BIOGRACE

Harmonised Calculations of Biofuel Greenhouse Gas Emissions in Europe

National GHG calculators – harmonized in co-operation with BioGrace

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Agentschap NL
Public workshop Utrecht
March 21, 2011

Contents

Introduction

Rules and methodology for GHG calculations

- RED article 19: Economic operators may use
  - o default values (19.1.a)
  - o actual values calculated according to Annex V.C (19.1.b)
  - o sum of actual value and disaggregated default value (19.1.c)
- RED Annex V.C + June communications: Methodology

Making actual calculations not straightforward

- Some kind of tool or software is needed
  - o Some companies will develop own tools
  - o Many others will use publicly available tools

Several GHG calculators available

Project BioGrace will ensure that all calculators will give the same result

Contents

Dutch tool - General information

Background

- Dutch government prepared a reporting obligation on sustainability for biofuels to start per 1-1-2009
- This was abandoned after the publication of the draft Renewable Energy Directive (RED).

The Dutch GHG calculator

- was developed in 2007/2008 by consultants EcoFys and CE
- has been available for (Dutch) stakeholders to make GHG calculation on biofuels
- has not been used extensively due to lack of legal framework in 2008 – 2010
- was recently updated and made “RED”- proof by Agency NL

BIOGRACE
Harmonised Calculations of Biofuel Greenhouse Gas Emissions in Europe

Intelligent Energy Europe

Dutch GHG tool

Reference: Diesel
Biofuel: Biodiesel
Feedstock: Rapeseed

Load Default Values | Calculate Results | Adapt Chain | Chain management | Disclaimer

D = Default; U = User input

Version 3.1 - aug

Current chain: Biodiesel from Rapeseed (not saved by user)

Feedstock production						
	Yield main product	Raw rapeseed		3113	kg / (ha*yr)	D
	Main product	Moisture content		0,10	kg / kg	D
	Material & energy use	Diesel		2963	MJ / (ha*yr)	D
	Material & energy use	N fertilizer		137,4	kg N / (ha*yr)	D
	Material & energy use	CaO fertilizer		19,00	kg CaO / (ha*yr)	D
	Material & energy use	K2O fertilizer		49,46	kg K2O / (ha*yr)	D
	Material & energy use	P2O5 fertilizer		33,67	kg P2O5 / (ha*yr)	D
	Material & energy use	Pesticides		1,230	kg / (ha*yr)	D
	Material & energy use	Seeding material - rapeseed		6,000	kg / (ha*yr)	D
	Field emissions	Field N2O emissions		3,103	kg / (ha*yr)	D
	Field emissions	Direct Land Use Change	No		g CO2/MJbiofuel	D
Feedstock drying						
	Yield main product	Dried rapeseed		1,000	MJdried rapeseed / (MJraw rapeseed)	D
	Main product	Moisture content		0,10	kg / kg	D
	Material & energy use	Diesel		0,181	MJ / (GJdried rapeseed)	D
	Material & energy use	Electricity (EU-mix, LV)		3,079	MJ / (GJdried rapeseed)	D
Transport feedstock						
	Yield main product	Dried rapeseed		0,990	MJdried rapeseed / (MJdried rapeseed)	D
	Main product	Moisture content		0,10	kg / kg	D
	Transport	Truck for dry product (Diesel)		50	km	D
Extraction in oil mill						
	Yield main product	Crude vegetable oil		0,613	MJcrude oil / (MJdried rapeseed)	D
	Yield by-product	Rapeseed cake		0,387	MJrapeseed cake / (MJdried rapeseed)	D

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Intelligent Energy Europe

Dutch GHG tool

Summary Input

Biofuel	Biodiesel
Feedstock	Rapeseed
Process	-
Reference	Diesel

Print summary results

Show detailed results

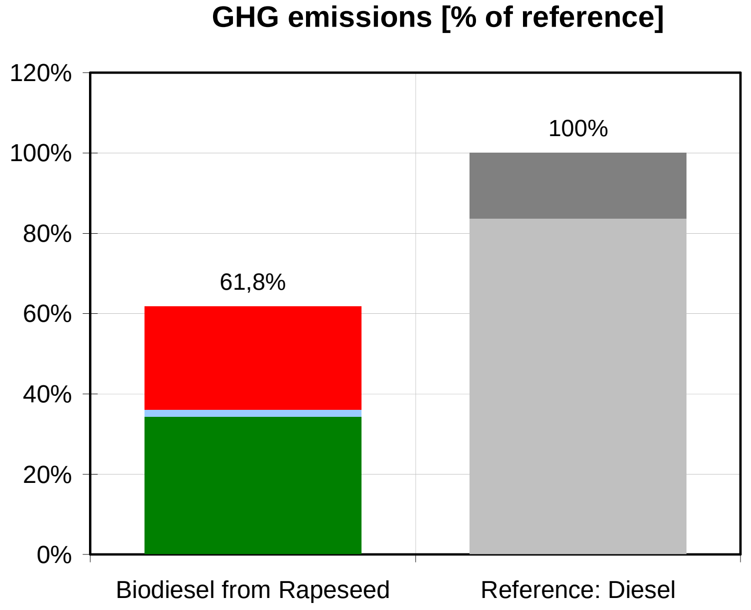
Return to input

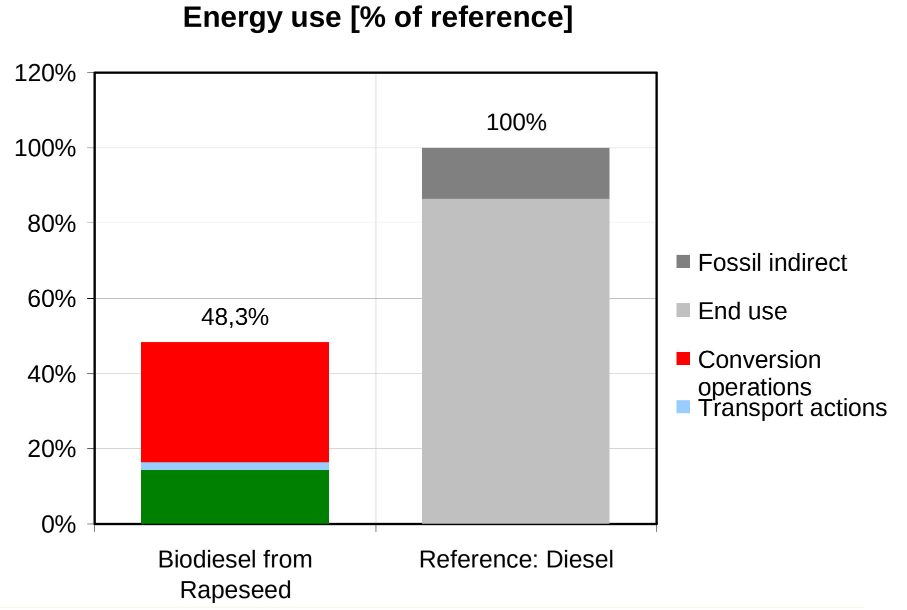
Summary output

	Biodiesel from Rapeseed				Reference: Diesel			
	Energy use (per MJ)		GHG emissions (kg/MJ)		Energy use (per MJ)		GHG emissions (kg/MJ)	
	(MJ)	(% of ref.)	(g CO2-eq.)	(% of ref.)	(MJ)	(%)	(g CO2-eq.)	(%)
Feedstock production	0,1672	14%	28,7496	34%				
Transport actions	0,0233	2%	1,4345	2%				
Conversion operations	0,3677	32%	21,5636	26%				
End use					1,0000	87%	70,1047	84%
Fossil indirect					0,1550	13%	13,6953	16%
Total	0,5582	48,3%	51,7477	61,8%	1,1550	100%	83,8000	100%
% Reduction		**51,7%**		**38,2%**				**0%**
Avoided emission (tonne CO_2/ha/yr)			**1371,5**					

