new Vancouver Fire Hall 17 will be the second largest training fire hall for VFRS, and specialize in HazMat response for the city. The complex requirements of such a facility led the team to divide the building into two separately certifiable Passive House zones: Zone A (living areas) running at 20 degrees and Zone B (four drive-through apparatus bays, a full size hose/training tower) running at 10 degrees in winter and 25 in summer. The project is scheduled to be completed by the end of 2020 and the facility is targeting LEED v4 Gold certification, Passive House certification, CaGBC Zero Carbon Building certification and Site Net Zero Energy through FCM.

Green Buildings

There are no KPIs to report at this time until the project is completed.

Status: A solar photovoltaic system will be installed capable of 85kW generation capacity.

Expected environmental benefits:

- Significant reduction in building energy use from natural gas and electricity down to zero
- Reduce GHG emissions
- Reduce water consumption
- Exceed the City of Vancouver standard specification for Green Demolition



Source; City of Vancouver, Architect Rendition of Fire Hall 17

Project Description

- As part of the City's affordable housing priority, this project will contribute to the Downtown Eastside housing targets by providing replacement self-contained units for the existing Roddan Lodge residents and Low-end of Market rental units
- The new building will also contain a replacement facility for the Evelyn Saller Centre, a social service agency for low income and at risk adults living in the Downtown Eastside including a low-cost cafeteria, showers and laundry services and a variety of social and recreational programs.
- The development will be certified to a LEED Gold environmental performance standard, and use high efficiency air source heat pump systems for building heating, cooling, and domestic hot water, in order to significantly reduce its GHG emissions.

Green Buildings

There are no KPIS to report at this time until the project is completed.

Status: Demolition of the old building is now complete and they diverted 97% of waste from landfill

Environmental benefits:

- Significant reduction in energy use from natural gas and electricity
- Reduce GHG emissions
- Reduce water consumption
- Exceed the City of Vancouver standard specification for Green Demolition



Source; City of Vancouver, Architect Rendition of Roddan Lodge

Project Description

- The system has been operational since 2010. It has been expanded to serve more than 5 million square feet of buildings and provides an infrastructure platform that enables recycling of waste heat sources in the community and secures 100% renewable energy outcomes for all buildings connected to the system.
- Building on the success of the NEU, Vancouver is committed to expanding renewable energy systems across the city. A new partnership with BC Hydro will drive a number of sustainable initiatives through identifying redevelopment areas with high potential for neighbourhood energy systems and working directly with large greenhouse gas emitters on opportunities to switch to low-carbon heat sources.

Renewable Energy

Status:

- Current NEU service area (as at July 2019): 5.5M sq ft
- NEU service area added in 2018: 158,394 sq ft
- 2018 annual energy sales: ~45 000 MWh. 56% of 2018 annual energy sold that was “clean” (e.g., sewage heat recovery, renewable natural gas)
- GHG reduction benefit increase to 24,000 tonnes* CO2 at build-out

Qualitative highlights from 2018:

- Connected the NEU to a new building at 565 Great Northern Way
- Council approved expansion of NEU service area into parts of Mount Pleasant, Northeast False Creek and the False Creek Flats

* Note: These estimates are based on a 70% renewable energy target for the NEU. GHG emissions would be further lowered when transitioning to 100% renewable energy at a future date.

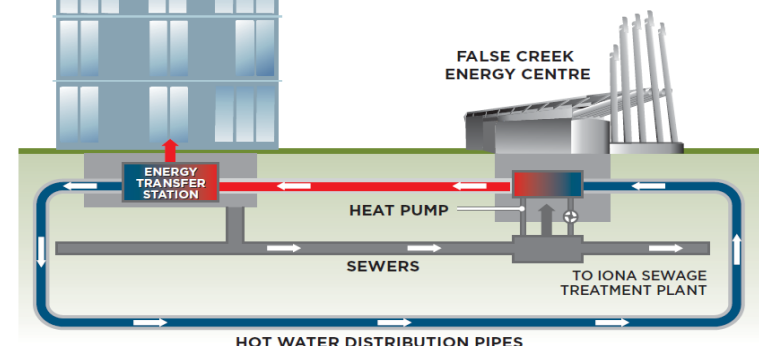


SEFC BUILDINGS

FALSE CREEK ENERGY CENTRE

The False Creek Energy Centre makes use of innovative architectural design to showcase its unique function. Its finger-like exhaust stacks integrate eye-catching public artwork that responds to the energy consumption of the neighbourhood it serves: LED lights change colour from blue in times of low energy demand to red at times of high demand.

How the Process Works



Project Description – Separating sewage from rainwater

- We are working toward the Province of BC's environmental goal to eliminate sewage overflows by 2050. As we replace combined sewer systems with separated sewer systems, properties will also need to have separated sewer systems.

Sustainable Water and Wastewater Management

Status:

- % of system that is separated : 54% (per Service Plan)
- total length (km) of pipe completed : 5,462 km

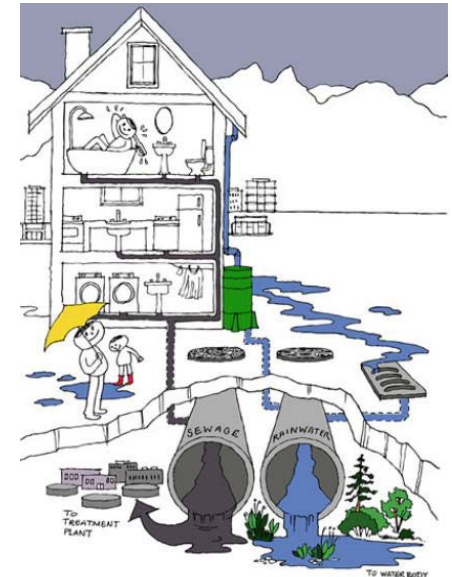
Environmental benefits:

- Eliminates combined sewer overflow
- Prevents flooding by increasing capacity
- Allows storm water to be used as a resource



How does the City prioritize sewer replacement?

In a two-pipe separated sewer system, storm water is collected through storm drains. It travels through different pipes than household sewage and other wastewater. There are two sewer separation programs running concurrently. The overall sewer mains are being separated so that storm drains carry storm water runoff separately from other wastewater.



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Websites

General	http://vancouver.ca/
Greenest City Action Plan	http://vancouver.ca/green-vancouver/greenest-city-action-plan.aspx
Investors Relations (including Green Bond Framework and Second Party Opinion)	https://vancouver.ca/your-government/investor-relations.aspx
Budgets and Finances	http://vancouver.ca/your-government/budgets.aspx
Capital Plan for 2019-2022	https://vancouver.ca/your-government/capital-plan-2019-2022.aspx
2019 Budget and Five-Year Plan	https://vancouver.ca/files/cov/2019-budget-book.pdf
Vancouver Economic Commission	http://www.vancouvereconomic.com/
Vancouver Charter	http://www.bclaws.ca/civix/document/id/complete/statreg/vanch_00