

Please note: The following guideline may be updated from time to time. If there is a discrepancy between this guideline and the grant agreement, the terms of the grant agreement shall prevail.

Please note: This guideline has been updated according to the BPP extension requirements.

Timelines

Program **Period 1** starts on October 1, 2017, and ends March 31, 2018.

Program **Period 2** starts on April 1, 2018, and ends March 31, 2019.

Program **Period 3** starts on April 1, 2019, and ends March 31, 2020.

Life Cycle Emission Assessment

A Life Cycle Emission Assessment (LCA) and Verification Report must be submitted with a Bioenergy Producer Program (BPP) Application – and also with the Period Report for each program period the Grant Holder has received funding. An exception is made if the Verification Report was submitted within three months of the program-period ending (i.e. BPP Application was submitted between January and March). In this case, the LCA verification report for that program period is not required (however, a Schedule A- Life Cycle Assessment Form of the Period Report is required). An LCA and Verification Report are not required with an Expression of Interest.

Table 1 – LCA Package Requirements and Timing

Submission Package	Type of documents to be submitted	Date of submission
Application Package	<ul style="list-style-type: none"> • LCA form (Schedule D1 or D2) • Verification Report, including: <ul style="list-style-type: none"> ○ Statement of Certification ○ Statement of Verification ○ Statement of Qualification ○ Conflict of Interest Checklist 	<ul style="list-style-type: none"> • With Application Package.
Period Report	<ul style="list-style-type: none"> • Schedule A (Life Cycle Assessment Form) • Verification Report, including: <ul style="list-style-type: none"> ○ Statement of Certification ○ Statement of Verification ○ Statement of Qualification ○ Conflict of Interest Checklist 	<ul style="list-style-type: none"> • Period Reports are due no later than June following the program period.

There are two types of LCAs to be completed under the BPP – one to accompany the Application Package and the other to accompany the Period Report. While the two are similar there are differences, particularly the end product transportation and distribution sections.

Directions for Supporting Documents with the Application Package

- An LCA and Verification Report are required with the application for BPP extension.
 - The LCA form is provided within the BPP Application Package as Schedule D.
- The LCA is meant to establish whether the applied-for product meets the BPP eligibility criteria, which is that it demonstrates an emission reduction when compared to a conventional alternative.
- The Alberta Climate Change Office (ACCO) provides the conventional alternative baseline that the applied-for product will be compared against.

- Since the BPP supports products that can be exported outside Alberta (e.g. renewable diesel, ethanol), the LCA must include the transportation emissions to the furthest realistic market.
 - Liquid biofuel production is assumed to be transported to California.
 - Electricity production is assumed to be consumed in Alberta; as such, emission estimates for end product transportation are not required.
- When calculating the transportation emissions (transport by truck, rail etc.) from the facility to market, life cycle emission calculations must use this market as a point of consumption.
- To demonstrate this reduction, the ACCO provides the emission values for different modes of transport, including potential routes for rail and marine.
 - For more information see Appendix A and B.
 - If the facility location is not in the tables of Appendix A, a distance tracking system can be used to estimate the road distance (e.g. Google Maps).
- Should the assessment demonstrate that an emission reduction does not occur, the product will not be eligible for funding under the BPP.
- The Schedule D and Life Cycle Verification Report (template provided) must be completed based on their respective guidelines.
- The greenhouse gas assertion and supporting information cannot be changed once the verifier has signed the Statement of Verification. Once verified, any changes to these documents will void the completed verification.
- An electronic version of the Excel form must be submitted (already included in the Application Package) in addition to the printed and signed copy.

