

Examples and exercises

Including outcomes on last page

Introduction

- During the training, the participants get
 - This list without the last page with outcomes
 - Excel files containing all examples
- Shortly after the training, the participants get
 - This list including the last page with outcomes
 - Updated Excel files with examples, in case some updates/corrections need to be made
- Please use the examples as well in your trainings to verifiers !

List of examples

Exercise 1 - Ethanol from sugar beet

- o Data from the public “NUTS-2 report” from NL
- o **Exercise:** Make the calculation in the BioGrace Excel tool and report the outcome

Example 2 - FAME from rapeseed

- o Data from the public “NUTS-2 report” from UK
- o Example includes adding user defined standard values

Example & Exercise 3 - HVO from rapeseed, new process configuration

- o Data from public IFEU report, based on input from Nesté Oil
- o Example: Required changes to the pathway will be demonstrated
- o **Exercise:** Check the calculation (under BioGrace version 4b) and find three calculation errors / inconsistencies with rules

Bonus question: find two additional inconsistencies with rules under version 4c

List of examples

Exercise 4 – partly build own pathway

- o Biogas from sugar beet, new pathway build, imaginary input data
- o Imagine that I (the trainer) represent the company that delivers the calculation as shown in the sheet “E-Sb(3)” and based on input data as shown in sheet “Example 4” (which in this exercise can be assumed to be correct).
- o You can ask me questions on how the calculation has been made.
- o **Exercise:** would you (verifier) accept this calculation under BioGrace version 4b? And under BioGrace version 4c?

Exercise 5 – FAME from soybean

- o Input data from the GEF calculator
- o **Exercise:** Check the calculation: find four errors / inconsistencies with rules

List of examples

Exercise 6 – FAME from Jatropha

- o Input data from the GEF calculator
- o **Exercise** includes building a new pathway, including input data and user-defined standard values and including a lignite CHP

Example & Exercise 7 – Sugarcane ethanol

- o Example / exercise for using the ENZO tool
- o Example: cultivation will be filled in together
- o **Exercise:** please fill in the remaining steps and report the outcome

Exercise 8 – FAME from rapeseed starting from empty Excel sheet

- o Calculation has been made without using any tool
- o Data have been taken over from literature sources correctly
- o **Exercise:** would you (verifier) accept this calculation?

List of examples

Exercise 9 – FAME from Soy

- o Exercise on N₂O field emissions and on Land use change
- o **Exercise** will be explained during training

Exercise 10 – Ethanol from Sugar beet

- o Exercise including calculation of a CHP (combined heat and power plant) and including Land use change
- o **Exercise** will be explained during training

Outcomes

1. Exercise 1:

Cultivation: 13.94 g CO_{2,eq}/MJ_{ethanol} (not allocated) or 54% emission reduction

2. Exercise 2:

Cultivation: 51.52 g CO_{2,eq}/MJ_{FAME} (not allocated) or 36% emission reduction

3. Exercise 3: Errors/inconsistencies (BioGrace version 4b):

1. It is not allowed to change one value from “cultivation” only (cell C43).
2. Allocation factors are wrong because in cell C103 value “0,1” was put instead of “0,01”
3. In cell C11, value of 55,7% (or 60,6% after correcting error nr. 1) is incorrect, should be 99%

Correct answer is 41,94 g CO_{2,eq}/MJ_{HVO} (allocated) or 50% emission reduction

Bonus question: two more inconsistencies with rules under BioGrace version 4c:

4. It is not allowed to give actual values for hydrogenation and not for other processing steps
5. It is not allowed to use “Electricity EU mix MV” under version 4c for making actual calculations

Outcomes

- Exercise 4:** You should not accept this calculation as it is, because:
(under BioGrace version 4b):
 - in step “biogas generation” two actual numbers have been filled in, the other numbers have not been changed (still starting values). This may not be done.(under BioGrace version 4c):
 - it is not allowed to change biogas generation without changing CH₄ extraction
 - it is not allowed to change “transport of CH₄” without changing the other transport steps.

Outcomes

5. **Exercise 5.** Errors / inconsistencies are:
- For N-fertilizer, a specific fertilizer type should be named (see BioGrace calculation rule)
 - In the oil mill the EU electricity mix is taken. This is correct in version 4b, however, in version 4c the specific country mix (Netherlands) should be taken.
 - Starting values in the esterification step have not been changed. This is correct in version 4b, however, in version 4c for processing either all input values have to be changed (for doing an actual calculation) or none.
 - Only for the first transport step actual values have been calculated. This is valid in version 4b, however, in version 4c either also for the transport to the depot actual values have to be calculated or the transport default value has to be taken for all transport steps (i.e. starting values remain unchanged).
 - A bonus has been added for cultivation on degraded land. This is only valid if the use of such land is proven correctly.

Outcomes

6. **Exercise 6:** no outcome (exercise is practicing building the pathway)

7. **Exercise 7:**

- Cultivation: 27 g CO_{2,eq}/kg_{sugarcane}
- Ethanol plant: 200 g CO_{2,eq}/kg_{ethanol}
- Total: 16 g CO_{2,eq}/MJ_{ethanol} or 81 % emission reduction

8. **Exercise 8:**

Yes, you can accept this calculation.

Easiest way to understand whether values are “reasonable” is to fill input numbers into one of the other tools

Outcomes

9. Exercise 9 on LUC:

- A.1) the 2 different methods to calculate cell H41 are presented in the “LUC Answer” sheet. One is explained below the cell H41 and the other one is explained in the table N36 to AE57. However, it is useless to use both methods at the same time in reality !
- A.2) calculation in the table N36 to AE57 should not be validated since the model used does not take into account all parameters required in the guidelines. The other method is correct.

10. Exercise 10 on N₂O emissions:

- B.1) The answer can be found in the sheet “N₂O emissions Answer”
- B.2) The calculation should be validated with the version 4.b (but not version 4.C) of the BioGrace tool, since in the “Cultivation” step actual values have been used only for the “cultivation of sunflower step” and not the “Sunflowerseed drying” step

Outcomes

11. Exercise 11 on CHP:

- C.1) All units are ok
- C.2) the 4 mistakes are :
 1. the calculation of the transport of bagasse is correct, but the result is not taken into account in the final results in table A6 to E17;
 2. the type of the electricity used for the credit of electricity is not correct. An emission factor for electricity production in power plants from bagasse should be used.
 3. the value in cell C93 “Electricity output / MJ steam” should be negative as it is an output
 4. emissions for the production of bagasse (line 92) should not be taken into account, as it is considered as a waste
- C.3) the calculation should not be validated, since the information provided are not properly sourced

Thank you for your attention



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