Outline of a sustainable and efficient bioenergy policy framework

Report on a workshop held in Copenhagen on May 16, 2018

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Report on a Bioenergy policy workshop held during the European Biomass Conference and Exhibition in Copenhagen, 16 May 2018

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Summary

A workshop, titled '**Outline of a sustainable and efficient bioenergy policy framework**', was organised by IEA Bioenergy Task 43 on May 16, 2018 at the occasion of the 26th European Biomass Conference and Exhibition held in Copenhagen.

Presentations were held by staff members of the International Energy Agency (IEA), the Food and Agricultural Organization of the United Nations (FAO), the International Renewable Energy Agency (IRENA), Wageningen University and Research Centre (WUR) and Ethanol Europe.

The aim of the workshop was to discuss sustainability performance metrics and effective bioenergy policy framework that can help meet climate, renewable energy and rural development goals while stimulating investments in sustainable bioenergy pathways.

More robust sustainability criteria are needed to ensure that renewable energy policy can enhance environmental, economic and social performance of the energy system. Opportunities to develop negative carbon emission practices, as well as carbon abatement cost, social benefits and rural jobs created, should be included in the evaluation.

Bioenergy / biofuels are neither inherently good or bad, just like many other elements of society. A system should be developed to evaluate performance metrics of bioenergy and other energy options. Accordingly, participants argued that **performance based renewable energy policy is needed**. Carbon abatement cost and social cost and benefits, including rural jobs created and maintained, are performance metrics that should be used.

Adam Brown, from IEA, argued that „GHG performance based rather than feedstock or technology specific principles" are needed.

„Biofuels will have to play a particularly important role in the transport sector."

Olivier Dubois, FAO, indicated that „ Models to assess the ILUC risks oversimplify the reality and therefore should not be the only basis for policy making." Bioenergy provides an opportunity for responsible investment in sustainable agriculture, rural development and bioeconomy.

„The key issue is not about choosing between 1G or 2G biofuels, but on how to make biofuels sustainable."

Jeffrey Skeer, IRENA, stated that that "regulations should encourage biofuels made from farm or forest residues, feedstocks grown on degraded land, or feedstocks with very high yields". He called for regulations that reward reductions in carbon emissions per unit of energy produced.

"*Regulatory distinctions between conventional (food crop based) and advanced (non-food crop based) biofuels may impede the development of high-performance biofuels*".

Wim Heijman, Wageningen University and Research, referring to an analysis he did on employment and other impacts of biofuel production in Europe, stated that

"A *fair evaluation of the social impact of biofuels requires us to take into account its impact on rural development*."

Zoltán Szabó, Ethanol Europe, argued that assumptions on costs of bioenergy need to be transparent in the Renewable Energy Directive currently negotiated.

"*Carbon abatement costs of alternative energy solutions should be given a prominent position in the debate*."

Introduction

This report presents the outcome of a bioenergy policy workshop organised by IEA Bioenergy Task43 during the European Biomass Conference and Exhibition in Copenhagen, 16 May 2018.

The aim of the workshop was to discuss sustainability performance metrics and principles for an effective bioenergy policy framework that can help meet climate, renewable energy and rural development goals while stimulating investments in sustainable bioenergy pathways.

Participants discussed the outlines of a sustainability assessment and policy framework that could ensure the selection of bioenergy and alternative options with sufficient environmental quality, stimulate investments in capacity development oriented towards long term carbon goals, and provide a climate for lasting economic and social benefits derived from forestry and agriculture.

During the workshop, and at several occasions during the conference, it was argued that performance based renewable energy policy is needed. Performance metrics to be used should include carbon abatement cost and social benefits, including rural jobs that are created.

Programme

The workshop was held at the Bella Center, Copenhagen on Wednesday, May 16, 2018, as a side-event of the 26th European Biomass Conference and Exhibition.

