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Indirect Land Use Change: Towards sound European Union policy decisions

Executive Summary

This paper seeks to contribute to the deliberations of the European Union institutions as they consider whether and how to address the indirect Land Use Change (ILUC) under the Renewable Energy and Fuel Quality Directives. As a world-leading renewable diesel producer and sustainability leader, Neste Oil recognizes and is concerned about the increasing deforestation rate especially in the tropical areas[1], and would like to offer its views on how to best minimise ILUC risks.

The paper makes the following key points:

1. Any truly effective solution must be global and cross-sectoral in scope, as transport biofuel feedstocks accounted for only about 2% of global cropland area in 2008, according to the UN Environmental Programme. [2]
2. European biofuels industry, regulated by the sustainability criteria of EU Directives, is a strong driver of sustainable agriculture in third countries: this role should be preserved.
3. There is still uncertainty about ILUC effects, as ILUC modelling is still evolving and the outcomes of different models vary greatly.
4. Focus of ILUC policy should be on preventive action that mitigates ILUC risks.
5. Long-term investment security is needed for transition to new generations of feedstocks.
6. A poorly designed ILUC policy could have a series of unintended consequences in terms of carbon emissions, European investments and jobs, development, trade and food prices, while failing to achieve its ultimate objectives.

Sustainably produced biofuels remain the best and most available option to reduce carbon emissions from transport, including aviation.

For example, the greenhouse gas emissions of Neste Oil's NExBTL renewable diesel are about 40% to 80% lower compared with fossil diesel. In 2011 alone, the consumption of renewable NExBTL diesel reduced GHG emissions in transport by an amount equivalent to that of taking around 310,000 fossil diesel cars off the roads, according to figures verified by independent auditors[3].

[1] Global forest land-use change from 1990 to 2005. Initial results from a global remote sensing survey. FAO and JRC, 2011. (http://foris.fao.org/static/data/fra2010/RSS_Summary_Report_lowres.pdf)
[2] United Nations Environmental Programme: Towards Sustainable Production and Use of Resources: Assessing Biofuels, 2009.(http://www.unep.org/publications/contents/pub_details_search.asp?ID=4082)
[3] Source: Neste Oil's Sustainability report 2011. http://www.2011.nesteoil.com/sustainability

1. What is ILUC ?

The concept of indirect land use change (ILUC) expresses the risk that when existing agricultural land which was producing commodity A is converted to produce commodity B, or when commodity A is diverted to another use, the existing demand for commodity A has to be satisfied with expansion of agricultural land somewhere else. The resulting expansion of agricultural land can, depending on where and how it happens, can produce additional carbon emissions. Both the concept and the risk of adverse ILUC effects are generally recognised.

Land requirements and land use change are key concerns for both environmental and social sustainability. Land use change - direct or indirect - can cause negative effects such as loss of biodiversity, loss of carbon stocks and land right conflicts, as well as positive effects such as an increase in soil carbon, rural development and a change to more sustainable agricultural practices. Controlling and mitigating direct and indirect land use change effects is a major challenge in view of ensuring sustainable energy crop production.[4]

2. Successful ILUC policy: global, science-based and preventive

2.1 Effective ILUC policy has to be cross-sectoral and global

According to UNEP, transport biofuel feedstocks accounted for about 2% of global cropland area in 2008[5]. Adverse ILUC effects may materialise when any industry increases demand for an agricultural commodity for the production of, for example, food, cosmetics, detergents or textiles. The world markets for agricultural commodities are integrated, and production shifts easily to serve other end-use industries following price signals and regulatory decisions. Consequently, if ILUC is addressed only in the biofuel industry, the goal of reduction of undesired land use change will not be achieved without similar policy measures in other sectors.

Equally, large-scale social phenomena such as urbanization and population growth are major drivers of direct and indirect land use change as land previously used for agricultural production or pristine land is converted to other uses, while demand for agricultural goods grows.

Therefore, any truly effective solution to ILUC needs to be global and cross-sectoral in scope. Addressing ILUC in only one sector, biofuels – the one with the most stringent sustainability criteria – would lead to shift of supply to other sectors and would not have the desired effect of reducing deforestation. Simultaneously, continuous efforts are needed to strengthen the combat against deforestation using several policy options available, including international agreements.

[4] Responsible Cultivation Areas, Identification and certification of feedstock production with a low risk of indirect effects, Ecofys, 2010.
[5] United Nations Environmental Programme, Towards Sustainable Production and Use of Resources: Assessing Biofuels, 2009.

