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Input to SOU 2019: 11 Biojet för flyget

Aviation Biofuels - Climate Impact and Sustainability

- Air traffic is an important source of greenhouse gas emissions. In order to avoid dangerous climate change, it is crucial to find alternatives that replace fossil fuels, such as electric aircrafts, electrofuels and sustainable biofuels.
- However, with today's mode of production, certain types of biofuels can cause higher emissions than fossil fuels. Recent studies have found that greenhouse gas emissions from palm oil-based fuel are higher than those from fossil fuels, because increased demand for palm oil leads to increased deforestation.
- Despite the fact that biofuels made from soy and palm oil are not environmentally friendly, these have dominated the market because they outperform other feedstock on price.
- It is crucial that policies that promote the use of biofuels contain a clear ruleset for excluding biofuels with a high risk of deforestation and accompanying greenhouse gas emissions.
- Introducing a requirement that all biofuels used to comply with the policy must be "advanced biofuels"¹ will ensure that only the biofuels with a positive climate impact are allowed. This will also exclude biofuels based on palm oil and soy. Such a requirement will also help to increase the competitiveness of biofuels produced domestically in Sweden.
- The Swedish authorities' report on biofuels in aviation proposes that the sustainability criteria for biofuels and bioliquids set out in Article 26 of the EU Renewable Energy Directive be used. However, these criteria are insufficient for avoiding deforestation risk and ensuring a positive climate impact, because they do not take account of indirect deforestation risk (ILUC).

¹ In this briefing, the term 'advanced biofuels' is used to refer to biofuels produced from a set of feedstocks listed in Annex IX of the EU Renewable Energy Directive, a list of mostly waste and residue-based materials.

- The EU Delegated Act on biofuels with high and low ILUC risk, which was approved earlier this year, seeks to address these shortcomings in the Renewable Energy Directive currently in force (RED I). Although the Act contains a good basis for assessing which feedstocks have a high deforestation risk, it defines *only* palm oil as a feedstock with a high ILUC risk.
- Soy also has a clearly higher deforestation and climate impact than other feedstocks and should therefore also be included in a high-risk category. The recast Renewable Energy Directive allows individual countries to impose stricter requirements on the types of biofuels that can be used, taking into account best available evidence on indirect land-use change impact
- Sweden can choose a model that only allows advanced biofuels; this is what the Norwegian blending mandate for biofuel in aviation requires. This will in practice exclude feedstocks with a negative climate effect such as palm oil and soy, provided that the palm oil by-product PFAD is not classified as a waste or residue). Alternatively, Swedish authorities may base their model for which feedstocks to allow on the EU Renewable Energy Directive, but impose stricter requirements that completely exclude palm oil- and soy-based biofuels.
- It is also recommended to include electrofuels in Sweden's aviation fuel mandate. Electrofuels are produced synthetically from renewable electricity, water and CO₂, by first making hydrogen through electrolysis and then adding CO₂ to synthesize a hydrocarbon. These fuels do not currently exist on the market, but the technology is available and some production pathways are already certified for aviation use. For their production to be scaled up in a relevant timeframe for decarbonisation, their development needs to start as soon as possible, provided there are robust sustainability requirements from the beginning. Electrofuels are currently not part of the proposed target on aviation, but offer a much more scalable solution to decrease aviation emissions than advanced biofuels can, and thus need to be kick-started.

Increased demand for biofuels may cause deforestation boom

The EU's sustainability criteria for biofuels require that biofuels provide a 50 percent reduction in greenhouse gas emissions over the life cycle compared to fossil fuels. In addition, there are requirements for land use, which must ensure that the raw material for the biofuel is not from land with high biodiversity value or high carbon stock.

However, there is broad agreement that the main problem with using palm oil for biofuels is that increased general demand for palm oil is driving deforestation in countries such as Indonesia and Malaysia. This is true even if the palm oil purchased by the biofuel producers does not come from recently deforested areas and is thus certified or "deforestation-free"; this is due to the "indirect land use change (ILUC)" it causes.

Today, approximately 45 percent of all new palm oil plantation expansion occurs at the expense of forest or peatlands that are done over rainforest or peatlands, according to the EU Delegated Act of 13 March 2019². As long as this continues, palm oil-based biofuel will have a very high deforestation effect (ILUC effect). Alongside palm oil, soy also has a significantly higher deforestation and climate footprint than other biofuel feedstocks.

