CARBON NEUTRAL ACTION REPORT 2018

SFU

This report was produced by Simon Fraser University. It provides a high-level overview of the actions taken and planned by the SFU campuses to reduce greenhouse gas emissions. These actions support SFU's commitment to being a sustainability leader through its operations, research, academics, campus and community engagement.

For more information about sustainability at SFU, please visit: www.sfu.ca/sustainability

SFU

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ACKNOWLEDGEMENTS

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DECLARATION STATEMENT

Simon Fraser University 2018 Carbon Neutral Action Report.

This Carbon Neutral Action Report for the period January 1st, 2018 to December 31st, 2018 summarizes Simon Fraser University's emissions profile, the total offsets to reach net-zero emissions, the actions taken in 2018 to reduce the University's greenhouse gas emissions and its plans to continue reducing emissions in 2019 and beyond.

By June 30, 2019 Simon Fraser University's final Carbon Neutral Action Report will be posted to the University's website at **https://www.sfu.ca/fs/projects-initiatives/sustainable-initiatives/ghg-emissions/carbon-neutral-action-reports.html.**

Martin Pochurko
Vice-President Finance and Administration

May 31, 2019

OVERVIEW

In 2018, Simon Fraser University (SFU) continued University-wide efforts to reduce its greenhouse gas (GHG) emissions through strategic planning, implementing energy saving measures and encouraging behaviour change amongst the SFU community. As a result, SFU saw a decrease of 5% in overall GHG emissions from 2017 to 2018, amounting to a 24% decrease in emissions from the 2007 baseline. SFU remains on track to reduce its emissions in line with the provincial target to reduce GHG emissions by at least 40% by 2030, in comparison to 2007 levels.

The University has a Strategic Energy Management Plan in place until 2020/21, which underlies the energy savings made in 2018. Actions were taken in the focus areas of: energy standards for new buildings and major construction; energy efficiency and conservation projects; renewable energy; energy monitoring; and behaviour programs.

Stationary combustion from buildings, and purchased energy accounts for the overwhelming majority (96%) of SFU's GHG emissions, as per the scope of the Carbon Neutral Government requirements. The actions taken to address energy consumption in buildings at SFU are, therefore, critical to the University's overall reduction in GHG emissions. SFU was able to reduce its buildings-associated GHG emissions by 6% from 2017 to 2018, despite the University's ever-growing physical footprint. In 2018 SFU introduced its own standard to embed green building principles into the design and construction of buildings. Construction continued on key buildings targeting LEED Gold certification: the Surrey Sustainable Energy and Engineering building and the Burnaby Student Union building. SFU's Vancouver and Burnaby campuses continued to roll out a comprehensive program of energy efficiency measures and monitoring upgrades, including: LED lighting, boiler upgrades, Direct-Digital Control systems and energy studies. On completion of the Sustainable Energy and Engineering building, SFU's Surrey campus will have more owned assets to be included in these programs. The Sustainable Spaces program offers a framework for offices, labs, dining areas and events to reduce GHG emissions through a range of actions and behavioural changes. In 2018 it expanded to cover the Vancouver and Surrey campuses.

In 2019, SFU plans to continue implementing energy efficiency measures and embedding energy saving practices to support the University's commitment to GHG emissions reduction. A number of actions taken towards reducing GHG emissions from buildings, fleet and paper in 2018 are ongoing for 2019. The University also plans to: focus on green building standards in new construction; explore opportunities to increase its use of electric vehicles in its fleet; and target GHG emissions reductions in labs. Looking further ahead, the biomass heating plant development on Burnaby Mountain will support SFU's renewable energy transition.

1.0 GREENHOUSE GAS EMISSIONS AND OFFSETS

1.1 Greenhouse Gas Emissions in 2018

Total absolute greenhouse gas (GHG) emissions for SFU's operations in 2018 were 14,650 tCO_2e[1]. Emissions decreased by approximately 5% from 2017. This reduction can be attributed to increased natural gas conservation from 2017, and a combination of energy and emissions saving measures. SFU has reached a 24% overall reduction in GHG emissions since its 2007 baseline year[2]. This has been achieved despite an approximate 12% increase in the university's physical space since 2007. Fugitive emissions from cooling are insignificant at less than 1% of SFU's total emissions. The fugitive emissions data is also onerous to collect; therefore, these emissions are considered out of scope, as per Annex 3 of the 2018 B.C. Methodological Guidance for Quantifying Greenhouse Gas Emissions.

1.2 Offsets Applied to become Carbon Neutral in 2018

In 2018, as reported in the BC Provincial Government's SMARTTool, SFU purchased 14,654 tonnes of carbon offsets at the price of $25 per tonne; this amounted to $366,350 of offsets plus GST.

11 tonnes CO_2e emissions from the combustion of biomass fuels were reported in the University's total GHG emissions profile in 2018. As stated in the 2018 B.C. Methodological Guidance for Quantifying Greenhouse Gas Emissions, the CO_2 emissions resulting from the combustion of biogenic fuel sources must be reported but do not require offsets.