Biofuels greenhouse gas calculator

NL Agency
Ministry of Economic Affairs





Dutch GHG tool

Biofuel	Biodiesel
Feedstock	Rapeseed
Process	-
Reference	Diesel

Return to overview results | Return to input

	Absolute Numbers (including allocation)					Relative contribution (including allocation)			
	Energy use [MJ fossil fuel/ MJ biofuel]	Emission CO2 [kg CO2/ MJ biofuel]	Emission N2O [kg CO2-eq/ MJ biofuel]	Emission CH4 [kg CO2-eq/ MJ biofuel]	Emission GHG [kg CO2-eq/ MJ biofuel]	Energy use [%]	Emission CO2 [%]	Emission N2O [%]	Emission CH4 [%]
Feedstock production									
Diesel	0,047	3,555	0,00E+00	0,00E+00	3,555	8,4%	6,9%	0,0%	0,0%
N fertilizer	0,092	5,319	5,370	0,376	11,065	16,5%	10,3%	10,4%	0,7%
CaO fertilizer	5,13E-04	0,031	1,41E-03	1,29E-03	0,034	0,1%	0,1%	0,0%	0,0%
K2O fertilizer	6,55E-03	0,363	2,47E-03	0,024	0,390	1,2%	0,7%	0,0%	0,0%
P2O5 fertilizer	7,02E-03	0,445	7,03E-03	0,014	0,466	1,3%	0,9%	0,0%	0,0%
Pesticides	4,52E-03	0,166	8,38E-03	9,89E-03	0,185	0,8%	0,3%	0,0%	0,0%
Seeding material - rapeseed	6,46E-04	0,034	0,024	1,72E-03	0,060	0,1%	0,1%	0,0%	0,0%
Field N2O emissions	0,00E+00	0,00E+00	12,575	0,00E+00	12,575	0,0%	0,0%	24,3%	0,0%
Direct Land Use Change	-	0,00E+00	-	-	0,00E+00	-	0,0%	-	-
Total Feedstock production	**0,159**	**9,914**	**17,989**	**0,427**	**28,331**	**28,4%**	**19,2%**	**34,8%**	**0,8%**
Allocation burden of this and previous steps to main product Raw rapeseed				100,0%					
Allocation burden of this and previous steps to by-product Raw rapeseed				0,0%					
Allocation burden of this step to Biodiesel at end-of-chain				58,6%					
Feedstock drying									
Diesel	2,13E-04	0,016	0,00E+00	0,00E+00	0,016	0,0%	0,0%	0,0%	0,0%
Electricity (EU-mix, LV)	8,51E-03	0,377	5,05E-03	0,021	0,403	1,5%	0,7%	0,0%	0,0%
Total Feedstock drying	**8,72E-03**	**0,393**	**5,05E-03**	**0,021**	**0,419**	**1,6%**	**0,8%**	**0,0%**	**0,0%**
Allocation burden of this and previous steps to main product Dried rapeseed				100,0%					
Allocation burden of this and previous steps to by-product Dried rapeseed				0,0%					
Allocation burden of this step to Biodiesel at end-of-chain				58,6%					
Transport feedstock									
Truck for dry product (Diesel)	2,29E-03	0,173	0,00E+00	2,43E-04	0,173	0,4%	0,3%	0,0%	0,0%
Total Transport feedstock	**2,29E-03**	**0,173**	**0,00E+00**	**2,43E-04**	**0,173**	**0,4%**	**0,3%**	**0,0%**	**0,0%**

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Harmonised Calculations of Biofuel Greenhouse Gas Emissions in Europe

Intelligent Energy Europe

Dutch GHG tool

DIRECT LAND USE CHANGE CALCULATION

Return to input

1. Standard Soil Carbon stock in mineral soil (SOC_{ST})

Climate region	Boreal	See figure 1		The blue fields are drop down boxes.
Soil type	High activity clay soils	See figure 3 & 2		
	Result	SOC_{ST}	68	ton C / ha

2. Factors reflecting the difference in Soil Organic Carbon (SOC) compared to the Standard Soil Organic Carbon (SOC_{ST})

Actual land use

Default=Calculate with standard values: Default
User = Own calculation incl. measured value

Type of land	Cropland	See tables 3, 6 and 8	
Climate region	Temperate/Boreal, dry		
Land use F_{LU}	Cultivated		0,8
Management F_{MG}	Full-tillage		1
Input F_I	Low		0,95
Result		SOC_A	51,68 ton C / ha

Reference land use

Default=Calculate with standard values: Default
User = Own calculation incl. measured value

Type of land	Cropland	See tables 3, 6 and 8	
Climate region	Temperate/Boreal, dry		
Land use F_{LU}	Cultivated		0,8
Management F_{MG}	Full-tillage		1
Input F_I	Low		0,95
Result		SOC_{ref}	51,68 g C / ha

3. Above and below ground vegetation (Cveg)

Actual land use

Default=Calculate with standard values: Default
User = Own calculation incl. measured value

Type of land	Cropland (General)
Domain	
Climate region	
Ecological zone	
Continent	
Crop type	
Result	$C_{VEG,A}$ 0 ton C / ha

Reference land use

Default=Calculate with standard values: Default
User = Own calculation incl. measured value

Type of land	Forest 10-30% canopy cover, excl plantations
Domain	Temperate
Climate region	
Ecological zone	Temperate continental forest
Continent	Asia, Europe (<= 20 y)
Crop type	
Result	$C_{VEG, ref}$ 2 ton C / ha

4. Bonus (eb) for cultivation on restored degraded land under the conditions provided for in point 8 of Annex V of directive.

Bonus	No	No = 0 g CO_2/MJ Yes = -29 g CO_2/MJ

Total results

Result: CO_2 emission caused by direct land use change 8,5625592 **g CO_2/MJ biofuel**

Calculate Results — Re-calculate the results if you changed the values here or at the input page.

