Revising the Methodology for Calculating and Reporting on GHG Emissions from Contracted Services

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1. Introduction

The City of Vancouver is working towards zeroing its carbon emissions. Reducing the Greenhouse gas (GHG) emissions has remained one of the top priorities in the Greenest City Action Plan, the Renewable City Strategy and the Corporate Green Operations Plan. Goods and services procured by the City continue to be the key contributors to GHG emissions. Through this project, the City is interested in assessing the magnitude of emissions associated with a good or a service to understand the strategic importance of suppliers as a part of corporate GHG reductions plan and to focus on contractors with the most significant impact.

1.1 Background

The City of Vancouver is in the process of becoming a leader in sustainable living by initiating a shift to derive all its energy from renewable sources and by implementing several policies to transform into the Greenest City in the world. To support this vision, the City has introduced various stratagems such as the Renewable City Action Plan[1] and the Greenest City 2020 Action Plan[2]. The goals supported by this project under the Renewable City Action Plan are Climate Change and Renewable Energy Targets. The Action Plan also mandates staff to "Undertake an assessment of carbon emissions from City suppliers and determine means to use its purchasing power for greening its supply chain"[3].

This project also supports the Greenest City goals of Climate Leadership by reducing the community-based carbon emissions, Lighter Footprint by reducing Vancouver's ecological footprint and Green Economy by increasing the number of suppliers greening their operations. In addition, the Corporate Green Operations Plan outlines organization-wide corporate initiatives. To improve the sustainability of City operations, four high-priority actions have been formulated, and one of these actions is "Planning and implementing a program to reduce greenhouse gas emissions significantly and fossil fuel use in City-run buildings and vehicles"[4]. All these policies and targets highlight the importance of calculating the GHG emissions from contracted services to attain the City's sustainability goals.

Currently, the City has been calculating and reporting a subset of emissions from contracted services to the BC Ministry of Environment as per the guidelines prescribed by the Ministry. Upon detailed analysis of a few key contractors, it was observed that the scope of the subset being reported only includes a portion of these emissions and it is likely that the existing methodology underestimates the total emissions associated with contracted services. Therefore, this research was commissioned to help the City better understand the gap and to make recommendations for improving the existing methodology.

1.2 Objectives

The research has four key objectives:

a) To compare the existing COV methodology for calculating and reporting on GHG emissions from contracted services to the Province of British Columbia to the EIO - LCA methodology (cradle-to-gate) being utilized by other public and private organizations and by the COV Sustainable and Ethical Procurement Program analysis conducted by an external consultant in 2016.
b) To identify the department with the highest GHG emissions from contracted services based on the LCA methodology and identify subcategories of spend and suppliers with the greatest GHG emissions.
c) To develop a tool for departments in the City to estimate the GHG emissions from a good or contracted service using the LCA methodology.
d) To recommend ways to improve/revise the existing methodology for reporting to the province

2. Research Method

The research method used in this study to achieve the aforementioned objectives is as follows:

1. Document Review–A study of existing documents on standards and guidelines of an existing method for calculating GHG emissions was conducted. Internal reports on the sustainable procurement practices were also reviewed. This exercise clarified the existing practices within the City for calculating and reporting on GHG emissions to the Province.
2. Literature Review- A high level scan of existing literature, industry case studies, white papers were conducted to identify the methods and tools used for calculating GHG emissions. This scan was useful in developing a foundation of knowledge for reviewing the LCA methodology used by the external consultants and comparing it to the existing COV methodology.
3. Stakeholder Engagement–Consultations with the subject matter experts in the Departments of Finance, Risk and Supply Chain Management as well as Planning, Urban Design and Sustainability aided in improving the understanding on specific aspects of the existing method and other internal studies for reporting GHG emissions as well as sustainable procuring practices.
4. Analysis –A gap analysis was conducted by comparing the LCA methodology to the existing method which helped in identifying the drawbacks in the existing methodology and analyzing the pros and cons of replacing the existing methodology for reporting GHG emissions to the Province.

