IEA Bioenergy

Task 29 – Socio-Economic Drivers in Implementing Bioenergy Projects

Task 38 - Greenhouse Gas Balances of Biomass and Bioenergy Systems

Task 40 - Sustainable International Bioenergy Trade: Securing Supply and Demand

Joint IEA Bioenergy
Task 29, Task 38 and Task 40 Expert Consultation

Dubrovnik, 25 – 26 October, 2007

On 25 – 26th October members of IEA Bioenergy Task 29, Task 38 and Task 40 met to discuss the sustainability of bioenergy. The programme consisted of one day of presentations by members and invited speakers. It was followed by a day of discussions in two Break Out Groups: Global Issues and Local Issues. The programme and all presentation are available on the Task 38 website (ftp://iefs001.joanneum.at login: sustainable password: biomass).

The goal of the meeting was to create statements on the sustainability of bioenergy and to foster links and cooperation between the Tasks.

Statements on the Sustainability of Bioenergy

Global Break Out Group

Global Break Out Group

Chairman: Andre Faaij
Rapporteur: Neil Bird

Improve use of existing biomass resources

A no-regrets strategy should be to focus on proper use of residuals from existing biomass production streams. This can include the cascading use of produced biomass to optimise its use from fossil intense product replacement, recycling, heat production and transportation fuel production. Particularly linking bioenergy production with waste management can reduce environmental impacts and solve local environmental problems while provide energy.

Realize the appropriate use of existing land resources

There are limited land resources available for agricultural and bioenergy production. With the increase in the interest in biomass for energy production it is likely that this will go to high productivity sites specifically in tropical countries and as a result directly compete with food production. This suggests that bioenergy cannot be a long term solution to the energy shortage and threat of climate change.

The drive to biofuel production has brought into question the sustainability of the agricultural systems involved. The focus should be more on perennial crops rather than conventional food crops as this will minimize impacts on food prices. Intensification of agricultural practices may be part of the solution but in general, this may require more energy, fertilizer and other inputs and there may be diminishing returns.

Focus on complete energy utilisation

Bioenergy must not be a “quick fix” to the threat of peak-oil and climate change. The focus should be on appropriate energy utilisation. This includes the transition to more logical and optimal energy conversion systems of which existing bioenergy technology is only one part. For example, biomass may be better used as a source of heat for electricity generation used to power electricity based transportation than a source of liquid fuels for transportation.

Learn from existing examples

We should be able to confidently state that certain biofuel feedstocks and technologies can lead to sustainable bioenergy production in some locations

For example: the combination of industrial, social interest and needs has created a successful use of bioenergy in Sweden. This included the discussion in the 1980s on the use of arable land for the production of food or biomass for energy. The Swedes improved the use of residuals. They had the advantage of high potential, strong government planning and governance. The increase of taxes on fossil fuels created the market for biomass utilization. Nevertheless, the system that applies to Scandinavian

forestry and mobilization of biomass resources use may not be attainable in other countries. Other examples require more complete investigation.

Other examples: Indonesia has large biomass resources but only a small component is actually used. The uses are driven by economic considerations (precious woods, palm oil). The majority is burnt as waste.

Costa Rica is developing a castor oil industry for the production of energy and liquid biofuels.

Brazil: Key drivers of the creation of the ethanol industry were reducing the fluctuation in sugar price and improving energy security. The price of oil (specifically in 1970s) was a big driver in the formation of the ethanol industry. The situation in Brazil may be successful as a whole but there are large regional and local differences. Currently there is a move away from the cheap labour of the early harvesting system towards mechanised sugar cane harvesting.

Realize and improve the understanding of the impacts of bioenergy

The tool for evaluation should be LCA with C&I as UBP06 or Eco-indicators99 in combination with macro-economic models and integrated assessment models (land use).

A single indicator or value for a specific technology is not the desirable outcome because the answers are situation specific due to the variety of settings (biomass resources and conversion systems). Worst case scenario could be used as secondary indicator, but the results will be very locally dependent because of a large number of input parameters and variables.