Directions for Supporting Documents for the Period Report

- A Schedule A (Life Cycle Assessment Form) and LCA Verification Report are needed for each Period Report in which the Grant Holder received funding.
- A third party is required to complete the LCA Verification Report at the end of each program period.
- When completing a Schedule A (Life Cycle Assessment Form) as part of the Period Report, a calculation of the greenhouse-gas emission reductions achieved during the program period for the supported production volumes is required.
- The ACCO provides the conventional alternative baseline, which the applied-for product will be compared against.
- LCA calculations must factor the real destination market for the supported product. It is expected that the facility will know where the product was consumed at this stage.
 - The producer should know the actual volume of production exported outside Alberta and the mode of transport, destination, and distance. Otherwise, a report based on the best-known information is acceptable.
 - In the absence of information on the final market destination, the volumes should be reported as transported to the furthest realistic market used in the assessment.
- The ACCO provides the emission intensity values for different modes of transport for the final product.
- The Grant Holder must include the emissions resulting from the volumes transported to markets outside Alberta and for transportation of product consumed in Alberta. These volumes should match with volumes provided in the Period Report.

LCA Form and Supporting Documents

1. The LCA form is comprised of the Life Cycle Emission Assessment reporting template with a provision for the signature of the third-party verifier (which must be from outside the grant recipient organization and possess technical expertise for reviewing the report) and any supporting documents. These supporting documents must include, but are not limited to, methodology, calculations, and assumptions used to complete the report. The LCA form should be completed based on this guideline document.
2. The LCA Verification Report must be completed based on the corresponding Verification Report Guideline document. The third-party verifier that completes the report should be a technical expert in engineering and/or greenhouse-gas accounting experiences and be familiar with similar project activities.
3. The verifier will issue a Verification Report that includes a signed Statement of Verification, a signed Statement of Qualifications, and signed Conflict of Interest Checklist. All of these must be submitted to the ACCO as part of the supporting documents for the project.
 - o The **Grant Holder** must sign the Statement of Certification.

Life Cycle Emissions

An emission reduction on a life cycle basis is the reduction in greenhouse gas emissions occurring as a result of the production and consumption of a bioenergy product when compared to the fossil fuel production process and consumption that would otherwise occur for a similar or assumed purpose. This includes all stages of feedstock production and recovery, fuel production and distribution, through to final consumption of the bioenergy product:

- Under liquid biofuels, regardless if they are exported or not, renewable diesel is compared to petroleum-based diesel, and ethanol fuel is compared to gasoline on an energy equivalent basis (different fuels do not necessarily have the same energy content in the same quantity of fuel).
- Emissions associated with electricity generated from biomass are compared against Alberta's overall "grid displacement factor." The Specified Gas Emitters Regulation *Carbon Offset Emission Factors Handbook* provides the grid displacement factor.

Life cycle stages for reporting purposes are outlined in the Glossary (below).

Both the value and a source or citation (published source or supporting documentation) must be submitted with Schedule A (Life Cycle Assessment Form) for each number entered.

Standard Reference Sources

The Bioenergy Producer Program webpage provides links to relevant resources:

- [Bioenergy Producer Program](#)

Key sources provided include:

- Carbon Offset Emission Factors Handbook, 2015
- Technical Guidance for Offset Protocol Developers issued under the Specified Gas Emitters Regulation
- GHGenius (version 4.03a)

Assurance Standards

Assurance refers to the confidence level that a third-party verifier expresses in a written conclusion concerning an applicant's compliance.

With respect to verification of the calculation of the LCA, the person providing assurance must be satisfied with the data and material used as evidence to assert the criteria have been met.

Level of Assurance

For the Bioenergy Producer Program, demonstration of a limited level of assurance for the LCA is required. For further guidance on verification, please see the resources listed under the Standard Reference Sources in this document.

General Instructions

Please complete the Application Package in excel format and submit an electronic version in addition to the printed and signed copy. Please submit signed copies of the Life Cycle Assessment forms and Verification Report Forms as a PDF version as well.

Only fill out the section of the form corresponding to the product for which support is being/has been claimed under the Bioenergy Producer Program. For liquid biofuels, select the "bioenergy product type" to establish the baseline emissions to be compared against.

- In the Application Package – Schedule D, while "renewable alcohol" or "renewable diesel" may not be the bioenergy product of your facility, these represent the two baseline scenarios that liquid biofuels are compared against. Please select the one with the baseline that your product is compared against.

