EU-US TASK FORCE ON BIOTECHNOLOGY RESEARCH

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http://ec.europa.eu/research/biotechnology/eu-us-task-force/index_en.cfm?pg=links
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PREFACE

Since 1990, the EU-US Task Force on Biotechnology Research has been coordinating transatlantic efforts to guide and exploit the ongoing revolution in biotechnology and the life sciences. The Task Force was established in June 1990 by the European Commission and the White House Office of Science and Technology Policy. This mandate has been renewed five times.

The Task Force has acted as an effective forum for discussion, for coordination and for developing new ideas for the last 21 years.

Through sponsoring workshops, and other activities, the Task Force brings together scientific leaders and early career researchers from both sides of the Atlantic to forecast research challenges and opportunities and to promote better links between researchers. Over the years, by keeping a focus on the future of science, the Task Force has played a key role in establishing a diverse range of emerging scientific fields, including biodiversity research, neuroinformatics, genomics, nanobiotechnology, neonatal immunology, and molecular biology.

The taskforce is composed by 6 Working Groups. In 2008, the working group on biobased materials was expanded to include bioenergy. At present, the working group on ‘Biobased materials and bioenergy’ is seen as a ‘think tank’ aiming at identifying research needs and selecting priority research areas of common interest to the EU and US. The WG concentrates on precompetitive science, and the socio-economic and environmental aspects. The WG was also invited to address “blue-sky” biotechnology research related to bioenergy and biobased products research.

At the 20th Meeting of the Task Force, held June 3-4, 2010 in Barcelona, Spain, the Task Force agreed that a series of workshops on bio-based products and bioenergy would be organized beginning in 2011. This is the report of the first workshop on the Sustainability of Biomass Production for Bioenergy held October 25-26, 2011 in Champaign-Urbana, Illinois.
The coordinators of the activity were Dr. David Thomassen (US DOE), Dr. Kay Simmons (US USDA), Dr. Maria Fernandez Gutiérrez (EU) and Dr. Piero Venturi (EU). The scientific co-chairs were Dr. Steve Long (University of Illinois, US) and Dr. Guido Reinhardt (IFEU, Germany)

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Executive Summary

The expectation that millions of hectares of first and second generation and more sustainable annual and perennial crops such as triticale, sorghum, woody crops and perennial grasses would feed emerging renewable power and biofuel projects, has not yet come to pass. Indeed, forward industry plans continue to shrink, despite government mandates. Economic and Environmental Life Cycle Assessments (LCAs) have had a major influence on policies toward the emerging bioenergy industry in both the US and EU. Policy changes reflecting indirect land use change (ILUC) may, perhaps, have important influence but ILUC is far from the only uncertainty. Conflicting LCA outcomes have contributed to an uncertain policy environment. This is likely one factor in the downturn in bioenergy investment in our countries at a time when large investments are being made elsewhere. Next to this, other factors such as social welfare, biodiversity (especially in emerging countries), and controversial discussions concerning different certifications systems for sustainable biomass have further complicated the scene.

The objective of this workshop was to look forward to how we may produce better LCAs and a framework of interaction that does not result in premature policy, while protecting the environment and assisting our economies and living quality. A second objective was how to intensify the co-operation between the EU and the US in this field.


The report made a number of Key Findings, including:

- Absent major technological innovation or policy changes, the RFS2-mandated consumption of 16 billion gallons of ethanol-equivalent cellulosic biofuels is unlikely to be met in 2022.
- Only in an economic environment characterized by high oil prices, technological breakthroughs, and a high implicit or actual carbon price would biofuels be cost-competitive with petroleum-based fuels.
- RFS2 (Renewable Fuel Standard) may be an ineffective policy for reducing global Greenhouse Gas (GHG) emissions because the effect of biofuels on GHG emissions depends on how the biofuels are produced and what land-use or land-cover changes occur in the process.
- Absent major increases in agricultural yields and improvement in the efficiency of converting biomass to fuels, additional cropland will be required for cellulosic
feedstock production; thus, implementation of RFS2 is expected to create competition among different land uses, raise cropland prices, and increase the cost of food and feed production.