1.3 Changes to Greenhouse Gas Emissions and Offset Reporting from Previous Years

Following the public release of SFU's 2017 Carbon Neutral Action Report, it was determined that the total emissions for the 2017 calendar year were under-reported by 15 tonnes CO_2e. There was a consequent under-purchase of offsets required to become carbon neutral in 2017 of $375 plus GST. This deficit of offsets has been added to SFU's 2018 payment, as indicated in the table below.

Simon Fraser University GHG Emissions and Offset for 2018 (tCO_2e)	
GHG Emissions created in Calendar Year 2018	
Total Emissions (tCO_2e)	14,650
Total $BioCO_2$	11
Total Offsets (tCO_2e)	14,639
Adjustments to GHG Emissions Reported in Prior Years	
Total Emissions (tCO_2e)	15
Total Offsets (tCO_2e)	15
Grand Total Offsets for the 2018 Reporting Year	
Grand Total Offsets Required (tCO_2e)	14,654
Total Offset Investment	$366,350

1 Tonnes of carbon dioxide equivalent (tCO_2e) is a standard unit of measurement, in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.

2 2007 baseline set from Willis Energy: SFU GHG Inventory.

2.0 ACTIONS TAKEN TO REDUCE GREENHOUSE GAS EMISSIONS IN 2018

2.1 Building Emissions

2.1.1 Planning for Reductions

The SFU five-year Strategic Energy Management Plan (SEMP), from 2016/17 to 2020/21, supports the University's Energy Utilization Policy (GP 43) which establishes SFU's commitment to prioritize energy efficiency, GHG emissions reduction and transitioning to renewable energy sources. The SEMP provides a roadmap for actions that support these institutional priorities. It commits the University to an energy reduction target of 2% per year, and to shifting 70% of its fossil-fuel based energy to renewables by 2020. In 2018, mid-way through the SEMP, progress was made in the five action areas:

- Energy standard for new buildings and major constructions;
- Energy efficiency and conservation projects;
- Renewable energy;
- Energy monitoring, targeting and reporting; and
- Behaviour programs.

As a result, by the end of 2018, the University's energy consumption was 11% lower than the SEMP baseline year of 2012/13.

2.1.2 New Buildings and Major Renewal of Existing Buildings

In 2018, SFU worked on embedding green building and infrastructure principles into design standards. SFU documented and published its Owner's Technical Requirements (OTR) as principles of building design and construction for construction professionals working at the SFU Burnaby campus. The OTR capture energy efficiency, sustainable design and site drainage specifications within the requirements.

In 2018 there was significant progress made towards completing the construction of major new buildings and renewals to existing buildings, with energy efficiency and GHG emissions reduction in mind.

Surrey Sustainable Energy and Engineering building (due to be completed in 2019)

Construction of the new 20,500-square-metre, $116 million Sustainable Energy and Engineering building began in 2017 and will be ready to host classes in the fall of 2019. The building will be home to a new, innovative Sustainable Energy and Environmental Engineering program. The building will also help to anchor the City of Surrey's City Centre revitalization and expansion. Through green design and construction, the building is targeting LEED Gold certification and will be a living showcase for sustainable building standards.

Student Union building (due to be completed in 2019)

The new 10,300-square-metre, $55 million Student Union building is an initiative of the Simon Fraser Student Society. It houses student clubs, a community kitchen, social space and other student spaces, all designed to be inclusive spaces to meet the needs of the diverse student population. Among the many green building features of the building, the project provides on-site stormwater storage, and a high-performance building envelope. The project is under construction, aiming to open in the summer, 2019 and is on target to achieve LEED Gold certification.

New residences buildings (due to be completed in 2020)

Construction of two new residential towers are currently underway in the Student Residences precinct, along with an expansion of the Residences Dining Hall. Integrated planning processes provided opportunities for the design to optimize energy best practices. The Residence towers are

targeted to achieve LEED Gold certification, with project completion in 2020.

Green infrastructure and stormwater management

In 2018, SFU Facilities Services continued to actively collaborate with stakeholder groups such as the Stoney Creek Environment Committee, and the UniverCity Adaptive Management Committee. It worked with them to initiate assessments and implement corrective actions to solve issues such as blocked drainage and erosion channels on site. The SFU Burnaby Stormwater Management Plan, completed in 2017, provided the framework to start developing a stormwater project plan. This project plan included, for example: improvements to the ongoing surface water quality monitoring programs, and an inventory of stormwater infrastructure to support scheduling routine maintenance.

2.1.3 Energy Efficiency and Conservation Projects

The energy efficiency and conservation projects implemented in 2018 reduced the University's GHG emissions from buildings by approximately 300 tCO_2e. Examples of these projects are as follows:

Lighting

SFU has a University-wide LED retrofit program. On the Burnaby campus alone, more than 10,000 lamps were replaced with energy efficient LEDs in 2018. The Burnaby retrofits focused on core buildings including: Bennett Library, South Science, Shrum Biology and Shrum Physics. The Vancouver campus also worked on replacing 730 light fixtures with LEDs in main buildings: Harbour Centre, Segal and the Centre for Dialogue.

Equipment upgrades

Boilers in the Childcare Centre, Diamond Alumni Centre, Library and the Water Tower building were replaced with more efficient, condensing boiler systems.