According to the EU Delegated Act, the share of expansion of soy production globally leading to deforestation is 8 percent. The EU's sustainability criteria for biofuel accordingly do not take into account this deforestation effect. It is important to note that biofuels based on soy and palm oil, although certified according to these criteria, still lead to more deforestation.

The report "Driving deforestation" launched by Rainforest Foundation Norway in January 2018, shows how the focus on biofuels in the most important markets in the world will drive sky-high demand for palm oil³. If the current and proposed targets for future biofuel consumption are to be implemented without strong measures against using palm oil feedstock, the demand for palm oil for biofuels in 2030 may be more than six times higher than today - a total of up to 67 million tons. This is more than the entire current global production of palm oil.

Increased palm oil production will result in the establishment of oil palm plantations in areas where there is currently rainforest or peatlands. According to the report, the growing biofuels market could lead to deforestation and destruction of rainforests corresponding to the entire area of Denmark, if strong restrictions are not imposed on the use of palm oil as a feedstock. This would entail an increase in greenhouse gas emissions of 7 billion tons of CO₂, equivalent to the US annual greenhouse gas emissions, for the next two decades.

The EU's Renewable Energy Directive allows for stricter requirements from member states

As mentioned, the EU's sustainability criteria for biofuels do not take into account that the high demand for palm oil for biofuels causes deforestation in rainforest countries, through indirect land-use change effects (ILUC).

The EU has earlier this year approved a Delegated Act on biofuels that deals with indirect land-use change, stating that palm oil-based biofuels have a high deforestation risk thus cannot be

² https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.133.01.0001.01.ENG&toc=OJ:L:2019:133:TOC

³ https://d5i6is0eze552.cloudfront.net/documents/Publikasjoner/Andre-rapporter/Cerology_Driving-deforestation_Jan2018.pdf?mtime=20180122234132

used to comply with the target for the use of renewables in transport of the recast Renewable Energy Directive (RED II). This is an important supplement to the EU's sustainability criteria. However, the Act still allows for the use of a certain amount of palm oil under a scheme for certification of palm oil-based biofuel volumes that have a demonstrably low ILUC risk.

At the same time, it is problematic that soy in the Act falls outside the limit set by the Commission to define what it chooses to define as high deforestation risk. Like palm oil, soy also has a significantly higher deforestation and climate impact than other biofuel feedstocks, and the percentage of global soybean production leading to deforestation is 8 percent according to the European Commission's review on the status of production expansion of relevant food and feed crops worldwide, which accompanied the Delegated Act. This is close to the 10 percent value that was set as the threshold for inclusion in the high ILUC risk category. In addition to being clear from the Commission's report, it has also been concluded in other studies published by the Commission that soybean in addition palm oil is an import product with a particularly high deforestation risk⁴.

The Directive allows member states to go further in limiting the types of biofuels that can be counted towards renewable energy targets than what the Directive sets at the EU level (specifically a cap on crop-based biofuels of 7 percent). As stated in Article 25 (1), Member States may distinguish between different types of biofuels, on the basis of the best available knowledge on ILUC effect (emphasis added):

“Member States may set a lower limit and **may distinguish [...] between types of biofuels, bioliquids and biomass fuels produced from food and feed crops, taking into account best available evidence on indirect land-use change impact.** Member States **may for instance** set a lower limit for the contribution from food or feed crop-based biofuels, bioliquids and biomass fuels produced from oil crops.”

In other words, even on the basis of the provisions of the EU's recast Renewable Energy Directive, one may exclude both soy and palm oil on the basis of ILUC risk.

There are still concerns about the loopholes that still exist in the regulations, as well as about the ongoing lack of clarity regarding how the certification scheme for biofuels with a low ILUC risk will work in practice. There is a risk that the remaining derogation provisions will incentivize the continued use of palm oil-based biofuels, without ensuring that indirect deforestation effects are avoided.

⁴ Ecofys, Millieu, & COWI. (2018). Feasibility study on options to step up EU Action against Deforestation. Luxembourg. Se http://ec.europa.eu/environment/forests/pdf/feasibility_study_deforestation_kh0418199e_nn_main_report.pdf og European Commission. (2013). The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation. European Commission.

It is therefore very important that some Member States draw up clear guidelines to ensure that these loopholes in the EU regulations do not contribute to a negative climate effect when using biofuels.

Norwegian authorities introduce aviation fuel mandate based on only advanced biofuels

In October 2018, the Norwegian authorities announced that they will introduce a biofuel mandate for aviation from 2020. The mandate entails that aviation fuel retailers must blend 0.5 percent advanced biofuel into jet fuel from 2020⁵. It has been announced that there will be a sharp escalation in the volume blending obligation until 2030.