- Food-based biofuel is one of many factors that contributed to upward price pressure on agricultural commodities, food, and livestock feed since 2007; other factors affecting those prices included growing population overseas, crop failures in other countries, high oil prices, decline in the value of the U.S. dollar, and speculative activity in the marketplace.

- The environmental effects of increasing biofuels production largely depend on feedstock type, site-specific factors (such as soil and climate), management practices used in feedstock production, land condition prior to feedstock production, and conversion yield. Some effects are local and others are regional or global. A systems approach that considers various environmental effects simultaneously and across spatial and temporal scales is necessary to provide an assessment of the overall environmental outcome of increasing biofuels production.

- Key barriers to achieving RFS2 are the high cost of producing cellulosic biofuels compared to petroleum-based fuels and uncertainties in future biofuel markets.

Although the EU-US Workshop did not specifically address any of the Key Findings listed above or discuss the National Academies report, it did discuss key uncertainties and challenges associated with the use and development of LCAs, many of which also impacted the conclusions of the National Academies report.

The Workshop addressed six key questions.

**QUESTION 1:**

*How do we achieve better and more consistent reporting of the uncertainty in different stages of the scenarios considered by environmental and economic LCAs?*

Achieving clear communication of quantified uncertainty in data as well in methodological approaches in LCAs is necessary, to avoid premature policy development on the one hand or on the other timely policy development where there is a high degree of certainty. The discussion might consider if the Intergovernmental Panel on Climate Change (IPCC) model of communicating the level of certainty might be considered for adoption here.

**QUESTION 2:**

*Are LCAs too far ahead of the data? What are the examples and how do we achieve better alignment?*

LCA predictions of the environmental impacts (especially greenhouse gas accounting and nitrogen use) and the economics of bioenergy feedstocks, appear well ahead of the actual data.
QUESTION 3:

What are the obstacles and/or uncertainties to overcome in achieving improved scientific LCAs?

− What are the appropriate comparators? For example, for biofuels “well to wheels” should the comparison be with today’s oil or with the more difficult sources such as tar sands that will be an increasing part of the future liquid fuel mix?
− Incremental improvements in technology from crop to fuel, and disruptive inventions, will change the LCA. How do we account for this in reporting outcomes of LCA’s?
− What are the perspectives to integrate ILUC into the LCA and/or certification systems?
− Is there a need to have a harmonization in co-product handling and how to proceed with this?

QUESTION 4:

How do we combine the existing methodology of environmental LCAs with new developments on economic and social LCAs towards a uniform approach to measure the sustainability of bioenergy production and use?

Whereas environmental LCAs have been discussed and applied for more a decade (despite still having some open questions), economic and social LCAs are much newer having been used for just a few years. Therefore, it is obvious that a harmonization between these methodologies is needed as well as a common understanding of how to merge the single results into overall conclusions.

QUESTION 5:

What are the main differences between the scientific LCA models and the politically driven certification systems and how might a more harmonized and coequal coexistence be achieved?

Quite a number of certification systems for sustainable biofuel production have been introduced recently especially in Europe targeting biomass and its biofuels production worldwide if used in Europe. Still, they are not fully in compliance with scientific sound LCA methodologies. The discussion might consider the ILCD and RED activities of the EC, the worldwide activities of GBEP and ISO, the US activities such as RFS2 and GREET and others.

QUESTION 6:

How do the challenges to reaching the above position differ between the EU and US?

More than 20 years of experience in biofuel assessments and policies exist in the EU and the US. Also, some collaboration and co-operation in science and policy on this topic has taken place and is still running. But there seems to be a big potential to
increase these, especially as it became obvious in the last few years, that biomass for bioenergy is not a country-specific issue what it was mainly in the 1990s for the US and some European countries, but today affects also foreign countries worldwide.

