CleanBC Industrial Incentive Program

Greenhouse Sector Guidance

This guidance applies to reporting operations with primary NAICS codes as follows:

- NAICS – 111419: Other Food Crops Grown Under Cover
- NAICS – 111412: Cannabis Grown Under Cover

Sector: Greenhouses

CIIP Product:
- Greenhouses - eligible plants
  (including cucumbers, peppers, tomatoes, and their respective seedlings)
- Greenhouses - cannabis plants
  (including seed/seedling to flower harvesting)

In addition to this guidance document, to assist in calculating inputs for the CleanBC Industrial Incentive Program (CIIP) application process, the ministry provides a spreadsheet with the appropriate calculation formulas built in (available via e-mail and webpage).

Quantification and Reporting of Emissions and Related Information

Unless explicitly stated otherwise in the CIIP guidance, quantification and reporting of greenhouse gas emissions and related information under CIIP must comply with the Greenhouse Gas Industrial Reporting and Control Act (GGIRCA) and the Greenhouse Gas Emission Reporting Regulation (GGERR), including with the referenced in GGERR Western Climate Initiative (WCI) quantification methodologies.

The WCI methodologies typically applicable to greenhouse reporting operations include, but may not be limited to, the following:

- WCI.020 General Stationary Combustion
- WCI.040 Electricity Generation
- WCI.280 Mobile Equipment at Facilities

In addition to the information required in the GGERR, applicants to CIIP must also report the GHG emissions associated with purchased grid electricity and heat.
Grid electricity emissions are quantified by multiplying the published electricity emission intensity factor for grid-connected entities $EIF_{Grid}^{Electr.}$ for the applicable reporting year by the amount of purchased grid electricity $Q_{Purchased}^{Electr.}$ in GWh:

$$E_{Electr.}^{Electr.} = EIF_{Grid}^{Electr.} \cdot Q_{Purchased}^{Electr.}$$

Purchased heat emissions are quantified by multiplying a BC-specific industrial heat emission intensity factor $EIF_{BC}^{Heat}$ by the amount of purchased heat $Q_{Purchased}^{Heat}$ in GJ:

$$E_{Purchased}^{Heat} = EIF_{BC}^{Heat} \cdot Q_{Purchased}^{Heat}$$

where

$$EIF_{BC}^{Heat} \text{ is } 0.063 \text{ tCO2e/GJ.}$$

Emissions associated with the production of self-generated electricity that is sold to the grid must be allocated to the sold electricity rather than to cannabis or eligible plants. Therefore, emissions associated with sold electricity must be quantified in the following manner:

1) **Determining emissions associated with all self-generated electricity**

- In the case of pure electricity generation (not a combined heat and power unit) there is no partitioning between generated electricity and heat; proceed to the next step.

- In the case of combined heat and power (CHP) generation (co-generation), select one of the three methodologies for allocating emissions listed in the *WRI/WBCSD’s Allocation of GHG Emissions from a Combined Heat and Power (CHP) Plant document*: 1) the efficiency method; 2) the energy content method, or 3) the Work Potential method.

- It is recommended that the efficiency method be used (see methodology below). For guidance on using other methodologies, please see the document listed above.

$$E_{EL} = \left[ \frac{P_{EL}}{\left(\frac{e_{EL}}{e_{H}}\right)P_{H} + P_{EL}} \right] \cdot E_{EL+H}$$

where:

- $E_{EL}$ are the emissions allocated to all self-generated electricity (tCO2e)
- $E_{EL+H}$ are the emissions allocated to all self-generated energy (tCO2e)
- $P_{EL}$ is total produced electricity (GJ; 1 GWh = 3600 GJ)
\[ P_H \] is total produced heat (steam) (GJ)
\[ e_{EL} \] is efficiency of electricity generation (default value = 0.35)
\[ e_H \] is efficiency of heat (steam) generation (default value = 0.80)

In the absence of actual efficiency values for the specific CHP unit(s) in place, reporting operations must use the default values for the efficiencies of steam and electricity production as stated above. If efficiency values are available and sufficient justification is provided to the ministry, they must be reported and used in place of the default values.

2) Determining emission intensity of self-generated electricity

Emissions intensity must be provided in tCO2e/GWh. GJs can be converted to GWh by dividing GJs by 3600. The Emission Intensity of self-generated electricity, in tCO2e/GWh, is:

\[ EI_{EL} = \frac{E_{EL}}{P_{EL}} \]

3) Allocating emissions to sold electricity

Emissions associated with sold electricity are quantified as follows:

\[ E_{EL}^{sold} = EI_{EL} \times P_{EL}^{sold} \]

where:

\[ P_{EL}^{sold} \] is the amount, in GWh, of produced electricity sold to the grid (1 GWh = 3600 GJ).

Therefore, the emissions for CIIP purposes are (where \( E_{onsite} \) is the reporting operation's emissions total as required to be reported under GGIRCA and submitted in the Single Window Reporting System):

\[ E^{CIIP} = E_{Elig. Plants} + E_{Cannabis} = E_{onsite} + E_{Grid}^{Electr.} + E_{Purchased}^{Heat} - E_{EL}^{sold} \]

Reporting operations must demonstrate that the total amount of sold energy does not exceed that which is allowable under a fully executed purchase agreement. Records evidencing such agreements must be kept in accordance with the GGERR.