Dutch tool - Summary

Contents

- Excel-based tool
- Tool is rather similar to BioGrace Excel sheets, but
  - It is more user-friendly:
    no calculations details, results in graphs
  - DLUC calculations are user-friendly
- The software programming makes it less flexible
  - More difficult to modify pathways or build new ones

Status

- Tool is available on-line via
  www.senternovem.nl/gave_english/ghg_tool
- All 22 chains (BioGrace) are included
- Updates follow updates of BioGrace Excel sheet

Contents

German tool - general information

Background

- No public tool has been available so far in Germany
- Aim: to facilitate stakeholders calculating actual values (combination of actual values and disaggregated default values)

The German GHG calculator

- is made by IFEU, contracted by BMU
- should be finalised mid 2011
- should be in line with BLE Guidance
- is strongly linked to economic operators: 1 sheet dedicated for cultivators, mill operators, refinery operators, etc.

German GHG tool

Palm oil greenhouse gas calculator

About | Background data | Start

according to the EU Directive 2009/28/EC

Plantation operator / first buyer of crops ?

Oil mill operator ?

Refinery operator ?

Last interface ?

supported by

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

ifeu

German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

- Plantation operator / first buyer of crops ?
- Oil mill operator ?
- Refinery operator ?
- Last interface ?

supported by
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

ifeu

German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

I. Market actor: Plantation operator, first purchaser

Step-by-step manual for calculating GHG emissions of oil palm cultivation

Final Result
Please provide this info together with your batch to oil miller.

Please note: When combining FFB batches and averaging GHG emissions, GHG value for each batch may not exceed **280g CO_2eq/kg FFB**

The CO_2 emissions from oil palm cultivation amount to

123,7 g CO_2eq/kg FFB ?

Size of the FFB batch

0 kg

Enter your operating data in step 1-4 to calculate CO_2 emissions of your FFB batch

STEP 1 - GHG emissions from land use changes

Do FFB´s originate from plantation areas that were plantation areas before january 1st 2008?

yes — Emissions from land use change are zero.

no — Click here to calculate emissions in sheet "land use changes"

Which emissions arose from land use changes?

0 kg CO_2eq per ha per year

STEP 2 - GHG emissions from cultivation

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German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

I. Market actor: Plantation operator, first purchaser

Step-by-step manual for calculating CO_2 emissions from land use change

The European Commission has published *guidelines for the calculation of land carbon stocks* (notified under document C (2010) 3751). These consist of tables with values for carbon stock in soils, above and below ground biomass for different soil types, climate regions, vegetation types etc.

Result
value will be added in sheet »actor cultivator« step 1

#WAARDE!
kg CO_2eq per ha per year

confirm value and back

Specify the parameters in step 1-4 to calculate CO2 emissions from land use changes

STEP 1 - Carbon stock in above and below ground biomass on 01.01.2008 (CS_R)

Please select:		
Vegetation type	Forest (10-30% canopy cover)	?
Domain		
Climate region		
Ecological zone		
Continent		
Above and below ground carbon on 01.01.08	**Please make a valid selection**	**t C/ha**

STEP 2 - Soil carbon on 01.01.2008 (CS_R)

Climate region	Tropical, moist	?
Please select:		
Soil type	Low activity clay soils	
Standard soil carbon t C/ha	47	

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German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

I. Market actor: Plantation operator, first purchaser

Step-by-step manual for calculating GHG emissions of oil palm cultivation

Final Result
Please provide this info together with your batch to oil miller.

Please note: When combining FFB batches and averaging GHG emissions, GHG value for each batch may not exceed **280g CO_2eq/kg FFB**

The CO_2 emissions from oil palm cultivation amount to

123,7 g CO_2eq/kg FFB

Size of the FFB batch

0 kg

Enter your operating data in step 1-4 to calculate CO_2 emissions of your FFB batch

STEP 2 - GHG emissions from cultivation

What is your FFB yield per ha per year?

19.000 kg FFBs per ha per year

What is the size of your cultivation area?

28 ha

How much fertilizer did you apply per ha per year? Please enter the amount for each of the following fertilizers.

N-fertiliser	128,0	kg N per ha per year
P_2O_5-fertiliser	144,0	kg P_2O_5 per ha per year
K_2O-fertiliser	200,0	kg K_2O per ha per year

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Intelligent Energy Europe

German GHG tool

STEP 2 - GHG emissions from cultivation		
What is your FFB yield per ha per year?		
	19,000	kg FFBs per ha per year
What is the size of your cultivation area?		
	28	ha
How much fertilizer did you apply per ha per year? Please enter the amount for each of the following fertilizers.		
N-fertiliser	128.0	kg N per ha per year
P_2O_5-fertiliser	144.0	kg P_2O_5 per ha per year
K_2O-fertiliser	200.0	kg K_2O per ha per year
CaO-fertiliser	0.0	kg CaO per ha per year
How much pesticides did you apply per ha per year?		
Pesticides	8.4	kg active ingredient per ha per year
How much diesel did you use per ha per year? Please include		
Diesel	57.4	l per ha per year
What is the size of your batch (consignment)?		
	0	kg
Emissions fertilizer	**2,077**	**kg CO_2eq per ha per year**
N-fertilizer production	757	kg CO_2eq per ha per year
N_2O field emissions	1,058	kg CO_2eq per ha per year
P_2O_5-fertilizer production	146	kg CO_2eq per ha per year
K_2O-fertilizer production	116	kg CO_2eq per ha per year
Ca-fertilizer production	0	kg CO_2eq per ha per year
Emissions pesticide production	**93**	**kg CO_2eq per ha per year**
Emissions diesel	**180**	**kg CO_2eq per ha per year**

Emissions (cultivation)	**2,350**	**kg CO_2eq per ha per year**
Emissions (land use changes)	**0**	**kg CO_2eq per ha per year**
Total emissions	**2,350**	**kg CO_2eq per ha per year**

BIOGRACE

Harmonised Calculations of Biofuel Greenhouse Gas Emissions in Europe

Intelligent Energy Europe

German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

- Plantation operator / first buyer of crops ?
- Oil mill operator ?
- Refinery operator ?
- Last interface ?

supported by

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

ifeu

German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

II. Market actor: Oil mill operator

Step-by-step manual for calculating CO_2 emissions of CPO production

Final Result
Please provide this info together with your batch to refinery.

Please note: When combining CPO batches and averaging GHG emissions, GHG value for each batch may not exceed **1190g CO_2eq/kg CPO**

The CO_2 emissions from palm oil mill amount to

1517 g CO_2eq/kg CPO ?

Size of the CPO batch

30000 kg

Enter your operating data in step 1-4 to calculate CO_2 emissions of your CPO batch

STEP 1 - GHG emissions of pre-products

What GHG emissions arose from the production of the FFBs? Indicate whether you want to use the default value or a calculated value.

default value — Click here to use default value "126" g CO_2eq/kg FFB in the field below

calculate value — Click here to calculate your emissions in g CO_2eq/kg FFB.

126 g CO_2eq/kg FFB

STEP 2 - GHG emissions from oil mill operation

How many tons of FFB´s did you process per year?

10.000 t FFB/year ?

German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

Mixing CPO batches from several suppliers and averaging GHG emissions

Overall quantity metric tonnes	Overall GHG value g CO_2eq/kg FFB
0	0

confirm value and back

Supplier#	Plantation name	FFB quantitity metric tonnes	GHG value g CO_2eq/kg FFB
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

fill in the information delivered by your suppliers

German GHG tool

Palm oil greenhouse gas calculator | About | Background data | Start

according to the EU Directive 2009/28/EC

IV. Market actor: Last Interface

Step-by-step manual for calculating greenhouse gas savings:

Final Result
Greenhouse gas savings

44% compared to fossil comparator ?