The chiller systems in the Applied Science building and Water Tower building were upgraded with energy efficient modular chillers.
The University also upgraded a number of drinking water fountains.

Heating, ventilation and air conditioning (HVAC)

SFU Vancouver installed a three-way valve into the chilled water system in the Segal building. This allowed Facilities Services to isolate the water temperature of the chiller, which cools the air, and the radiant panels in the classrooms. By doing this, the chiller's water temperature can be run lower in order to avoid condensation issues with the radiant panels. This was implemented primarily as an upgrade for comfort and longevity of the equipment. However, the relief this has provided on the usage of the HVAC system as a whole will result in energy savings. SFU Vancouver also upgraded the HVAC controls in the Segal building and Goldcorp Centre for the Arts. These upgrades allow for the adjustment of building schedules, for example for the HVAC equipment to be turned off overnight.

Energy management and building control systems

The building control systems of the Diamond Alumni Centre and Water Tower building were upgraded and integrated to the campus-wide Direct-Digital Control systems, to enable greater oversight and energy conservation.

SFU continued to replace obsolete pneumatic controls and heating valves, with new electronic controls systems to reduce heat leakage, therefore improving energy conservation. These efforts were focused on buildings in the Academic Quadrangle, Schrum buildings and Robert C Brown complex.

A condition assessment was conducted in the building metering and control infrastructure at SFU Burnaby. Installation of an electrical power monitoring system began to facilitate real-time power and environmental system monitoring of the campus.

Other projects

Energy studies were conducted in the Applied Science building, Bennett Library, Blusson Hall, TASC 1 and the South Science building to assess energy consumption and the potential for implementing energy saving measures.

SFU installed 125 water efficient aerators in the washrooms, resulting in a reduction of approximately 300 Gigajoules (GJ) of gas and 1,700 cubic-metres of water.

2.1.4 Behaviour Change

Sustainable Spaces

SFU launched the Sustainable Spaces program in 2017. The program recognizes and celebrates ecological, economic and social sustainability efforts in different spaces at SFU. There are four certification streams: Sustainable Offices, Sustainable Labs, Sustainable Dining and Sustainable Events; and three levels of certification: Gold, Silver, and Bronze. The Sustainable Spaces program provides a framework for offices, labs, food vendors and event organizers to reduce GHG emissions through a variety of physical and behavioural changes, including: temperature monitoring, seeking naturally-lit meeting rooms, and purchasing energy efficient lab equipment. 85 Sustainable Spaces were certified in 2018 alone.

In 2018, the Sustainable Offices program was launched at the Vancouver and Surrey campuses. Staff-focused welcome events were set up to introduce and promote the program, educate attendees and encourage departments to register. The event exceeded participation expectations and was well received. As a result, eight offices were certified in 2018 including four offices at the Surrey campus.

Lab spaces are a significant contributor to SFU's overall GHG emissions from buildings. In 2018, The Sustainability Office and Facilities Department piloted site-specific metering and a smart screen dashboard on a lab in an effort to find strategic ways to increase energy efficiency in labs on campus. This information will be used to fully launch a Labs program in 2019.

In 2018, the Sustainable Events stream certified 77 events across SFU's three campuses, resulting in approximately 17,575 participants engaged on the sustainability efforts made by event organizers. Major events achieving Gold certification included the fall student welcome week at the Burnaby campus, the annual President's Staff Appreciation BBQ and two national conferences.

Other behaviour change programs

Through a collaborative effort, the Facilities Services Energy Team and the Sustainability Office hosted a 2018 Bright Ideas campaign, asking for suggestions on how the Facilities Services department could conserve energy. It sparked 27 new energy saving ideas from Facilities Services staff members. Five of the ideas were put into action. These included: improved weather stripping for doors and windows, LED lighting upgrades and 'green' tips shown on an energy consumption dashboard linked to two chemistry labs.

2.2 Fleet Emissions

There was an increase, of 46%, in fuel related SFU GHG emissions from 2017 to 2018. This was not a significant absolute amount because fleet emissions account for 2% of SFU's reported GHG emissions. The increase was due, in part, to expansion of the Safety and Risk Services operated fleet, from 37 to 55 vehicles. Another contributing factor to the increase in fleet emissions was higher diesel consumption for boilers and backup generators during the winter, for heating and during a natural gas shortage[3]. Despite the increase in fleet GHG emissions from 2017 to 2018, SFU has achieved a 64% reduction in fleet emissions in comparison to the 2007 baseline. In 2018, SFU continued an ongoing eight-year plan to replace older engine model vehicles with new, fuel-efficient vehicles. Two Campus Public Safety departmental service vans were downsized to improve fuel efficiency. IT Services operated one electric vehicle which is used for transporting network equipment, testing equipment and for staff to travel between offices and the Network Operations Centre on campus. Purchasing an electric vehicle was an environmentally and GHG emissions conscious decision, aligned to IT Services' and SFU's commitment to reducing its environmental impact.