2.2. Uncertainty of effects: ILUC modelling is still evolving

The European Commission (EC) stated in its 2010 report on ILUC[6] that "…*Moreover, the estimated land-use change can never be validated, as indirect land-use change is a phenomenon that is impossible to directly observe or measure*."

Indeed, quantifying ILUC can only be based on models that project past impacts and current state of affairs into the future. As the EC states, "…*this is inherently uncertain, since future developments will not necessarily follow the trends of the past*".

The complexity of ILUC modelling is increased by the necessity to have a global model which must include multiple feedstocks and products. Since the key agricultural commodities are transportable and traded globally, ILUC effects are global in nature. The results from the ILUC models has been shown to be critically dependent on the assumptions they make and the data they use – both of which often suffer from significant reliability issues. Another reason for the uncertainty of modelling is the relative immaturity of the state of ILUC research. Studies and models on ILUC have been carried out only during the past 5 years or so.

It is therefore not surprising that there is a large variation in the outcomes from these models. A study released in July 2011 by economic consultancy Copenhagen Economics compares the results of various ILUC models and highlights the resulting wide variation of estimates[7]. To cite one example, the estimates for ethanol produced from wheat varied from -79 to 329 grams of CO2 eq./MJ versus the fossil fuel comparator of 83.8 grams.

2.3. Preventive action through mitigation of ILUC risks

Rather than attempting to address the negative consequences of ILUC, the focus should be directed towards reducing the causes of ILUC. There are several tools available already today to mitigate ILUC risks. The use of ILUC mitigation measures supported by an incentive mechanism emerged as the best policy approach to tackling ILUC risks in a study conducted by Ernst & Young in 2011[8]. Neste Oil was one of the industry and non-governmental organizations that commissioned this study.

- First, increasing hectare yields reduces the need for expanding to new land. Crop yield increases can come about from relatively low-cost agronomic management gains, if the farmers are empowered and incentivised to adopt them[9]. There are significant governmental initiatives in progress aiming at exactly this. For example, as part of its palm oil strategy, the Malaysian government is focused on increasing agricultural productivity. Accelerating removal of older, lower yielding trees and replanting with high-yield varieties is expected to double over time the already high hectare yields of palm oil production (3.5 – 4 tons per hectare). Moreover, newly developed high-yield strains hold the promise of potentially yielding 12 tons per

[6] Report from the Commission on indirect land use change related to biofuels and bioliquids, COM 811 (2010) final.
[7] The Missing Indirect Land-Use Change Factors – how to make decisions when the science is incomplete ? July 2011. http://www.copenhageneconomics.com/Web/Publications/Energy---Climate.aspx
[8] Biofuels and indirect land use change – the case for mitigation, Ernst and Young, October 2011.
[9] Murphy, R., Woods, J., Black, M. and MacManus, M, M. (2011) Global developments in the competition for land from biofuels, *Food* Policy, 36 (S1), pp. S52-S61.

hectare, decreasing the pressure on future plantation expansion. Model-based ILUC factors can only poorly capture this type of dynamic, positive effects.

- Secondly, effective use of co-products can significantly reduce carbon emissions: The United Nations Food and Agricultural organization (FAO) thinks that integrating food and energy production in developing countries particularly through the use of by-products can be an effective approach to mitigate climate change, especially indirect land use change (ILUC). [10] Integrating food and energy systems can lead to increased land and water productivity, reducing greenhouse gas emission and increasing food security. Also, the use of co-products can have a role in encouraging the displacement of unsustainable animal feed production.

- Third, and coupled with the two first ones, an incentive mechanism for ILUC mitigation should be adopted. The RED and FQD already contain a provision that foresees a credit to be awarded to biofuels produced on severely degraded land. This mechanism could be expanded to encompass a broader range of mitigation measures. The above mentioned Ernst and Young study lays out proposals and a tentative implementation plan for such a scheme.

- Fourth, international development organizations – the World Bank, the regional development banks, the European Union and bi-lateral development agencies, together with the industry and NGOs, could launch concerted action through funding and advice to give a serious boost to crop yield increasing methods and use of by-products.

We believe that the combination of these and potentially other mitigation measures offer a more promising way to address ILUC than the policy options of assigning blanket ILUC factors to different feedstocks or increasing the requirements of already significant GHG reduction requirements of biofuels.