The programme:

- 8:30 - 8:40: **Welcome and introduction**, Hans Langeveld (IEA Bioenergy Task 43)
- 8:40 - 8:50: Adam Brown (International Energy Agency): '**A bioenergy roadmap to 2030**'
- 8:50 – 9:00: Olivier Dubois (Food and Agricultural Organization of the United Nations): '**Effective Bioenergy Policy Framework**'
- 9:00 – 9:10: Jeffrey Skeer (International Renewable Energy Agency), '**Policies for Sustainable Biofuels**'
- 9:10 – 9:20: Wim Heijman (Wageningen University'): '**Rural development benefits**'
- 9:20 – 9:30: Zoltán Szabó (Ethanol Europe): '**Challenges for stimulating investments**'
- 9:30 – 9:50: Q&A
- 9:50 – 10.10: **Panel discussion**
- 10:10 – 10:15: **Concluding remarks**

Presentations

ADAM BROWN – IEA (INTERNATIONAL ENERGY AGENCY)

'IEA Bioenergy Technology roadmap: The right policy framework?'

The IEA Bioenergy Technology Roadmap was launched in November 2017 as the result of a team effort between IEA, IEA Bioenergy and several other organisations. Current rates of bioenergy deployment are very modest, and a strong acceleration is needed until 2030. The '2 degrees scenario' by IEA requires modern bioenergy (final energy consumption) to triple for industry and transport and double for electricity applications by 2030.

Four key actions are needed:

- Mature technology options should be promoted on the short term
- Development and deployment of new technologies should be stimulated
- Feedstock should be mobilized in a sustainable way, backed by a supportive sustainability governance system
- A coordinated international effort is needed to develop investment capacity.

The ideal policy landscape should focus on developing a level playing field, keeping risks for investments low and support innovation. In this way, policy should provide a fair, stringent, and stable sustainability regime.

A supportive regime should have three objectives:

- Ensure carbon savings
- Promote best practices and stimulate innovation
- Provide a stable regulatory regime.

Conclusion

The following can be concluded:

- Sustainable bioenergy is an essential element in a portfolio of measures needed to develop a low carbon scenario
- Biofuels can play an important role in transport, particularly in sectors which are difficult to decarbonize, like aviation and shipping
- Development of advanced biofuels is key to the success of biofuels as they open up feedstock opportunities and realize high carbon savings
- Progress will depend on the development of appropriate policy frameworks combined with sustainability governance.

OLIVIER DUBOIS – FAO (FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS)

'Effective Bioenergy Policy Framework'

Sustainable Bioenergy development is complex but there is sufficient collective evidence, knowledge and tools to produce bioenergy in a sustainable way.

Suggested key operating principles for sound bioenergy policy making include:

- Do not rely on myths and sweeping statements
- Do not base policy or funding decisions only on modelling results or over-simplifications
- Instead, embrace complexities of bioenergy development (rather than over-simplifying things)
- One needs to remain agnostic about feedstocks and biofuels/bioenergy options; what is important is that they are sustainable
- Remain constructive and rigorous using available tools and promote proven best practices to get things right in an integrated, contextualized and evidence-based approach.

Recommended basics for sound bioenergy feedstock policies:

- ILUC risk exist for all land-based bio-products – biofuels, including 2G biofuels (in the case of plantations)
- Models to assess ILUC effects are risking oversimplifying reality; consequently, they should not be the only basis for policy making
- There are ways to reduce ILUC risks, so it is more constructive to focus on these
- Choice of feedstock – and related policies - should be based on a contextualized and evidenced-based assessment of their sustainability.

Recommended basics for sound 1st generation (1G) and 2nd generation (2G) biofuels policies:

- The distinction between 1G/2G is becoming increasingly blurred:
    - Challenges and opportunities observed for 1G biofuels can be useful for 2G biofuels
    - There are several examples of technological and financial synergies between 1G and 2G biofuels.
- It will take quite some time before 2G biofuels have a meaningful impact on energy use and climate change. 2G biofuels should be developed in parallel with 1G biofuels, and much more sustainable biofuels will be needed, as of now
- The key issue is not about choosing between 1G or 2G biofuels, but on how to make biofuels sustainable.

