

ENVIRONMENT COMMITTEE

*HIS WORSHIP, THE MAYOR
AND COUNCILLORS*

SUBJECT: BUILDING BENCHMARK BC PILOT PROGRAM

RECOMMENDATIONS:

1. THAT Council authorize public disclosure of energy use and emissions data for Burnaby's portfolio of buildings submitted to the Building Benchmark BC pilot program, with a target date of February 2021.
2. THAT Council endorse the City of Burnaby's continued participation in the BC Benchmarking pilot program.

REPORT

The Environment Committee, at its meeting held on 2021 January 21, received and adopted the attached report requesting Council authorization for public disclosure of energy use and emissions data for Burnaby's portfolio of buildings submitted to the program, and for Council to endorse continued participation in the program.

Respectfully submitted,

Councillor J. Keithley
Chair

Councillor C. Jordan
Vice Chair

Copied to: City Manager Director Corporate Services Director Planning and Building Director Engineering Facilities Management Assistant Director Engineering

TO: CHAIR AND MEMBERS ENVIRONMENT COMMITTEE **DATE:** 2021 January 11

FROM: DIRECTOR PLANNING AND BUILDING **FILE:** 41500 20

SUBJECT: BUILDING BENCHMARK BC PILOT PROGRAM

PURPOSE: To update Council on Burnaby's participation in the Building Benchmark BC pilot program, request Council authorize public disclosure of energy use and emissions data for Burnaby's portfolio of buildings submitted to the program and request Council endorse continued participation in this program.

RECOMMENDATIONS:

1. **THAT** Council authorize public disclosure of energy use and emissions data for Burnaby's portfolio of buildings submitted to the Building Benchmark BC pilot program, with a target date of February 2021.
2. **THAT** Council endorse the City of Burnaby's continued participation in the BC Benchmarking pilot program.

REPORT**1.0 INTRODUCTION**

Council endorsed the City of Burnaby's participation in an energy benchmarking and disclosure pilot program on 2019 December 16 and the report was forwarded to the Environment Committee for information on 2020 January 29. The project was renamed 'Building Benchmark BC' (buildingbenchmark.bc.ca) after the first Council report.

This report updates Council on Burnaby's participation in this pilot program to date, presents preliminary results of energy benchmarking for the portfolio of thirty (30) municipal buildings submitted to the program and presents next steps for the program. The report also recommends that Council confirm disclosure of energy use and emissions data for the full portfolio of civic buildings submitted to the pilot program.

2.0 POLICY SECTION

Benchmarking civic buildings as part of Building Benchmark BC and encouraging private sector buildings to participate supports Burnaby's City Energy Strategy (2020 July 6) and Climate Action Framework (2020 July 6), demonstrating leadership on the challenging Big Move to retrofit existing buildings.

Specifically, the benchmarking project meets one of the City Energy Strategy's Quick Start commitments under Zero Emissions Buildings, Existing Facilities, demonstrating best practice in building energy management:

QUICK START: Benchmark key civic buildings, through the Building Benchmark BC program. In addition to tracking building energy use, benchmarking allows for comparison across similar buildings, improved energy management and consideration of potential GHG reductions. By participating in voluntary benchmarking and disclosure, the City is demonstrating best practice in building energy management." (City Energy Strategy, Report to Environment Committee, 2020 June 24, p. 16.)

Promoting energy benchmarking also supports strategies and actions in the Environmental Sustainability Strategy (2016) and the Community Energy and Emissions Plan (2016).

Burnaby's participation in Building Benchmark BC pilot program aligns with the City of *Burnaby's Corporate Strategic Plan* by supporting the following goals and sub-goals of the Plan:

- **A Connected Community**
 - Partnership – Work collaboratively with businesses, educational institutions, associations, other communities and governments
- **A Healthy Community**
 - Healthy environment – Enhance our environmental health, resilience and sustainability
- **A Dynamic Community**
 - Economic opportunity – Foster an environment that attracts new and
 - Community development – Manage change by balancing economic development with environmental protection and maintaining a sense of belonging
 - City facilities and infrastructure – Build and maintain infrastructure that meets the needs of our growing community
- **A Thriving Organization**
 - Financial viability – Maintain a financially sustainable City for the provision, renewal and enhancement of City services, facilities and assets

3.0 BACKGROUND

3.1 Building Benchmark BC Pilot Program

Building Benchmark BC is a pilot program that involves a range of stakeholders and funding providers, including Natural Resources Canada, BC Hydro, Metro Vancouver, University of British Columbia, and Open Technologies. To date, the cities of Surrey, Richmond, Vancouver, North Vancouver, New Westminster, Victoria, Kelowna, and Burnaby, along with the District of Saanich and the Township of Langley, are participating local governments. Participants from the private sector are also involved, drawn mainly from the development industry. The overarching goal of the Building Benchmark BC pilot program is to test and demonstrate the feasibility and benefits of energy benchmarking and voluntary disclosure of results to various stakeholders, in a coordinated manner that promotes common methodology for measuring and reporting among local governments, while building the case for a provincial scale program.