STEP 1

What are the GHG emissions of the final product?

	1747	g CO_2eq/kg refined palm oil
Calculation of heat content	47	g CO_2eq/MJ

Is the biofuel used for electricity production or for cogeneration?

Electricity from Cogeneration	**85**	g CO_2eq/MJ

German tool - Summary

Contents

- Excel-based tool
- Tool differs from BioGrace Excel sheets:
  - Pathways are split in partial calculations
  - DLUC calculations are user-friendly
- The software programming makes it inflexible
  - Not possible to modify pathways or build new ones

Status

- Tool is available on-line via www.ifeu.de/english
- Currently one chain available: palm oil
- Cereals-to-ethanol and oil_seeds-to-biodiesel chains are ready but not available on line

Contents

Spanish tool - general information

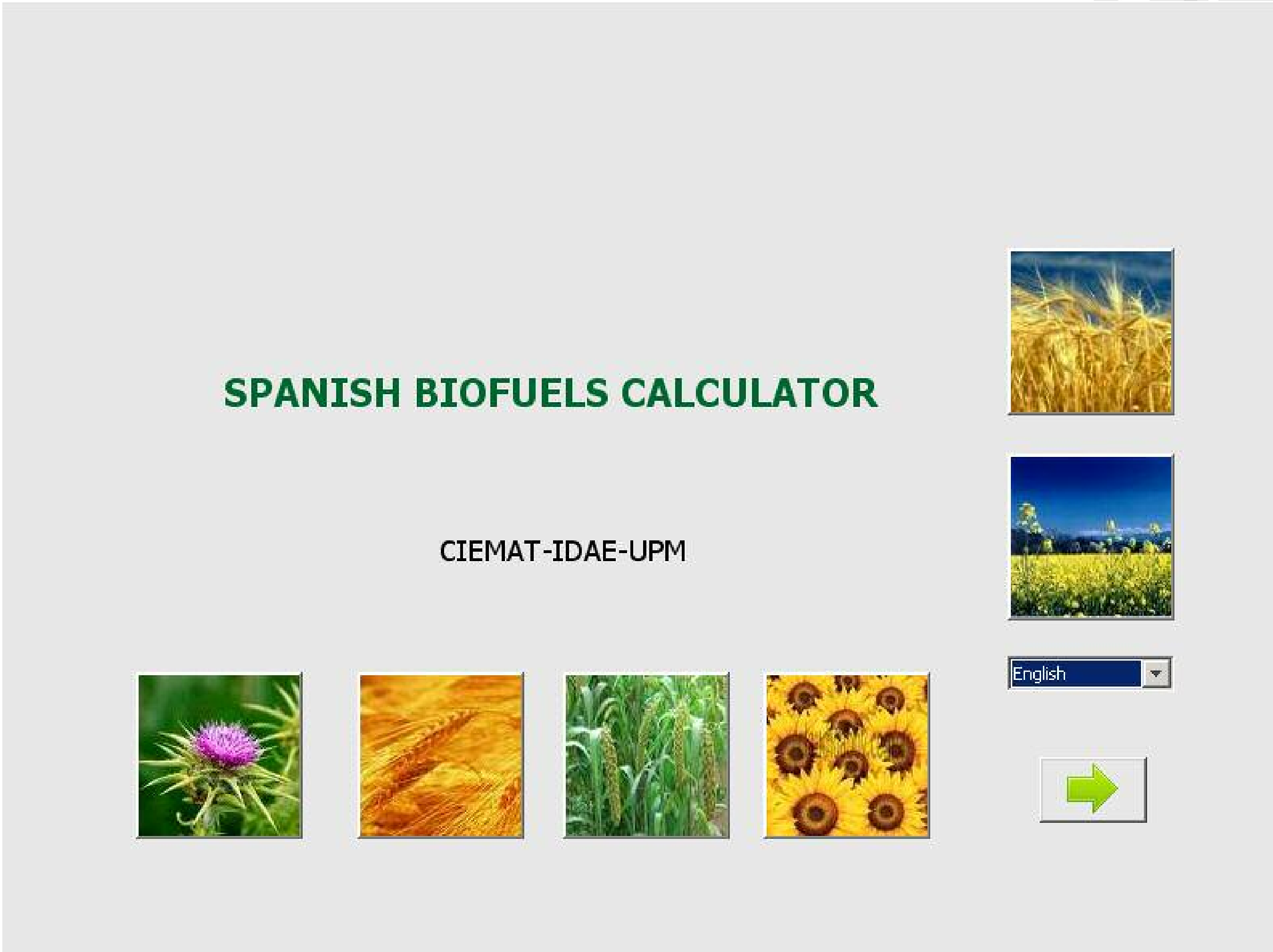
Background

- o No public tool has been available so far in Spain
- o Aim: to provide stakeholders (especially farmers and small biofuel companies) with a tool to calculate the GHG emissions required by the RED