For liquid biofuel production, count the incremental emissions related to bioenergy production and ignore emissions associated with other co-products.

- For example, if ethanol is a co-product of producing flour and distillers' grains, only count the emissions associated with the ethanol life cycle. The emissions should be allocated between ethanol and the co-product using the same methodology used in GHGenius.

Supporting documentation must be submitted showing calculations, input data and assumptions for all emission numbers used in completing the schedule.

- For example, in the Fuel Production row, the greenhouse gas emissions for every gigajoule of the product are to be entered.

In the corresponding "source" cell, refer to the section of your accompanying documentation to demonstrate how this value was derived.

- For example, in the production stage of the life cycle, the calculations should show how much natural gas and electricity were used in production, any factors or assumptions, and how this result leads to the emissions value entered for that life cycle stage.

Provide full and specific references – with internet links where available – for any industry, international or government (e.g. Specified Gas Emitters Regulation guidance documents), average or standard values used in your calculations.

LCA as part of the Application Package (Schedule D)	
Section on Form	Tips for Producers
Date of Application	Please enter the date the Application Package was completed.
Company	Please enter the company name.
Reporting for the Period Covering:	Please specify the time period that the data used to complete the LCA form correspond to (e.g. October 1, 2017 to December 31, 2017).
Signature Line	The third-party verifier must sign the report.

LCA as part of the Period Report (Schedule A)	
Section on Form	Tips for Producers
Grant Number	Please enter the nine-digit grant number on the top right corner of the form.
Company	Please enter the company name.
Reporting for the Period Covering:	Please Specify the Program Period as applicable: <ul style="list-style-type: none"> • Period 1: October 1, 2017 to March 31, 2018 • Period 2: April 1, 2018 to March 31, 2019 • Period 3: April 1, 2019 to March 31, 2020
Signature Line	The third-party verifier must sign the report.

Liquid Biofuels – Renewable Alcohol	
a. Bioenergy Product Type	Select “renewable alcohol” as the product type. This is to establish the appropriate baseline to compare it against.
b. Bioenergy Product	Enter the type of renewable fuel produced.
c. Feedstock Used	List all of the feedstocks used (e.g. corn, wheat, municipal solid waste).
d. Life Cycle Stages (grams/GJ column)	For each row in this section, enter the value (in grams of carbon dioxide equivalent) you have calculated for the greenhouse gas emissions from that life cycle stage for each gigajoule of renewable fuel produced. <ul style="list-style-type: none"> • For example, in the case of “Fuel dispensing”, calculate the emissions resulting from electricity used in the pumps, card locks, etc. • Use actual numbers where possible; use accepted industry averages or standards where you do not possess the necessary data. • For example, if you run your own generator you should know the actual fuel input and efficiency, and be able to calculate the emissions resulting for each kWh generated. • If you rely on grid electricity, use accepted emission factors for baseline and project provided by Alberta Environment and Sustainable Resource Development in their Carbon Offset Emission Factors Handbook (March 2015).

	<ul style="list-style-type: none"> • Similarly, if you buy rather than produce your own feedstock you may have to estimate land-use change, cultivation and fertilizer manufacture emissions based on third party data. • In the Life Cycle Emission Form (as part of the Application Package), renewable alcohol production is assumed to be exported to markets beyond Alberta. In this case, it is assumed that the furthest realistic market is California. Emissions associated with the transportation of the products to these markets must be included in the estimation. See Appendix A and B for more information. • In the Period Report- Schedule A, emissions have to be determined for the real volume of production (eligible production for BPP) consumed in Alberta and exported outside of Alberta using types of transport, destination of the products (where known). Otherwise, use your best-known information. • Submit associated data and calculations as supporting documentation. • You do not need to fill out the “subtotal of production stages” row or the “Total life cycle emissions” row. These values are calculated automatically based on what you enter in the other rows.
<p>Life Cycle Stages (Source column)</p>	<p>In this column, enter the source of the data you supplied in the corresponding row of the grams/GJ column.</p> <ul style="list-style-type: none"> • You may reference a document prepared by you or on your behalf as long as the supporting data and calculations are clearly laid out. • Acceptable sources demonstrating calculations include emissions reporting in accordance with the Specified Gas Emitters Regulation, reports that include GHGenius modeling, any other reports recommended by Alberta Environment and Parks, and your own internal data (ensure you keep corresponding records on file in the case of an audit). • You may also refer to academic studies or industry publications. • The Alberta Climate Change Office reserves the right to disqualify data if it is not determined to be from a reliable source.
<p>Total supported eligible production (litres)</p>	<p>In Period Report – Schedule A, this value should be taken from the Period Report Form, Question 3.e. - Total Supported Eligible Production.</p>