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Energy benchmarking is the process of tracking and recording a building's energy performance over time, based on the principle that building energy consumption must be measured before it can be managed. The data can help building owners and managers identify opportunities for efficiency improvements and retrofit projects, which can have a broader community benefit of reducing greenhouse gas emissions from buildings. The term 'disclosure' means reporting energy performance to jurisdictions or to the public, in order to inform government policy and program development, to increase transparency and public awareness in the marketplace and to demonstrate leadership and good practice for sustainable development and climate action. Details on Building Benchmark BC's disclosure website are provided below and in *Appendix A* attached.

3.2 Burnaby's Participation and Next Steps

Over the past year, City staff attended meetings to provide input on the design and implementation of the pilot program. Staff made recommendations to improve a legal instrument of the program, which was then revised and used across the program. Staff also provided building level data to the project coordinator (OPEN Green Building Society) and worked with the project manager to categorize civic buildings by type. One of the findings has been that municipal buildings are more complex, and therefore more difficult to categorize, than private sector office, commercial, or residential buildings.

Private sector building recruitment for the program took place in the first half of 2020. To aid in recruitment, City staff provided program information to various developers in Burnaby to encourage voluntary participation and a public information bulletin about Building Benchmark BC was prepared and presented in City Connect to increase awareness and encourage participation. Nineteen (19) private sector buildings located in Burnaby are participating in the program. The City of Burnaby submitted a portfolio of thirty (30) municipal buildings to the program. The buildings represent a cross-section of City of Burnaby buildings and facilities, and range by age, size, energy system and function.

The second half of 2020 involved data collection, cleaning and analysis by the project coordinator. The next steps are reporting, preparing the disclosure map and preparing public communications. This will be followed by another recruitment phase to add additional buildings, starting toward the end of Q1 2021, and then the same steps of collecting data, analyzing providing benchmarking data to participants, and updating the disclosure map. The pilot program is scheduled to complete in Q3 of 2021 and will result in a data set consisting of two years of energy use (2019 and 2020). The original schedule for the project was revised and extended because of COVID-19 and the challenges of recruiting and collecting data during a pandemic.

The project coordinator is currently applying for external funding to add a third phase of building recruitment and inclusion of energy use data for 2021. With Council approval to provide the same level of in-kind staff resources, Burnaby could participate in the program. Benchmarking our civic buildings to a longer data set with potentially more buildings, having access to the full data set as a project partner and showing climate action leadership are the benefits of partnering for the additional phase, should external funding be confirmed by the project coordinator.

3.3 Energy Performance Scorecards and Preliminary Results (2019 data)

For each building submitted to the pilot program, an Energy Performance Scorecard was prepared for the owner/manager that summarizes energy and green building performance based on data for the year

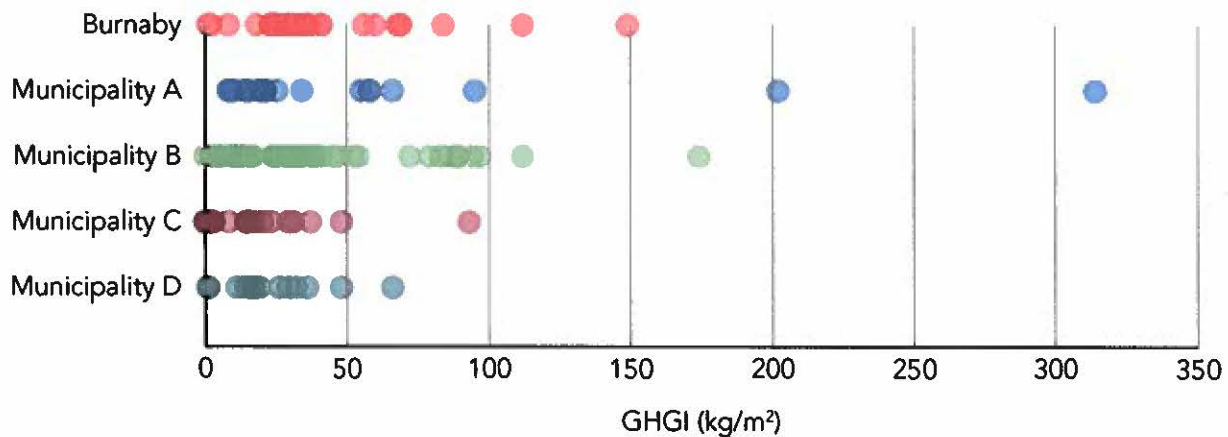
2019. The Scorecard compares (i.e. benchmarks) the building’s performance to other buildings and building types in the local jurisdiction and across the data set. Examples of Energy Performance Scorecards for two civic buildings in Burnaby are provided as *Appendix B* attached.