Focus on the systems, both agricultural production and advanced technologies that can have a big impact. Niche markets can play a large role in early implementation (gasification in paper mills). Materials substitution should not be overlooked.

Serious concerns of sustainability, environmental and social impacts and true greenhouse gas emission balances need to be addressed but these concerns do not mean lack of opportunities.

There is an urgent need for policy development and operation guidelines

Policies should be multi-dimensional and not focus on one measure (in the past, GHG). The policies and operation guidelines should be developed under collaboration with many departments in government (energy, environment, agriculture, and water) and levels of government and they should recognize the needs and impacts at the local level.

Collaboration between Tasks is needed

As the issue of sustainability of bioenergy is multi-dimensional, collaboration between Tasks is required. This could be accomplished by the appointment of a cross-Task technical coordinator that could bridge between social and technical tasks. As well, cooperative task meetings (i.e. between 2 tasks with a strategy to work together) could become part of IEA process (i.e. an example is what happened here in Dubrovnik – 29, 38, 40 organized and 30, 31 joined). Also multi-component Case Studies requiring collaboration across Tasks should be undertaken.

Local Break Out Group

Local Break Out Group

Chairman: Keith Richards
Rapporteurs: Brenna Lattimore, Bill White

Allow for a workable definition of sustainability

The definition of sustainability will vary at different scales and in various local contexts. Two communities very close together may have varying views on what is sustainability. Studies are required to bring greater understanding to this issue.

Trade issues must be considered

Can bioenergy trade provide us with a reliable source of energy? One must be aware of the global inequality of trade conditions (e.g. North vs. South). In witnessing the effect of trade in conventional fuels from developing countries one must be concerned as to whether the benefits of bioenergy trade will trickle down to the broader population. This can also be viewed as a question of whether local sustainability will be realized. A final trade question is what will be the extra-community/international aspects of different forms of production.

Chain of supply must be included

Sustainability must be considered at each level of the supply chain.

Improve the perception of bioenergy

There is no “silver bullet” that will automatically make bioenergy the universal energy of choice, but education including success stories and demonstration projects can increase the uptake of renewable energy sources. Factors that encourage increased use include: local buy-in, influential spokespersons, trust among all parties, full cost accounting of fossil fuels and proper promotion.

Improve the Science / Policy interface concerning bioenergy

There is a need for national policy development but this must be informed by quality science including science from the IEA Tasks. This will allow, among other things, policy makers to discriminate between more or less sustainable systems and to include information/perspectives from a wide range of nations. At the local level, bringing on IEA Task expertise could assist in the development of operational guidelines.

Multi-task Collaboration

The local group concurs with the comments in the global section above.

Specific roles for IEA Bioenergy

1. **Establish links with respected environmental organizations (i.e. WWF) to promote the appropriate use of bioenergy and cultivate two-way learning and exchange.**
2. **Participate in initiatives to define sustainability (i.e. Roundtable on Sustainable Biofuels) and play leading role in the harmonization of initiatives on certification**
3. **Identify and classify countries and/or regions for suitability of certain technologies, studies and policies.**

   In so doing encourage other countries and global organizations i.e. UNIDO) to participate in IEA Bioenergy
4. **Improve communication and public perception on bioenergy.**

   IEA Bioenergy should have a specific public relation and extension agenda to disseminate results of studies, policy statements in a clear through existing channels. This requires clarifying the audience for publications (including expansion); encouraging dissemination of information not just within IEA to other organizations; and making scientific results readable to the lay-person. For example: biofuels does not just mean liquid biofuels for transportation.
5. **Take the lead creating a methodology for liquid biofuels in the CDM.**

Global Issues Break Out Group Raw Notes

Attendance:

Ali Mohamed, Bird, Brown, Cowie, de Dominicis, Delzeit, Denruyter, Faaij, Gauch, Guest, Gustavsson, Kojakovic, Kraxner, Marland, Persson, Pingoud, Scarlat, Trømborg, Woess-Gallasch

Key Issues (Global perspectives)

Link between small scale projects and policies
Must not create islands of good policy
Importance of local sustainability and not just global sustainability