3. Long-term security for investments is necessary for transition to new generations of feedstocks

Industry has invested billions of euros in recent years to build renewable energy production facilities in response to RED and FQD directives. A recent analysis has suggested that the current average annual capital investment in all forms of renewable energy in Europe is around 35 Billion euros.[11] The investment signals provided by these directives have fostered technological innovation and a wave of job creation and economic growth in the renewable energy industry in Europe and beyond.

These renewable energy investments have been made with long-term horizons in mind. Through a multi-year investment program just completed, Neste Oil alone has invested some 1.5 billion euros in Europe (Rotterdam, Porvoo, Finland) and Asia (Singapore) for producing its innovative and clean-burning renewable NExBTL diesel. NExBTL is

[10] *Making Integrated Food-Energy Systems work for People and Climate' – An Overview*, Bogdanski, Dubois, Jamieson and Krell, FAO, 2010 (http://www.fao.org/docrep/013/i2044e/i2044e.pdf)
[11] Financing renewable energy in the European energy market, Ecofys, 2011.

produced from a range of sustainably produced feedstocks, including waste animal and fish fat, rape-seed oil, crude palm oil and by-products of palm oil refining.

Recouping these kind of investments are necessary for the industry to make the longer term shift toward new generations of feedstocks, such as microbial oil and algae oil. Land use requirements for these feedstocks would be small. Neste Oil is investing 80% of its R&D effort into these new feedstocks. However, their use on a significant commercial scale is still probably a decade or more away based on current progress, due to yet unproven technology, high costs and the necessary timeframes from R&D and piloting to successful large scale industrial production.

Neste Oil is concerned that assigning ILUC factors to feedstocks or biofuels in Europe in particular could very well jeopardize the development of new generations of feedstocks by stranding the current, large investments that need to be recouped. A significant cash-flow is needed to finance the necessary R&D, piloting and capital investment in view of transition to new generations of feedstocks.

The necessary investment security requires “grandfathering” of existing production facilities from any possible ILUC factors, as well as realistic understanding of availability of new generations of feedstocks at significant commercial scale.

4. Possible unintended consequences of ILUC policy

Neste Oil is concerned that ILUC policy based on assigning blanket ILUC factors to feedstocks could have a series of unintended environmental, developmental and economic consequences without reaching its climate policy goals.

The RED directive already guarantees that biofuels reduce carbon emissions by setting requirements for direct emission reductions (35 % compared to fossil fuels now, and 50% reduction in 2017), and by providing a detailed GHG calculation methodology. Assigning a blanket ILUC factor to biofuels would entail a risk to exclude sustainably produced biofuels from markets.

4.1. Sustainability efforts of European biofuels industry at risk ?

The biofuel industry in the EU is currently one of the main drivers of sustainability in agriculture in many third countries. This is because of the stringent sustainability criteria enshrined in the RED and FQD directives. Since European biofuel producers require traceability of feedstock and sustainability certificates, the whole supply chain needs to adopt sustainable practices and must therefore refrain from expanding into areas where land types are banned by the European directives. No such criteria exist as yet for other sectors which require use of agricultural land (food, cosmetics, textile, pharmaceutical), and do not exist in most jurisdictions.

In addition to the positive effects throughout the supply chain, significant governmental action has also ensued. One example is the palm oil industry in Malaysia[12] and

[12] The palm oil sector is one of the sectors under “National Key Economic Area” of the Economic Transformation Programme (ETP) initiated by the Malaysian Government in 2010. One of the Entry Point

Indonesia[13]. Both countries are taking concrete actions to eliminate the methane release to the atmosphere which is produced in the wastewater treatment at palm oil mills. The EU directives have played a significant role in moving this forward.

If ILUC policy was to exclude certain feedstocks from the biofuel pool, the positive sustainability developments would likely grind to a halt, as the supply would be directed to other uses than biofuels or to other jurisdictions without sustainability criteria.

4.2. Sustainable biofuel production as a driver of economic development

According to UN Food and Agriculture Organisation (FAO) safe integration of food and energy production may be the best way to improve national food and energy security whilst reducing poverty in a climate friendly way.[14] Farming systems that combine food and energy crops present numerous benefits to poor rural communities. Using such integrated systems, farmers can also save money from reduced use of fossil fuels and through substitution of chemical fertilizers with slurry from biogas production.