The Scorecard provides multiple scores for building performance, including overall greenhouse gas emissions, building energy use, energy use intensity (per square meter) and greenhouse gas intensity (per square meter). For each, the buildings are ranked against a larger set, including in some cases, buildings in the same use category for the same municipality.

Results for Burnaby’s buildings are shown in *Figure 1*, compared to other municipal data that has been publicly disclosed. The metric is greenhouse gas intensity per square meter, to simplify comparison across buildings of different sizes. GHGI is also the metric used in Burnaby’s Green Building Policy.

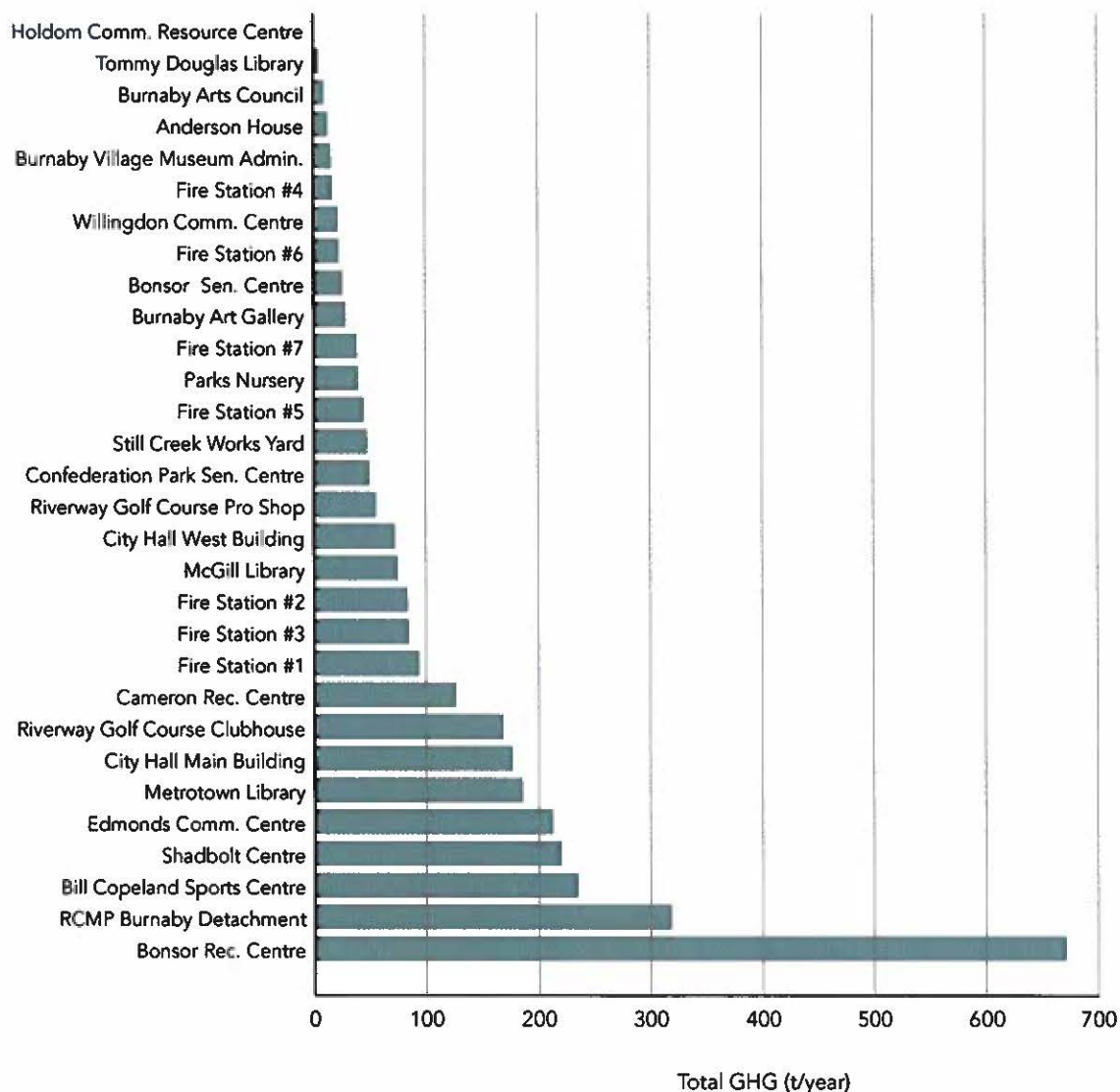
The communities demonstrate a large range in building performance, from very low to more than 100 GHGI/m². The higher end buildings tend to be those with energy-intensive uses, such as swimming pools or commercial kitchens. Most buildings fall within a range of 10 to 50 GHGI/m², and in this, Burnaby is comparable to the other municipalities.