Recommended basics for sound policies on Good Bioenergy Practices:

- Proven good bioeconomy practices are known; for example, agro-ecological zoning, outgrower schemes and integrated food energy systems
- Land use efficiency can be optimized by mixing energy and food crops (e.g. rotations, agroforestry systems)
- Biomass use can be optimized via cascading uses (e.g. biogas from livestock manure)
- It is better to develop policies to promote good practices than relying only on scenario results of modelling and global studies.

Key messages

FAO key messages on bioenergy:

- Sustainability of bioenergy is context specific. Therefore, its assessment must be based on reality and not or models and global studies
- Tools and knowledge are now available to help governments and operators reduce risks and enhance opportunities of bioenergy development
- Per se biofuels are neither good nor bad. What matters is the way they are managed
- Bioenergy should be seen as another opportunity for responsible investment in sustainable agriculture, rural development and bioeconomy.

JEFFREY SKEER – IRENA (INTERNATIONAL RENEWABLE ENERGY AGENCY)

'Policies for Sustainable Biofuels'

A lot of biomass for transport and other uses can be obtained without reducing food supplies or converting high carbon land –especially if we use high-yielding lignocellulosic feedstocks. Sustainable intensification and landscape planning –increasing output per unit of land while maintaining or improving ecosystems' health and productive capacity – can make substantial amounts of land available. This could be used for bioenergy crops like high-yielding, rapidly growing trees and grasses, and sugar cane. Restoring degraded land and reducing losses in the food chain can also save land. Residues – from food and lumber production and from cities – are another source of potential feedstocks.

Some policies and measures for bringing forth these pockets of potential are suggested in a brief that IRENA prepared last year with FAO and IEA Bioenergy. Some are reviewed here, a few more are suggested.

There is a lot of potential for sustainable intensification because of the gap between actual and potential yields. FAO projects that global average yield for major food crops will rise from 4.2 t/ha in 2010 to 5.1 t/ha in 2050. The potential yield, however, is on average 10.4 t/ha. If the yield gap could be closed, less than half as much land would be needed for food. For maize, a leading biofuel feedstock, actual yield is less than 25% of potential yield in most of Africa and India. Rice yields approach the maximum potential in China and Japan but only 40 to 55% in India and less in some other parts of Asia. There's a lot of potential for improvement.

There is also potential for sustainable intensification of pasture land, used to raise livestock. Beyond the 1.5 billion hectares of land that is used today to grow food crops, *1.4 billion hectares of prime and good pasture land is available*. About 97% of the world's food and feed is grown on the crop land, while less than 3% is grown on the pasture land. If this pasture land were used more intensively, food for the livestock could well be raised on a quarter of it, leaving three quarters for energy purposes and biodiversity enhancement. There is evidence that such an approach has been instrumental in slowing the rate of rain forest loss in Brazil, by reducing pressure to clear new land for agriculture.

The joint paper notes that boosting yields in agriculture is key to support sustainable bioenergy expansion. This may include adoption of modern farming techniques, providing secure land tenure that give farmers financial incentives to manage their land for high yields while maintaining soil productivity.

According to FAO, one-third of food produced for human consumption (1.3 billion tons per year) is lost or wasted. Imagine how much less would be wasted, and how much land could be released (of which could be part used for bioenergy crops), if best practices for food production were adopted everywhere. Waste and losses in the food chain could be reduced promoting good harvesting techniques, investing in storage and refrigeration, developing infrastructure, encourage sale of imperfect food items, modifying labels so good food is not discarded, and educating consumers to match food purchases to their needs.

Energy crops might be grown on restored degraded lands. The Bonn Challenge and New York Declaration have committed countries to restore 350 million ha by 2030. The African Forest Landscape Restoration Initiative (AFR100) aims to restore 100 million of these. It has already been joined by 18 countries.

Restoration of degraded or marginal land can be promoted by economic incentives for land restoration (e.g. being able to extract value from food and fuel grown on the land) and information on suitable production systems (adapted to less than optimal soil conditions).