Key Conclusions and Opportunities for Future Research

1. It is critical to report the known uncertainty and assumptions made in the development of LCAs especially when there is a lack of validated data.
2. The transparency of LCAs can be improved by requiring that analyses use publicly available raw datasets.
3. Standards should be established for reporting the degree of uncertainty of data and the assumptions made for LCAs.
4. Guidelines for the interpretation and use of LCAs in decision-making (especially policy) would be useful.
5. It is important to make clear distinctions between real data, validated model data, un-validated model data, and estimates.
6. We need to make more investments in measurements of some LCA parameters.
7. There is value in developing environmental, economic and social LCAs. Although harmonization between these different LCAs would be useful, tools for doing this harmonization are needed but do not currently exist.
8. There is some overlap between certification systems and LCA. Certification systems can be made more robust if they are better harmonized with LCAs since LCA can be used to generate information for setting up some certification criteria.
9. The US and EU should continue to collaborate and cooperate in the science and policies associated with the development and improvement of LCA.
US-EU Workshop on the Sustainability of Biomass Production for Bioenergy

University of Illinois
Champaign-Urbana, Illinois, USA
October 25-26, 2011

AGENDA

Day 1. Tuesday, October 25, 2011

7:30 - 8:30  Breakfast

8:30  Welcome & introductions
Setting the scene of the workshop

David Thomassen / Piero Venturi
Steve Long / Guido Reinhardt

SESSION 1

9:30  Environment
Economy
Social

Maria Fernandez, Session Chair
Carl Bernacchi
David Zilberman
Bruce McCarl

Breakout group discussion - Question 1
How do we achieve better and more consistent reporting of the uncertainty in different stages of the scenarios considered by environmental and economic LCAs?

Gail Taylor, Session Chair
Larry Smart, Rapporteur

Breakout group discussion - Question 2
Are LCAs too far ahead of the data? What are examples and how do we achieve better alignment?

Richard Murphy, Session Chair
Heather Youngs, Rapporteur

Reporting / discussion
Rapporteurs (above) / ALL
Break

13:15 Lunch

14:30 Session 2
- Environment
  - Bill Parton
- Economy
  - Laurence Eaton
- Social
  - Andrea Ciroth

Break

Breakout group discussion - Question 3
What are the obstacles and/or uncertainties to overcome in achieving improved scientific LCAs?

Breakout group discussion - Question 4
How do we combine the existing methodology of environmental LCAs with the new developments on economic and social LCAs towards a uniform approach to measure the sustainability of bioenergy production and use?

Reporting / discussion
- Rapporteurs (above) / ALL

18:15 Finish Day 1

19:00 Dinner
Day 1. Wednesday, October 26, 2011

7:00 - 8:00  Breakfast

SESSION 3
8:00  Data banks
      Tools
      Certification systems

BREATK

Breakout group discussion - Question 5
What are the main difference between the scientific LCA models and the politically driven certification systems and how might a more harmonized and coequal coexistence be achieved?

Breakout group discussion - Question 6
How do the challenges to reaching the above position differ between the EU and US?

Reporting / discussion
Rapporteurs (above) / ALL

BREAK

Conclusions / closure
David Thomassen
Piero Venturi
Guido Reinhardt
Steve Long

11:45  Finish Day 2

11:45-15:30  Lunch / Bioenergy Farm Tour
• It is important to consider and acknowledge the boundaries that are part of any LCA. LCAs, necessarily, are aggregate conclusions that need to include reports of the boundaries that are part of the assessment. Examples include indirect land use change, environmental benefits/costs, and market responses, all with major impact on the analysis. When the scope of an LCA widens and the analysis includes an aggregation of assumptions, as is often the case, there is a multiplicative increase in uncertainty.