Figure 1. Municipal building performance using greenhouse gas intensity, based on publicly disclosed data. 2019 data.



The two example building Score Cards in *Appendix B* attached show the mixed performance of Burnaby’s buildings, and the complexities of measuring building energy performance. On the one hand, the Tommy Douglas Library makes use of a geothermal heating system, which results in very low greenhouse gas emissions intensity. As libraries are also low-energy users in terms of function, total emissions are also very low. Bonsor Recreation Centre, a much larger building, includes a swimming pool, which is a higher user of energy. The heating system at Bonsor makes use of natural gas and solar thermal panels. The resulting greenhouse gas emissions intensity is considerably higher than Tommy Douglas, and Bonsor has the highest total greenhouse gas emissions of any of Burnaby’s civic facilities in the program (see *Figure 2* below). Further data analysis is required to determine how much better Bonsor’s performance is relative to other municipal swimming pools.

Figure 2. Total greenhouse gas emissions per year for the thirty Burnaby civic buildings submitted to the pilot program. 2019 data.¹



Multiple factors play a role in total building emissions, including the carbon-intensity of the energy system, building function, occupancy, building age (and date of retrofit if applicable), and building size. For example, the Riverview Golf Course building has a high greenhouse gas emissions intensity due to its many functions including the kitchen facilities; however, as a smaller building, its total emissions are mid-range. Going forward, further data analysis will be conducted by city staff. The data will inform other City Energy Strategy Quick Starts, including the retrofits electrification strategy. It will also be used for communications about the challenges and opportunities in building retrofits, as part of Burnaby’s larger Climate Action communications plan.

¹ Not all civic buildings were included in the submission. The thirty (30) buildings submitted to Building Benchmark BC, shown in Figure 2, were selected to represent a cross-section of City of Burnaby buildings and facilities, and range by age, size, energy system and function.

3.4 Disclosure Option

All participants in Building Benchmark BC receive an Energy Performance Scorecard for their building(s), as discussed in *Section 3.3*. Public disclosure of the building information is voluntary. Those who opt in agree their data can be viewed on the public disclosure map, which is made available online and displayed using an interactive web-based mapping interface. Examples of the web interface are provided in *Appendix A* attached. The timeline for the first set of participating municipalities to opt in is late January (2021). Communications and promotion of the map to the public, targeting potential new building owners and managers for recruitment, is tentatively scheduled for mid-February (2021).

To date, Metro Vancouver, New Westminster, Saanich, Vancouver, North Vancouver, and Victoria have opted to disclose their building data. Richmond and Surrey are still considering the disclosure option. Langley and Kelowna were later joining the program, and their disclosure date is therefore later.

Burnaby committed to the benchmark program to demonstrate leadership on key civic buildings. Disclosure through the Benchmarking BC pilot program would mean that our portfolio of thirty (30) buildings, subject to final data verification,² would display as points on the interactive map available online, along with other municipalities and private sector buildings that choose to opt in. Energy use and benchmarking for each building would be viewable by selecting the corresponding point on the map. The data is also displayed in ranked format, compared against other buildings in the program, other buildings in Burnaby, and/or other buildings in the same category (see *Appendix B* attached). Viewers will therefore see the range of building performance across civic facilities.

