Bioenergy in the European Union

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Content

I. The EU Renewable Energy Directive (RED)

II. BioGrace: harmonised GHG calculations under the RED

III. Outlook

EU Renewable Energy Directive (RED)

- Entered into force in 2009
- Renewable energy objectives until 2020:
  - 20 % overall share of renewable energy
  - 10 % biofuels in transport sector
- Why?
  - Mitigation of greenhouse gas emissions
  - Security of energy supply
  - Promoting technological development and innovation
  - Providing opportunities for employment and regional development
- Includes sustainability requirements for liquid biofuels

Sustainability criteria for bioliquids

- Mandatory for biofuels / bioliquids used for compliance with 2020 target and benefiting from national support schemes
- Apply to ALL feedstocks entering the EU market (produced inside and outside the Community)
- Mainly covering environmental aspects
- Implementation:
  - Independent auditors must check information
  - Can be part of voluntary certification schemes (to be approved by Commission)

Sustainability criteria for bioliquids (ctd.)

Mandatory criteria

- Greenhouse gas emission saving shall be at least 35 % (50 % after 2017)
- Not from areas with high biodiversity value (e.g. grassland, primary forests)
- Not from areas with high carbon stocks (forests, peatland)

Criteria to be reported

- Availability of food at affordable prices (in particular in developing countries)
- Land use rights
- Implementation of ILO criteria
- Cartagena Protocol on Biosafety
- Convention on International Trade in Endangered Species of Wild Fauna and Flora

Greenhouse gas calculation in the RED

- RED Annex V provides
  - default values (overall and disaggregated) and
  - methodological rules for own calculations („actual values“)
- Economic operators may use
  - default values or
  - actual values calculated according to Annex V or
  - the sum of actual value and disaggregated default values.
- With the increase of GHG saving thresholds the use of actual values will become more important

GHG calculation methodology in Annex V

- To be used for calculating actual values
- Main specifications:
  - From well-to-wheel
  - Infrastructure not included
  - Functional unit: 1 MJ
  - GHG included: CO_2, CH_4, N_2O (GWPs provided)
  - Emissions from direct land use change to be included
  - Allocation of co-products based on LHV (exemptions!)
  - Fossil reference values: 83.8 g CO_2 eq / MJ (for transport fuels)

GHG calculation methodology in Annex V (ctd.)

Steps from cultivation to filling station

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ee}$$

e_{ee}: combined with **e_p**

$ee_{ccs/ccr}$: technology not in place

e_{sca}: following LUC method

e_u: maybe relevant for biogas pathways

e_l: following the decision 2010/335/EU

e_{ec}, e_p, e_{td} = basic „disaggregated default values“

- **Bonus** for cultivation on degraded land: **29 g CO_2 eq / MJ**

Need for harmonisation

Input data (e.g. amount of fertiliser)	X	**Conversion factors** (e.g. heating values, emission values)	=	**GHG emissions**

Different factors may lead to different results!

Problems when calculating actual values:

- Auditors have to check whether conversion factors are correct
- Economic operators can improve the GHG balance of their biofuel without decreasing actual GHG emissions

Content

The BioGrace project

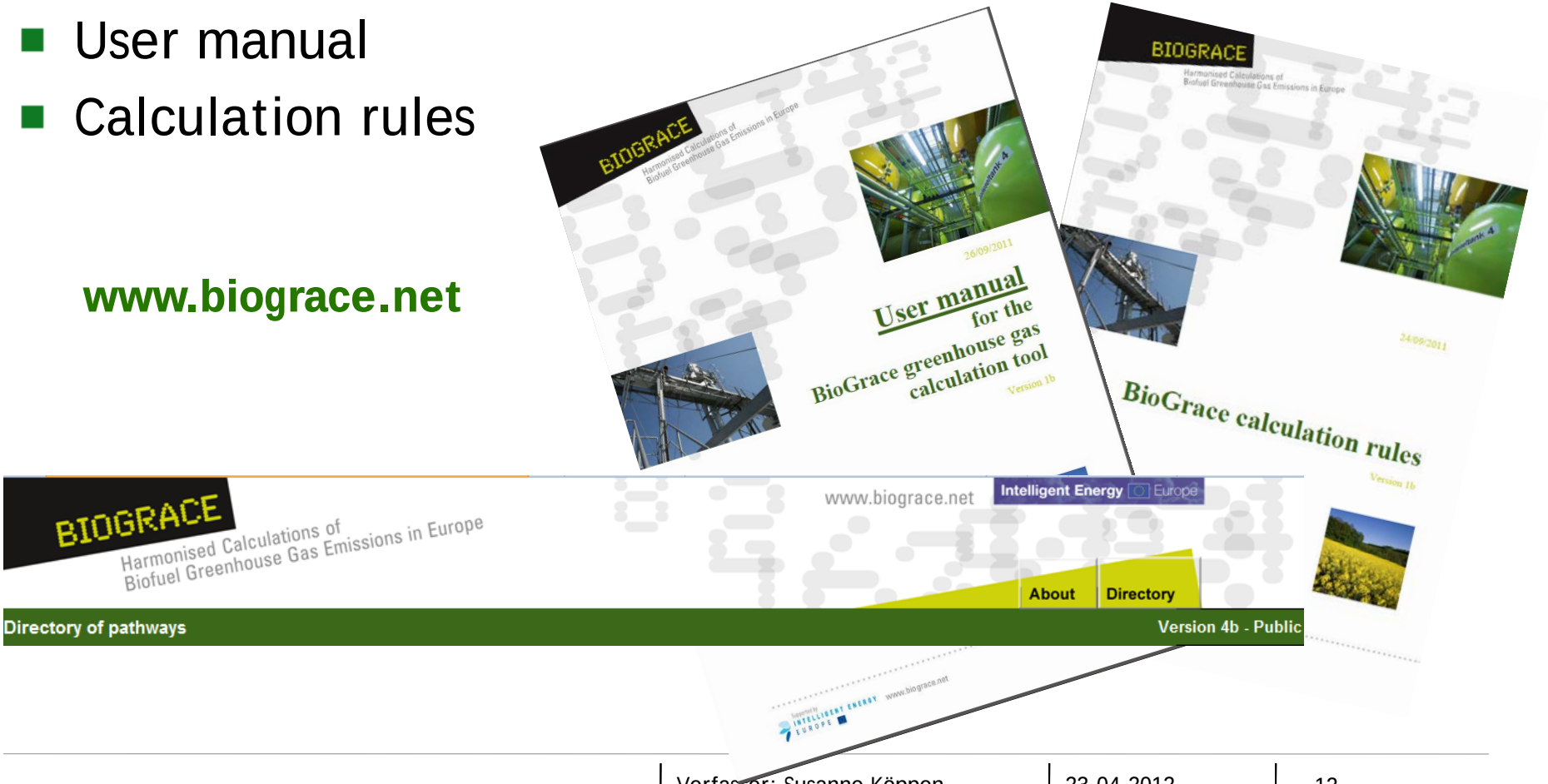
BIOGRACE
Harmonised Calculations of Biofuel Greenhouse Gas Emissions in Europe