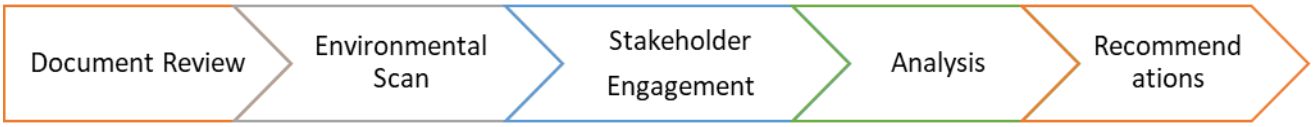

Figure 1. Process chart depicting the adopted research method and objectives involved in the study

The process chart depicted in Figure 1 illustrates how the method adopted in this study aided in achieving the objectives of the project. The document review and environmental scan were contributory in understanding the LCA methodology. Stakeholder engagement was instrumental in comparing the existing method to the LCA methodology and gaining insights on procurement practices. The analysis aided in identifying the sources of emissions in the supply chain and suggesting critical recommendations for improving the existing methodology.

3. Summary

Industrial activities performed to produce a good or provide a service have associated impacts on the climate. These impacts can be determined by converting the total purchasing spend of an activity into GHG emissions. This can be performed by determining appropriate intensity factors by converting impacts from activities to GHG intensity per dollar spent. Finally, the GHG intensity per dollar spent is multiplied by the total purchasing spend of the activity, resulting in total GHG emissions associated with a good or a service. The intensity factors can also be determined from publicly available environmental databases, by selecting a database that covers the upstream and downstream emissions as per the reporting requirements, i.e., cradle-to-gate[1] or operational emissions[2]. Figure 2 depicts one of the most extensively used procedures involved in calculating GHG emissions associated with a good or a service, irrespective of the type of intensity factors chosen.

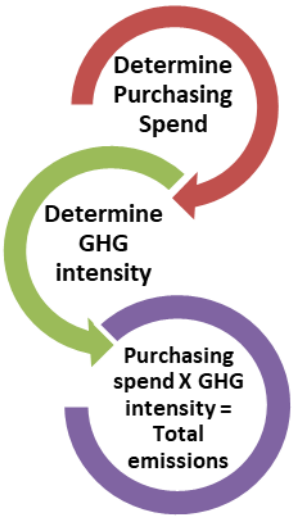

Figure 2. General procedure for calculating GHG emissions

From the literature review, it was observed that many organizations are calculating GHG emissions using Economic Input-Output Lifecycle Assessment [3](EIO-LCA) methodology to estimate the magnitude of GHG emissions associated with contracted services and identify the major sources of supplier emissions for action. In 2016, the City commissioned an external consultant to review its sustainable and ethical procurement program. As part of the review, the consultant calculated the GHG emissions associated with 70 spend subcategories using an EIO-LCA methodology based on the CEDA database.

The LCA methodology was used to assess the magnitude of emissions associated with goods and services and was used as a benchmark for identifying gaps in the existing methodology. An excel workbook was developed for the LCA methodology along with a user guide for the City to calculate GHG emissions.

The LCA and existing methodologies were compared by using them to calculate GHG emissions for a same set of vendors. It was observed that the GHG emissions calculated using the former were

[1]Refer to Appendix A
[2]Refer to Appendix A
[3] Refer to Appendix A

higher than the latter. This was an expected outcome since Provincial guidelines require the Municipality to report only the direct emissions associated with its operations for Traditional Services. This clause leaves an extremely narrow scope for calculating and reporting emissions. However, this comparison does give an indication of the magnitude of the GHG emissions not being included in the existing methodology and which can be considered for setting priorities and managing suppliers.

The spend data for the years 2015, 2016 and 2017 was analyzed using the LCA methodology. The observations from the analysis of the spend data are as follows:

1. Top department contributing to highest GHG emissions from contracted services was identified.
2. After determining the top department, all the vendors associated with the department were divided into goods and services based on the nature of procurement.
3. Overall, goods and services have an 80:20 contribution to the total GHG emissions of the top department.
4. The top three activities under goods and services contributing to the highest GHG emissions were recognized along with a list of vendors contributing to the highest GHG emissions under each activity.
5. Furthermore, it was also observed that sources of emissions have been consistent over the assessed years, hence, allowing us to focus on a subset of vendors with the goal of reducing GHG emissions associated with their goods and services.