2.3 Paper Emissions

SFU's GHG emissions from paper have been reduced by approximately 40% since the 2007 baseline at SFU. This reduction can be attributed to the continuing shift towards online and digital forms of communication. In 2018 there were some changes made to the SFU paper supply, increasing orders directly from an external supplier rather than the SFU Central Stores.

In 2018 SFU continued in its efforts to limit the use of virgin paper on campus. The standard office paper stock for both SFU's Central Stores, the main supplier of office paper to departments across the University, and Document Solutions, SFU's print and digital services hub is 30% recycled content paper. Document Solutions has further increased the use of FSC and recycled paper to over 90% and is encouraging the use of ConVerd Board (10% post-consumer waste content and 100% recyclable) for its large format operations as a green alternative to PVC, styrene and foam-based boards, as well as eliminating the need for laminating.

In 2018 SFU introduced new, more efficient Recoh office printers. The Recoh printers are all colour enabled – whereas the former printers did not all have this capability – which has eliminated the need for individuals to operate their own desktop colour printers. The default setting is to print double-sided, in black and white which has reduced paper and ink consumption. The SFU printers are also synced with PaperCut print management software which includes the capability to report on the GHG emissions and energy consumption associated with print jobs.

3.0 PLANS TO CONTINUE REDUCING GREENHOUSE GAS EMISSIONS

3.1 Building Emissions

3.1.1 Planning for Reductions

In 2019, SFU will continue to focus its efforts in advancing the five key action areas of the SEMP (see page 7). In 2019 the SFU Campus Master Plan for the next 50 years will be adopted. The final Plan will provide direction to enhance sustainability goals, through shaping the University's physical plan.

The recently revised BC Energy Step Code provides more stringent energy requirements to new buildings and major renovation projects, which will support SFU's emissions reduction efforts. New buildings will be designed

3 SFU's reported fleet emissions include GHG emissions from diesel consumption for fleet, boilers and backup generators.

to exceed Step Code requirements wherever possible, and require energy modelling to optimize building performance. SFU will raise awareness of climate adaptation strategies and the need for building resilience when drafting design briefs for new buildings, and when instructing consultants. From 2019 onwards, new building development at SFU will include stress tests for utilization and growth needs, in order to increase efficiency and make best use of the available space. In existing buildings, SFU's key strategies to achieve GHG emissions through energy demand side management will be: lighting retrofits, boiler replacements, HVAC system optimization and Direct-Digital Control infrastructure upgrades.

3.1.2 New Buildings and Major Renewal of Existing Buildings

Lorne Davies Complex & Grandstand (due to be completed in 2020)

The Lorne Davies Complex is home to the University's athletic and recreational programs and, as an older campus building, it has a relatively high energy consumption. In 2019, construction of a new SFU grandstand and outdoor football stadium, adjoining the south face of the Lorne Davies Complex, will begin. The plans for development include a much-needed, major renewal of the Lorne Davies Complex. Energy modeling will be used throughout the design process to optimize the energy performance of the new building assemblies. Structural upgrades to the roof will also include making the roof 'net zero energy ready', for future installation of Photovoltaic rooftop arrays. As water use is a significant factor for an athletic facility, water conservation measures are planned to reduce water consumption, and related GHG emissions, as much as possible in the facility.

Renewable energy (due to be completed by 2020)

The Burnaby Mountain District Energy Utility project is a collaboration between SFU, the SFU Community Trust and Corix Utilities, to develop and operate a biomass heating plant. The plant will ultimately provide energy to SFU and UniverCity residents. In 2019, construction will begin with the installation of new underground piping, following the site preparation completed in 2018. The new plant will utilize wood waste and biomass as the primary fuel sources, and will reduce up to 85% of the SFU Burnaby campus GHG emissions at full buildout. The project is due to be completed by 2020.

Green infrastructure and stormwater management

In 2019, with the goal of supporting the University's low carbon resilience planning, facilities and infrastructure planning efforts will continue to identify and highlight stormwater vulnerabilities from climate change, in managing the quality and quantity of drainage. Routine maintenance of the stormwater infrastructure has been planned, based on problems identified in 2018. Campus planning efforts will be focused 'uphill' of the trouble spots to protect water quality downstream. Planning studies for early site proformas - for example for the Innovation Precinct on the east side, or the Residences Master Plan on the west side of Burnaby campus - will integrate green infrastructure in stormwater management as part of the design brief. This will provide direction to move from 'hard' to 'soft' infrastructure to embed climate resilience in infrastructure. Hydraulic site modeling of development sites will also be used to inform building siting and design. SFU will continue to coordinate with Stoney Creek Environment Committee and the UniverCity Adaptive Management Committee to monitor and improve the management of stormwater on Burnaby Mountain. Additional plans for 2019 include ongoing mapping of open space, which will quantify permeable surfaces and inventory trees and creeks, to inform green infrastructure strategies.

3.1.3 Energy Efficiency and Conservation Projects

A number of the energy efficiency and conservation projects implemented in 2018 will continue in 2019 and beyond. Examples of planned projects are as follows.

Lighting

SFU will continue its LED replacement strategy across the University, in buildings and areas which have not yet received LED upgrades. This includes, for example, buildings in the Academic Quadrangle, Schrum buildings and the Goldcorp Centre for the Arts.