More food also means more crop residues. Some is needed to feed animals or maintain soil fertility, the rest can be used for bioenergy. Similarly, as wood production expands to meet growing demand, there are growing amounts of logging and processing residues left over which can be used to produce bioenergy.

Better use of residues and waste can be encouraged by guidelines for appropriate residue extraction, leaving sufficient residues in place to enrich the soil, soft loans for machinery designed to collect residues with less labour, and information on cost-effective residue collection and transport.

Some related points were raised at a recent conference organized by IRENA, the European Commission, the Alternative Renewable Transport Fuels Forum, Below 50 and the Biofuture Platform.

- Regulations should encourage options with low risk of indirect land-use change – such as biofuels made from farm or forest residues, feedstocks grown on degraded land, or feedstocks with very high yields (highlighted in the joint brief by IRENA, FAO and IEA Bioenergy)

- Regulations should reward reductions in carbon emissions per unit of energy produced. This will naturally stimulate those feedstocks that have higher yields and processes which are most cost-effective and carbon efficient. An important example of this is the RenovaBio regulations being implemented in Brazil, which will create a system of tradeable certificates based on carbon emissions reductions from sugarcane ethanol.

- Policy support should be stable and long-term. This is especially true for those sectors that are hardest and most costly to decarbonize, such as aviation. If oil prices remain low due to a mix of factors (e.g. strong supply from unexpectedly rapid expansion of shale oil and reduced demand stemming from increased electric vehicle penetration and biofuel use), both a substantial market price for carbon emissions reductions and volumetric targets for biojet consumption could be needed to secure the desired outcome. Steady support is also needed to move lignocellulosic conversion processes from pilot plants to plants with the lowest production costs possible, so that they have a chance of competing and we can bring fuels from high-yielding wood and grass crops and abundant farm and forest residues to market.

WIM HEIJMAN – WUR (WAGENINGEN UNIVERSITY AND RESEARCH)

'Rural development benefits'

Most papers are written on biofuels impacts on climate; less is written on their impact on rural development. This presentation focused on jobs created directly as well as indirectly by a large-scale bio-refinery; the Pannonial Ethanol refinery in Hungary is taken as an example.

Global bioethanol production since 2000 has increased considerably. Food price developments since 2004 show that increasing bioethanol production does not coincide with food price increases.

Key biofuels policies in the US and EU do not rely on rural development arguments, in contrast to Brazil. Benefits of bio-refineries for rural communities seem to be neglected, especially in the EU.

Our research has used an input-output analysis (using the Leontief model), using RAS procedures for estimating regional input/output tables quantifying spending by the Pannonia Ethanol plant which is the largest ethanol producing facility in Europe (generating 450 million litres of ethanol, 350 thousand tons of DDG and 15,000 tons of corn oil each year).

Multipliers in the Tolna region that were calculated range from 1.00 to 1.47 for manufacturing. Results are presented for the Fejer region and national level in Hungary. We identified expenditures of the Pannonial plant per sector in 2016. Some 75% of expenditure was on agriculture, 11% on electricity, gas and water, and 7% on transport and storage. Impacts on rural development were calculated from expenditures and multipliers.

Conclusion

It is concluded that a fair evaluation of the social impact of biofuel production requires an assessment of their impacts on rural development.

ZOLTÁN SZABÓ – ETHANOL EUROPE

'Challenges for stimulating investments'

While biofuels often have received a bad press, science shows that ethanol's performance is better than one might expect. GHG emissions are favourable compared to its fossil equivalent (16 vs 95 g CO2-eq/MJ). Carbon abatement cost for passenger cars for ethanol is competitive and inexpensive.

Surveys show that the general public in Europe feels that crop-based biofuels should be encouraged by an active EU policy. However, the latest proposal to revise the biofuels policy in the EU – RED II – shows important shortcomings.

- Electrification has nothing to do with the existing vehicle fleet (over 95% in 2025, and over 90% of the cars in 2030 will run on fuel)

- Advanced biofuels have seen plant closures. Currently, scale is lacking in waste-based biofuels, and other alternative solutions that have been proposed (imported UCO, molasses, palm oil residues)

- Conventional biofuels (especially ethanol) are being side-lined, and their climate potential is neglected. On the plus side, banning unsustainable biofuel alternatives may bring

climate and biodiversity benefits

- Soft measures have had little progress in three decades (taxation, modal shift, etc.)

