BIOGRACE II

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

BioGrace

Harmonised GHG calculations for electricity, heating and cooling from biomass

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NL Agency
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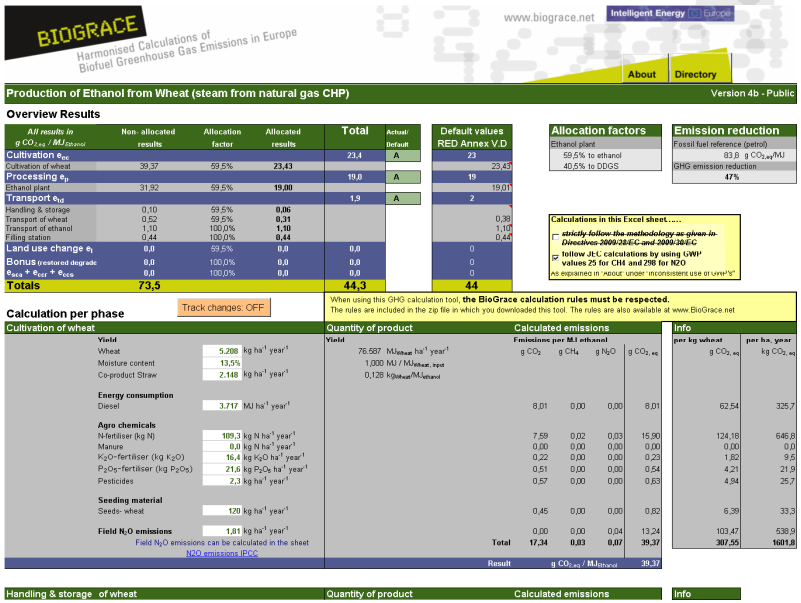
Introduction

- BioGrace started as IEE project in 2010
- In 2010-2012, BioGrace-I has
  - Produced a user-friendly tool for biofuels
  - Harmonised calculations
  - Send in tool for recognition as “voluntary scheme”
    - Excel tool
    - Calculation rules
    - User manual
- Since April 2012: BioGrace-II
  - (mainly) GHG calculations for electricity and heat from solid, gaseous and liquid biomass



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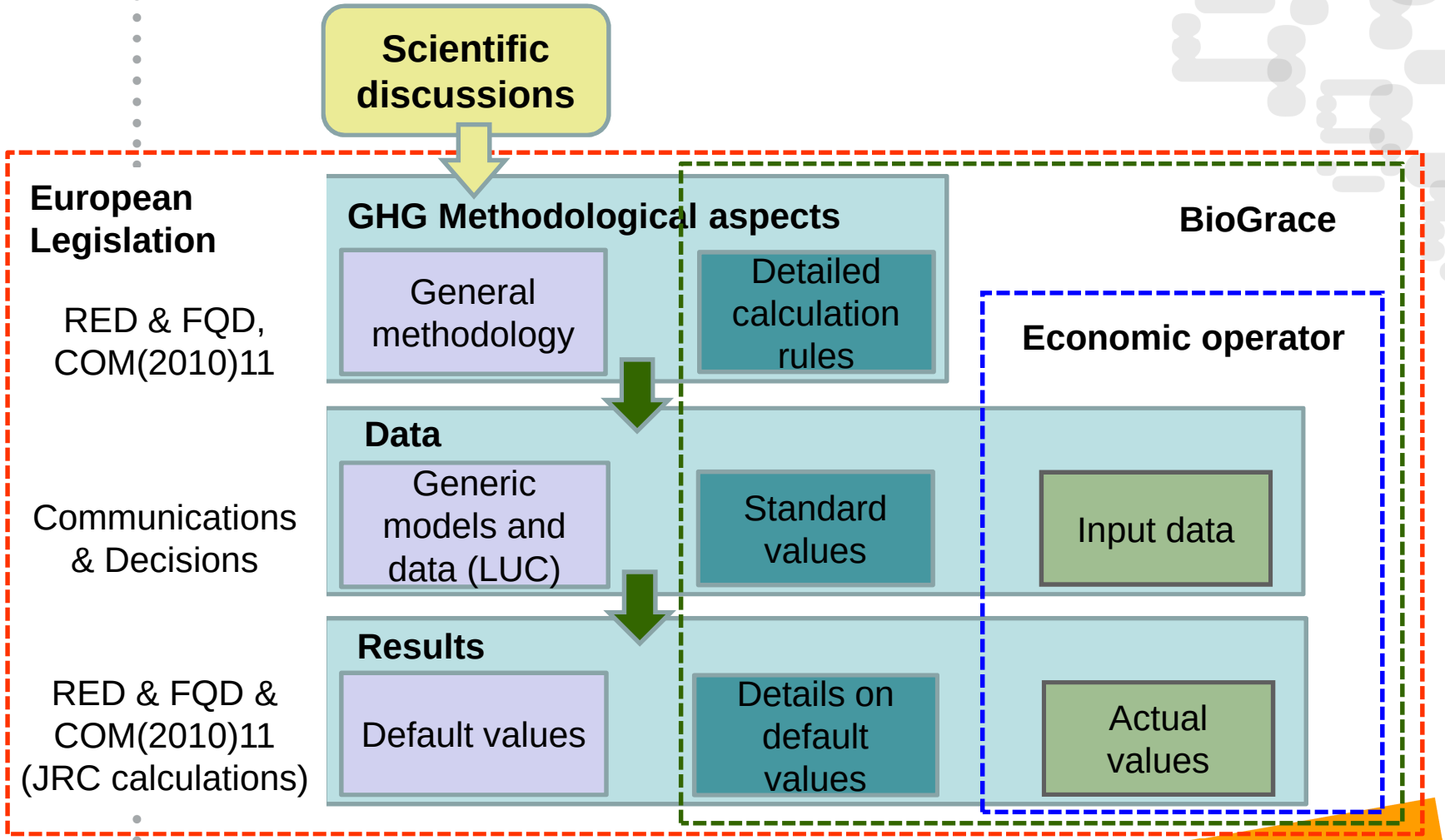
LCAs: science versus policy implementation



