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Considerations for Research on Biofuels

I. Introduction

As global energy demand rises, countries are recognising a growing need for diversifying energy supplies in order to ensure energy security, sustain economic development and reduce greenhouse gas (GHG) emissions. BIAC holds the view that all energy options must be taken into account when designing appropriate energy policy frameworks in order to minimise over-dependence on a limited number of energy sources, thus reducing energy supply risks. In terms of the contribution that renewable energy sources can make to the national energy supply, all renewable sources (including wind, solar, water and biomass) should be considered and compared in order to reach a sound energy policy framework. One current such energy source with intense policy interest and research activities is biofuels, the focus of this paper.

Biofuels and their associated technologies and policies are generating robust debate between and within governments, businesses, trade unions, NGOs and research institutions. While different sectors represented within BIAC often face very different challenges and opportunities with regard to biofuels and while there is no common position on this issue, BIAC members agree that the OECD and the IEA have key roles to play in this area, to provide fact-based analysis on challenges, opportunities and possible solutions. Both organisations are global hubs where invaluable expert knowledge on issues of energy, food and agriculture, biotechnology, transport and chemicals is synthesized and shared among governments and with stakeholders. This paper outlines issues that should be taken into account in any additional analysis on biofuels.

II. Points of guidance for biofuels analysis

A. Complete lifecycle impacts of biofuels production and use

The range of considerations regarding biofuels include: the potential for commercial scale production; the potential of advanced biofuels technologies; local and international impacts on food prices; chemical raw materials; land use; transport systems and vehicles; climate change; and society. To focus only on one part of this “ecosystem” would lead to misleading policy decisions. It is important to consider the complete biofuels lifecycle in related analysis and to situate biofuels discussions within the broader context of different energy sources.

This will provide policy-makers with as complete a picture as possible before decisions are made as to how biofuels production, research, and policy-making will proceed.

B. Commercial viability of biofuels production and use

The economic viability of any alternative energy source hinges greatly upon the cost and availability of feedstocks, the efficiency of the process used, co-product improvements, and the price of oil. Increasing global energy demand, oil price fluctuations and strong projected growth in the number of additional transport vehicles will undoubtedly also have an impact. BIAC calls on the OECD and the IEA to continue to develop economic assessments of biofuels (and biomass) production, taking into account the following long-term lifecycle considerations: eco-balance, energy yield, land-use changes, cost-effectiveness, nutrient-recycling in biofuels waste and co-products, sustainability of production, transport, fertilisers, market-based development, and implications for all affected industries.

C. Impacts on commodity prices

Bioethanol production is currently based upon starch- and sugar-producing feedstocks such as maize, sugarcane, sugarbeets, and wheat while biodiesel is based on oil-producing feedstocks, such as tallow, rapeseed and soy. Next generation technologies based upon non-food feedstocks are getting closer to market-ready but are not yet commercial. A recent OECD report notes that considerable international attention has therefore been placed on the expanded use of crops to meet biofuels targets and the impact those biofuels policies may have as one of several contributors to rising prices of food and livestock feed in both developed and developing countries¹. Policy-makers need a clear picture as to which extent biofuels are contributing to the development of global food and feed prices in the longer-term, bearing in mind that world market prices for many agricultural commodities are due to a combination of factors. Current agricultural commodity prices should be compared to trends in production and transport costs. Implications for electricity, heat and industrial feedstock prices in OECD and non-OECD countries should also be assessed.

D. Government mandates

Some governments believe that their support is necessary for biofuels production, and major biofuels-producing economies are therefore setting volumetric production targets. While such policies can act to encourage the development of the biofuels industry, targets may strain or exceed a country's production and land capacity. In carrying out analysis of biofuels, BIAC encourages the OECD and the IEA to continue to carefully monitor the role of government biofuels policies and their impacts on trade, competition, commodity prices,

¹ "While it is clear that biofuel growth together with other longer-term factors also contributed to the price hikes observed in 2007 and 2008, these were also caused by a range of short-term disruptions in international commodity markets" (OECD 2008 Economic Assessment of Biofuel Support Policies, p115).

climate change and sustainability more generally. Biofuels policy is a component of overall government energy policy and must be viewed in this context.

