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## **LCFS Expert Workgroup –Sub EWG on Carbon Emission Factors Work Plans**

*April 1, 2010*

This draft work plan includes the following items:

- 1. Membership**
- 2. Goals and objectives**
- 3. Prioritized list of topics/questions that this subgroup intends to address**
- 4. Invited technical advisors and other additional support needed**
- 5. Timeline for addressing topics**
- 6. Identify responsibilities for subgroup members**

### **1. Membership**

Co-chairs: Sonia Yeh (University of California, Davis) and Richard Nelson (Kansas State University)

Other EWG members: Michael O'Hare (University of California, Berkeley), Don O'Connor (representing CDFA, S&T Consulting), Holly Gibbs (Stanford University), Steffen Mueller (University of Illinois at Chicago), Uwe Fritsche (Oeko-Institut, Germany)

ARB staff representative: Kevin Cleary

### **2. Goals and objectives**

This goal of this subEWG is to survey the existing databases of emission factors, methodology and assumptions, and come up with a set of recommendations that will help to improve the current emission factors used in the CARB ILUC analysis.

The proposed work plan would have the following principles:

1. The issue is relevant and critical for the analysis
2. The assumptions can be validated
3. The issue can be addressed within reasonable amount of timeframe (short-term vs. long-term)

### **3. Prioritized list of topics/questions that this subEWG proposes to address**

Below is a list of key topics/questions identified by this subEWG

- 3A.** Identify and compare the existing datasets on carbon stock and fluxes, methodologies and assumptions used in ILUC analysis, and identify key gaps. The comparison should include, but not limited to,
  - Land types and associated covers (collaborative with sub-group #3 on land cover types)

- Identify potential circular references between data sets
- Data (and the spatial resolution) on C stock (biomass C and soil C), fluxes (sources and sinks)<sup>1</sup> in the reference scenario
- Methodology and assumptions used to calculate emission factors. These include the assumption about
  - the rate and duration (and the spatial resolution) of biomass and soil C loss after conversion,
  - The rate and duration (and the spatial resolution) of C uptake (+/-) after land use conversion in the corresponding converted land use type(s)<sup>2</sup>

**3B.** Identify additional datasets on carbon stock and fluxes and the methodology and assumptions that can be used to improve ILUC analysis

- Focus on improving spatial and temporal (mature vs. growing vegetation) resolution of the data and methodology/assumptions of calculating emission factors
- Quantify N<sub>2</sub>O emission factors that can be incorporated into the analysis
- Identify important GHG emission sources and sinks that are ignored in previous analysis. e.g.
  - *additional* fertilizers that will be required to improve yield
  - other inputs changes (e.g energy inputs +/-) associated with yield and/or management changes
  - higher grazing rates/yields on abandoned cropland,
  - credits for crops that sequester N<sub>2</sub>O,
  - GHG emissions from land that stayed in the same use category but changed management practices.
- Identify important GHG emission sources and sinks that will be modified by scenarios. e.g.
  - *additional* fertilizers that will be required to improve yield
  - other inputs changes (e.g energy inputs +/-) associated with yield and/or management changes
  - GHG emissions from land that stayed in the same use category but changed management practices,
  - GHG emissions changes (+/-) due to crop switching, less intensive field management, less intensive energy use, etc.

**4. Invited technical advisors and other additional support needed**

*All of the names listed below are experts identified by the members of the subEWG. They have not been formally contacted to provide their inputs to the subEWG.*

- Experts who are knowledgeable about current analyses and datasets
  - Nancy Harris, Sean Grimland and Sandra Brown/Winrock
  - Experts from Woods Hole
  - Sassan Saatchi (NASA JPL) - tropical to global biomass maps using satellite data

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<sup>1</sup> This is used to characterize foregone sequestration

<sup>2</sup> For example, in the case of converted cropland, what's the assumed periods of abandonment, cultivation, regrowth/reclamation, and the next transitional land use cover type and the corresponding C+/- (as a function of space and time).

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- Experts from MIT
- Johan Six and Emma Suddick – comparative study of current emission factors in the EPA/CARB analysis; N2O emissions (UCD)
- Experts involved in the European studies
- Experts who are willing to provide inputs and perhaps contribute to the writing
  - UCD/ Life Cycle Associates, LLC from CEC FFCA Deliverable
- Experts who are willing and review our recommendations
  - Brent Sohngen/OSU
  - Richard Houghton (WHRC)
  - Dr. Charles Rice, Kansas State University
  - Dr. Tristram O. West, ORNL

5. **Timeline for addressing topics:** In order to plan dates and agendas for future EWG meetings, a timeline for resolving subgroup issues and preparing materials for full EWG consideration is needed. We are planning for the expert workgroup to meet monthly through November 2010.

6. **Identify responsibilities for subgroup members:** Please see the proposed timeline and proposed responsibilities for subEWG members and invited experts in the table below.

| Proposed work plan   | Timeline        | SubEWG members/Experts  |
|--|-----------------|---|
| 3A. Identify and compare the existing datasets on carbon stock and fluxes, methodologies and assumptions used in ILUC analysis, and identify key gaps. | April - June    | Members:<br>Holly Gibbs, Sonia Yeh<br><br>Experts:<br>- Nancy Harris, Sean Grimland and Sandra Brown/Winrock<br>- Experts from Woods Hole<br>- UCD/ Life Cycle Associates, LLC from CEC FFCA Deliverable  |
| 3B.  |                 |   |
| Improve spatial resolution of the data and methodology/assumptions of calculating emission factors   | May - September | Members:<br>Holly Gibbs, Sonia Yeh, Don O'Connor<br><br>Experts:<br>- Sassan Saatchi (NASA JPL) - tropical to global biomass maps using satellite data<br>- MIT(?)<br>- Experts from MIT<br>- Experts involved in the European studies<br>- UCD/ Life Cycle Associates, LLC from CEC FFCA Deliverable |
| Quantify NO2 emission factors that can be incorporated into the  | May - September | Members:<br>Steffen Mueller   |

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|   |                 |  |
|---|-----------------|--|
| analysis  |                 | <p>Experts:</p> <ul style="list-style-type: none"> <li>- Johan Six and Emma Suddick (UCD)</li> </ul>   |
| Identify important GHG emission sources that are ignored in previous analysis | May - September | <p>Members:<br/>Richard Nelson, Don O'Connor</p> <p>Experts:</p> <ul style="list-style-type: none"> <li>- Sassan Saatchi (NASA JPL) - tropical to global biomass maps using satellite data</li> <li>- MIT(?)</li> <li>- Experts from MIT</li> <li>- Experts involved in the European studies UCD/ Life Cycle Associates, LLC from CEC</li> </ul> <p>FFCA Deliverable</p> |
| Identify important GHG emission sources that will be modified by scenarios    | May - September | <p>Members:<br/>Richard Nelson, Don O'Connor</p> <p>Experts:</p> <ul style="list-style-type: none"> <li>- Representatives from other subEWGs especially the subEWG on Yield Elasticity, Land Cover Type, Other Energy, and Time Discounting</li> <li>-</li> </ul>  |
| Recommendations by the subEWG   | Oct-Nov         | <p>Members: all</p> <p>Reviewers:</p> <ul style="list-style-type: none"> <li>- Brent Sohngen/OSU</li> <li>- Richard Houghton (WHRC)</li> <li>- Dr. Charles Rice, Kansas State University</li> <li>- Dr. Tristram O. West, ORNL</li> </ul>  |