Equipment upgrades

IT Services is planning to upgrade audio visual technology in three lecture theatres and 54 classrooms at the Burnaby campus in 2019. Upgrading the technology and equipment will improve the learning environment for faculty and students, and will also improve energy efficiency through the ability to reduce system idle time.

Facilities Services will continue the ongoing boiler replacements, for example replacing the heating ventilator in Burnaby Facilities Services with a more efficient, dedicated outdoor air system.

Heating, ventilation and air conditioning (HVAC)

Facilities Services will continue the ongoing optimization of HVAC systems in the Academic Quadrangle, Lauren Davies Complex and West Mall Centre.

There are plans to work on building temperature setbacks, as part of the BC Cool Campus campaign, in 2019.

Energy management and building control systems

Facilities Services will continue with major Direct-Digital Control system upgrades, for example in the Schrum Communications building and East Theatre Annex.

3.1.4 Behaviour Change

Sustainable Spaces

After piloting and testing several streams in the Sustainable Spaces program in 2018, SFU's Sustainability Office will continue to develop and expand the program in 2019. Plans include: launching the Labs stream at the Burnaby campus and improving the delivery method of the Offices program.

As a result of the Labs smart screens and metering pilot, there will be a targeted approach to engaging and certifying labs at the Burnaby campus in 2019. The program will work with lab managers, principle investigators, and students, to identify key areas of improvement in both energy consumption and lab safety.

For the Office program, Sustainable Spaces will engage with all three campuses and affiliate SFU programs. Stakeholders will be connected with through launch events, lunch and learns, and strategic campaigns to maximize participation and GHG emissions reducing efforts.

3.2 Fleet Emissions

SFU is exploring potential opportunities to increase its use of electric vehicles. For example: changing to electric or hybrid security patrol vehicles, and leasing electric vehicles for its fleet. Facilities Services owns and operates approximately half of the University's fleet vehicles for maintenance and operations. Plans are underway to review and develop a plan to align with the Province's Clean BC commitment to reduce GHG emissions from government vehicles by 40%, by 2030. SFU's plans include: investigating zero emissions vehicles suitable for operation, expanding the electric vehicle plug-in infrastructure and conducting an inventory of vehicle use, to understand the most effective

replacement approach. The University acknowledges that fleet changes need to be accompanied by support for behaviour change, to encourage more efficient vehicle use and reduce GHG emissions from fleet.

3.3 Paper Emissions

In the 2018/19 fiscal year, SFU's Document Solutions has committed to:

- Ensure that 100% of production handled is printed on FSC certified paper and/or with at least 30% post-consumer waste content by enriching communication and awareness among the SFU community;
- Research and remain current with alternatives for special stocks and to promote greener choices when clients request jobs to be laminated;
- Replace shrink-wrap with paper binding whenever possible and explore solutions to eliminate shrink-wrapping all together;
- Recommend green options for meeting and events materials such as biodegradable name badge holders and eco-friendly products; and
- Coordinate recycling of toner cartridges for Ricoh MFD operations for SFU PRINT.

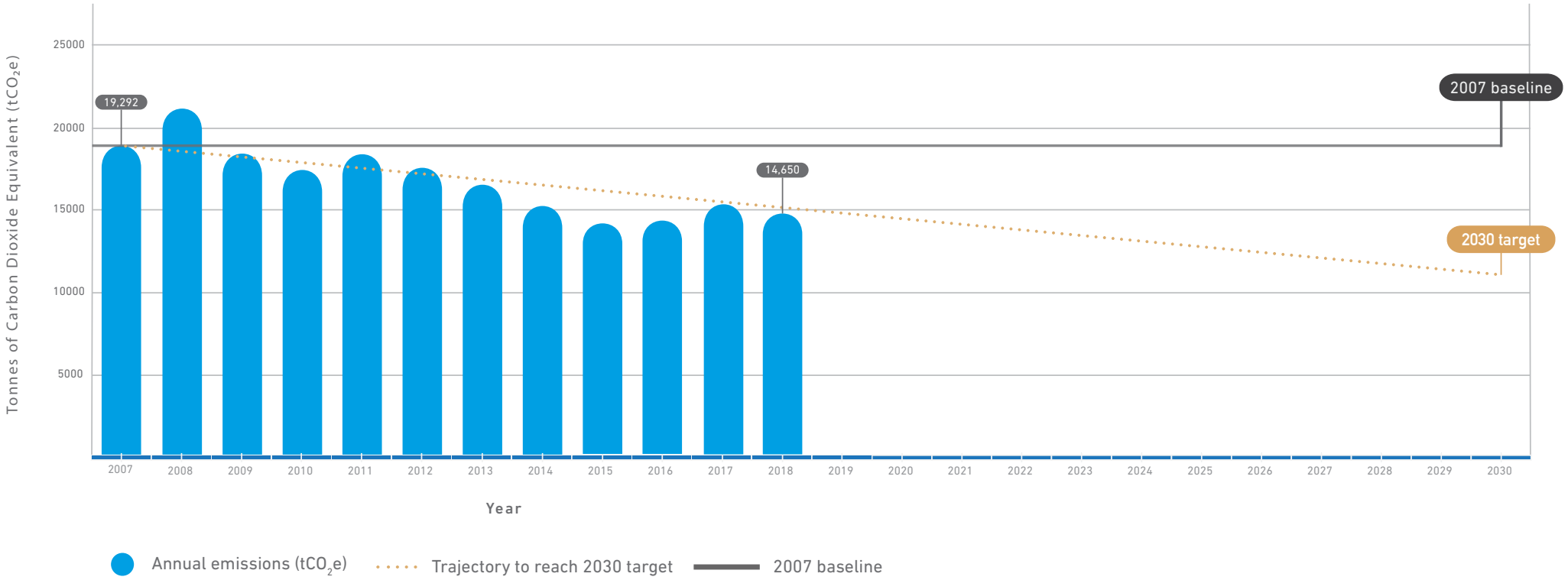
SFU will continue to educate and encourage its community to purchase sustainable and alternative paper source and to minimize overall paper use wherever possible. With a growing number of offices ordering office paper through online ordering systems such as Staples, SFU is working closely with its providers to identify opportunities to promote recycled content paper.

