BRITISH COLUMBIA	**Ministry of Energy and Climate Solutions** Issued: November 2013 Revised: December 2023	Low Carbon Fuels (Technical) Regulation **Approved Version of GHGenius and Global Warming Potentials** **Information Bulletin RLCF-011**

Background

Section 1 of the Low Carbon Fuels (Technical) Regulation (LCFTR) prescribes the version of GHGenius to be used to calculate the carbon intensity for each component of a fuel's lifecycle, unless another method is used to obtain the carbon intensity (see Information Bulletin RCLF-006: Carbon Intensity Records).

Section 2 of the LCFTR prescribes the global warming potential (GWP) values for greenhouse gas emissions (expressed as carbon dioxide equivalent) for use in carbon intensity calculations.

This guidance outlines the approved versions of GHGenius and the GWP values specified by the LCFTR for use in carbon intensity calculations.

Approved versions of GHGenius

The versions of GHGenius* approved for calculating the lifecycle carbon intensity of fuels are:

Compliance period	Approved version of GHGenius
July 1, 2013 to December 31, 2014	GHGenius 4.01b
January 1, 2015 to June 30, 2023	GHGenius 4.03a, 4.03b or 4.03c
July 1, 2023 to December 31, 2023 (transition period)	GHGenius 4.03a, 4.03b, 4.03c, 5.02, 5.02a, 5.02b
January 1 to December 31, 2024 and subsequent compliance periods	GHGenius 5.02b with any changes that the director considers to be corrections to the model or immaterial to the determination of the carbon intensity

GHGenius 5.02 was initially released in 2022. It was a significant update from GHGenius4.03. It uses updated data sets and includes new features to improve both its accuracy and functionality. A brief summary of the changes is provided below. For a full explanation of the changes to the model please refer to the GHGenius 5 Changelog.

- New feedstocks:
  - Sorghum,
  - Palm sludge oil,
  - Spent bleaching earth oil,
  - Sewage sludge,

* Environment and Climate Change Canada (ECCC) owns the copyright to GHGenius 4.03c. Please contact ECCC to obtain a copy of the Model or a copy of the report which includes instructions on how to run the Model. GHGenius 5.02, 5.02a and 5.02b can be downloaded from the GHGenius website.

    - Tall oil,
    - Organic waste, and
    - Carbon dioxide.
- New fuels:
    - Ammonia,
    - Hydrogenated renewable gasoline,
    - Hydrogenated renewable propane, and
    - Wood pellets
- New pathways:
    - Ethanol to jet fuel,
    - E-Fuel pathways
        - Methanol from electricity,
        - Renewable natural gas (RNG) from electricity,
        - Ammonia from electricity,
        - Fischer tropsch distillate (FTD) from electricity,
    - FTD from landfill gas (LFG),
    - Gasoline from natural gas (NG),
    - Dimethyl ether (DME) from LFG,
    - RNG from wood pellets,
    - Bio-oil pathways
        - Wood pellets,
        - Sewage sludge,
        - Manure,
        - Organic waste,
        - Municipal solid waste (MSW),
        - Refuse-derived fuel (RDF), and
    - Refined bio-oil.

GHGenius 5.02b was released in October 2023. It has some notable changes compared to GHGenius 5.02. Those are listed below. For a full list of the changes please see the GHGenius5.02b Changelog.

- The biogenic methane global warming potential was updated from 27.3 to 28 to align with other BC programs and regulations,
- Natural gas transmission emissions can now be modelled for RNG, and
- HRJ, HRD, and steam have been added as coproducts.

GWP values

The GWP values prescribed by the LCFTR are:

Compliance period	Specified Global Warming Potential values
July 1, 2013 to December 31, 2014	100-year GWPs published by the IPCC in 1995 (2nd Assessment Report)

January 1, 2015 to December 31, 2023	100-year GWPs published by the IPCC in 2007 (4th Assessment Report)[1]
July 1, 2023 to December 31, 2023 (transition period)	100-year GWPs published by the IPCC in 2007 (4th Assessment Report)[1] or 100-year GWPs (without feedback) published by the IPCC in 2013 (5th Assessment Report)[2]
January 1 to December 31, 2024 and subsequent compliance periods	100-year GWPs (without feedback) published by the IPCC in 2013 (5th Assessment Report)[2]

The IPCC 100-year GWPs mentioned above (1995, 2007 and 2013) of carbon dioxide, methane, nitrous oxide, CFC-12, HFC-134a and sulphur hexafluoride can be accessed within the GHGenius model. When using any version of GHGenius 5.02, the Ministry of Energy, Mines and Low Carbon Innovation requires use of the GWPs without climate-carbon feedback with the model set to “carbon weighted”.

References

1. Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland (2007) "Changes in Atmospheric Constituents and in Radiative Forcing". In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

2. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

Need more information?

Please visit the Renewable and Low Carbon Fuels website or email the Low Carbon Fuels Branch at lcfs@gov.bc.ca.

Disclaimer

The information in this bulletin is for your convenience and guidance only and does not replace or constitute legal advice. It is recommended that anyone who is a Fuel Supplier review the *Low Carbon Fuels Act*, the Low Carbon Fuels (General) Regulation and the Low Carbon Fuels (Technical) Regulation, and seek independent legal advice to confirm their status, legal obligations and opportunities. The *Low Carbon Fuels Act*, the Low Carbon Fuels (General) Regulation and the Low Carbon Fuels (Technical) Regulation are available at BC Laws.