Reporting of Energy

Applicants to the CIIP must also report annual amounts of heat and electricity. Electricity must be reported in GWh (1 GWh = 3600 GJ)
• Generated on site – electricity in GWh and heat in GJ;
• Purchased – electricity in GWh and heat in GJ;
• Sold – electricity in GWh;

For the purposes of CIIP it is assumed that:

• All energy generated on-site but not sold is used for production;
• All purchased energy is used on-site;
• All sold electricity was generated on-site.

In the CIIP application, purchased electricity, self-generated electricity and heat and sold electricity are reported under the ‘Production’ tab.

To report purchased energy, from the ‘Product or Service’ dropdown menu, select ‘Purchased Electricity’ or ‘Purchased Heat’ as applicable; enter the amount of electricity purchased (in gigawatt hours) or heat purchased (in gigajoules) and the emissions associated with the purchased electricity or heat. To report energy generated on site, select ‘Generated Electricity’ or ‘Generated Heat’ as applicable; enter the amount of electricity (in gigawatt hours) or heat generated (in gigajoules) and the associated emissions. To report self-generated electricity sold to the grid, select ‘Sold Electricity’ and enter the amount (in gigawatt hours) and associated emissions.

 Quantification of Production

Applicants to the CIIP must report the following areas in hectares, if used at the operation within the reporting year:

• Growing area of eligible plants, and
• Growing area of cannabis plants.

The growing area at a reporting operation is the eligible production and propagation area. The eligible production and propagation areas are the heated commercial greenhouse space used to grow either eligible plants (cucumbers, peppers, tomatoes, and their respective seedlings) or cannabis plants (from seed/seedling to flower harvesting). Facility space used for non-eligible activities or uses (e.g. office, residential, storage, equipment, packing, packaging) or to grow non-eligible crops or plants must not be allocated to either product. No reporting operations in B.C. currently warehouses plants. If an operation commences warehousing, that area must not be allocated to the growing area for either eligible plants or cannabis plants.

It is recognized that growing area is commonly quantified in acres or square feet. To convert:

• Acres into hectares, divide the number of acres by 2.471;
• Square feet into hectares, divide the number of sq. feet by 107,639.11.

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1 One acre is exactly 43,560 square feet. One square foot is exactly 0.09290304 square meters.
**Emission Allocation between Products**

Applicants to CIIP must allocate GHG emissions between the production of eligible plants, cannabis plants, and exported electricity. For single product operations, this is not required as all facility emissions are attributed to the production of that single product.

In multi-product operations, this is accomplished through the allocation of the emissions associated with the energy consumed in the production pathway of a salable product. The term “production pathway” refers to the collection of processing units needed to grow either eligible plants or cannabis plants.

1) For each product, determine the processing units (PU(s)) (i.e. emission sources) that comprise its entire production pathway.
2) Classify all PU(s) in the reporting operation into two types: exclusive PU (EPU - a PU involved in only one product) and shared PU (SPU - a PU shared by both products).
3) All emissions from EPU(s) must be allocated to the relevant product.
   - Direct metering must be used where available (e.g. all current reporting operations that grow both eligible plants and cannabis plants do so in separate facilities with direct metering).
4) For each SPU, the fraction of emissions to be allocated to each product must be determined based on metering where possible. In the absence of metering, growing area can be used to allocate emissions.
   - Reporting operations must consult with the ministry regarding the acceptability of any alternative allocation methodologies prior to the submission of their CIIP application.

If the allocation methodology involves growing area, then emissions can be split between these products as follows:

\[
E_{\text{Elig. Plants}} = E_{\text{EPU}_{\text{Elig. Plants}}} + \left( \frac{A_{\text{Elig. Plants}}}{A_{\text{Elig. Plants}} + A_{\text{Cannabis}}} \right) * E_{\text{SPU}}
\]

\[
E_{\text{Cannabis}} = E_{\text{EPU}_{\text{Cannabis}}} + \left( \frac{A_{\text{Cannabis}}}{A_{\text{Elig. Plants}} + A_{\text{Cannabis}}} \right) * E_{\text{SPU}}
\]

where:
- \(E_{\text{Elig. Plants}}\) are the emissions allocated to eligible plants (tCO2e)
- \(E_{\text{Cannabis}}\) are the emissions allocated to cannabis plants (tCO2e)
- \(E_{\text{EPU}}\) are the emissions from EPU(s) to be directly allocated to a product (tCO2e)
- \(E_{\text{SPU}}\) are the emissions from SPU(s) that require allocation to a product (tCO2e)
- \(A_{\text{Elig. Plants}}\) is total eligible plant-growing area (ha)
- \(A_{\text{Cannabis}}\) is total cannabis plant-growing area (ha)
The applicant must add all emissions from generated electricity and/or heat to the products produced at the facility and/or to sold electricity.

All emissions from purchased electricity and/or heat must be added to the facility’s products.

**Emission Intensity**

For the purposes of CIIP:

- The Emission Intensity of eligible plants $EI_{Elig.\ Plants}$ will be calculated as:

$$EI_{Elig.\ Plants} = \frac{E_{Elig.\ Plants}}{A_{Elig.\ Plants}}$$

- The Emission Intensity of cannabis plants $EI_{Cannabis}$ will be calculated as:

$$EI_{Cannabis} = \frac{E_{Cannabis}}{A_{Cannabis}}$$

**Adjustment Factor**

After the incentive payment has been determined for eligible plants, an adjustment factor of 0.2 will be applied in order to recognize that 80% of carbon tax is already reimbursed through the Carbon Tax Relief Grant Program. No adjustment factor will be applied to incentives for cannabis plants.