LCAs: science versus policy implementation

- Some current discussions are so far only scientific
  - Forest carbon stock changes
  - Indirect land use change
- BioGrace will not include such topics in tools before policy makers have decided (based on scientific input)
  - To include the issues into legislation
  - To amend the GHG calculation methodology

BioGrace follows Commission and JRC and makes decisions implementable for stakeholders

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BioGrace-II activities

- BioGrace-II will
  - Explain methodology and add calculation rules e.g. National or EU electricity mix
  - Build GHG calculation tool for electricity, heat and cooling
  - Discuss with policy makers on harmonisation
  - Organise stakeholder feedback and workshops
  - Train verifiers to verify actual GHG calculations
- Small part of work is still on biofuels
  - Verifier trainings
  - Update of biofuel tool after update of RED Annex V
- Some details of work depend on new biomass sustainability report - follow-up of COM(2010)11

BioGrace-II activities

- GHG calculation tool aiming at
  - Make transparent the default values from COM(2010)11
  - Allow stakeholders to make actual calculations

ANNEX II – Typical and default values for solid and gaseous biomass if produced with no net carbon emissions from land use change

Primary solid and gaseous biomass pathways	Typical greenhouse gas emissions (gCO_{2eq}/MJ)	Default greenhouse gas emissions (gCO_{2eq}/MJ)
Wood chips from forest residues (European temperate continental forest)	1	1
Wood chips from forest residues (tropical and subtropical forest)	21	25
Wood chips from short rotation forestry (European temperate continental forest)	3	4

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BioGrace-II activities

Build GHG calculation tool for electricity, heat and cooling

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Production of Electricity, Heat and Cooling from Wood pellets from EU forest residues (natural gas) — TEMPLATE - proposal