The Spanish GHG calculator

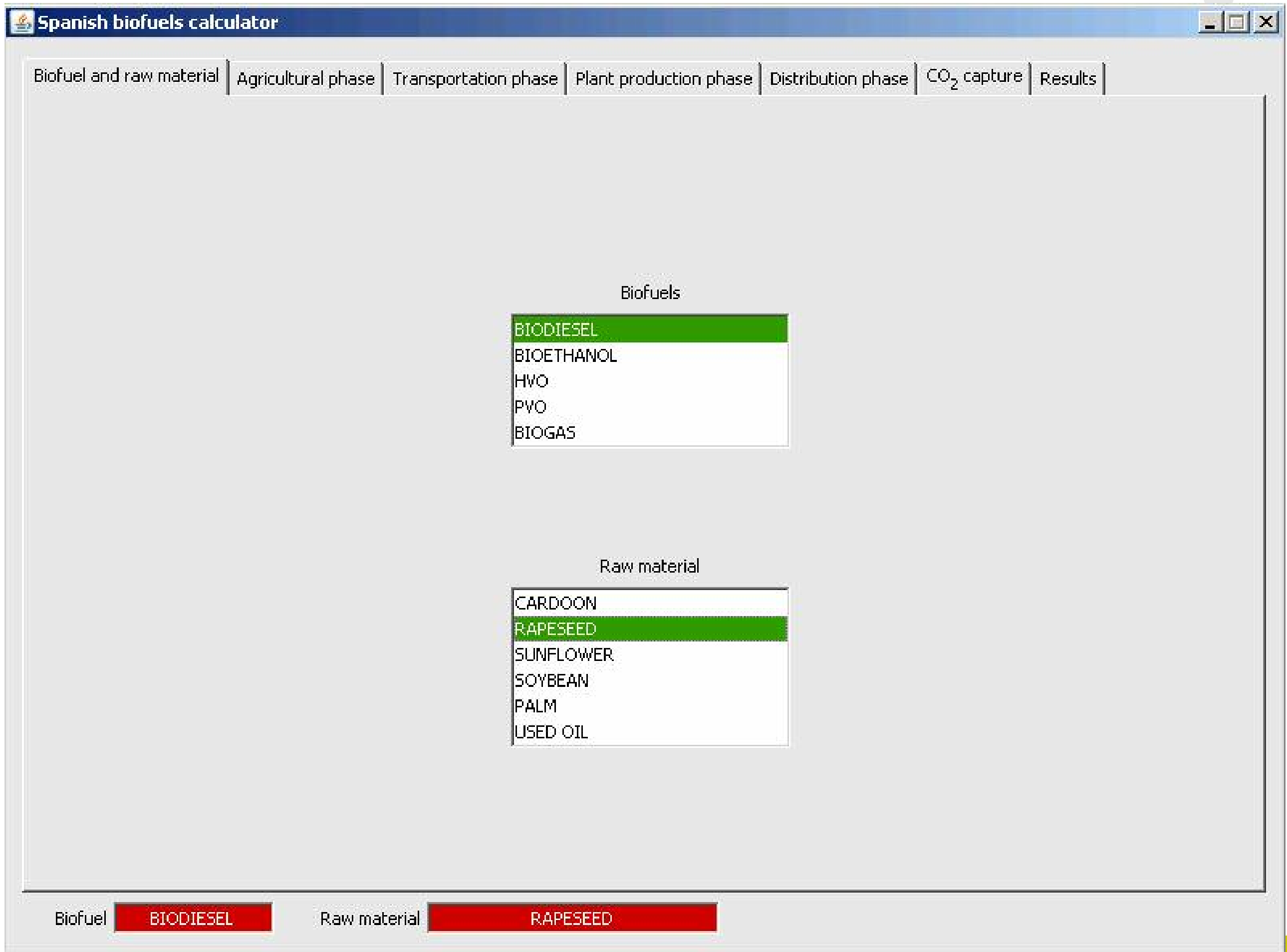
- o being developed by CIEMAT, contracted by IDAE
- o focuses on agricultural stages
- o uses data from NUTS study (actual values or averages calculated for smaller geographical areas)

Spanish GHG tool



Spanish GHG tool

Biofuel and raw material selection screen



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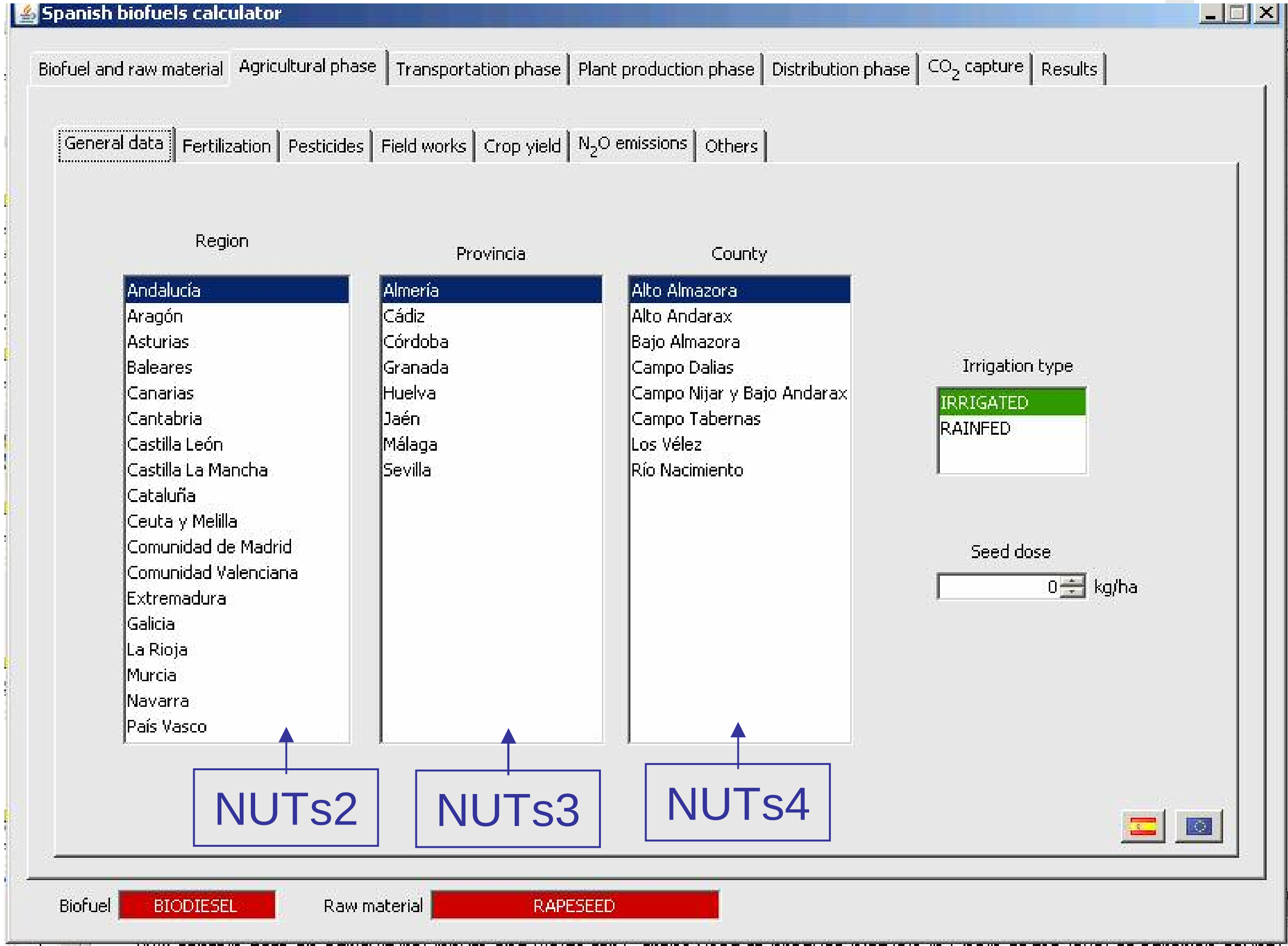
Spanish GHG tool

