



IEA Bioenergy Task 38 conference  
**Greenhouse gas emissions from bioenergy systems: impacts of timing, issues of responsibility**

Brussels, Belgium, March 8th – 10th, 2010

Global Bioenergy Partnership:  
Version zero of the methodological framework for GHG LCA of bioenergy

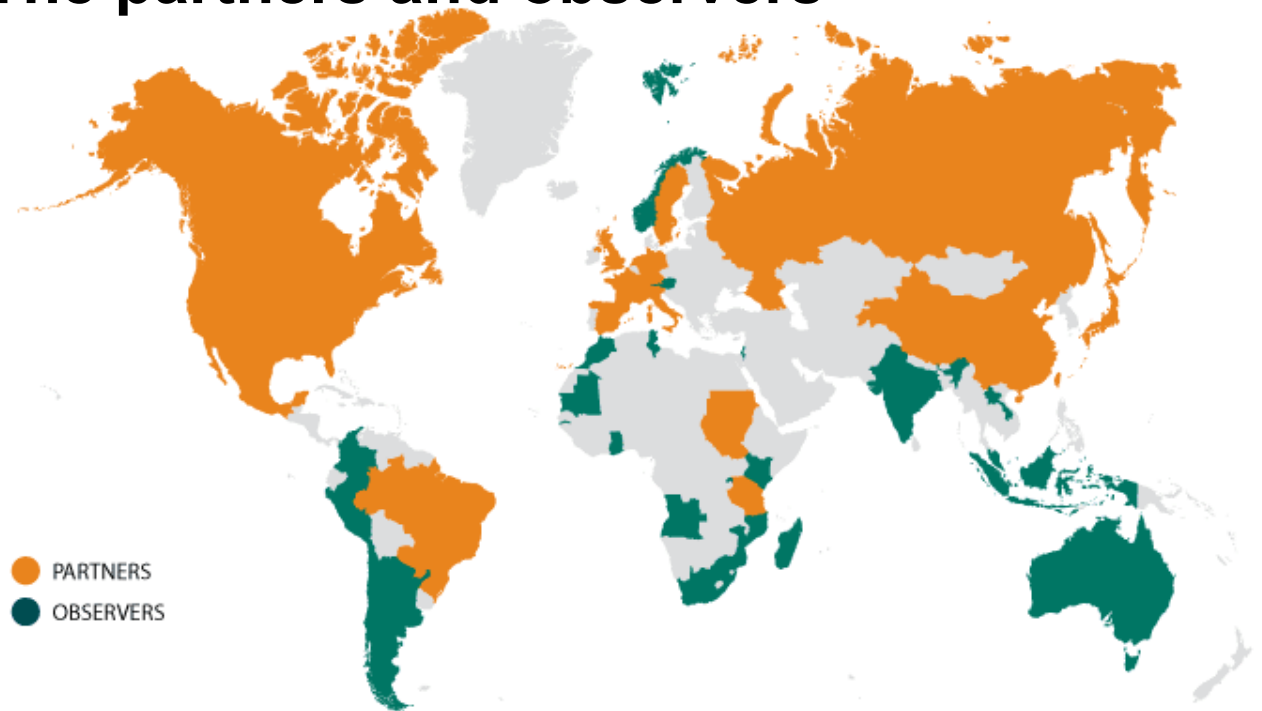
**Horst Fehrenbach IFEU Germany**

- **About GBEP**
- **The Taskforce GHG methodologies**
- **Version Zero of the framework**
- **Testing the framework**
- **Comparing exemplary calculations**
- **conclusions**

## The Global Bioenergy Partnership

- **Launched at the G8 Summit 2005 at Gleneagles to initiate an international discussion on the issues related to bioenergy**
- **Objective: support "*bioenergy deployment, particularly in developing countries*" and „*to work on biofuel best practices and take forward ... sustainable development of bioenergy*“.**
- **Members G8 + 5 (originally), meanwhile: 18 countries, 10 organizations + 20 observers.**

## The partners and observers



● PARTNERS  
● OBSERVERS



## Programme of Work:

**Oct/07: start of the  
Task Force on **GHG methodologies**  
(chair: USA, co-chair: UNF)**

**Jun/08: start of the  
Task Force on **Sustainability** (chair: UK)  
... is working to develop a set of relevant, practical, science-  
based, voluntary criteria and indicators as well as examples  
of best practice regarding the sustainability of bioenergy.**

## 5 key elements by GBEP Steering Committee :

1. Review existing methodologies;
2. Develop a harmonised approach so GHG lifecycle assessments can be compared on an equivalent basis;
3. Encompass the full well-to-wheel lifecycle of biofuels;
4. Not indicate a preference for any particular existing methodology or feedstock, or to limit parameters; and
5. Define parameters and inputs to be considered when conducting a LCA and develop a good practice document.