4.0 APPENDICES (CHARTS)

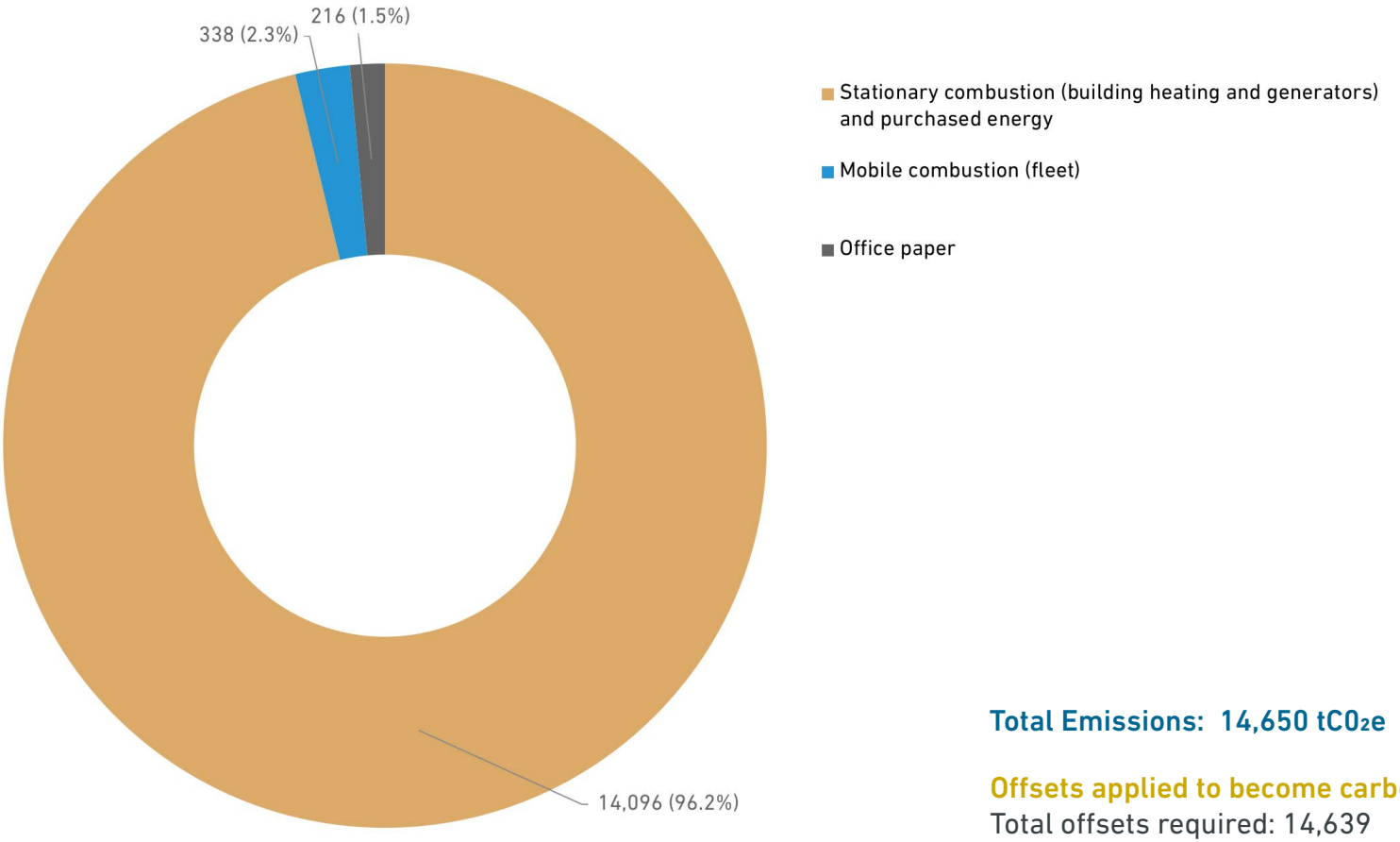
Appendix 1: Progress Towards Greenhouse Gas Emissions Reduction Targets