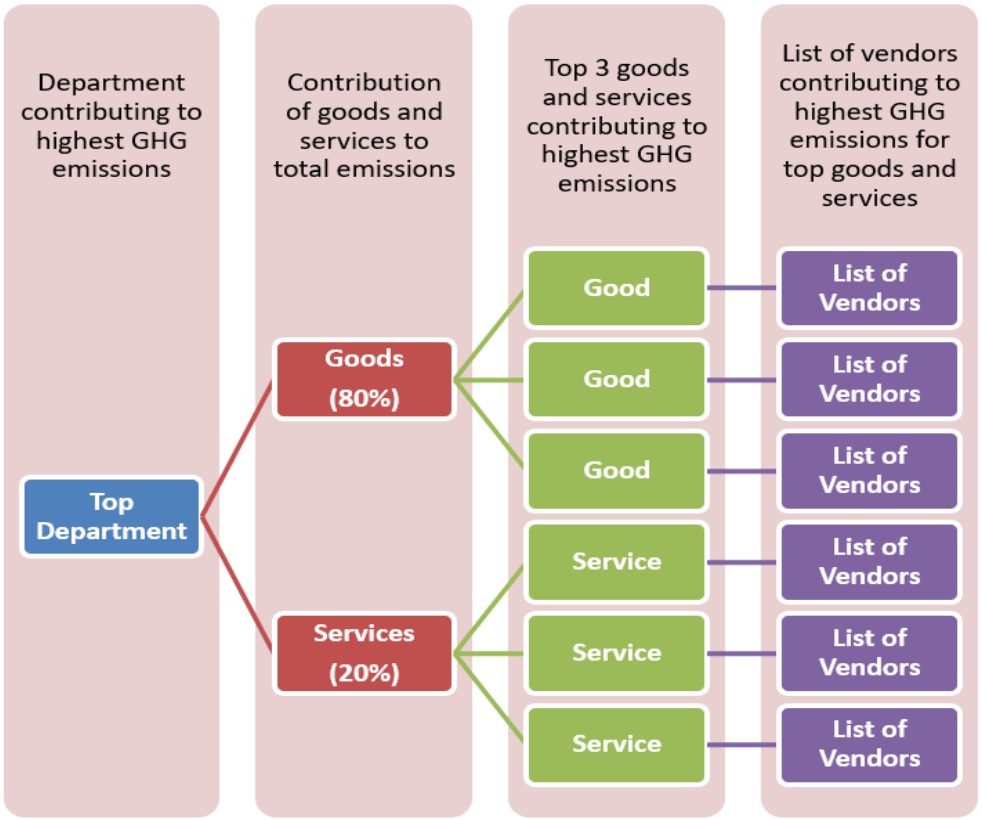

Figure 3. Hierarchy of top department followed by subcategories and vendors contributing to highest GHG emissions

The LCA and existing methodologies were compared by using them to calculate GHG emissions for a same set of vendors. It was observed that the GHG emissions calculated using the former were higher than the latter. This was an expected outcome since Provincial guidelines require the Municipality to report only the direct emissions associated with its operations (Operational Emissions)[4] for Traditional Services. This clause leaves an extremely narrow scope for calculating and reporting emissions. However, this comparison does give an indication of the other significant sources of GHG emissions not being included in the existing methodology and which can be considered for internal reporting by the City. Furthermore, the comparison aided in identifying some limitations in the existing methodology such as

a) Assigning different intensities to the same activity procured by different sub-divisions which may underestimate or overestimate the GHG emissions associated with that activity.
b) Assuming the purchasing spend for each vendor does not vary much over the years.
c) Calculating the GHG emissions using the list of vendors formulated in 2012.

Based on the analysis and the findings, this report concludes by stating a few recommendations for City's consideration:

1. Determining operational emissions[5] at activity level instead of sub-division level.
2. Annually revising the spend associated with vendors contributing to GHG emissions for Traditional Services[6].
3. Considering the feasibility of updating the operational emissions for sub-divisions.

During this project, the next steps that would be beneficial were identified as conducting a feasibility study to change the GHG intensities used in the existing methodology as well as revising the purchasing spend associated with Traditional Services. The City could also consider doing a pilot with suppliers who are top emitters to determine the feasibility of tracking actual emissions in order to better understand the difference between actual and estimated emissions.

[4]Refer to Appendix A
[5] Refer to Appendix A
[6] Refer to Appendix A

References

[1] City of Vancouver (COV), “Renewable City Strategy,” pp. 1–63, 2015.
[2] City of Vancouver, “Greenest City 2020 Action Plan,” pp. 2015–2020, 2015.
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Appendix A: Definitions

Definitions

1. **Scope 1** refers to all the direct GHG emissions from equipment and facilities owned and operated by an organization[5].
2. **Scope 2** refers to the indirect GHG emissions from purchased electricity. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity but occur at sources owned or controlled by another entity[5].
3. **Scope 3** refers to all other indirect emissions sources that result from an organization's activities but occur from sources owned or controlled by another company or entity, including business travel, embodied emissions in supply chain goods and services, emissions from landfilled solid waste, and employee commute[5].
4. **Cradle- to- Gate for goods** refers to an assessment of a partial product lifecycle from resource extraction (cradle) to the factory gate (i.e., before handing over to the consumer). Figure 4 illustrates an example of cradle-to-gate emissions for a Good.

