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## Editorial

# Developments in international bio-energy markets and trade

### Context and recent developments

A reliable and sustainable supply of biomass is vital to any market activity aimed at bioenergy production. Given the high expectations for bioenergy on a global scale and of many nations, the pressure on available biomass resources is increasing rapidly. Due to high prices for fossil fuels (especially oil, but also natural gas and to a lesser extent coal), the competitiveness of biomass use has strongly increased. In addition, the development of CO<sub>2</sub> markets (emission trading), as well as ongoing learning and subsequent cost reductions for biomass and bioenergy systems, has strengthened the economic drivers for increasing biomass use, production and trade. Last but not the least, various policy incentives (in particular for biofuels for transport) drive demand up.

Without the development of biomass resources (e.g. through energy crops) and a well-functioning biomass market that can assure a reliable and lasting supply, the existing high ambitions for bioenergy may not be met. A lack of availability of good quality (and competitive) biomass resources has proven to be a structural showstopper for many market initiatives in the past. The strongly growing demand for biomass and biofuels make clear that there is a growing need to develop biomass resources and exploit biomass production potentials in a sustainable way. Largely driven by the growing demand for food, impacts of climate change and more sensitive global markets, prices of biomass resources and fuels have been rising sharply, including indirect effects on raw material prices for e.g. the forest industry, as well as on food (e.g. vegetal oils and starch). Bioenergy is still a very small component in the set of forces that determine global food prices and availability, but certainly, bioenergy should not worsen current problems.

It is, in particular, important to develop both supply and demand for biomass and energy carriers derived from biomass in a balanced way and avoid distortions and instability that can threaten investments in biomass production, infrastructure and conversion capacity and create too strong competition. Our understanding of how this is best organised and managed is still relatively poor. Biomass markets are still immature and this is in particular true for the demand side of the market; many biomass markets, e.g.

for solid fuels, rely on policy objectives and incentives that prove to be volatile. In addition, biomass markets are poorly mapped and only very limited analyses work, statistics and modelling exercises are available.

On the other hand, various countries have considerable experience with building biomass markets and linking available resources with market demand. Examples are found in Brazil, Sweden, Finland, Canada, The Netherlands a.o. Relatively recently, international trade of biomass resources has become part of the portfolio of market parties, and volumes traded worldwide increase at a very rapid pace with an estimated doubling of volumes in several markets over the past few years. The fact that markets are growing means that more and more resources are becoming available from regions where biomass use was low or absent so far and supply risks for biomass users have reduced due to more diverse and reliable supplies. This is in itself a very positive development.

Remarkably, biomass has long been considered an energy source to be used at the local or regional level (e.g. because of limited availability and the assumed prohibitive energy use and costs for long-distance transport). This is remarkable from the perspective that basically any energy commodity is traded on a global scale (fossil fuels, power). Relatively recently, the international debate on the role of bioenergy has taken a different direction and international biomass trade has been picked up by the market at a very rapid pace. Also, the importance of international bioenergy markets and trade has fetched momentum at international organisations as FAO, the UN (i.e. UNCTAD with its' biofuels initiative), the G8 Bioenergy partnership, WTO and is pursued by a variety of European nations (i.e. Germany, UK, Italy, the low countries and the whole of Scandinavia), Brazil, Canada, Russia, the US, Japan and other countries in East and South East Asia. One very visible result is that considerable investments are taking place in export-oriented biomass and biofuel production capacity, especially in developing countries.

Over the past years, IEA Task 40, titled: "Sustainable International Bioenergy trade" under IEA's Bio-energy Agreement, has mapped developments in its' member countries and for several specific markets as ethanol and pellets.

The *core objective* of Task 40 is to support the development of a sustainable, international, bioenergy market, recognising

the diversity in resources, biomass applications. Eventually, biomass may develop into commodity market, which could have multiple benefits, such as much improved market stability and competitive prices. Developing the sustainable and stable, international, bioenergy market is a long-term process. The Task aims to provide a strong contribution to such (policy making) decisions in the coming years for market players, policy makers, international bodies as well as NGOs. It aims to do so by providing high-quality information and analyses, providing overviews of developments, be a linking pin between different arenas involved in the debate, a clearinghouse for information and by targeted dissemination activities.

The Task works in five key areas to serve the main objectives:

1. Improve the understanding of biomass and bioenergy markets; this includes the description of ongoing developments, support development of statistic material, understanding factors that influence supply and demand for biomass on shorter and longer term as well as learning lessons from comparable other markets (such as food, fodder, forestry products, etc.).
2. Analyse the possibilities to develop biomass resources and exploit biomass production potentials in a sustainable way, including supply chains and required logistics and transportation operations.
3. Coherent analysis of biomass markets by modelling and scenario analysis; dynamic demand and supply models of bioenergy that takes influencing factors (pricing, actual demand, stocks, energy use for long-distance transport) into account.
4. Analyse the impacts of biomass utilisation and trade and develop frameworks to secure the sustainability of biomass resources and utilisation. Evaluation of the political, social, economic and ecological impact of biomass production and trade in these systems for the local people, for food production; also in relation to specific sustainability criteria. Contributing to certification procedures and development of best practice guidelines, especially for integrating the production of biomass for energy and subsequent export into agricultural and agro-forestry systems, also in developing countries, is a key element in this.