Liquid Biofuels -- Renewable Diesel	
a. Bioenergy Product Type	Select “renewable diesel” as the product type. This is to establish the appropriate baseline to compare it against.
b. Bioenergy Product	Enter the type of renewable fuel produced.
c. Feedstock Used	List all of the feedstocks used (e.g. canola, tallow, etc.).
d. Life Cycle Stages (grams/GJ column)	<p>For each row in this section enter the value, in grams, you have calculated for the emissions from that life cycle stage for each gigajoule of renewable diesel produced.</p> <ul style="list-style-type: none"> • For example, in the case of “Fuel dispensing,” calculate the emissions resulting from electricity used in the pumps, card locks, etc. • Use actual numbers where possible and accepted industry averages or standards where you do not possess the necessary data. • For example, if you run your own generator you should know the actual fuel input and efficiency and be able to calculate the emissions resulting for each kWh generated. • If you rely on grid electricity use accepted emission factors for baseline and project provided by Alberta Environment and Sustainable Resource Development in their Carbon Offset Emission Factors Handbook (March 2015). • Similarly, if you buy rather than produce your own feedstock you may have to estimate land-use change, cultivation and fertilizer manufacture emissions based on third party data. • In the “Life Cycle Emission Form” (as part of the Application Package), renewable alcohol production is assumed to be exported to markets beyond Alberta. In this case, it is assumed that the furthest realistic market is California. Emissions associated with the transportation of the products to these markets must be included in the estimation. See Appendix A and B for more information. • In the “Period Report - Schedule A”, emissions have to be determined for the real volume of production (eligible production for BPP) consumed in Alberta and exported outside Alberta using types of transport, destination of the products, where known. Otherwise, use your best known information. • Submit associated data and calculations as supporting documentation. • There is no need to fill out the “subtotal of production stages” row or the “Total life cycle emissions” row. These values are calculated automatically based on what you enter in the other rows.

Life Cycle Stages (Source column)	<p>In this column, enter the source of the data you supplied in the corresponding row of the grams/GJ column.</p> <ul style="list-style-type: none"> You may reference a document prepared by you or on your behalf as long as the supporting data and calculations are clearly laid out. Acceptable sources demonstrating calculations include emissions reporting in accordance with the Specified Gas Emitters Regulation, reports that include GHGenius modeling, any other reports recommended by Alberta Environment and Parks, and your own internal data (ensure you keep corresponding records on file in the case of an audit). You may also refer to academic studies or industry publications. The Alberta Climate Change Office reserves the right to disqualify data if it is not determined to be from a reliable source.
Total supported eligible production (litres)	In Period Report – Schedule A, this value should be taken from the Period Report Form, Question 3.e. - Total Supported Eligible Production.