- **Bio**fuel **Gr**eenhouse Gas emissions:
  alignment of **c**alculations in **E**urope
- Key objectives:
  - Enhance transparency
  - Harmonise GHG calculations performed in EU-27
  - Facilitate stakeholders
  - Disseminate results
- Consortium
  - Coordinator: Agentschap NL (formerly SenterNovem)
  - Partners: ADEME, BE2020, BIO-IS, CIEMAT, IFEU, EXERGIA, STEM

Products

- Greenhouse gas calculation tool (excel-based)
- User manual
- Calculation rules

www.biograce.net



Objective: Enhance transparency

- Calculator reproduces 22 default GHG values (Annex V RED)
  - Has not been done by the Commission or JRC
  - Is a recurrent exercise

Production of FAME from Rapeseed (steam from natural gas boiler)

Overview Results

All results in g $CO_{2,eq}$ / MJ_{FAME}	Non- allocated results	Allocation factor	Allocated results	Total	Default values RED Annex V.D
Cultivation e_{ec}				**28,9**	**29**
Cultivation of rapeseed	48,63	58,6%	**28,49**		28,51
Rapeseed drying	0,72	58,6%	**0,42**		0,42
Processing e_p				**21,7**	**22**
Extraction of oil	6,53	58,6%	**3,83**		3,82
Refining of vegetable oil	1,06	95,7%	**1,02**		
Esterification	17,61	95,7%	**16,84**		17,88
Transport e_{td}				**1,4**	**1**
Transport of rapeseed	0,30	58,6%	**0,17**		0,17
Transport of FAME	0,82	100%	**0,82**		0,82
Filling station	0,44	100%	**0,44**		0,44
Land use change e_l	**0,0**	58,6%	**0,0**	**0,0**	0
$e_{sca} + e_{ccr} + e_{ccs}$	**0,0**	100%	**0,0**	**0,0**	0
Totals	**76,1**			**52,0**	**52**

Ojective: Harmonisation of calculations

- Calculator allows to perform actual calculations

BIOGRACE
Harmonised Calculations of Biofuel Greenhouse Gas Emissions in Europe

- List of standard values
  - Includes all relevant conversion factors (e.g. LHVs, emission factors)
  - is publicly available (www.biograce.net)
  - Is implemented in national calculators
    - Germany ($ENZO_2$), Spain (CALCUGEI), UK (DfA carbon calculator)
  - European Commission makes reference to list
- Calculation rules
  - Guideline when calculating actual values
  - Fills definition gaps

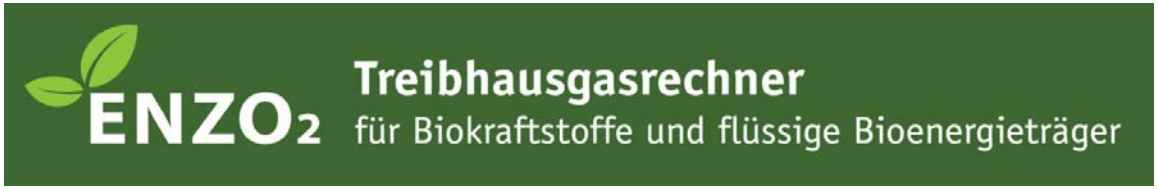
Content

Outlook: BioGrace

- BioGrace calculator likely to be recognized by the Commission
  ➔ can be used as add-on in all recognized certification systems that do not provide own calculators
- Constant updating of calculator
  - Update of default values
  - Update of methodologies
  - Extension of default values
- Inclusion of new methodologies
  - Indirect land use change
  - N_2O field emissions

Outlook: European Union

- Report / methodology for iLUC is expected soon
  - Will be implemented in BioGrace tool, if applicable
- Sustainability criteria likely to become mandatory for solid biomass
  - Already now strong advice to apply RED criteria to those fuels (COM 2010(11))
  - BioGrace II project will provide calculation tool for solid and gaseous biomass



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