Overview Results

All results in g $CO_{2,eq}$ / MJ Wood pellets	Non- allocated results	Total (allocated results)	Actual/ Default	Default values COM(2010)11	Electricity Allocation factor	Electricity Allocated results	Heat Allocation factor	Heat Allocated results
Cultivation e_{ec}						1,2		0,6
Wood chipping	1,77	1,77			65,7%	1,16	34,3%	0,61
Processing e_p						21,3		11,1
Wood pellet production	32,40	32,40			65,7%	21,29	34,3%	11,11
Combustion of wood pellets	0,00	0,00			65,7%	0,00	34,3%	0,00
Transport e_{td}						0,2		0,1
Transport of wood chips	0,34	0,34			65,7%	0,22	34,3%	0,12
Transport of wood pellets	0,27	0,27						
Land use change e_l	0,0	0,0			65,7%	0,0	34,3%	0,0
Bonus (restored degraded land)	0,0	0,0			65,7%	0,0	34,3%	0,0
$e_{sca} + e_{ccr} + e_{ccs}$	0,0	0,0			65,7%	0,0	34,3%	0,0
Totals	34,8	34,8		35,0		22,7 g $CO_{2,eq}$ / $MJ_{Pellets}$		11,8 g $CO_{2,eq}$ / $MJ_{Pellets}$
						66,7 g $CO_{2,eq}$ / $MJ_{Electricity}$		23,7 g $CO_{2,eq}$ / MJ_{Heat} or $MJ_{Cooling}$

When using this GHG calculation tool, **the BioGrace calculation rules must be respected.**
The rules are included in the zip file (containing the complete tool) and also at www.BioGrace.net

Main output

- ☐ Electricity
- ☐ Heat
- ☐ Cooling
- ☑ Electricity and heat

Conversion efficiencies

34,0%	electrical efficiency
50,0%	thermal efficency
30,0%	cooling efficency
150	Temp of useful heat (°C)

Allocation factors

Production chain	
100,0%	to energy carrier
0,0%	to co-product(s)
CHP	
65,7%	to electricity
34,3%	to heat

Emission reduction

Fossil fuel reference	
198	g $CO_{2,eq}$/$MJ_{electricity}$
87	g $CO_{2,eq}$/MJ_{heat}
57	g $CO_{2,eq}$/$MJ_{cooling}$
GHG emission reduction	
66%	for electricity
73%	for heat
100%	for cooling

Track changes: OFF

Calculation per phase

Wood chipping

Yield		
Wood chips	1,0	$ton_{Wood\ chips}$ / $ton_{Forest\ residues,\ input}$
Moisture content	50%	
Energy consumption		

Quantity of product

1,00	$MJ_{Wood\ chips}$ / $MJ_{Forest\ residues,\ input}$
15,00	$MJ_{Wood\ chips}$ / $kg_{Forest\ residues,\ input}$
0,068	$kg_{Straw\ bales}$/$MJ_{Straw\ pellets}$

Calculated emissions

Emissions per MJ Wood pellets

g CO_2	g CH_4	g N_2O	g $CO_{2,eq}$

Info

per kg wood	per ha, year
g $CO_{2,eq}$	kg $CO_{2,eq}$

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Cultivation e_{ec}						1,8		1,8
Wood chipping	1,77	1,77			100,0%	1,77	100,0%	1,77
Processing e_p						32,4		32,4
Wood pellet production	32,40	32,40			100,0%	32,40	100,0%	32,40
Combustion of wood pellets	0,00	0,00			100,0%	0,00	100,0%	0,00
Transport e_{td}						0,3		0,3
Transport of wood chips	0,34	0,34			100,0%	0,34	100,0%	0,34
Transport of wood pellets	0,27	0,27						
Land use change e_l	0,0	0,0			100,0%	0,0	100,0%	0,0
Bonus (restored degraded land)	0,0	0,0			100,0%	0,0	100,0%	0,0
$e_{sca} + e_{ccr} + e_{ccs}$	0,0	0,0			100,0%	0,0	100,0%	0,0
Totals	**34,8**	**34,8**		**35,0**		**34,5** g $CO_{2,eq}$ / $MJ_{Pellets}$		**34,5** g $CO_{2,eq}$ / $MJ_{Pellets}$
						101,5 g $CO_{2,eq}$ / $MJ_{Electricity}$		**69,0** g $CO_{2,eq}$ / MJ_{Heat} or $MJ_{Cooling}$

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Track changes: OFF

Calculation per phase

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Yield		
Wood chips	**1,0**	ton$_{Wood\ chips}$ / ton$_{Forest\ residues,\ input}$
Moisture content	**50%**	
Energy consumption		

Quantity of product

1,00	$MJ_{Wood\ chips}$ / $MJ_{Forest\ residues,\ input}$
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Calculated emissions