Appendix 2: SFU Greenhouse Gas Emissions by Source (tCO_2e)

Appendix 1: Progress Towards Greenhouse Gas Emissions Reduction Targets



Appendix 2: SFU Greenhouse Gas Emissions by Source (tCO_2e)



Total Emissions: 14,650 tCO_2e

Offsets applied to become carbon neutral in 2018

Total offsets required: 14,639
Total offsets including adjustments from prior years: 14,654
Total offset investment: $366, 350 plus GST
Emissions which do not require offsets: 11[5]

5 Under the Carbon Neutral Government Regulation, emissions from the combustion of biomass fuels do not require offsets.

Part 1: CNAR Survey

1. General Information

Name: Wendy Lee

Contact Email: wmlee@sfu.ca

Organization Name: Simon Fraser University

Sector: Post Secondary

Role - Please select your role(s) below.
If more than one individual completed the survey, multiple categories may be selected:

Energy Manager: Yes

Sustainability Coordinator: Yes

Administrative Assistant: No

Facilities/Operations Manager/Coordinator: No

CEO/President/Exec Director: No

Treasurer/Accounting: No

Superintendent: No

Other - Please Specify: Manager Planning Services

A. Stationary Sources (e.g. Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

1. Actions taken by your organization in 2018 to support emissions reductions from buildings.

a) Do you have a strategy to reduce emissions from stationary sources?

Yes

If yes above, what are the main goals?: The Strategic Energy Management Plan (SEMP) supports the University Sustainability Plan and its long term commitment to energy efficiency and conservation. The SEMP provides a strategic framework for minimizing energy consumption and for supporting the University's

b) Whether you have a strategy or not (1.a), briefly describe your organization's plans to continue reducing emissions from stationary sources:

I. Over the medium-term term (1-5 years)

The SEMP provides a 5 year action plan to continuously invest in demand-side management through projects that will improve energy efficiency and avoid greenhouse gas emissions for the University. A new Central Heating Plant is currently under construction which will use renewable biomass as the primary fuel source, displacing an estimated 70% of the University's emissions.

II. Over the long term (6-10 years)

The University will continue to explore opportunities for the use of alternative fuel sources such as low carbon electrification, biomass and solar thermal energy. In addition, high-performance building standard is in place to minimize the impact of new buildings.

c) Please describe your strategy's goals (if any) related to energy audits.

The energy consumption of the buildings are benchmarked. Worst performers have a high priority for energy audits.

I. What % on average of your building portfolio has an energy audit completed each year (if any)?: 8

d) Please describe your strategy's goals (if any) related to building retrofits.

The SFU Owner's Technical Requirements that guide major renewal projects outlines energy performance objectives, in support of University Policies such as the Sustainability Policy, the Energy Utilization Policy and other institutional strategic plans. For major building retrofits, building envelope improvements include improvements in insulation, mechanical systems, DDC systems. Energy performance is targeted at Energy Step Code 2 or higher. These major retrofits target LEED Gold certification.

I. What % on average of your building portfolio is retrofitted each year in the following categories (if any) - click here for further information:

Minor retrofits (e.g., low cost, easy to implement measures including caulking, lighting, adding roof insulation, etc.) (%): 10

Major retrofits (e.g., replacing windows and doors, equipment replacement such as boilers, etc.) (%): 5

Deep retrofits (e.g., replacing roof, replacing the heating, ventilation and air-conditioning system with a renewable technology like a ground-source heat pump, etc.) (%): 5

e) Please describe your strategy's re/retro-commissioning goals (if any)?

Buildings are to be recommissioned every 5 years. Automated recommissioning will be utilized to aid the optimization of the building energy level.

I. What % on average of your building portfolio do you recommission each year?: 10

f) Do you keep records of Refrigerant gases category and refilling volumes?

Yes

I. If yes, have you included the associated emissions in your reporting?

No

II. What, if any, mitigation approaches have been considered? Please describe.

Preventative maintenance program is in place for the cooling system to minimize and avoid leakage.

g) How many newly constructed buildings received at least LEED Gold certification in 2018: 0

I. How many newly constructed buildings did not receive LEED Gold certification?: 0

II. Please explain why LEED Gold certification was not obtained.

No new buildings added in 2018

B. Mobile Sources (Vehicles, Off-road/portable Equipment): Fuel Combustion:

3. Actions taken by your organization in 2018 to support emissions reductions from mobile sources.

a) Do you have a strategy to reduce emissions from mobile sources?

Yes

I. If yes, what are its goals?

The goals are to replace the 3 oldest vehicles every year, to improve overall fuel efficiency and reliability and reduce GHG emissions from the fleet.

b) Whether you have a strategy or not (3.a), briefly describe your organization's plans to continue reducing emissions from mobile sources:

I. Over the medium-term term (1-5 years)

Replace aging fleet with newer more fuel efficient vehicles

II. Over the long term (6-10 years)

Exploring options for the next 6-10 years including assessing options to buy or lease, and determining the optimal size and mix of the fleet. Electric vehicles will be included int he assessment for functional suitability and affordability.

c) How many fleet vehicles did you purchase from the following categories:

Electric Vehicle – EV - (e.g., Nissan Leaf, Chevy Bolt): 0

Gas/diesel vehicle: 3

I. If you purchased new gas/diesel vehicles, can you briefly explain why vehicles from the other categories were not chosen?