Agricultural county selection screen



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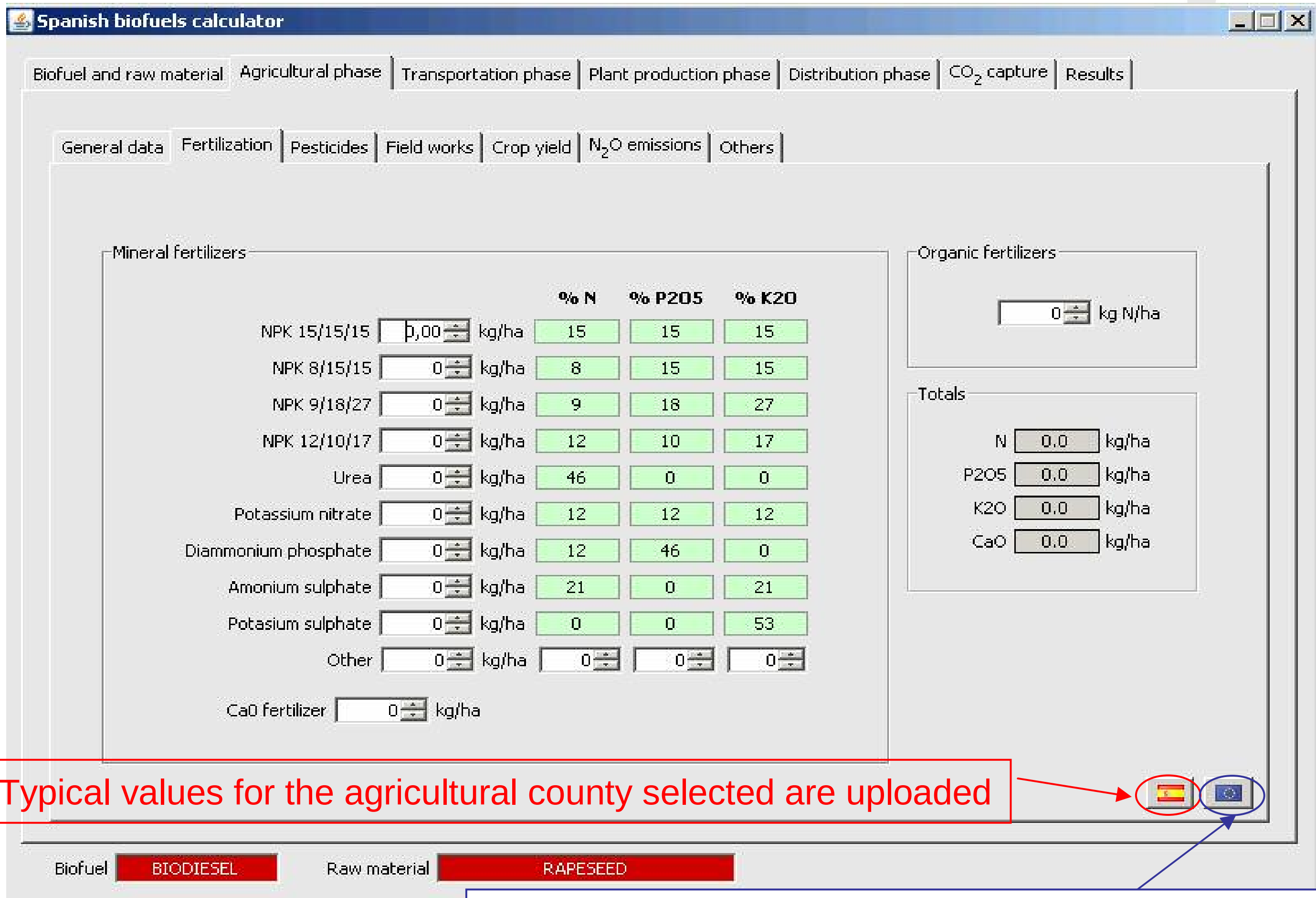
Intelligent Energy Europe