Identifying building information displayed on the map is limited to who manages the building, building category (retail store or library, for example) and building age. The address and the name of the building are unavailable for viewing, although civic facilities could be identified by category (e.g. museum) and location.

Leadership and accountability for climate action are the primary reasons for the City of Burnaby to publicly disclose the civic buildings submitted to the pilot program. Reducing emissions from existing facilities and buildings is one of the most challenging areas of climate action. Energy benchmarking is a building management best practice that allows for comparison of energy use across similar buildings, improved energy management and consideration of greenhouse gas emissions when considering retrofits and technological upgrades. Burnaby's transition to a carbon neutral city by 2050 (and carbon neutral corporate operations by 2040) is complex and challenging but achievable. The transition requires implementation of the City Energy Strategy and working with the community to implement the Climate Action Framework. Full participation in Building Benchmark BC shows leadership in support of these efforts. It also helps to communicate both the challenge and the commitment of the City to climate action.

Prior to public disclosure option, Corporate Communications would prepare communication materials for use in tandem with public promotion of the Building Benchmark BC disclosure map by the project

² A few buildings from other local governments in the program have not been publicly disclosed due to data validation challenges. Burnaby staff would also do due diligence prior to public disclosure with a final data verification step.

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convener (OPEN Green Building Society). Communication materials would place Burnaby's participation in the pilot program in the context of the City Energy Strategy and Climate Action Framework, highlighting the programs and initiatives Burnaby has already undertaken to improve energy efficiency, add renewables, and decrease energy use in the operation of its facilities. It would also highlight key buildings and provide further explanation about building function, energy systems, and the resulting greenhouse gas emissions. The aim would be to include star performers as well as buildings that are more challenging to retrofit.

4.0 CONCLUSION

To date, participation in the Building Benchmark BC pilot program has provided staff with valuable experience and knowledge about energy benchmarking and disclosure in this area of climate action and with valuable information about building energy performance. The data will be considered alongside existing facilities management plans, as staff prepare a plan to transition civic facilities to carbon neutrality.

Burnaby's participation in the Building Benchmark BC pilot program also demonstrates leadership and accountability for climate action to help achieve our community's emission reduction targets. Opting to disclose and share the energy use data for the civic buildings on the public disclosure map demonstrates climate action leadership by highlighting energy benchmarking programs as a building management best practice.

Based on the information presented in this report, it is recommended that Council confirm disclosure of building energy use data for the portfolio of buildings included in the pilot program. Also recommended is that Council endorse Burnaby's participation in the additional phase of the pilot program.



E. W. Kozak, Director
PLANNING AND BUILDING

MS:sa
Attachment

cc: City Manager
Assistant Director Engineering Facilities Management
Director Corporate Services

APPENDIX A WEBSITE INTERFACE

As shown below left, web users can choose to view properties by type or by participant, which includes local governments and private building owners. Each metric is explained (Total Greenhouse Gas Emissions, for example), and individual buildings are also displayed in comparison to other buildings.

BUILDING BENCHMARK BC

Building Benchmark BC is supporting property owners through a changing landscape of energy management. For full program details, please visit buildingbenchmarkbc.ca.

Below are a list of performance metrics (e.g. ENERGY STAR Score or Energy Use Intensity) by which you can colour code the map results, and use the histogram sliders to filter down to different performance ranges.

Select a metric to see filtered results on the map Reset all

Show All Property Types

Show All Participants

PROPERTY INFORMATION

Total Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions are the carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) gases released into the atmosphere as a result of energy consumption at the property. GHG emissions are expressed in metric tons of carbon dioxide equivalent (tCO₂e), a universal unit of measure that combines the quantity and global warming potential of each greenhouse gas. Total emissions is the sum of direct emissions (emissions associated with onsite fuel combustion) and indirect emissions (emissions associated with purchases of electricity, district steam, district hot water, or district chilled water). These emissions estimates are calculated from site electricity, natural gas, and steam energy use using GHG emissions factors.

Number of buildings with data: **218**
Range: **1** minimum to **1,082** tCO₂e/yr maximum
Inter-quartile range: **125** tCO₂e/yr
Mean / median / mode : **157 / 89 / 3** tCO₂e/yr
Standard deviation: **192** tCO₂e/yr

APPENDIX B: EXAMPLE BUILDING SCORECARDS

Two examples of the results from the benchmark project, provided to all participants (local government and private sector) in the program with buildings on this page.