Do not focus only on GHG emission benefits:
- Other values: biodiversity, social
- Climate forcing
- Focus on more than just GHGs in sustainability
- Biofuels may be beneficial for GHG balances, but currently not beneficial for the environment in general
- Trade-offs between different environmental goals

Displacement of agricultural services as a result of biofuel establishment

Appropriate use of land resources:
- high productivity sites should and will be used for bioenergy so inherently compete with agriculture
- low productivity sites should be used for biodiversity and other values
- Optimal use of land (a limited resource)
- Sustainable land management
- Saving or storing carbon in forest

Focus on solutions

Optimal energy systems of which bioenergy is one part.
Focus should be on energy not only mass. Transition to more logical energy conversion systems.
Not only focus on production but also on improvements in efficiency and demand side management.
Business as usual but with a different fuel is not the answer. Must include energy efficiency and demand side management.
Bioenergy must not be a “quick fix” to the energy and climate crunch.
Sustainability as a driver of technology advancement
Appropriate use of technology
Optimal use of biomass. Biomass may be better used for heat energy than liquid fuels.
Be cognizant of peak-oil use

Not enough attention to conventional agricultural and livestock management. Bioenergy could be part of the solution but if we focus on perennial crops. Interest should switch from conventional food crops to lignocellulosic crops. Rebalancing of agriculture. Bioenergy could force the reopen the discussion of the sustainability of agriculture in general.

More intensive agriculture requires more energy, fertilizer and other inputs. Increasing bioenergy production will require an increase in intensive agriculture.

Poverty. Competition of lands for food and biofuel

Competition with other agricultural production.

Cascading use of biomass to optimise use. Sceptical on the benefits of biofuels to solve the GHG problem. Focus on proper use of residuals and waste products. Improve the efficiency in biomass resource use throughout the mass utilisation system. Increased use of residuals to improve the efficiency of use

Biosphere is the only way to store carbon. How do we assess the value of carbon storage?

Viewpoints

Definition of sustainability has been around for 20 years. We should focus on criteria and indicators (C&I) and redefine sustainability

Biofuels may be beneficial for GHG balances, but currently not beneficial for the environment in general

Focus on more than just GHGs in sustainability

Strategy for technology development across all renewables

Appropriate development of bioenergy resources

Integration of sustainability issues into bioenergy

Optimisation of locations for bioenergy

Rural access to energy (renewable)

Ongoing Activities, Best Practices, Policy Needs

Will certification schemes assure sustainable biomass production?

Combination of industrial, social interest and needs has created a successful use of bioenergy in Sweden. This included the discussion in the 1980s on the use of arable land for the production of food or biomass for energy. They improved the use of residuals. They had the advantage of high potential, strong government planning and governance. The increase of taxes on fossil fuels created the market for biomass utilization.

The system that applies to Scandinavian forestry and mobilization of biomass resources use may not be attainable in other countries (European and developing countries). We should not try to export the Swedish solution to other countries, but learn from the Swedish example.

Other examples require investigation.

Indonesia has large biomass resources but only a small component is actually used. The uses are driven by economic considerations (precious woods, palm oil). The majority is burnt as waste.

Costa Rica is developing a castor oil industry for the production of energy and liquid fuels.

Supporting industries (scale) are an important factor in the success of bioenergy

Brazil: Is this a success story? There is a move away from the cheap labour of the early harvesting system towards mechanised sugar cane harvesting. The ethanol industry was created to reduce the fluctuation in sugar price and improve energy security. The price of oil (specifically in 1970s) was a big driver in the formation of the ethanol industry. The situation in Brazil may be successful as a whole but there are large regional and local differences. There are cases where sugar production is reasonably environmentally positive, but many where it is environmentally negative.

Subsidy systems to support bioenergy use may not be a solution in developing countries

EMPA database is a tool that can analyse the balances of most bioenergy pathways

How do we measure success? Are GHGs the proper measure?

Knock-on effects. Science is required to support the political decisions and drive policy. GHG balances are the short term factor of importance. For this reason, we need globally consistent GHG assessment and methodology. CDM Meth Panels should be proactive and create consistent methodologies for the assessment of GHG emissions from bioenergy projects.