Spanish GHG tool

Fertilization data input screen

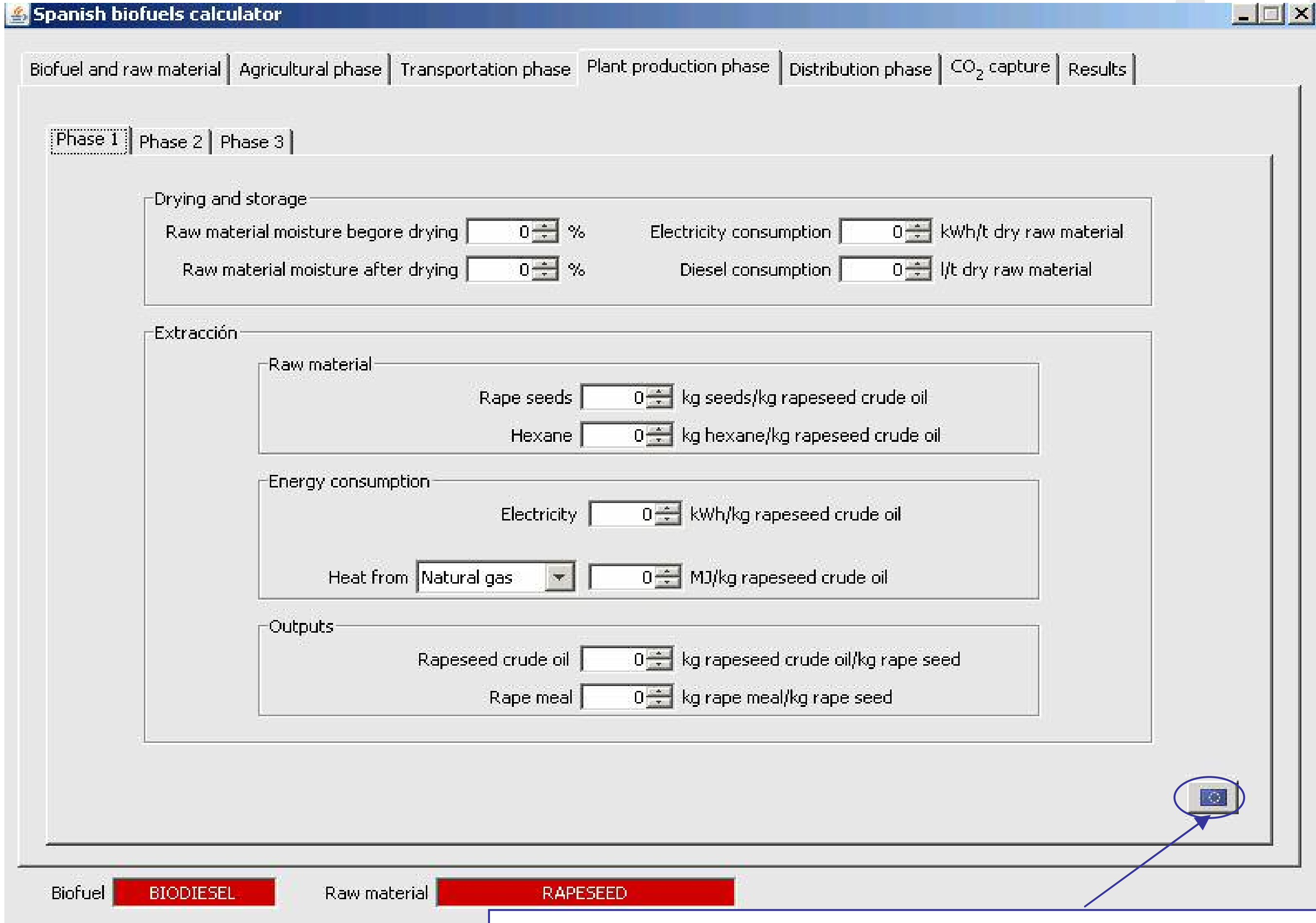


Typical values for the agricultural county selected are uploaded

Values to reproduce the default values of the RED are uploaded

Spanish GHG tool

Transformation data input screen



Values to reproduce the default values of the RED are uploaded

Spanish GHG tool

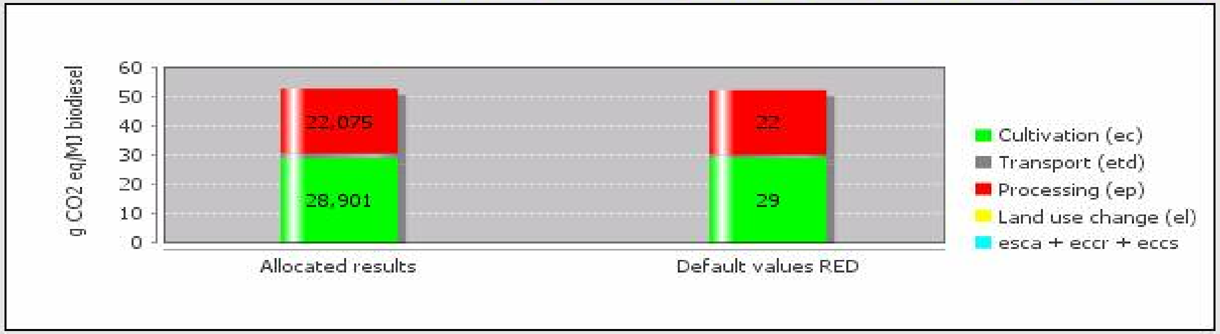
Results screen

Spanish biofuels calculator

Biofuel and raw material | Agricultural phase | Transportation phase | Plant production phase | Distribution phase | CO_2 capture | Results

Cultivation of raw materials e_{ec} | Transport and distribution phases e_{td} | Transformation phase $e_p - e_{ee}$ | Totals

All results in CO_2 eq g/MJ biodiesel	Non-allocated results	Allocation factor (%)	Allocated results	Emission reduction (%)	Deafault values RED Annex V.D
Cultivation e_c	49,33	58,59	28,9		29
Transport e_{td}	1,64		1,53		1
Processing e_p	25,5		22,08		22
Land use change e_l	0	58,59	0		0
$e_{sca} + e_{ccr} + e_{ccs}$	0	100	0		0
TOTALS	76,47		52,51	37,34	52



Biofuel: BIODIESEL | Raw material: RAPESEED

Spanish tool - Summary

Contents

- Tool build in Java
- Focus on Spain:
  - Contains data on agricultural inputs and yields for 6 crops used to produce biofuels in Spain at the level of agrarian county (NUTs4)
  - Any farmer in the country can select his/her county and crop and the corresponding values regarding agricultural inputs and yields will appear in the tool.
- For processing and transport: RED default values
- Standard values from BioGrace

Status

- Biodiesel from rapeseed, rapeseed HVO and ethanol from wheat CHP chains ready
- Final version expected mid-2011

Contents

UK tool - general information

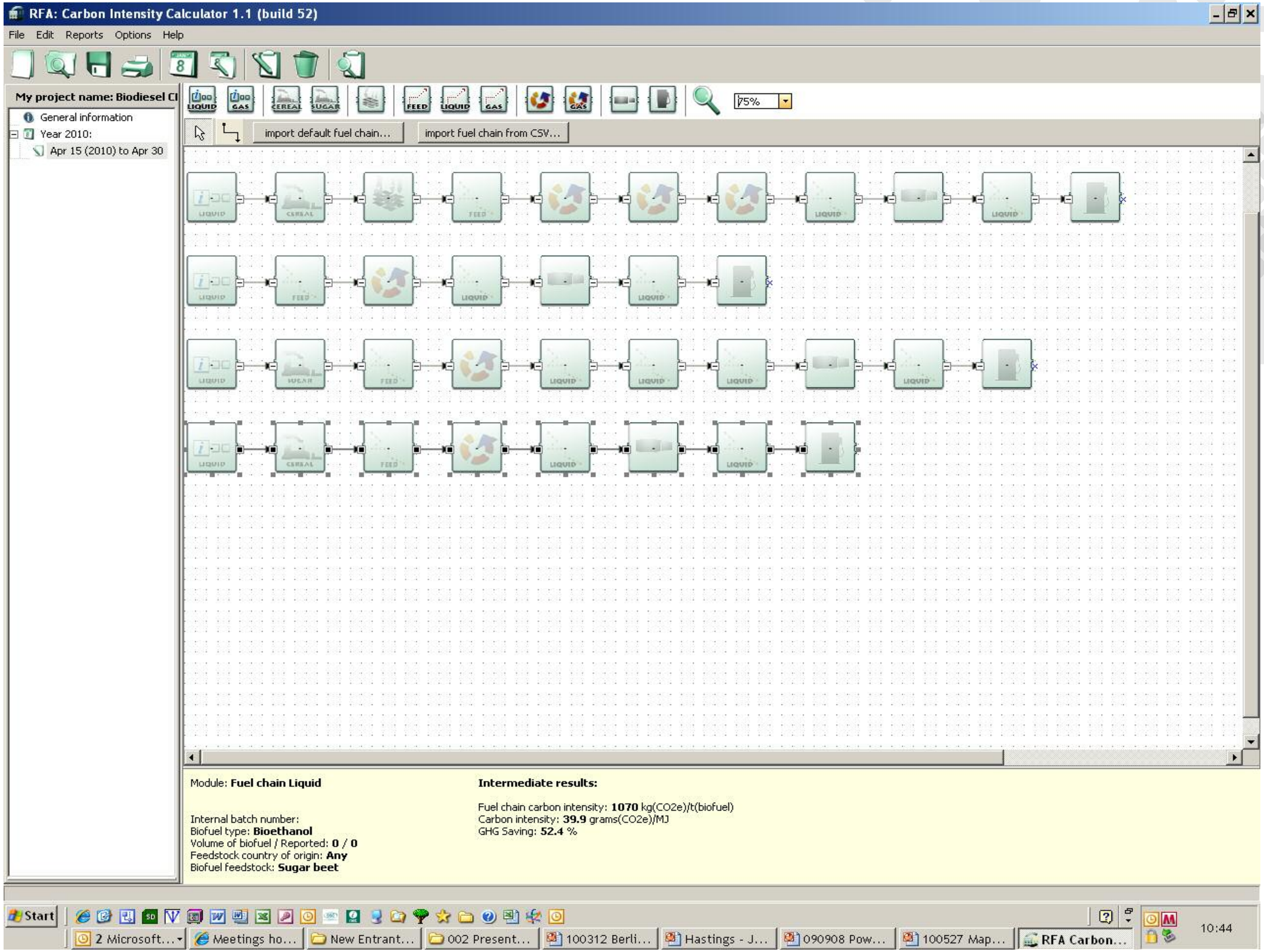
Background

- UK GHG calculator was developed under RTFO reporting scheme
- Calculator existing since 2008, regularly updated
- Aim is to facilitate stakeholders calculating actual values under RTFO reporting