## Approach

- The taskforce decided to develop a flexible “checklist” framework that could be applied to the LCA of bioenergy production and use.
- Work was based on accepted methods for undertaking LCA and GHG inventories, such as the ISO 14040 standards and the IPCC good practice guidance for land use change and forestry.
- Over the course of 16 months and 5 taskforce meetings, the taskforce produced the LCA checklist that is being presented today.

# Version Zero of the framework

- *Released by June 2009*
- **Objective: provide a template for LCA that is transparent and that can be applied to a wide range of bioenergy systems.**  
**It does not set data standards and does not specify particular emissions models, but shall help to ensure using appropriate methods.**





## 10-step framework

1. GHGs covered
2. Source of biomass
3. Land use changes due to bioenergy production
4. Biomass feedstock production on farms and in forests
5. Transport of biomass
6. Processing into fuel
7. By-products and co-products
8. Transport of fuel
9. Fuel Use
10. Comparison with replaced fuel

**Some partner performed some initial testing in order to check the applicability to specific GHG calculation methods**

- . eg. to the “German method”  
- which is based on the EU rules.**
- . We compared some exemplary calculation using different methods and applied the logic of the GBEP framework for analyzing the differences.**

## Step 1: GHGs Covered

	German Sustainability Ordinance (adopted from EU RED)	IFEU meth. previously proposed for Regulation
CO <sub>2</sub>	Yes (1)	Yes (1)
CH <sub>4</sub>	Yes (23)	Yes differentiation made betw. fossil: (21) and non-fossil CH <sub>4</sub> (18.25) (values acc. to Kyoto-Prot.)
N <sub>2</sub> O	Yes (296)	Yes (310) (value acc. to Kyoto-Prot.)
HFCs	Considered to be negligible	
PFCs		
SF <sub>6</sub> others		

*Remark: meanwhile IPCC 2007 factors should be applied*

## Step 2: Source of biomass

	<b>German Sustainability Ordinance (adopted from EU RED)</b>
<p><b>Please explain definition of waste:</b></p> <p>Substance that the holder intended to discard</p> <p>Substance that had zero or negative economic value</p> <p>Substance for which the use was uncertain</p> <p>Substance that was not deliberately produced and not ready for use without further processing</p> <p>Substance that could have adversely affected the environment</p>	<p>No definition</p> <p>just a general that certain feedstock of less “value” like agricultural crop residues (straw, husks, nut shells and even bagasse and non refined glycerine) will enter/leave the system boundary with zero emission.</p>

## Step 3: Land use change

	<b>German Sustainability Ordinance (adopted from EU RED)</b>
<b>Direct</b> land use changes are taken into account	<b>Yes</b>
<b>Indirect</b> land use changes are taken into account	<b>Not yet!</b>  (in line with a European amendment the German regulation will adopt this)
A combination of both is included	Yes (bonus for production on previously degraded land will subtracted from dLUC value.

## Step 4: Biomass feedstock production

	<b>German Sustain. Ordinance (adopted from EU RED)</b>
<b>1. Sources of direct GHG emissions and removals are accounted for:</b>	YES
Emissions from operating farm/forestry machinery	YES
Emissions from energy used in irrigation	YES
Emissions from energy used in transport of feedstocks	NO (this is included in step 5)
Emissions from energy used to prepare feedstocks	YES
CO <sub>2</sub> emissions from lime/dolomite applications	YES
<b>N<sub>2</sub>O emissions resulting from the application of nitrogen fertilizers:</b>	<b>YES</b>
<b>_direct; __volatilization; __runoff/leaching</b>	<b>YES (model by JRC)</b>

## Step 7: By-products and co-products

	<b>German Sustain. Ordinance (adopted from EU RED)</b>
1. By/Co-products from the biomass are accounted for.	YES
2. By/Co-products from non-biomass feedstocks are accounted for.	YES
3. Explain definition of by/co-products	No specific definition
4. An allocation method is used (Y or N):	YES
Allocation by energy content	YES
Method to determine energy content:	Lower heating value (of dry matter or fresh substance ?)

## Step 10: Comparison with replaced fuel

	<b>German Sust. Ordinance (adopted from EU RED)</b>
..... 8. Emissions from extraction/production are accounted for (Y or N)	Yes
8a. Direct and embodied emissions in extraction/production accounted for:	
___ Fuel combustion from drilling	Yes (but unclear)
___ Fugitive methane emissions from equipment	Yes (but unclear)
___ Fuel combustion from turbines and compressors	Yes (but unclear)
___ Transportation emissions from helicopters and supply vessels	Yes (but unclear)
.....	