In principle, government support for particular energy technologies should be temporary, should not cause undue market distortions, and should target options that will eventually become economically viable. The full range of available energy technologies should be taken into consideration by policymakers. OECD research should investigate the value that a stepwise technical approach, involving a range of stakeholders from several different sectors, could bring to the design of energy policies. Analysis should also include an assessment of the impact of trade policies on the price, supply and quality of biofuels.

E. Land-use

Land-use requirements for biofuels production can be significant, but vary greatly depending on the feedstock used and the degree of agricultural productivity in the producing region. OECD has already carried out excellent work in this area. In further work, technological advances that could increase crop yields and therefore reduce the amount of land needed for production as well as the move to biofuel feedstocks that can be grown on degraded or abandoned land should be given due attention. In view of existing and proposed government mandates and policy scenarios around the world, we would continue to benefit from further analysis of how much land (and of what types) will be needed for biofuels production, and to what extent might improved crop varieties, yields and new technologies change such projections. Biodiversity considerations, as well as other spill-over effects, should also be addressed in such analysis.

F. Climate change

The potential of biofuels in addressing climate change depends on the feedstock, farming practices, and fuel production process. The biofuels lifecycle should be considered when calculating the consequences of biofuels production for climate change and the full ecological footprint, including for example the electricity inputs required for biofuels production processes (which in some countries may be more dependent on fossil fuels than others). Similarly, land-use changes that are attributable to biofuels feedstock production should be examined for their impacts on carbon dioxide emissions, ammonia emissions and other GHG emissions. As biomass is limited, the use of biomass in stationary applications should also be considered when exploring possible ways to achieve greatest GHG emissions savings. Careful life-cycle analysis that includes feedstock, co-products, and impacts of transport, is therefore essential when determining impacts on climate change.

G. Water

Biofuels production depends on a sufficient supply of water, which may constrain their production in certain areas where water is scarce. The largest single use of water in biofuels production is in producing the feedstock crops. The impact of advances in agricultural technologies and improved crop varieties on water consumption should be given due

attention. BIAC encourages the OECD and the IEA to include water impacts and requirements in biofuels research and analysis.

H. Advanced biofuels and new technologies

Advanced biofuels generally refer to the use of new production processes and new feedstocks for liquid and solid biofuels that are cleaner, higher yielding, and more effective than existing processes. Some of these technologies are based on cellulose, the most abundant plant material on earth, found in materials such as agricultural or forest residue, straw, or non-food crops (e.g. switch-grass). Carefully-allocated support for advanced biofuels research, together with public-private partnerships and international collaboration will play key roles in determining how quickly advanced biofuels become commercially viable. Further analysis of biofuels should take into account the potential commercialisation of advanced biofuels and what this could mean for the future biofuels lifecycle. Research should also examine the use of biomass to produce electricity for plug-in cars and also bio-gas.

I. Impacts on society and the developing world

It is likely that the impacts, both positive and negative, of the biofuels lifecycle are not distributed evenly. For example, while the livelihoods of some farmers may improve due to increased demand for certain crops, some farmers of other crops or livestock farmers may come to face new pressures as prices for animal feed, fertilisers, and pesticides increase. While the potentially uneven distribution of social impacts is not necessarily unique to biofuels production, BIAC encourages the OECD and the IEA to take social impacts in developed and developing countries into deeper consideration in their ongoing analysis.

III. Conclusion

The OECD and IEA biofuels research to date has been invaluable in building knowledge and raising awareness among policy-makers about the intricacies of biofuels policy-making. We feel that lifecycle research of the costs and benefits of biofuels (both among different types of biofuels, and biofuels in relation to other energy sources) remains important. The inter-governmental set-up of the OECD and the IEA, together with input from business and other experts, holds strong potential towards reaching comprehensive fact-based analysis acceptable to all parties. In our view, the OECD and the IEA play an important role in offering in-depth expertise towards this objective. BIAC stands ready to offer more detailed guidance and support as work proceeds.