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THIRD-PARTY REVIEW OF NOVA SCOTIA COMMUNITY COLLEGE STARS REPORT – GHG EMISSIONS

Dear Sir/Madam

1.0 INTRODUCTION

WSP Canada Inc. (WSP) has completed a third-party review of Nova Scotia Community College (NSCC) STARS report, including OP-1 Emissions Inventory for the year 2021-2022. The following tasks were completed during the review and our findings are summarized in the following memo:

- Confirm methodology (and calculations spot checks) and whether the inventory report was completed in accordance with the standard GHG Protocol

NSCC reports its Greenhouse Gas (GHG) emissions for 16 facilities all located in Nova Scotia. The emissions reported include scope 1 mobile and stationary combustion, scope 2 emissions from the use of electricity, district steam and biomass, and select scope 3 categories such as employee and student commuting, rentals and business travel via passenger vehicles.

2.0 METHODOLOGY REVIEW

Fleet Emissions (Mobile Combustion – Scope 1)

Background

NSCC's approach to quantifying fleet emissions aligns with the GHG Protocol standard for quantifying mobile combustion emissions.

NSCC identified all the vehicles used and the distance travelled, in km, throughout the reporting period. The emissions for each vehicle were calculated using the Natural Resources Canada's (NRCan's) CO₂ emission factor for each make and model of the vehicles¹. The CH₄ and N₂O values were extracted from the 2021 GHG Emission Factors Hub published by the US Environmental Protection Agency (EPA)².

¹ NRCan, (n.d.), *Fuel Consumption ratings search tool*. Retrieved from <https://fcr-ccc.nrcan-rncan.gc.ca/en>

² USEPA, (2022), *Greenhouse Gas Emission Factors Hub*. Retrieved from https://www.epa.gov/system/files/documents/2022-04/ghg_emission_factors_hub.pdf

After conducting spot checks on the GHG inventory, it appears that some of the emission factor values used may have been transcribed incorrectly. For example, the CO₂ emission factor used for the 2014 Ford F-150 was 256 gCO₂/km. After inputting the make and model into the NRCan search tool, the emission factors published range between 292-366 gCO₂/km.

Recommendation:

NRCan provides vehicle-specific CO₂ emission factor, which is acceptable to be used, however it may result in differences from obtaining fuel consumption values and using reported emission factors for each fuel. The default emission factors based on fuel economy might be different due to driving patterns, maintenance of vehicles and other parameters. Therefore, we recommend the volume of fuel purchased is tracked and used to quantify emissions. However, the overall method used is still appropriate.

For CH₄ and N₂O, an alternative source of emission factors is to use country-specific emission factors. In Canada, the Government of Canada annually publishes emission factors through its National Inventory Report (NIR). Mobile combustion emission factors for different fuel types which can be found in table A6.1-14³. However, the changes in emission factors is unlikely to result in material changes in overall emissions as fleet emissions account for ~1% of overall emissions.

Stationary Combustion Emissions (Scope 1)

Background:

NSCC's approach to quantifying emissions align with the GHG Protocol standard for quantifying stationary combustion emissions.

As per NSCC's methodology document, NSCC used its Energy Start Portfolio Manager the record and analyse the energy Usage. The usage was converted to energy content using heat content factors. The emissions were calculated by using region-specific emission factors for each facility.

The GHG inventory did not have the stated emission factors, so the specific emission factors could not be reviewed.

Recommendation:

The methodology used to quantify scope 1 stationary combustion emissions is appropriate and aligns with the GHG Protocol standard.

Scope 2 emissions (electricity, steam and biomass)

Background:

NSCC's approach to quantifying emissions align with the GHG Protocol standard for quantifying scope 2 emissions.

As per NSCC's methodology document, NSCC used its Energy Start Portfolio Manager the record and analyse the energy Usage. The usage was converted to energy content using default conversion factors. The emissions

³ ECCC, (2023), *Canada National Inventory Report, Part 2*. Retrieved from https://publications.gc.ca/collections/collection_2023/eccc/En81-4-2021-2-eng.pdf

were calculated by using region-specific emission factors for each facility. The GHG inventory did not have the stated emission factors, so the specific emission factors could not be reviewed.

Recommendation:

The methodology used to quantify scope 2 emissions is appropriate and aligns with the GHG Protocol standard.

Scope 3 emissions (Rentals and Business Travel)

Background:

NSCC's approach to quantifying emissions align with the GHG Protocol standard for quantifying scope 3 emissions from rental vehicles and business travel via passenger vehicles.

NSCC identified all the vehicles used and the distance travelled, in km, throughout the reporting period. The emissions for each vehicle were calculated using the average fuel economy of passenger vehicles and the emission factor of motor gasoline from the US EPA⁵.

After conducting spot checks on the GHG inventory, it appears that the emission factors used from the US EPA is incorrect. The stationary emission factor for motor gasoline from Table 1 was used. Since passenger vehicles are mobile, stationary combustion emission factors should not be used.

Recommendation:

NSCC can either use the emission factors listed in tables 2 and 3, or the mobile emission factors listed in the Canadian NIR in table A6.1-14⁴. Apart from the change in emission factor, the methodology used is appropriate and in line with the GHG Protocol's requirements. However, the CO₂ emission factors in the US EPA for stationary and mobile combustion are the same. The change in emission factors for CH₄ and N₂O are unlikely to cause a material change in overall emissions.

Scope 3 emissions (Employee and Student commuting)

Background:

NSCC's approach to quantifying emissions align with the GHG Protocol standard for quantifying scope 3 emissions from employee and student commuting.

NSCC estimated the distance travelled by conducting a survey. Based on the survey responses, NSCC estimated the distance travelled from the estimated one-way distance driven along with the number of days employees and students commuted to the facility. The emission factors used for scope 3 emissions for employee and student commuting was the same emission factor as that of scope 3 business travel and rentals. The emission factors were calculated using the average fuel economy of passenger vehicles and the emission factor of motor gasoline from the US EPA⁵.

After conducting spot checks on the GHG inventory, it appears that the emission factors used from the US EPA is incorrect. The stationary emission factor for motor gasoline from Table 1 was used. Since passenger vehicles are mobile, stationary combustion emission factors should not be used.

⁴ ECCC, (2023), *Canada National Inventory Report, Part 2*. Retrieved from https://publications.gc.ca/collections/collection_2023/eccc/En81-4-2021-2-eng.pdf

Recommendation:

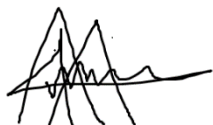
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3.0 CONCLUSION

In conclusion, the methodology used is appropriate and satisfies the requirements of the GHG protocol. The emission factors used can be updated to more appropriate values. The GHG Protocol follows the hierarchy identified in the IPCC methodology. The IPCC identifies that in the absence of models to more accurately estimate emissions (tier 3 approach), country-specific emission factors should be used (tier 2 approach). If neither tier 2 nor tier 3 approaches are possible, then default emission factors can be used⁶.

Sincerely,

WSP Canada Inc.



Amine Mikati, MSc.

Analyst, Climate Change Advisory Services

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CC: Emily Gillis - WSP; Michael Chapman, Martha MacGowan - NSCC

⁵ ECCC, (2023), *Canada National Inventory Report, Part 2*. Retrieved from https://publications.gc.ca/collections/collection_2023/eccc/En81-4-2021-2-eng.pdf

⁶ IPCC, (2006), *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2*. Retrieved from <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html>