

Roundtable on Sustainable Biofuels

An initiative of the EPFL Energy Center



Expert Advisory Group on GHGs

Paper 2 for discussion during the 1st meeting: Background Paper

The aim of this first Expert Advisory Group on GHGs (EAG) meeting is to agree on a working procedure to reach consensus on a methodology and approach to measuring GHG emissions linked to biofuels' production and processing.

Who is participating in this Expert Advisory Group?

Coordinator GHG WG:

Dr. Tourane Corbière, tourane.corbiere@epfl.ch

Experts :

Dr. Isaias De Carvalho Macedo, UNICAMP

Dr. Bruce Dale, Michigan State University

Dr. Alex Farrell, UC Berkeley

Dr. Edgard Gnansounou, EPFL

Dr. Hisashi Ishitani, Keio University

Dr. Guido Reinhardt, IFEU

Dr. Michael Wang, Argonne National Labs

Dr. Jeremy Woods, Imperial College London

Dr. Rainer Zah, EMPA

Goals of this Expert Advisory Group

This group of experts will tackle the most sensitive and controversial issues related to GHG emissions calculation and, ideally, achieve a consensus on a methodology and approach to measuring GHG emissions. The goal is to identify and spread current best practice in assessing the GHG emissions linked to biofuels production.

The suggestions from this group will then serve as the basis for the broader GHG Working Group meetings. The GHG Working Group will then make recommendations to the Steering Board regarding how to account for GHG emissions based the suggestions coming from the Expert Advisory Group on GHGs.

We hope to, within one year, agree on and a tool that makes it possible to answer the following question:

How much emission reduction does the use of biomass yield for a specific biofuel, calculated from its source up to its use, and compared with the average use of fossil fuel?

With this tool, supply chains can then prove compliance with the following draft RSB principle regarding GHG emissions:

Biofuels should result in lower GHG emissions compared to fossil fuels when analyzed via a lifecycle assessment (with system boundaries from “well to wheel”). This should include direct and indirect GHG emissions, for instance from fossil energy used in growing, transporting and processing biofuels. It should also include GHG emissions resulting from land use changes as land is converted to biofuel crop production, or as production for other markets is displaced.

The group will also recommend a procedure for maintaining and updating the tool after the first year of the project.

Questions: Is our goal to pick one pre-existing tool? To create a new tool? Or to accept several tools as reference values and make slight modifications/additions to each one to reflect our overall approach?

The goals of this first GHG Expert Advisory Group Meeting are to:

1. Agree on the key points/criteria for choosing the future RSB GHG approach
2. Come to an understanding about adequate methodological simplification
3. Set the basis for a methodology comparison
4. Collect EGG feedback about the draft principle tackling GHG issues (if time allowing)
5. Plan next meeting and agree on the agenda

Other meetings will be specifically dedicated to discuss the way co-product allocation and such indirect effects as land use issues should be tackled. These topics will not be discussed in depth during this first Expert Advisory Board meeting.

1. Key points/criteria for the future RSB GHG approach:

1. The approach will be based on life cycle approach from well to wheel.
2. The unit will be: gCO₂e/MJ gram of carbon dioxide equivalent per mega-joule of energy.
3. The approach will use a reference system: the greenhouse gas emissions along the biomass chain will be compared with a relevant standard fossil reference chain.
4. The approach will focus on those steps/inputs with the biggest impact on GHG emissions. Where emissions in one step represent a small part of overall emissions, or where they are similar amongst different feedstock and processing types, default values will be used.
5. The approach will focus on the impacts which vary from crop to crop or production method to production method – we want to create a tool that can compare different types of production to each other, and then that overall number to fossil fuel.
6. Default values will also be used when no data are available from particular links in the chain. The defaults value will be evaluated conservatively, and be as specific as necessary for various feedstocks, countries, processing technologies, etc. This will encourage process improvements. If an owner of biomass thinks he is performing better than the standard value, he will have to prove this with the aid of a predetermined methodology (and perhaps third-party verification). We hope to reduce the need for verification and monitoring, yet still incent producers to improve GHG performance.

7. Direct certification tool based on RSB GHG approach versus indirect incentives:

Impacts are divided into two categories:

- DIRECT impacts: things that farm/plant/shipping company can affect, or uses directly, like amount of fertilizer, energy used in processing, directly demonstrable alterations in land use (for example a forest cut down to plant energy crops)etc.
- INDIRECT effects that they cannot control like displaced deforestation or land use change. These indirect changes in land use have to be described qualitatively and fall under another category.