The role of palm oil in rural development has received particular attention from the World Bank, given the concerns over tropical deforestation. In its report published in April 2011[15], leading to the end of a year long moratorium on new investments in palm oil projects, the World Bank found that:

> *"The palm oil sector employs an estimated 6 million people worldwide and generates more jobs per hectare than other large scale farming operations. The sector is largely driven by private sector investment and includes a large number of smallholder farmers. Smallholder farmers are involved in nearly 40 percent of Southeast Asia's area under oil palm cultivation and over 80 percent of Africa's area under oil palm cultivation. While income earned by smallholders can vary widely according to the form of engagement and market access, smallholders regularly report achieving more income from oil palm than alternative crops. This is causing increasing numbers of smallholders to enter the sector as global demand for palm oil continues to grow."*

The World Bank went on to conclude that:

> *"The net environmental and social impacts of oil palm depend on where and how it is developed. Problems arise when strong economic incentives for expansion are superimposed on a governance framework that has weak capacity for guiding the*

Projects (EPP) is to get all palm oil mills to trap biogas from POME for heat and power generation by 2020. http://www.mpob.gov.my/index.php?option=com_content&view=article&id=992%3Ankea-national-biogas-implementation-epp5&catid=153&lang=en.

[13] In Indonesia, a new, legally binding regulation requiring a reduction of GHG emissions of palm oil production is being implemented. This regulation is called the Indonesian Sustainable Palm Oil (ISPO) standard and it requires the reduction of GHG emissions in oil palm plantations. The ISPO certification system is mandatory and by 2014 all enterprises must implement it.

[14] *'Making Integrated Food-Energy Systems work for People and Climate' – An Overview*, Bogdanski, Dubois, Jamieson and Krell, FAO, 2010; ibid.

[15] The World Bank Group framework and IFC Strategy for Engagement in the Palm Oil Sector http://www.ifc.org/ifcext/agriconsultation.nsf/AttachmentsByTitle/Final_PO+paper_Mar2011/$FILE/WBG+Framework+and+IFC+Strategy_FINAL_FOR+WEB.pdf

development of new oil palm plantations onto areas where the environmental and social impacts are minimized... A focus on increasing the productivity of existing oil palm plantations, when combined with good governance, could limit pressure on expansion into forest lands, and most importantly, addressing the productivity differentials between large plantations and smallholdings could benefit the poor. Improving access to markets and finance for independent smallholders, and strengthening farmer extension services, would also deliver additional benefits to local populations."

4.3 Effects of shifting demand – higher food prices?

The world oil seed markets are very sensitive to shifts in demand and supply, and are therefore characterised by quick and large volatility of prices. If the main non-European oil plants (soya and palm oil) were taken out of the European biofuel pool through ILUC factors, and an equivalent demand was shifted to European grown rapeseed and sunflower oil, the impact on the prices of the latter could be dramatic. This would mean higher food prices in Europe, but likely also globally, due to integrated nature of world vegetable oil markets.

4.4. Increased dependency on imported fossil diesel and increased oversupply of gasoline in Europe?

For years, Europe has had a large diesel deficit and a gasoline surplus. In other words, too little diesel is refined in the EU to meet the intra-EU demand, while there is oversupply of EU refined gasoline. Consequently, the EU needs to import diesel oil, while its own refining industry suffers from thin or negative margins because of oversupply of gasoline.

Taking out significant portions of the biodiesel and renewable diesel feedstock pool by blanket ILUC factors would result in a situation where the biofuel mandates set by RED and FQD directives would have to be met increasingly by ethanol blended gasoline, if ethanol was assigned lower ILUC factors. The additional fossil diesel demand resulting from disqualification of high ILUC factor biodiesel feedstock from the diesel pool would have to be satisfied with imports from outside of the EU.

4.5 ILUC and international trade

European and non-European stakeholders have already expressed concerns about the compatibility of ILUC policies and WTO rules. The Brazilian Sugar Cane Association, UNICA fears that ILUC might turn into a non-tariff barrier. "*It is difficult to base the legislation on such immature science. It would be easily challengeable at the WTO*", said Géraldine Kutas, head of UNICA liaison's office in Brussels in 2011[16]. The European Biodiesel Board (EBB) has also stressed that the introduction of ILUC "*should be assessed against the World Trade Organization's rules*"[17]. These concerns are widely hared and growing among 3rd countries rich in biofuel feedstocks and production potential.

[16] European Voice, "Growing pressure to change EU biofuel policy", 28/4/2011. http://www.europeanvoice.com/article/imported/growing-pressure-to-change-eu-biofuel-policy/70930.aspx
[17] European Biodiesel Board (EBB) Press Release 29/5/2009 http://www.ebb-eu.org/EBBpressreleases/EBB%20position%20on%20ILUC%20July29%202009.pdf