Advanced biofuels are biofuels made from waste and residues. This ensures that problematic palm oil and soy-based biofuels with high greenhouse gas emissions are excluded.

Norway will also exclude biofuels with a «high deforestation risk» in road transport, after the parliament in December 2018 decided to exclude biofuels with a «high deforestation risk» from Norway's biofuels policy. A proposal for a new set of rules will be put forward in conjunction with the national budget for 2020, in October 2019.

Recommendations to the Swedish government's draft policy on aviation biofuels

The purpose of aviation biofuel policies is to reduce greenhouse gas emissions. The Swedish government's inquiry emphasizes that a greenhouse gas reduction obligation in aviation will favor biofuels with the best climate effect. However, given today's biofuels market there is a significant risk that palm oil- and soy-based biofuels will be widely used. The experience from the road transport sector has shown that palm oil- and soy-based biofuels outperform environmentally friendly biofuels at a large margin on price. There is every reason to believe that this will also happen in the aviation sector unless the regulations ensure that the use of biofuels based on palm oil, soy and other high deforestation risk crops is restricted.

Should the proposal be introduced without such fuels being excluded, the consequence of the fuel mandate is most likely to be increased global emissions of greenhouse gases.

When using only the EU's sustainability criteria and a Life Cycle Analysis (LCA) perspective such as the one proposed in the Swedish fuel mandate for aviation, it is important to be aware that even if the ILUC emissions associated with palm oil-based biofuels are higher than for all other types of biofuels, the same type of biofuels can deliver significant emissions reductions relatively speaking, from a purely LCA perspective. This is confirmed, for example, by the fact that batches of palm oil-based biofuels used to comply with the biofuel blending mandate for

⁵ <https://www.regjeringen.no/no/aktuelt/biodrivstoff-i-luftfarten/id2613122/>

road transport in Norway in 2018 were characterized by, in part, large reductions in life-cycle emissions - up to 87 per cent.

Rainforest Foundation Norway therefore strongly warns against introducing the proposed GHG reduction obligation in Swedish aviation without explicitly excluding fuel based on high-deforestation feedstocks, such as soy and palm oil, from the scheme.

Our recommendations:

It is crucial that an aviation biofuel policy already in the initial phase precludes the use of feedstocks which cause serious negative environmental consequences. A regulatory framework to ensure this must therefore be in place when such a mandate is introduced. The study presents an ambition of 30 percent volume blending by 2030. With such a large volume, there is a significant risk that palm oil and soy will be used as long as the regulations allow for it, and the situation in road transport shows that this is also profitable for the fuel companies.

As the Swedish authorities report, there are few established biojetfuel producers worldwide. Palm oil and by-products such as PFAD constitute a significant proportion of the feedstock portfolios of the largest biofuel producers in Europe, including those which are also considered to be able to deliver large volumes in the medium term, such as Neste, ENI and Total. This is also evident in the Norwegian authorities' impact assessment carried out by the Environment Agency, Avinor and the Civil Aviation Authority.

Rainforest Foundation Norway recommends that Swedish authorities develop a robust regulatory framework to exclude biofuels with a high deforestation risk in fulfilling the GHG reduction obligation in aviation. This can be done in various ways. Although palm oil and soy are the feedstocks with the highest negative climate effect, it will probably be expedient to design "feedstock neutral" regulations that exclude feedstocks on the basis of high deforestation risk and not feedstock names.

- Establishment of a GHG reduction obligation based on only advanced biofuels, which will ensure that feedstocks with high greenhouse gas emissions and deforestation risk such as palm oil and soy are excluded. It is important that PFAD is excluded as a feedstock, through explicitly defining it as not a waste/residue.
- Alternatively, a reduction obligation can be introduced based on the EU's delegated act, which also approves crop-based biofuels, but where requirements that exclude high ILUC biofuels, such as palm oil and soy based biofuels, are established. This can be done by setting a lower threshold value / limit (for example above 5%) for the amount of deforestation risk that can be accepted for biofuel feedstocks that are included in the biofuel mandate.

- It is also recommended to include electrofuels in the aviation policy. Electrofuels are currently not part of the proposed target in aviation, but offer a much more scalable solution to decrease aviation emissions than only using advanced biofuels.
- There should also be a requirement that the aviation fuel retailers on a quarterly basis publicly disclose information on volume of biofuels retailed, which feedstocks these volumes are based on and the feedstocks' share of total volume, as well as the climate benefit of the respective feedstocks.