This differentiation makes it possible to clarify what the RSB GHG approach and the linked product certification does (monitor direct effects), and what it doesn't do (like indirect effects). Thus, for indirect effects, other types of solutions (or ways to measure) can be thought of.

Do you agree on these points? Are there other key points that should be clarified/fixed from the beginning?

2. Adequate methodological simplification:

The following sources of emissions are typically excluded from biofuels well-to-wheel studies:

- GHG emissions associated with the manufacture or maintenance of machinery or equipment used in the production of feedstock, in their conversion to biofuels or in their transport.
- The considered GHG gases will be CO₂, CH₄ and N₂O. It seems reasonable to exclude PFC, HFC and SF₆ because they do not contribute significantly (just air conditioning in vehicles).
- Emissions associated with the production of chemicals used in conversion plants that would contribute to less than 1 percent of total fuel chain emissions.

Are there other simplifications that can be brought?

3. Basis for a methodology comparison:

Key questions for setting the comparison basis: Is our goal to pick one pre-existing tool? To create a new tool? Or to accept several tools as reference values and make slight modifications/additions to each one to reflect our overall approach?

Which are the best criteria for comparison?

- For which industries/products was this tool designed?
- What kind of software is used?
- Is it free?
- Is it transparent/ well documented?
- What are the system limits?
- What are the main assumptions?
- Are they based on default data? If yes, what is the source of these data?

Further comments?

Which LCA tools/methodologies exist?

- EIOLCA.net
- E4tech
- GHG Genius (Concawe)
- EcoInvent
- PEAMS (good representation of marine applications)
- LEM (lifecycle emission model from Univ. Cal)

Others?

Sample comparison table:

Criteria for comparison	EIOLCA	E4tech	etc . . .
For which industries/products was this tool designed?			
What kind of software is used?			
etc . . .			

Has anyone already carried out this kind of comparison? What do you think about a collective comparative table to be filled on a bioenergywiki page ? Should this page only be open to EGG?

4. Summary of feedback about the draft principle tackling GHG issues:

Below are the edits to the original principle regarding GHG emissions of biofuels proposed by the Steering Board. The editing was free of access to any of the Steering Board and Working Group members, although thus far no one in these groups has formally edited this principle. It is important to keep in mind that the bioenergy wiki serves as a forum of discussion, but due to its freely open access, the elements posted on it should be seen as raw opinions still to be discussed. We will discuss this feedback in the GHG WG meeting on June 27th. EGG members can give other feedback during our July 25th meeting, in writing to Tourane, or directly on the Bioenergy Wiki.

Original Draft Principle

Biofuels should result in lower GHG emissions compared to fossil fuels when analyzed via a lifecycle assessment (with system boundaries from “well to wheel”). This should include direct and indirect GHG emissions, for instance from fossil energy used in growing, transporting and processing biofuels. It should also include GHG emissions resulting from land use changes as land is converted to biofuel crop production, or as production for other markets is displaced.

Draft Principle after Consultation (recommended changes in italics)

Biofuels should result in lower GHG emissions compared to fossil fuels when analyzed *on the long term* via a lifecycle assessment (with system boundaries from “well to wheel”). This should include direct and indirect GHG emissions, for instance from fossil energy used in growing, transporting and processing biofuels. It should also include GHG emissions resulting from land use changes as land is converted to biofuel crop production, or as production for other markets is displaced. *It should take a futures attitude of approaching zero emissions by using planned "Carbon Dioxide Sink Creation" as corporate and national social responsibility.*

5. Next meeting and agenda:

Next meeting will be held in September.

What about Wednesday 19th or Thursday 20th September? At what time? Do we try to have a better time for Dr. Ishitani this time?
 Are any changes needed in the timeline?

	2007								2008		
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March
Constitution of Expert Advisory Group											
Expert Advisory Group meetings/conf calls											
Choice of the methodology for GHG assessment:											
<i>1) Identify the main points in the life cycle that contribute the most to GHG emissions</i>											
<i>2) Inventory and comparisons of the existing LCA tools/ methodologies</i>											
<i>3) Address GHG emissions from land use changes</i>											
<i>4) Other specific topics as needed</i>											
Draft overall recommendation GHG elements of draft standard											
Devise recommendations for governance structure to continually update GHG tool (Phase Two)											