The UK GHG calculator

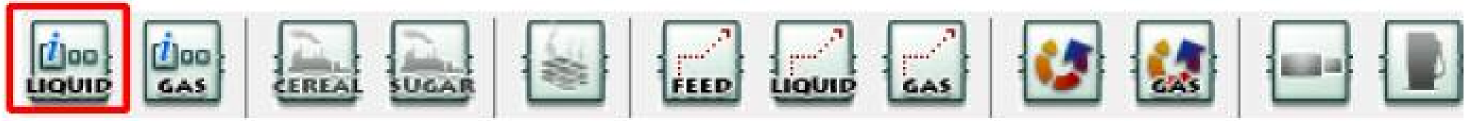
- was made and is regularly updated by consultant E4Tech, contracted by RFA
- has recently been made “RED-proof”
- strongly linked to RTFO reporting scheme
- provides more “standard values” as compared to BioGrace

UK GHG tool


RFA: Carbon Intensity Calculator 1.1 (build 52)
File Edit Reports Options Help
My project name: Biodiesel CI
General information
Year 2010:
Apr 15 (2010) to Apr 30
import default fuel chain...
import fuel chain from CSV...
Module: Fuel chain Liquid
Internal batch number:
Biofuel type: Bioethanol
Volume of biofuel / Reported: 0 / 0
Feedstock country of origin: Any
Biofuel feedstock: Sugar beet
Intermediate results:
Fuel chain carbon intensity: 1070 kg(CO2e)/t(biofuel)
Carbon intensity: 39.9 grams(CO2e)/MJ
GHG Saving: 52.4 %

UK GHG tool

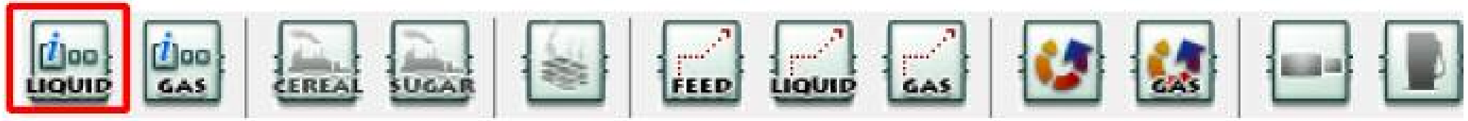
7.2 Fuel chain – Liquid



Basic data	
Module description	A brief description of the module. This field is optional.
Details and links to verification evidence	Any further details can be added here, including, for example links to any evidence which supports the actual data used within this module. This field is optional.
Internal batch number	A batch number for your own reference can be entered here. This field is optional.
Fuel type produced	The biofuel type of this batch / fuel chain. This field is compulsory. This field can only be changed if no modules follow the 'Fuel chain – Liquid' module.
Country	The country in which the feedstock was produced (NOT necessarily the country in which the biofuel was produced). This field is compulsory ('Unknown' can be selected if relevant). This field can only be changed if no modules follow the 'Fuel chain – Liquid' module.
Biofuel feedstock	The type of feedstock from which the biofuel was produced. This field is compulsory ('Unknown' can be selected if relevant). This field can only be changed if no modules follow the 'Fuel chain – Liquid' module.

UK GHG tool

7.2 Fuel chain – Liquid



Quantity of fuel	The quantity of biofuel in this batch (measured in litres) – this is the quantity of fuel the software enters into the monthly CSV report which can be uploaded to the RFA Operating System.
Quantity of fuel recorded in the RFA Operating System	If you make any adjustments to fuel quantities recorded on the RFA Operating System after uploading a monthly CSV report, the new quantities can be recorded in this field (measured in litres). Annual reports can only be prepared if fuel quantities are recorded in this field.
Fuel chain default value	This field shows the appropriate fuel chain default value, based on the data you supplied on fuel type, feedstock and country of origin.
Social and Environmental	
Land use on 01 Jan 2008	The land use, on 1st January 2008, for the land on which the biofuel feedstock was grown. Definitions of the land use are given in the Technical Guidance for RTFO year 3 Part 1 Annex H.
Standard	The sustainability standard to which the reported feedstock was produced – see Section 3.3 of the Technical Guidance for RTFO year 3 Part 1 for further details.
Social level	The 'Social level' achieved by the sustainability standard selected. This field will generally not need to be changed.

UK tool - Summary

Contents

- Tool build in LCA-software package
- Tool can produce supplier monthly and annual C&S reports
- Tool differs from BioGrace Excel sheets:
  - More than 250 biofuel production pathways included
  - DLUC calculations not included
- The software programming makes it flexible
  - Rather easy to modify pathways or build new ones

Status

- Tool on-line via www.renewablefuelsagency.gov.uk including a user manual
- All chains available (and more) but not all chains give same result (yet) as compared to RED defaults

Contents

Comparison of results

Check list Version 3.0 February 2011	Default greenhouse gas emissions						
	Table A RED Annex V/FQD Annex IV	BIOGRACE W3		BIOGRACE WP4 National GHG Calculators			
Biofuel production pathways	Default value	1/25/298	1/23/296	The Netherlands ANL	Germany IFEU	Spain CIEMAT	UK
Ethanol wheat lignite	70	69.9	69.8	69.9	67.9		70
Ethanol wheat (proces fuel not specified)	70	69.9	69.8	69.8	67.9		70
Ethanol wheat (natural gas - steam boiler)	55	54.9	54.6	54.6	52.8	55.61	55
Ethanol wheat (natural gas - CHP)	44	44.3	44.1	44.1	42.2		44
Ethanol wheat (straw)	26	26.1	26.0	26.0	24.0		26
Ethanol corn	43	43.6	43.4	43.4	42.6		43
Ethanol sugarbeet	40	40.3	40.1	40.1			40
Ethanol from sugarcane	24	24.3	24.0	24.0			24
Biodiesel rape seed	52	52.0	51.7	51.8		52.51	52
Biodiesel palm oil	68	68.7	66.0	66.0	68.9		68
Biodiesel palm oil (methane capture)	37	37.1	36.9	37.0	36.3		37
Biodiesel soy	58	57.2	56.9	57.0			58
Biodiesel sunflower	41	40.8	40.6	40.6			41
Biodiesel UCO	14	21.4	21.3	21.3			14
PVO rape seed	36	36.1	35.9	31.2			36
HVO rape seed	44	44.5	44.2	44.2		44.57	44
HVO palm oil	62	61.6	58.9	58.9			62
HVO palm oil (methane capture)	29	29.1	29.0	29.0			29
HVO sunflower	32	32.9	32.7	32.7			32
Biogas - dry manure	15	14.3	13.0	12.9			15
Biogas - wet manure	16	15.8	14.5	14.4			16
Biogas - MSW.	23	22.7	21.4	21.4			23
	1/25/298	1/25/298	1/23/296	1/23/296	1/25/298	1/23/296	

Contents

Conclusions

Several GHG calculators available

- Two exist since 2008, three (including BioGrace Excel sheets) are newly developed
- Project BioGrace will ensure that all calculators will give the same result
- Some allow to modify or build new pathways, others don't

National GHG calculators have different aims

- Some are more focussed on national data or national reporting, others are more international oriented
- Focus on different aspects
  - Agricultural stages (Spain)
  - Supply of data through the chain of custody (Germany)

Thank you for your attention

Intelligent Energy Europe