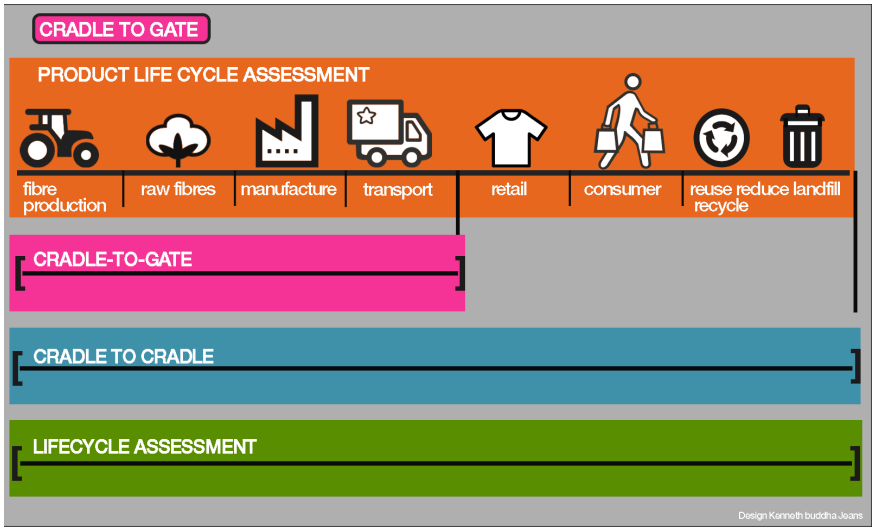

Figure 4. Illustrating cradle-to-gate emissions for a good[7]

5. **Cradle- to- Gate for services** refers to a partial product life cycle of all the products and materials that are utilized in the process of providing a service. Figure 5 illustrates an example of cradle-to-gate emissions for a Service.

[7] Source: http://buddhajeans.com/encyclopedia/cradle-to-gate-overview/

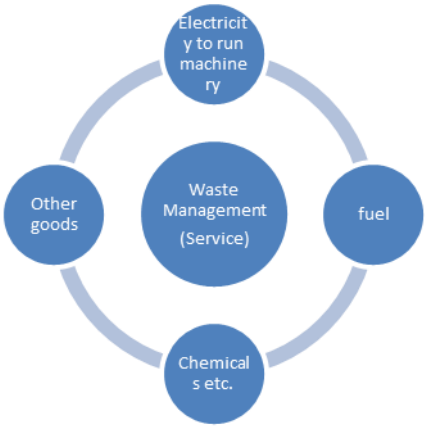

Figure 5. An Illustration of cradle-to-gate emissions for waste management (Service).

6. Lifecycle assessment (LCA) is a tool that can be used to evaluate the potential environmental impacts of a product, a material, a process, or an activity. An LCA is a comprehensive method for assessing a range of environmental impacts across the full lifecycle of a product system, from materials acquisition to manufacturing, use, and final disposition[6].
7. Traditional Services, according to the Province of British Columbia, are Fire protection, Solid waste collection, transportation and diversion, Arts, recreational and cultural services (provided by the local government), Road and traffic operations, Drinking, storm and wastewater and Administration and governance[7].
8. Non-Traditional Services, according to the Province of British Columbia, include all the services that are not considered to be traditional such as community policing, subsidized housing, professional services such as engineering design, legal, planning to name a few[7].

GHG emissions can be quantified in numerous ways. Some of the popular ways to quantify GHG emissions include:

9. Operational emissions refer to Scope 1 direct GHG emissions resulting from stationary combustion of fuels at an organization whose operations involve stationary combustion of fuel[8].
10. Lifecycle emissions are all the emissions associated with the production and use of a specific product or service, throughout its lifecycle based on the scope being considered. It can include emissions from raw materials, manufacture, transport, storage, sale, use and disposal[9].
11. Embodied energy is the sum of all the energy required to produce any goods or services, considered as if that energy was incorporated or 'embodied' in the product itself[10].
12. Economic input-output life-cycle assessment or EIO-LCA involves the use of aggregate sector-level data to quantify the amount of environmental impact that can be directly attributed to each sector of the economy and how much each sector purchases from other sectors in producing its output[11].