Electricity	
a. Bioenergy Product	Leave the default bioenergy product (Electricity).
b. Feedstock used	List all of the feedstocks used (e.g. biogas, woodchips, etc.)
c. Life Cycle Stages (grams/MWh column)	<p>For each row in this section enter the value, in grams, you have calculated for the emissions from that life cycle stage for each megawatt hour of electricity produced.</p> <ul style="list-style-type: none"> For example, in the case of “Feedstock transmission/Delivery” you need to calculate the emissions resulting from moving the feedstock product from wherever it originates to your facility where it is converted to heat. All factors must be included, for example emissions resulting from the electricity to run pumps or compressors, or the emissions from trucks or trains used to haul raw feedstock, etc. Use actual numbers where possible and accepted industry averages or standards where you do not possess the necessary data. For example, if you run your own generator to provide electricity to transmit feedstock you should know the actual fuel input and efficiency and be able to calculate the emissions resulting for each kWh generated. If you rely on grid electricity you can use accepted emission factors provided by Alberta Environment and Parks in their Carbon Offset Emission Factors Handbook (March 2015). Similarly, if you buy rather than produce your own feedstock you may have to estimate the feedstock recovery component based

	<p>on third party data.</p> <ul style="list-style-type: none"> • If emissions are displaced in any life cycle stage of the production process, you may include it in “Less emission displaced (if any)” as a negative value to get the credit from that displacement amount. • For emission offset registered projects, you must use the same baseline that you use for Alberta Emission Offset System projects for calculating emission displacement credit. • There is no need to fill out the “subtotal of production stages” row or the “Total life cycle emissions” row as these are calculated automatically based on what you enter in the other rows.
Life Cycle Stages (Source column)	<p>In this column, enter the source of the data you supplied in the corresponding row of the grams/GJ column.</p> <ul style="list-style-type: none"> • You may reference a document prepared by you or on your behalf as long as the supporting data and calculations are clearly laid out. • Acceptable sources demonstrating calculations include emissions reporting in accordance with the Specified Gas Emitters Regulation, reports that include GHGenius modeling, any other reports recommended by Alberta Environment and Sustainable Resource Development, and your own internal data (ensure you keep corresponding records on file in the case of an audit). • You may also refer to academic studies or industry publications. • The Alberta Climate Change Office reserves the right to disqualify data if it is not determined to be from a reliable source.
Total supported eligible production	<p>In Period Report – Schedule A, this value should be taken from the Period Report Form, Question 3.e. - Total Supported Eligible Production.</p>