• There is generally a lack of data needed to develop robust, science-based, meaningful LCAs. Biological variation and heterogeneity can be described and predicted when we have sufficient data; however, there is significant unpredictability and uncertainty in the many areas where we lack data, e.g., crop yields across spatial/soil/climate heterogeneity and quantification of greenhouse gas exchange and biogeochemistry. It is critical to report the known uncertainty and assumptions made especially when there is a lack of validated data.

• Process technology also needs to be reported as part of an LCA. Process choices have a big impact on LCAs. The impacts of different process choices are often known and these should be described and reported. In some cases, the processes are proprietary and are not transparent for inclusion as part of an LCA.

How can the reporting of uncertainty be improved?

• Improvements in peer review and editorial management of publications that report LCAs can help drive better reporting of uncertainty. This is especially important when high profile publications seek to include novel or controversial reports.
• Reporting of uncertainty can be improved with the development, use and conformation to established standards, including ISO standards. Experts should develop minimum core standards that are used for all analyses.

• The transparency of LCAs can be improved by requiring that analyses use publicly available raw datasets.

• Standards should be established for reporting the degree of uncertainty of data and the assumptions made. These could incorporate statistical analysis of mean values versus highs, lows, and outliers. However, care needs to be taken that these “improvements” are not stifling to innovation.

Question 2: Are LCAs too far ahead of the data? What are the examples and how do we achieve better alignment?
Richard Murphy (Session Chair), Heather Youngs (Rapporteur)

Are LCAs too far ahead of the data?
In many ways, yes.

1. Data and data quality issues
   - There is a lack of curated publicly available data that is used for the development of LCA. Current incarnations are slow to get through review and thus end up being outdated by the time that they are available. Unfortunately, innovation tends not to be included.
   - There is a lack of data available from developing countries, data that has very important implications for thorough LCAs and the future of biofuels.
   - Biology is challenging and can be uncertain. Thus, biological data is inherently uncertain, although we have reasonable 'certainty' around many technological issues.
   - Some data is far worse than other, e.g., data for some crops like jatropha, is extremely poor.
2. It is important to make a distinction between uncertainty (lack of knowledge) and variability.
   - Biological systems have inherent heterogeneity and variation.
   - Natural environments are spatially and temporally heterogeneous.
   - Some components of LCAs, e.g., climate, appear much more random.

3. Incorporate spatial and temporal variability into LCAs when the variation is known and understood, e.g., N₂O, soil carbon, water use.

4. It is important to make clear distinctions between real data, validated model data, unvalidated model data, and estimates.

How do we achieve better alignment of LCAs with existing data for our diverse needs?

5. The purpose(s) of LCAs need to be clearly stated.
   - For example, assessments of current / past technology versus future or prospective analysis (scenario analysis). The degree of resolution needed should be specified.
   - The overall transparency of data and assumptions for predictions and forecasting used in LCA studies is a critical issue. Many private consulting firms keep the data private.
   - Peer-review may not be sufficient. ISO standards should be followed.
   - Validation remains a missing component.
   - As LCAs are developed, there is a need to engage stakeholders and for better standard methods to incorporate innovation into the LCAs.
   - Guidelines for the interpretation and use of LCAs in decision-making (especially policy) would be useful.
   - While the development of policy coherence is important, policy needs to be based on the natural divergence of scientific opinions. Unfortunately, the opposite is happening.
What are the appropriate comparators in developing LCAs?

- The comparator will depend on the type and context of the LCA, e.g., is the LCA being conducted to improve a process or to prepare for the future? It is important to focus on the goal and scope definition stages of LCA development. The policy drivers and objectives of LCAs need to be clearly defined. For example, gasoline mix is a range, so there can be several scenarios just for this comparator.
- Baselines used to develop LCAs need to be updated. It is important to document the baseline including, for example, current agricultural practices.
- An LCA is a function that evolves with time. Thus, results of LCAs have to be adapted and revisited to reflect changes. This is an issue when using LCAs in legislation, i.e., the challenge of fixed legislation based on a constantly adapting LCA.

Incremental improvements in technology will change an LCA. How do we account for technology improvements and the resulting impacts on LCAs when reporting outcomes of LCAs?

