BIOGRACE II

Harmonised Greenhouse Gas Calculations for Electricity, Heating and Cooling from Biomass

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 – Wood chips from eucalyptus

- Data from another GHG calculation tool (see http://www.unep.org/bioenergy/Portals/48107/doc/activities/GEF%20greenhouse%20gas%20calculator_FINAL.xls
- **Exercise a):** Make the calculation in the BioGrace Excel tool with the data and report the outcome (without N_2O field emissions)
- **Exercise b):** Calculate the N_2O field emissions and report the outcome

Exercise 2 - Wood chips from eucalyptus

- Same data as above
- Example includes adding user defined standard values

Exercise 3 – Pellets from forestry residues

- **Exercise:** Check the calculation and find four calculation errors / inconsistencies with rules

List of examples

Exercise 4 – Final conversion only

- **Exercise:** Fill in the data / information in the final conversion sheet and report the outcome

Exercise 5 – Calculate efficiency sheet

- **Exercise:** Calculate the electrical and heat efficiency as well as allocation factors.

Exercise 6 –Pellets from eucalyptus

- Exercise including calculation of a CHP (combined heat and power plant)
- **Exercise:** Insert the data and report the outcome.

Outcomes

1. **Exercise 1**:
   Cultivation (without field emissions): 6.59 g $CO_{2,eq}$/$MJ_{wood\ chips}$
   Cultivation (with field emissions (10.73 kg N_2O / ha): 14.56 g $CO_{2,eq}$/$MJ_{wood\ chips}$

2. **Exercise 2**:
   Cultivation: 15.8 g $CO_{2,eq}$/$MJ_{wood\ chips}$

3. **Exercise 3**: Errors/inconsistencies:
   1. Not allowed to give actual values for pellet production and not for other processing steps
   2. It is not allowed to use “Electricity EU mix” for making actual calculations
   3. The use of actual and default values has to be indicated in the ‘Overview Results’ section.
   4. The factor 1.2 has to be changed into 1 if actual calculations are done.

4. **Exercise 4**: Final conversion only:
   Heat and electricity both save 59% greenhouse gases

Outcomes

5. **Exercise 5**: Calculate efficiencies sheet
   Efficiencies: n_{el} = 21,4%; $n_{h,tot}$= 45,5%
   Allocation factors:
   - Electricity = 56%
   - Heat (100˚ C) = 39%
   - Heat (250˚ C) = 5%

6. **Exercise 6:** Pellets from eucalyptus
   Pellet production: 1.51 g $CO_{2,eq}/MJ_{pellets}$

Thank you for your attention

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