Appendix A

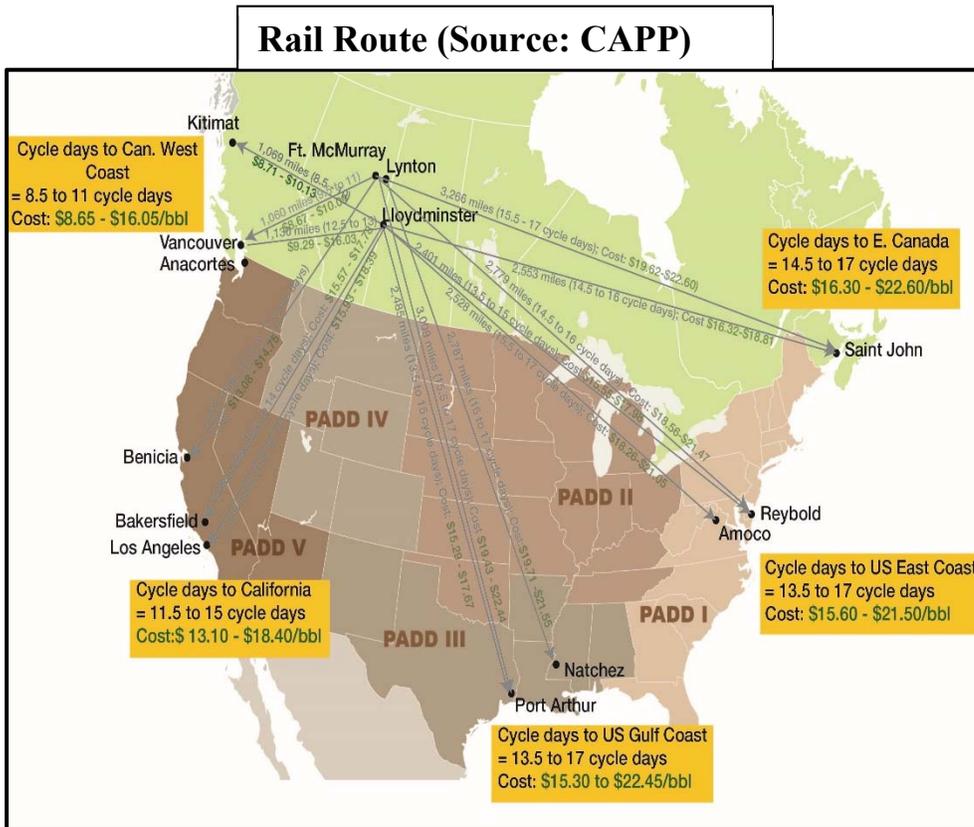


Table A 1 – Different modes of transport and corresponding distances

Rail route	Rail distance (km)
Lloydminster – Los Angeles	3941
Lloydminster – Bakersfield	3673
Fort McMurray – Benicia	3335
Road	Road distance (km)
Red Deer – Lloydminster	400
Edmonton – Lloydminster	250
Lethbridge – Lloydminster	580

Source: CAPP 2016

Table B1 – Emission intensity of different mode of transport

Mode of transport	Emission intensity gmCO ₂ e/tonne-km
Medium duty truck	649.8
Heavy duty truck	202
Rail	22.5
Marine freight (container)	22.2

Source: GHGenius (version 4.03a)

Appendix B

Calculating emissions associated with product transportation and distribution

- For exported products, calculate the transportation distance (in kilometres) from the facility to the market, including marine, rail and truck.
- Multiply the distance with the emission intensity of the corresponding mode of transport from Table 1.
- Divide the result by energy content of the fuel (in GJ/tonne) to get the emissions of the product distribution (in grams CO₂e/GJ)

Glossary

Emission Displacement Credit	Carbon dioxide emissions credit arising from the use of a renewable carbon source that obtains carbon from the air.
Exhaust Emissions	Emissions associated with the use of fuel in the vehicle. Includes all greenhouse gases.
Feedstock Recovery	Feedstock production and recovery. Direct and indirect emissions from recovery and processing of the raw feedstock, including fugitive emissions from storage, handling, upstream processing prior to transmission, and mining.
Feedstock Transmission/Delivery	Feedstock transport. Direct and indirect emissions from transport of feedstock, including pumping, compression, leaks, fugitive emissions, and transportation from point of origin to the fuel refining plant. Import/export, transport distances and the modes of transport are considered. This includes energy and emissions associated with the transportation infrastructure construction and maintenance (trucks, trains, ships, pipelines, etc.).
Fertilizer Manufacture	Direct and indirect life cycle emissions from fertilizers and pesticides used for feedstock production, including raw material recovery, transport and manufacturing of chemicals. This is not included if there is no fertilizer associated with the fuel pathway.
Fuel Dispensing	Fuel dispensing at the retail level. Emissions associated with the transfer of the fuel at a service station from storage into the vehicles, including electricity for pumping, fugitive emissions and spills.
Fuel Distribution and Storage	Fuel storage and distribution at all stages. Emissions associated with storage and handling of fuel products at terminals, bulk plants and service stations, includes storage emissions, electricity for pumping, space heating and lighting.
Fuel Production	Fuel production from raw materials. Direct and indirect emissions associated with conversion of the feedstock into a saleable energy product, including process emissions, combustion emissions for process heat/steam, electricity generation, fugitive emissions and emissions from the life cycle of chemicals used for fuel production cycles.
Gas Leaks and Flares	Leaks and flaring of greenhouse gases associated with production of oil and gas. Fugitive hydrocarbon emissions and flaring emissions associated with oil and gas production.
Land-use changes, cultivation	Land use changes and cultivation associated with biomass derived fuels. Emissions associated with the change in the land use in cultivation of crops, including N ₂ O from application of fertilizer, changes in soil carbon and biomass, methane emissions from soil and energy used for land cultivation.
Less Emissions Displaced	Emissions displaced by co-products of alternative fuels. Emissions displaced by co-products of various pathways. System expansion is used to determine displacement ratios for co-products from biomass pathways.