- Disruptive inventions are going to change baselines. As noted above, LCAs are dynamic not static. Thus, data used to develop LCAs must be updated. As a result, it is important to make and report the assumptions used on the rate of adoption of new technologies into LCAs.
- This is even more difficult for second generation biofuel technologies. There is a lack of technological data and doubts about actual results about reliability and greenhouse gas balances. LCA results are worse now than they were even ten years ago since we have so much more data that needs to be considered and included.
- We can make assumptions about some uncertain technology parameters (for example efficiency) for use in LCAs.
• We need to make more investments in measurements of some LCA parameters.
• There are ongoing constraints and difficulties in detailed data sharing. This continues to be a barrier for LCAs. It is important to enhance the way we can exchange information among different groups.
• Second generation biofuels example
  ➢ Several years ago the LCAs were much more optimistic than today. Now we know more about processes and have new information about technical details so are less optimistic.
  ➢ Technologic improvements can happen in several stages of the fuel cycle, e.g., agriculture, transformation.
  ➢ How can we project how the technology is going to improve? We need to look at other technologies and at other similar cases.
  ➢ First generation biofuels improve with time as technology evolves.
  ➢ EU Renewable Energy Directive (RED) is a driver for improvement. It was issued in 2009 and it sets a minimum threshold of 35% greenhouse gas emission saving compared to fossil fuel until 2017. After 2017 the threshold rises to 50% and from 2018 to 60% for biofuels produced in installations working from that year onwards.

Perspectives to integrate indirect land use change (ILUC)

• For a number of reasons we should not attempt to include ILUC until we have an overall framework to address indirect effects. All of the indirect effects have to be considered, not just greenhouse gas effects.
• It is very difficult to get consistent data. There are fundamental problems related to the methodologies used, including too much uncertainty.
• This is a very complex issue evidenced by the diverse perspectives among discussants.

Is harmonization in co-product handling needed as part of LCA development and use?

• Reporting assumptions are the important issue. Reporting needs to be transparent.
• Methods of allocation really matter. There is a need for harmonization. It is more realistic to include substitution methods or system expansion methods.
Question 4: How do we combine the existing methodology of environmental LCA (ecoLCA) with new developments on economic (eLCA) and social (sLCA) LCAs, towards a uniform approach to measure the sustainability of bioenergy production and use?
Mike Jones (Session Chair), May Meilang Wu (Rapporteur)

- Our levels of knowledge are quite different for different LCAs – eLCA > ecoLCA >> sLCA. Is it possible to combine indicators for an integrated LCA? Initially, more integration is likely to lead to increased inconsistency.
- System boundaries are very different for these LCAs making them hard to compare. Should the system boundary be the same or remain different for the three LCAs?
- Is the sLCA approach a system approach? Should sLCAs use geographic boundaries or a cradle to grave approach?
  - e.g., the cornbelt. Economic drivers of land are typically influenced by land outside of the region while other drivers such as biogeochemistry are affected by factors within the region.
  - e.g., livestock feed lots are in other areas, not all in the mid west (not constrained)
  - e.g., acid rain typically happened in the NE.
- Which factor is larger – biogeochemical or other regions in biofuel supply chain?

Inter-dependencies and similarities

- LCC (life cycle cost) analysis and LCA have the same basic units and consistent boundaries and methodologies. LCC has been used to be consistent with LCA and to avoid double counting. EcoLCA can be done based on eLCA. sLCA is very much reliant on eLCA and ecoLCA. None of them are independent of the other two. As an example, ILUC is a linkage between eLCA and ecoLCA.
- LCC includes opportunity costs and other consumer surpluses that can be incorporated into LCA. CGE (computable general equilibrium) modeling is an example.
- sLCA is a big challenge. We need to develop method definitions and indicators.
- eLCA and ecoLCA (cost analysis) harmonization can be done.
Temporal and spatial effects in LCA

- Nitrogen fertilizer use per acre has changed over the time.
- Biogeochemistry even changes from place to place within a physiological system having local impacts.
- There are many water issues, including the need to consider spatial heterogeneity.

