

## **Conclusions of the GBEP Task Force Meeting on GHG Methodologies**

Washington D. C., 9-10 October 2007

On October 9<sup>th</sup> and 10<sup>th</sup> the United States hosted the first meeting of the GBEP Task Force on GHG methodologies. The meeting was attended by: Canada, France, Germany, Italy, Japan, the UK, the U.S., UNEP, the UN Foundation, the International Council on Clean Transportation, University of California Berkeley, Iowa State University, and the GBEP Secretariat.

The Task Force hoped to identify commonalities in how different countries and institutions are measuring the greenhouse gas (GHG) impacts of biofuels. Canada, France, Germany, the UK, the US, Iowa State University, and the University of California Berkeley all presented on their efforts in this area and there was a large amount of overlap and commonality in what is being included in the various methodologies. There was also significant agreement that some issues such as how and if to include indirect land-use need further clarification.

Based on these presentations, the taskforce felt it was possible to develop a checklist for what different countries should be looking at as they seek to develop a GHG methodology. The task Force took initial steps in developing what that checklist would encompass, and what questions still need further clarification. The checklist and list of further questions follows below.

### **Checklist: elements to be included in developing a GHG methodology for biofuels**

- 1. Greenhouse gases to be covered** (Note: while a comprehensive methodology would cover all six gases, a methodology covering only carbon dioxide, methane, nitrous oxide could be sufficient).
  - a. Carbon dioxide (CO<sub>2</sub>)
  - b. Methane (CH<sub>4</sub>)
  - c. Nitrous oxide (N<sub>2</sub>O)
  - d. Hydrofluorocarbons (HFCs)
  - e. Perfluorocarbons (PFCs)
  - f. Sulphur hexafluoride (SF<sub>6</sub>)

**2. Direct effects of land use change- land directly converted to grow biofuel feedstocks** (note: some changes instantaneous, some gradual)

**a. Changes in inventory of above-ground biomass**

Use IPCC methodologies which include:

- i. Net carbon emission.
  1. Deforestation (e.g. slash and burn)
  2. Deforestation by timbering
  3. Maintenance burning
- ii. Neutral (more or less) to carbon emission
  1. Forest replaced by oil seed trees
  2. Deforestation w/energy recovery
- iii. Net Carbon Sequestration
  1. Perennial energy crops on degraded lands (e.g. Jatropha)
- iv. Other factors – annual crops or perennial crops

**b. Changes in inventory of soil carbon**

- i. Net carbon emission from soil degradation (native lands going under the plow)
- ii. Net carbon accumulation from change in cropping system (i.e. to no till)
- iii. Net carbon accumulation from change from annual to perennial

**3. Effects of production cycle ( GHG equivalents)**

**a. On-farm/forest elements (to farm/forest gate)**

- i. IPCC
- ii. Energy use of farm machinery use
- iii. Energy content for delivery of irrigation water
- iv. Energy content of fertilizers
- v. Lime: CO<sub>2</sub> emissions from lime stone (CaCO<sub>3</sub>) to lime (CaO) in fields for stabilizing soil acidity
- vi. Energy use of pesticides
- vii. Nitrous oxide production on farm
- viii. Nitrous oxide production off farm (downstream)
- ix. (reduction of energy costs used for co-products)
- x. Seeds
- xi. Maintenance burning

**b. Processing energy (farm/forest gate to tank)**

- i. Transportation to processing plant
- ii. Energy content of production supplies
- iii. Energy use in processing cycle
- iv. Energy expended in plant construction
- v. Average transportation to retailer

#### **4. Wells to Wheels**

- a. Miles per energy unit
- b. Tailpipe emissions

#### **5. Comparison to petroleum fuel replaced**

- a. crude oil extraction, type of crude could impact emissions, e.g., tar sands, heavy vs. light crude, etc... Treatment of associated natural gas also important, flaring vs. capture
- b. crude transport
- c. refining, energy use and allocation between co-products
- d. fuel transport and distribution
- e. tailpipe emissions

## **KEY ISSUES STILL NEEDING RESOLUTION**

The Taskforce recognized that there were still some significant issues needing further clarification before a common methodology checklist could be developed. One issue is developing common definitions of terms (e.g. direct land-use is land directly converted to grow biofuel feedstocks). The other important issues can be grouped into three categories:

### **1. Methodology Issues**

- Energy balance calculations (e.g. are co-products included?)
- If not, how to allocate emissions from co-product (e.g. displacement)?
- Transparency about default values/parameters and model?

### **2. Externalities**

- Should criteria pollutants like particulate matter be included?
- Should indirect land-use (shifting of land use patterns due to crops being diverted to biofuel production) be included? If so, how and to what extent?
  - Stimulation of land use changes and biofuel production elsewhere
  - Consumption (how much fossil fuel is being displaced)
- How is N<sub>2</sub>O Fixing accounted for?

### **3. Future Considerations**

- How are future technologies (e.g. cellulosic) accounted for?