- Emission standards are unreliable: the gap between labelled and real driving emissions has been increasing (about 40%).

While RED is supposed to be a regulation to attract private investment, it is anticipated that the proposed RED II (status May 2018) will be insufficient to meet climate targets, and it is on course not to stimulate substantial investment in the transport bioenergy sector. Consequently, fossil oil will not be replaced in sufficient quantities by 2030.

Key messages

To avoid that RED II will have to be reopened in five years:

- Food versus non-food (advanced) biofuel is a false dichotomy. Performance metrics are needed

- ILUC needs to be included in policy, with focus on mitigation

- Assumptions on costs of bioenergy need to be transparent, with carbon abatement cost prominent.

The biggest risk for investors is regulatory risk. To mobilise transport bioenergy investments clarity in messaging is essential. Otherwise industry will rather invest in the bioeconomy and transport decarbonisation will suffer.

Discussion

The presentations were followed by a lively discussion. Issues that were brought forward included:

- **We need to talk about non-energy impacts**, like labour, food storage and health improvements. Evaluation of environmental performance of energy solutions should be broadened. More positive messages can be given if more emphasis is on employment and non-carbon effects.

- **Progress made should be rewarded**; good practices should be supported. Policies should be rewarding innovation. Carbon benefits of energy alternatives should be quantified.

- **Impacts of food losses should be linked to climate change**; the current level (one third of food being lost) is equivalent to the second-largest country in terms of GHG emissions which is very high. This was calculated by FAO.

- **Regulations are needed on Private Public Partnerships**; quality control should be guaranteed.

- **Yield gaps should be considered in a dynamic way**, as potential yield levels are also being raised by research. The fact that a yield gap exists does not mean that farmers are working inefficiently. To close the yield gap would require farmers to benefit as well.

- **Farmers do not take up knowledge without economic incentives**. There should be economic incentives. Farmers are behaving rationally, and they can calculate. They are also risk-averse.

- **Not all (local) markets are functioning well**. Earlier, farmers were encouraged to produce less rather than more. Yield gaps will decline over time. Food losses are not economic. Land released from reducing food losses could be made available for bioenergy production.

- The **EU biofuel policy was not developed for GHG emission reductions**. It was set up to reduce food surpluses and increase regional development. Diversifying of outputs was realised despite the RED. This is positive.

- **Biofuels policies are distributed over many directorates (DGs)** in the European

Commission. Energy policy is now focussing more on decarbonisation, but RED may not be used to realise this. Still RED has become irrelevant for biofuels, as it realises only 3-4% of transport fuels.

- **There is a disconnect between RED and climate policy**. It is not practical to take focus on 10-year periods in policy as investments that are needed require longer focus

- A broad selection of stakeholders was involved in a workshop held the day before by IEA Bioenergy (Sustainability intertask project) including a member of the unions which is a breakthrough. **Broader stakeholder involment is critical for policy development**.

- Reform of the European Common Agricultural Policy (CAP) will provide opportunities for employment and rural development under the second pillar. **We don't hear the voice of farmers often enough on bioenergy which is an opportunity for them**.

- **Simple messages are needed for policy and public**. Maybe there has been too much emphasis on bioenergy in the RED. Should we not open up the biofuels discussion into the bioeconomy, which is a new concept not clear yet to public? In this way you may get a different perception.

- **Carbon abatement costs and social impacts should be quantified**. We should focus on performance metrics.

- Unions have not been sufficiently involved in the discussion. **Employment performance of biofuels should be a key message** in communications.

- **There is a huge opportunity for green gas**. There is an infrastructural issue which is considered positively.

- **Investors (and banks) are no longer willing to invest in first generation biofuel technology** because of the lack of stable and clear regulatory framework and the negative image of biofuels.

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Further Information

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