Standards and indicators for each LCA are different. These cannot simply be combined or aggregated together.

Issues or questions with sLCA?

- Naturally more qualitative than the other two
- Job creation and cost is the current focus. Number of jobs created is a key and measurable.
- Environmental impact is way down the list.
- Surveys to collect useable information have considerable uncertainty. The results often depend on the attitudes and beliefs of the people being surveyed rather than the actual reality of their situations.
- There is a need to look at other countries on the social pillar.
- LCC is linked to sLCA and could serve as a starting point for sLCA.
- It is important to have a solid baseline for comparison in the development of sLCA.
- What is the common currency for sLCA? Social status (poor vs. rich)? What is the LC of poverty? How do we quantify across diverse labor conditions, e.g., from a worse condition to a slightly better condition?
- There are no guidelines and principles for sLCA from EPA although it is required.
- Conclusion: We can quantify the impacts of jobs, health, and the environment through the three pillar analysis. More effort will be needed.

The three pillar approach

- A multi-criteria analysis can be used that incorporates environmental, economic and social considerations.
- Progressing from eLCA to incorporate ecologic and social issues. Current LCA that includes indirect land use change does, in fact, include an economic-environmental linkage. Ecology affects feedstock availability and choice. Land use change affects economics.
• Use standard cost benefit analysis for policy together with eLCA. A hybrid approach of existing cost analysis with eLCA is available.

• We can use the principles of LCA to conduct three independent LCAs, with their own indicators, method, and boundaries for a pathway/supply chain. Results may not be presented in a single base unit. Triple analysis results provide more information than the single eLCA alone. It is more important to give a balanced approach to provide to decision maker an overall picture.

• The results from the three pillar analysis can be weighted. Apply all three at the same time for several options. Select the choice that fits all three LCAs and use it to screen the options. The one selected is more likely to be considered by policy makers.

• Results can be combined to come up with new indicators. Additional indicators (quantifiable) may be derived from the triple LCA, e.g., focus on greenhouse gas per ton of feedstock or job creation per ton of CO₂. Develop a short list of sustainability indicators. Develop a process design of sustainability analysis.

Limitations with the three pillar approach – the accuracy of model prediction decreases from ecoLCA to eLCA to sLCA.
We are facing a policy double standard. Why do we need certification for importing biofuels and not for importing food? Is it a necessary national scale certification or does it represent an important added value for the final user? Certification is likely desirable for political or individual perspectives but making it mandatory does not make sense unless it is made also mandatory for other products. The situation is quite heterogeneous among different countries:

- UK - Monitoring occurs through standard lookup tables. There are no process models. Biomass used for liquid fuel is monitored.
- EU - The starting point was the Renewable Energy Directive (RED). Biofuels and biomass do not count toward EU targets if they do not pass a set of mandatory sustainability criteria. Now there are eight recognized certification systems (some are international, some at the national level). For EU domestic production, if the biomass is produced under the common agricultural policy, it is supposed is sustainable. There is some information available on the costs of certification. Certification systems are based on a set of qualitative and quantitative criteria.
- US - Everything ends up under USDA or federal legislation. Existing USDA tools for agricultural management practices are used and “imported” into bioenergy production systems (not GHG emissions). Other criteria are then added to these pre-existing tools. This certification is not applied to biofuels imported from abroad but only to US produced biofuels. Social dimension is included in the certification.

Differences between LCA models and political certifications:

- If you fulfill specific indicators you get a certification. In contrast, LCA is used for impact assessment and for comparison among different options.
• Certification systems are much more prescriptive than LCA (for which the choices are much more limited).
• Certification has to be simple and easy to handle, realistic and include measurable criteria.
• There could be some overlap between certification and LCA. In fact, certification can face difficulties in formulating criteria and LCA can be used to generate information for setting up some certification criteria, e.g., for emissions. However, there is a need for putting together LCA with other sources of information.
• Political certification is broader and sits on top, but LCA can be used as a tool for politically driven certification as well. However, there could be some problems related to costs.
• Only a certification addressing biomass production regardless of the final use (food, energy, etc.) might be able to avoid impacts.