Emissions per MJ Wood pellets

g CO_2	g CH_4	g N_2O	g $CO_{2,eq}$

Info

per kg wood	per ha, year
g $CO_{2,eq}$	kg $CO_{2,eq}$

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Processing e_p						32,4		32,4
Wood pellet production	32,40	32,40			100,0%	32,40	100,0%	32,40
Combustion of wood pellets	0,00	0,00			100,0%	0,00	100,0%	0,00
Transport e_{td}						0,3		0,3
Transport of wood chips	0,34	0,34			100,0%	0,34	100,0%	0,34
Transport of wood pellets	0,27	0,27						
Land use change e_l	0,0	0,0			100,0%	0,0	100,0%	0,0
Bonus (restored degraded land)	0,0	0,0			100,0%	0,0	100,0%	0,0
$e_{sca} + e_{ccr} + e_{ccs}$	0,0	0,0			100,0%	0,0	100,0%	0,0
Totals	34,8	34,8		35,0		34,5 g $CO_{2,eq}$ / $MJ_{Pellets}$		34,5 g $CO_{2,eq}$ / $MJ_{Pellets}$
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GHG emission reduction	
49%	for electricity
21%	for heat
100%	for cooling

Track changes: OFF

Calculation per phase

Wood chipping		Quantity of product	Calculated emissions				Info	
Yield			Emissions per MJ Wood pellets				per kg wood	per ha, year
Wood chips	1,0 $ton_{Wood\ chips}$ / $ton_{Forest\ residues,\ input}$	1,00 $MJ_{Wood\ chips}$ / $MJ_{Forest\ residues,\ input}$	g CO_2	g CH_4	g N_2O	g $CO_{2,eq}$	g $CO_{2,eq}$	kg $CO_{2,eq}$
Moisture content	50%	15,00 $MJ_{Wood\ chips}$ / $kg_{Forest\ residues,\ input}$						
		0,068 $kg_{Straw\ bales}$/$MJ_{Straw\ pellets}$						
Energy consumption								

BioGrace-II activities

Discuss with policy makers on harmonisation

BioGrace-II will

- Organise policy maker workshops to discuss harmonisation
- Come with clear proposals

Contents

Role of policy makers

Two harmonisation topics

- Calculation rules
  e.g. National or EU electricity mix
- One list of conversion factors

If other tools exist: ensure that they give same result

- Cooperation from owner of tool is required
- Track record: most biofuel tools were aligned

Role of policy makers

Why discuss with policy makers on harmonisation?

- Stakeholders request for harmonisation
  - On sustainability criteria in general
  - Including detailed issues like details in GHG calculations
- BioGrace-II has intermediary role
  - Between JRC, national governments and experts
  - Build tool and formulate detailed calculation rules
- Policy makers will finally decide
  - Lesson from BioGrace-I: GHG experts cannot cause harmonisation without decisions at policy level

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More information?

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- Project partners

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  - BE2020, Austria (Nikolaus Ludwiczek)
  - BIO IS, France (Perrine Lavelle)
  - IFEU, Germany (Horst Fehrenbach)
  - STEM, Sweden (Anders Dahlberg)
  - VREG, Belgium (Jimmy Loodts)

- Involvement from

  - JRC & LBST, EURELECTRIC, DECC, CWAPE

NL Agency Ministry of Economic Affairs · AEBIOM European Biomass Association · bioenergy2020+ · bio Intelligence Service Scaling sustainable development · ifeu · Swedish Energy Agency · vreg Vlaamse Regulator van de Elektriciteits- en Gasmarkt

More information?

- All information is available:
  - on www.BioGrace.net
  - and is for free

Contents

Concluding summary

- BioGrace is about implementation of policies
  - Practical tools helping stakeholders to make actual calculations
  - Strictly following European legislation
  - Strongly aiming to create a harmonised European market

- BioGrace-I on biofuels has been finalised
  - GHG calculations for liquid biofuels only
  - Tool has been send in for recognition as a voluntary tool

- BioGrace-II on electricity and heat from biomass just started
  - Harmonise GHG calculations for bio-electricity and bioheat
  - Strong parallels with BioGrace-I but also differences
  - Important role for policy makers

Thank you for your attention

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