We must explain that there isn't one simple answer to the questions. But we can at least give direction for some positive and acceptable practices. Local production and use of biomass for energy is a "low hanging fruit" that should be pursued. The production of biomass for liquid biofuels that are exported to other countries is a complicated question that has some locally positive results but many negative impacts. It may require many years of research to understand the complexity of the situation.

A better understanding of land use change and land use planning is required to identify the lands that are suitable for bioenergy production and lands that require protection because of high conservation, biodiversity value. Need for better monitoring of forest

resources and land-use change. Australian government has created a fund for the monitoring of land use in S.E. Asia. This needs to be coordinated and extended to other regions. There are other existing initiatives (GEO, GEOS, WPAD). Geo-summit in Cape Town later this year. IEA should be involved with this initiative.

Governance. How can we assure that the proper policy decisions are made given that we have better data? WWF is about to release a paper on governance issues (from global to local to farmers).

Bioenergy may worsen the environmental impacts.

Has forest certification and forest product change of custody certification been successful? Is this a success story that should be followed in the bioenergy chain? The system exists and it is working perfectly, but it is not certain of its net effect. It is the tool that is available, but it may be only effective in the “developed country” market. Completely new certification schemes SHOULD NOT be developed for the bioenergy market.

Is there a mix of policy tools to achieve the goals that we suggest? Are National Governments the key factor in the proper development of sustainable bioenergy?

Global scale land use planning is probably not a way forward. Then what do we do? A possibility is to identify lands or regions that must be protected. Environment is low on the list of values in most developing countries.

It will be difficult to control the market, but we must avoid providing incentives for inappropriate practices.

Remote sensing must be complimented with field based measurements (ground-truthing).

Summary Brief for ExCo

Inventory of potential concrete examples

Case studies that can be developed within Tasks

Illustrate using case studies where the use of bioenergy is not so controversial but has challenges due to lack of technology or immature markets. These could be country studies or technology studies. The studies could focus on the amount of useable bioenergy using technologies that have no or little controversial environmental and social economic impacts.

These studies should not be limited to forest residue but should include agricultural residue, manure management.

The tool for evaluation should be LCA with C&I as UBP06 or Eco-indicators99. Worst case scenario could be used as secondary indicator, but the results will be very locally dependent because of variation in electricity GHG intensity (region to region, year to year) and the use of end products.

Serious concerns that need to be addressed

Concerns do not mean lack of opportunities

Situation specific answers since variety of settings (biomass resources and conversion systems) with big differences

There is an urgent need for policy development

Policies should be multi-dimensional and not focus on one measure (in the past, GHG).

Policies should be developed under collaboration with many departments in government (energy, environment, agriculture, water).

Technology development

Focus on the technologies that can have a big impact

Niche technologies can have a large impact

Materials substitution should not be overlooked

Collaboration between Tasks

Multi-component Case Studies requiring collaboration across Tasks

Role of IEA Bioenergy

Link with

- RSB (Roundtable on Sustainable Biofuels)
- GEO, GEOSS

Establish a Roundtable on Sustainable Biomass (not just biofuels)

Harmonization of initiatives on certification

Take the lead creating a methodology for biofuels in the CDM

Identify and classify countries and/or regions for suitability of certain technologies, studies and policies

Improve communication and public perception on bioenergy. Biofuels does not just mean liquid biofuels for transportation. IEA Bioenergy should have a specific public relation agenda to disseminate results of studies, policy statements,

Consistency of terminology – biofuel = liquid biofuel, bioenergy = solid biomass for energy, biogas.

Propose using:

- Bioenergy = all forms of energy from biomass
- Gaseous biofuels = methane from decomposition of biomass
- Liquid biofuel = biomass converted to liquids primarily for transportation
- Solid biofuel = wood and other biomass (generally used for combustion for heat)

Concern that large scale bioenergy pathways will be pushed / dominated by large energy company interests.