**Question 6: How do the challenges to reaching the above position differ between the EU and US?**
Heather Youngs (Session Chair), Steve Smith (Rapporteur)

• Europe is further along in the process overall with the RED standard and the upcoming water framework directive. US biofuel standards (and possible certification) are still developing. Europe is taking a more consistent approach across sectors. The US is still developing its approach so the end results and impacts are less clear.
• Europe has a focus on climate, with specific climate goals. Not the case in the US.
• The US is more focused on domestic biofuel production, while Europe has some additional imports (although the fraction can vary by country). Thus, certification issues in Europe have focused more on imports.
• Will European imports increase in the future? Greater focus in the US on energy security. This could change in the future, e.g., there is growing discussion in the US, especially in California, about imports from Brazil, so imports could become a bigger focus.
• There is a greater focus on diesel in Europe (so palm oil is a large issue) while in the US the focus is more on gasoline substitution, e.g., ethanol. Thus, there are different issues and data needs.
• There are many parallels to food security which is closely intertwined with biomass production. European food security may be decreased by climate change (and perhaps further restricted by genetically modified organism (GMO) issues). The US is still likely to be a net food exporter for some time.

• GMOs continue to be a large difference between Europe and the US.
  ➢ GMOs are more broadly accepted in the US.
  ➢ Would GMO-based biofuel be acceptable in Europe?
  ➢ Europe may already be importing genetically modified biofuel feedstocks.
  ➢ This issue has implications for imports and for certification. GMO from South America would likely be ok for the US. What about for Europe? How about GMO in Africa?
  ➢ Much of the focus on GMO is short-term, but in the long-term GMO may be a key to increasing agricultural yields sufficiently to allow land for biofuel production.

• Concern over labor conditions was one driver for the certification process in Europe (although it is not yet quantified it is part of the current reporting standard). It is not clear if there is a similar focus in the US for the energy sector perhaps due in part to less focus on imports. It should be noted, however, that there is a significant concern about labor issues for imported consumer goods in the US.

• Forest management differs country by country in Europe. US forest management systems vary as well by region. In many cases there are large numbers of small owners which makes it more challenging to organize, certify, etc. Forest management issues are more common than different between the US and Europe but there is still much variety.

• Both Europe and the US are in the same boat on indirect land use change issues due to global markets. The issue of how to price carbon on land is still an open issue that would be a good topic for collaboration. Progress is being made in both Europe and the US on monitoring/verifying carbon in agriculture.

• Miscellaneous issues.
  ➢ How do standards deal with invasive feedstock varieties, e.g., some varieties of Miscanthus?
  ➢ There are stronger policies in the EU from the top down, but countries can differ. The system is different in the US, i.e., more political give and take from the start.
  ➢ New natural gas seems likely to change things a lot in US. Europe?
  ➢ Water an emerging issue for both regions. It is becoming part of the Euro RED certification system. The upcoming water framework directive will have a large impact in the EU. Water regulations in the US vary regionally. There are separate regulation systems for water quantity vs water quality in the US.
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The Sustainability of Biomass Production for Bioenergy Workshop

Second generation biofuels and more sustainable perennial grasses have not yet come to pass. Conflicting outcomes regards LCAs and ILUC have contributed to an uncertain policy environment.
The objective was to look forward to how we may produce better LCAs and a framework of interaction that does not result in premature policy, while protecting the environment and assisting our economies and living quality. A second objective was how to intensify the co-operation between the EU and the US in this field. Opportunities for future research have been discussed too.

http://ec.europa.eu/research/biotechnology/eu-us-task-force/index_en.cfm?pg=links