**We compared some exemplary calculation using different methods and used the GBEP framework for analyzing the differences.**

**Exemplary case: sugar cane ethanol (Brazil)**

**Models:**

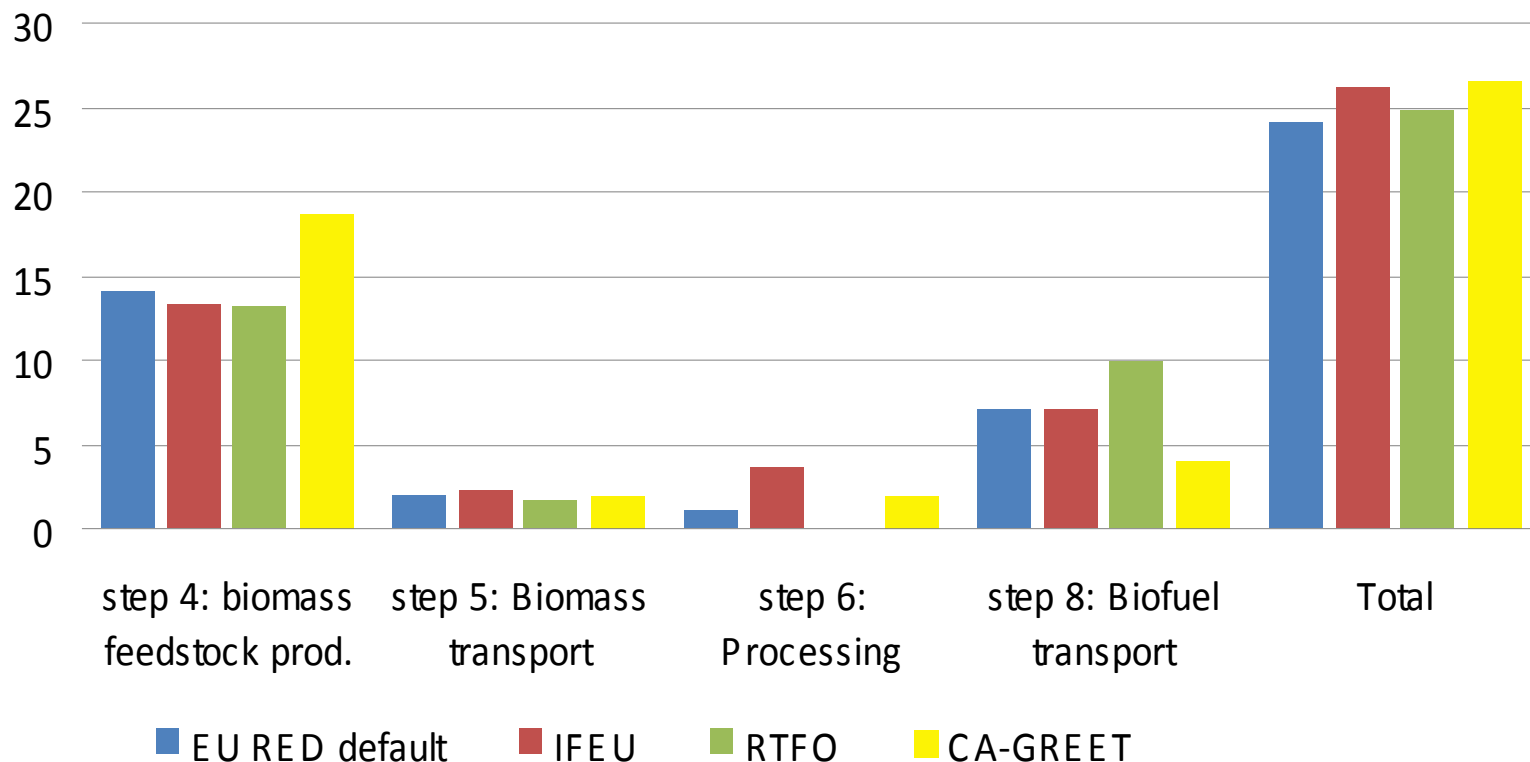
**RTFO (U.K. Calculator by DfT)**

**EU Default values**

**IFEU model**

**CA-GREET (California for LCFS)**

## Sugar Cane Calculation with EU defaults, RTFO, IFEU and CA-GREET models: Brazilian sugar cane ethanol (kgCO<sub>2</sub>e/GJ )



Compilation by A. Fuentes Gutiérrez and C. Garcia Bustamante

## So far

- **The GBEP methodological framework is a tool to get a detailed portrait and profound characterization of any GHG method for bioenergy.**
- **Completed templates may appear to provide an overflow of information. However such piles of information are extremely wanted when GHG balances are considered increasingly in decision making.**

## What is the added value?

- **GHG savings will gain an essential status for all kinds of energy at global level. But, there is a confusing diversity of approaches; most confusing for developing countries;**
- **GBEP offers the opportunity to discuss and communicate the methodological issues at intergovernmental level!**

***“Technical knowledge meets decision making significance!”***

# YOU STENING

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**THE GBEP COMMON METHODOLOGICAL  
FRAMEWORK FOR GHG LIFECYCLE  
ANALYSIS OF BIOENERGY**  
VERSION ZERO



[www.globalbioenergy.org/events1/gbep-events-2010/task-force-on-ghg-2010/en](http://www.globalbioenergy.org/events1/gbep-events-2010/task-force-on-ghg-2010/en)