Other vehicle categories were not suitable for the use (light duty service trucks), too costly or not available.

d) How many existing EV charging stations does your organization have in each category:

level 2: 3

level 3: 0

How many level 2 stations (if any) are specifically for your fleet vehicles: 0

How many level 3 stations (if any) are specifically for your fleet vehicles: 0

e) How many EV charging station(s) did you install in 2018 in each category:

level 2: 0

level 3: 0

How many level 2 stations (if any) were installed specifically for your fleet vehicles: 0

How many level 3 stations (if any) were installed specifically for your fleet vehicles: 0

f) Other actions, please describe briefly (e.g. charging station feasibility studies, electrical panel upgrades, etc.)

Potential locations for adding more charging stations have been identified, pending further feasibility study. Facilities Services is also undertaking a review of its long term fleet management strategy, including assessing leasing vs. owning, including possible lease of electric vehicles.

4. Please indicate the number of the vehicles in the following vehicle classes that are in your current fleet (including any purchased in 2018):

Definitions:

• Light duty vehicles (LDVs) are designated primarily for transport of passengers <13 and GVWR<3900kg
• Light duty trucks (LDTs) are designated primarily for transport of light-weight cargo or that are equipped with special features such as four-wheel drive for off-road operation (include SUVs, vans, trucks with a GVWR<3,900kg)
• Heavy duty vehicles (HDV) includes vehicles with a GVWR>3,900 kg (e.g. ¾ tonne pick-up truck, transport trucks)

a) Light duty vehicles (LDVs)

Electric Vehicles – EV - (e.g., Nissan Leaf, Chevy Bolt): 0

"Plug In" Electric Vehicle – PHEV -- (e.g., plug-in Prius, Chevy Volt) : 0

Hybrid vehicles – HEV – (e.g., non "Plug In"- older Toyota Prius, Toyota Camry hybrid): 0

Hydrogen fuel cell vehicles: 0

Natural gas/propane: 0

Gas/diesel: 55

b) Light duty trucks (LDTs)

Electric Vehicles – EV : 0

"Plug In" Electric Vehicle – PHEV: 0

Hybrid vehicles – HEV – (e.g., non "Plug In"- older Ford Escape Hybrid, older Chevrolet Silverado pickup hybrid etc): 0

Hydrogen fuel cell vehicles: 0

Natural Gas/propane: 0

Gas/diesel: 36

c) Heavy duty vehicles (HDV)

Electric Vehicles – EV : 0

"Plug In" Electric Vehicle – PHEV : 0

Hybrid vehicles – HEV – (e.g., non "Plug In"): 0

Hydrogen fuel cell vehicles: 0

Natural Gas/propane: 0

Gas/diesel: 0

5. Please indicate the number of the vehicles you plan to replace in your fleet:

How much do you budget per LDV?: 0

How many LDVs do you plan to procure annually over the next 5 years?: 0

How many LDTs do you plan to replace annually over the next 5 years?: 15

How much do you plan to spend per HDV?: 0

How many HDVs do you plan to replace annually over the next 5 years?: 0

C. Office Paper: Indicate which actions your PSO took in 2018:

6. Actions taken by your organization in 2018 to support emissions reductions from paper supplies.

a) Do you have an Office Paper strategy?

No

I. If yes, what are its goals?

No formal strategy.

b) Whether you have a strategy or not (6.a), briefly describe your organization's plans to continue reducing emissions from paper use:

I. Over the medium-term (1-5 years)

SFU is committed to continuing to reduce the use of virgin paper on campus. Document Solutions, responsible for SFU's print and digital services, has plans to: ensure that 100% of production handled is printed on FSC certified paper and/or with at least 30% post-consumer waste content by enriching communication and awareness among the SFU community. It has also committed to research and remain current with alternatives for special stocks and to promote greener choices when clients request jobs to be laminated. It will replace shrink-wrap with paper binding whenever possible and explore solutions to eliminate shrink-wrapping all together. Document Solutions can also recommend green options for meeting and events materials such as biodegradable name badge holders and eco-friendly products and coordinate recycling of toner cartridges for Ricoh MFD operations for SFU PRINT.SFU's Central Stores also has plans to increase its supply of recycled content paper. SFU will continue to educate and encourage its community to purchase sustainable and alternative paper source and to minimize overall paper use wherever possible. With a growing number of offices ordering office paper through online ordering systems such as Staples, SFU is working closely with its providers to identify opportunities to promote recycled content paper.

II. Over the long term (6-10 years)

N/A

c) Have an awareness campaign focused on reducing office paper use

No

d) Purchased alternate source paper (bamboo, hemp, wheat, etc.)

No

e) Other actions, please specify.

SFU promotes efficient use of paper and printing. Document Solutions offers document imaging services to convert hardcopy documents into digital formats that can be more easily accessed and shared or allow the information to edited/re-sued as part of a paperless office strategy.