Trade is the central essential component of the work. In addition, the understanding of developing the demand and supply side for biomass is essential on a regional and national level as well. In addition, both entrepreneurs and policy makers are now dealing with development of biomass markets on a regional level in an international context. The balance between opening up market, removing barriers and at the same time building capacity to develop regional resources and demand is at this moment difficult in many situations and requires serious attention. Markets are immature and volatile and Task 40 has identified a range of barriers in the 2004–2006 working period that hamper sound development of (international) biomass markets at the moment and that should effectively be addressed. The necessary market stability and proper governance to secure sustainability of biomass production and trade is far from achieved.

Exchange of information on bioenergy experiences between parties and countries in different stages of market development can then also be facilitated. For market parties such as utilities, companies providing transport fuels, as well as parties involved in biomass production and supply (such as forestry companies), high-quality knowledge, clear criteria and identification of promising possibilities and areas are of key interest. Furthermore, investments in infrastructure and conversion capacity rely on minimisation of risks of supply disruptions (both in terms of volume, quality and price).

The development of truly international markets for bioenergy has become an essential driver to develop available biomass resources and bioenergy potentials, which are currently underutilised in many world regions. This is true for both (available) residues as well as possibilities for dedicated biomass production (through energy crops or multifunctional systems such as agro-forestry). The possibilities to export biomass-derived commodities for the world's energy market can provide a stable and reliable demand for rural communities in many (developing) countries, thus creating an important incentive and market access that is much needed in many areas in the world. The same is true for biomass users and importers, who rely on a stable and reliable supply of biomass to enable (often very large) investments in infrastructure and conversion capacity.

Of overriding importance is to secure that biomass produced in other parts of the world is supplied on a truly sustainable basis. The debate on whether or not large-scale use, production and trade of biomass is sustainable is fierce in some arenas and development of certification procedures is taken up in various countries and by several sectors. Different perspectives and strategies emerge on how biomass and bioenergy markets should be governed and supported and how the sustainability of the resources and use can be secured (e.g. through certification).

The development and deployment of internationally accepted criteria, project guidelines and a certification system that is supported on a global level and widely deployed in the market are a considerable challenge. This is relevant for large schemes involving supply chains from various parts of the world, down to smaller projects on the regional scale. Choices on the governance of developing biomass markets are now at a critical stage. At this very moment, fundamental policy choices can still be made on how biomass markets are steered, controlled and governed.

The content of this special issue is based on work by IEA Task 40 and its members, and tackles a number of issues raised above:

- The contributions of Bolkesjo and colleagues, Junginger et al., and Perry et al. give insight in the recent developments in specific countries (respectively, Norway, the Netherlands and the United Kingdom) and how biomass markets and trade have been developing and may develop in the future.
- The contribution of Heinimo tackles the situation in Finland which has a well-established biomass market and infrastructure, and goes into depth in gaining insights into the role of indirect trade (i.e. via wood products) in the total biomass supplies in that country, a part of the

biomass market that is still hardly tackled in statistics and trade flows.

- A more aggregated picture is provided by the paper headed by Junginger and involving all task members, which synthesizes the developments in bio-energy trade in a variety of countries. Clearly, the importance of trade for the total biomass market and supplies is evident from the reported results.
- Walter et al. provide a global picture of the international ethanol market which has seen immense growth rates over the past 5 years or so. Brazil is a dominant player here and this analysis explores the potential impacts of countries and regions that may rely on ethanol imports in the coming decades, as well as the required response from potential ethanol exporters (including Brazil, and also many other nations). The paper highlights drivers, uncertainties and the daunting scale of the markets that are likely to develop. This comes with opportunities, and also with threats. Successful market introduction of ethanol production from lignocellulosic biomass resources is the key wildcard in this respect. In any case, securing sustainability of biomass production, use and trade at large is vital. The developments over the past few years have clearly shown how intertwined biomass and bio-energy are with land-use, food supplies, fossil energy markets and strategic decisions around those themes.
- The analysis by van Dam et al. gives a comprehensive overview of the ongoing efforts to introduce sustainability criteria for biomass production in the market. At the moment, different pathways are pursued by different actors. This situation may generate problems on the shorter term, when diverging procedures would emerge, which could affect the credibility of the much needed certification schemes. However, the rapid developments in both the corporate world and highest political levels show how serious these matters are taken and the speed of progress is unprecedented compared to earlier certification efforts in agriculture and forestry.
- Finally, the analysis by Smeets et al. explores how sustainability criteria could affect ethanol production from sugarcane, both in terms of costs and supply potentials. Although uncertainties remain and real-life experience with criteria is needed, the findings are hopeful: certification in line with the new broad proposals is not a show-

stopper for ethanol production, and the additional costs may be easily off-set by further learning and technological progress, while at the same time a wide range of socio-economic and ecological targets are met.

At the moment of writing, the proposal of the European Commission for introduction of sustainability criteria for biomass produced both in and outside the Union is heavily debated. The position of the EU on this will be a very important one internationally, and it is hoped that integral and broad certification, including the crucial land-use change issues, will be agreed upon.

It is clear that biomass and bioenergy is in the eye of the storm at the moment. The rationale for large scale and sustainable use of biomass for power, heat, fuels and feed-stocks during the first half of this century still stands and our technical capabilities and organisational experiences are developing rapidly to do that in a sustainable manner.

I hope the content matter presented in this special issue makes a useful contribution to the development of a functional and sustainable market for biomass and bioenergy.

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More detailed information on the activities and results of IEA Task 40 can be found on the website [www.bioenergytrade.org](http://www.bioenergytrade.org).

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