Local Issues Break Out Group Raw Notes

Participants:

Cherubini, Domac, Douya, Gordon, Kusivilic, Lattimore, Lunnan, Richards, Richardson, Smith, Stupak-Moller, Van Stappen, White, Yagishita

Key Issues (Local perspectives)

system sustainability / inclusiveness in definitions

scale – moving up and down the scale from standards to local level guidance

good guidance at local level is still lacking re: what's sustainable and what is not

we need to continue research with the outcome of site-specific guidelines/maps

guidance for local people (i.e. farmers with woodlots)

bioenergy is a novelty to local communities; barriers to novel concepts and change. When you add the novel concept of "sustainability" it adds an additional novelty – overwhelming therefore need for guidance/ to "pack it" in a way that communities can understand

what is sustainable? Hard to define/political concept
sliding scale of sustainability

energy is not an attractive topic for local communities – they would rather invest in general maintenance/infrastructure, schools, health, etc

bioenergy is NOT necessarily a novelty in many communities because they have been using fuel wood for centuries; perhaps it is the TERM bioenergy that is novel, but not the actual burning of wood. In the north we see wood as something to burn in stove or at camp

link bioenergy with waste management/environmental concerns to make it more attractive to communities

general conception is that wood burning is dirty

have to be careful how you educate – don't want to condescend but want to be sure you're clear and basic and easy to understand

technology transfer programs directed at individuals; example of carbon-neutral communities

Education

goals: improving lives of local peoples

incorporating secondary effects of bioenergy

optimal level of bioenergy use including social impacts

important not to push tech but be good listeners to help people solve issues pertinent to their communities

Environment – carbon neutrality, environmental well-being

Community sustainability should be defined by each community

Local energy sufficiency

What works will differ among communities and regions

Community's first question may be: will bioenergy provide us with safe and reliable source of energy?

Important for communities to make the best of the bioenergy feedstocks they already have before looking elsewhere (i.e. utilize waste)

Question: When does a community decide that they are going to take action for the global good? (i.e. become a carbon-neutral community)

How can we provide communities with the knowledge that would inspire them to do this and give them guidance to do so?

And if one community decides to become carbon neutral, what rights do they have to seek sources elsewhere, PERHAPS to the detriment of other communities?

Cost considerations are crucial

Can't underestimate the importance of frameworks at a national level that can drive local practices

Trade and local sustainability (pitfalls/challenges?)

Do we have the confidence to be able to come forward and state that we can have sustainable bioenergy production at some locations? Do we have that much knowledge right now?

Global trade equality – and in trade, who benefits? Trickle down…

Is there one definition of sustainability, or is it quite varied and flexible?

- Important to realize that what's being done in one country (i.e. importing in western Europe), making that community sustainable, it may be at the expense of sustainability in a tropical country

Supply is an issue

The need for sustainability along the supply chain and insurance that we're not exporting impacts

Sustainability can be measured at each level of the production chain

Sustainability is an overarching value: i.e. improves the quality of life (social and economic) of local people while maintaining or improving environmental values

How you measure this at a local level will vary throughout communities. What this means to a local community

Best available knowledge

Boundaries between communities (key issue)

Measurement (key issue)

Promotion of bioenergy

Important to realize our gaps in knowledge and be able to be confident that it should be promoted

Utilization of “greenwashing” techniques like those used for natural gas?

Put true value on things and peoples’ attitudes will change

Internalization of externalities

Carbon costs

What makes a source attractive?

- Credible and proven
- Easy
- Automated
- Clean
- Same cost or less
- Local buy in
- Influential spokespersons
- Sustainable: ecologically, social, economic
- Reliable
- Feel-good component
- Trust
- Sexy ☺
- Environmental
    - carbon stocks
    - nutrients in the soil
    - efficiency of energy inputs/outputs
    - land use and biodiversity

Ongoing Activities, Best Practices, Policy Needs

Task 29:

Matrix – Bill and Biljana – attempts to understand different stakeholders and the drivers behind going from unsustainable to sustainable system

Propose survey of socio economic drivers

Task 30:

Environmental consequences of short rotation cropping systems

Barriers to large scale implementation will be ID

Information package will be developed and made available to promote awareness of SRWC systems

Integration of environment factors and production

Task 31

FAO collaboration/certification publication

Technology transfer – day long or half day event where local or regional bioenergy stakeholders are brought together with international experts to discuss ideas and issues

Work to overcome barrier of cost – increasing cost inefficiencies. Economic cost competition of the production chain

Task 38

Work to give overview on greenhouse gas balances of all different bioenergy systems

Carbon in soils from different methods

Use of fertilizers

Attempts to investigate possibilities of including biofuels in CDM methodologies (i.e. Schlamadinger)

Position paper on comparison of different bioenergy systems with fossil fuel systems in terms of energy balances and emissions

All Tasks:

A blend of education and analysis:

- Getting the message out
- Communicate to ExCo the depth and maturity of our knowledge now – not just promoting this type of energy but recognizing that some systems are almost as evil as fossil fuels, looking at lifecycle

Needs:

Work needs to be done on integrating work of all the Tasks/identifying and filling gaps

Would be beneficial to step outside of OECD countries and encourage participation of developing countries

Some way to make sure that our work is all going towards something (the same thing)

Global flows are happening big time but there is a lack of awareness of impacts and development at a local level

When discussing international trade be aware of local sustainability issues

International/national focus – how it's intertwined, tax money, etc

Work to take broader criteria for sustainability to the level of specific practice

Science can lag behind policy – at times not sufficiently local science

Need for the development of NATIONAL POLICIES/GUIDELINES (i.e. Minnesota, Sweden, Ontario guidelines)

Some sense of urgency on making operational guidelines that would influence national policy

Need to influence policy makers to distinguish between more and less sustainable while knowledge exists – we shouldn't trust governments to make this policy themselves because they know little about this field.

Science is discriminating – some options are clearly better than others

Would be good to map what the tasks are doing to address these gaps – informing our work plan

Summary Brief for ExCo

What initiatives should we communicate to ExCo?

Clifford's work on understanding what the industry is thinking

Workshops, exchanges, etc. are quite effective at increasing awareness of all the work that's going on and moving forward with our work

It will be best for our work with communities if we have a better understanding of which types of bioenergy systems are sustainable – more workshops could aid in this

This type of model will aid in discussions with communities and development of best management practices – bringing Task expertise to a local level

Discuss our outcomes of this meeting – i.e. deliverable 1 and 2

Is the point of the tasks to keep the dialogue going between ourselves or to move outside, thereby necessitating a change in language?

Role of IEA Bioenergy

Encouragement of other countries to participate in the task and encouragement of links with other organizations dealing with local level/developing country impacts (i.e. UNIDO) to bring in their expertise

Encouraging dissemination of information not just within IEA but between IEA and other organizations

Freshen bioenergy image

Make information simple and transparent to aid decision making

Be discriminating about what initiatives to promote and ensure adequate information get out to public

Bioenergy extension program

Internal marketing across tasks – info disseminated throughout tasks to ExCo

Take scientific knowledge and make it into lay-person language (i.e. what about our ETE briefs? Are they too dense and technical?) – get an outside party to write?

Should we be aiming at multiple audiences rather than just policy makers (i.e. also industry, public)?

Clarify our audience, and present possibility of expanding audience

Tap into respected organizations like WWF, consider their ideas, and discuss how they might convey the message (two-way learning and exchange)

IEA could become a learning organization

Collaboration between Tasks

Proposition of all- task get together on a common theme that would assist with structure and integration; building more relationships between tasks with complementary research

Proposition of a technical coordinator to try and bridge between social and technical tasks

Mini-symposiums on different themes

Bioenergy promotion could be a joint task activity

Cooperate on models; provide relevant outputs to national, international and local guidelines

Technical tasks can provide information on what would work best at a local level – local people can give feedback into what they think would work/not

Cooperative task meetings (i.e. between 2 tasks with a strategy to work together) could become part of IEA process: i.e. an example is what happened here in Dubrovnik – 29, 38, 40 organized and 30, 31 joined