Written Submission for the Pre-Budget Consultations in Advance of the 2019 Budget

By Nikita Pavlenko, Researcher at the International Council on Clean Transportation

List of Recommendations:

- **Recommendation 1:** That the government fund an Indirect Land-Use Change (ILUC) assessment and stakeholder engagement as part of the development of its Clean Fuel Standard. The aim of this work would be to develop and implement an accurate set of carbon intensity values in order to ensure the proper accounting for greenhouse gas (GHG) reductions under the Clean Fuel Standard (CFS).
- **Recommendation 2:** That the government provide funding in the amount of $ 500,000 for the ILUC assessment necessary to support the development of the CFS

Importance of ILUC accounting

The below comments summarize the risks inherent to ILUC within the context of fuel policies worldwide and suggest a methodology for the inclusion of ILUC within the proposed CFS policy. They are taken from the comments submitted through the consultation process for the CFS and reflect ICCT's position taken during the course of the technical working group convened by Environment and Climate Change Canada (ECCC).

It is difficult to observe iLUC because it's impossible to see what the world would have looked like in a counterfactual scenario with no biofuel policy. As explained regarding Canadian canola harvested area above, it is impossible to separate out the many disparate drivers of agricultural changes when looking at historical data. Therefore, economic modeling is necessary to evaluate the aggregate impacts of biofuel policies on agricultural markets. Looking forward, to isolate the impact of biofuel policy specifically, it is necessary to use economic models to simulate global scenarios with and without biofuel policy. Use of these models has been the accepted scientific standard in major low carbon fuel policies in the US, California, and EU (EPA, 2010; ARB, 2015a; Laborde, 2011; Valin et al., 2015).

If Canada does not account for or otherwise address ILUC, the actual GHG reductions achieved by the Clean Fuel Standard will be substantially lower than reported. In the EU, the Renewable Energy Directive (European Union (EU), 2010) mandates 10% use of renewable energy in transport in 2020 but does not account for ILUC. As a result, the policy is expected to be met almost entirely with food-based biofuels that generate substantial ILUC emissions. In fact, the mix of food feedstocks used for biofuel in the EU is estimated to have ILUC emissions high enough to reverse the previously perceived climate benefits of the biofuel policy. With the most up-to-date ILUC science, we now understand that the EU's biofuel policy will result in net GHG emissions compared to petroleum (Figure 6). **Because of a failure to account for ILUC, the EU has perversely supported biofuels that are worse for climate than fossil fuels.**

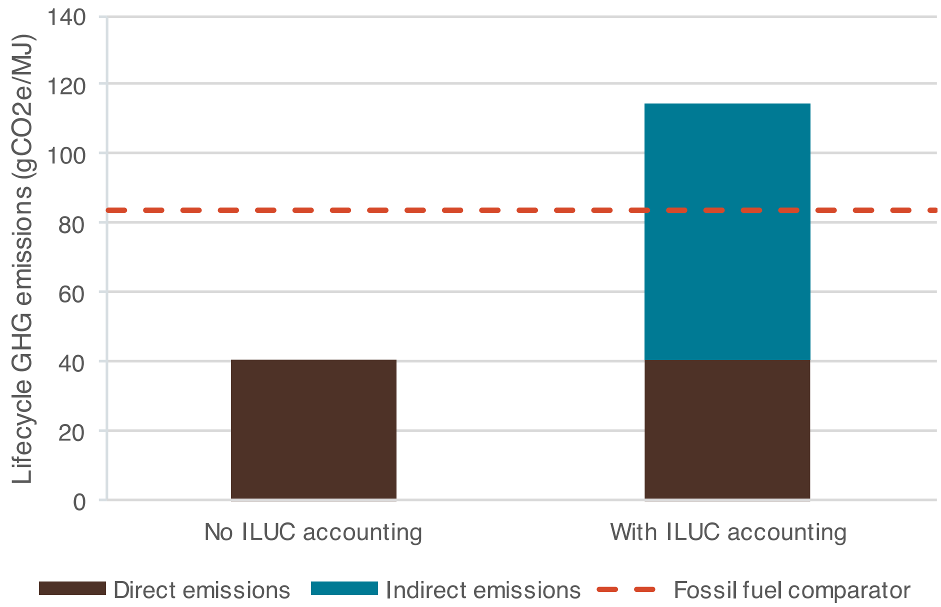

Figure 6: Lifecycle GHG emissions from EU biofuel policy with and without ILUC accounting. Source: Valin et al. (2015) and European Union (2009)

The perverse impacts of failing to account for ILUC will be even worse in Canada's Clean Fuel Standard, because Canada's policy aims to incentivize biofuels on the basis of their GHG reduction. With ILUC accounting, we have a completely different understanding of which biofuel feedstocks deliver the greatest benefits compared to if we considered direct emissions alone (Figure 7). For example, palm biodiesel appears to be one of the lower-carbon feedstocks shown in Figure 7 on the basis of direct emissions alone. However, when we include indirect emissions, it is clear than palm biodiesel has the worst climate impact of these feedstocks, and has an even greater carbon intensity than the petroleum baseline. At the same time, landfill gas appears to be a relatively poor-performing feedstock on the basis of direct emissions, but in fact offers much greater GHG benefits compared to most of the other feedstocks in Figure 7 when accounting for ILUC. In this figure, we use ILUC emission estimates performed for California's Low Carbon Fuel Standard (ARB, 2015a), and median direct emission values for approved pathways of each feedstock category in the Low Carbon Fuel Standard (ARB, n.d.), except for palm biodiesel, for which we take the direct emission estimate from EPA (2012).

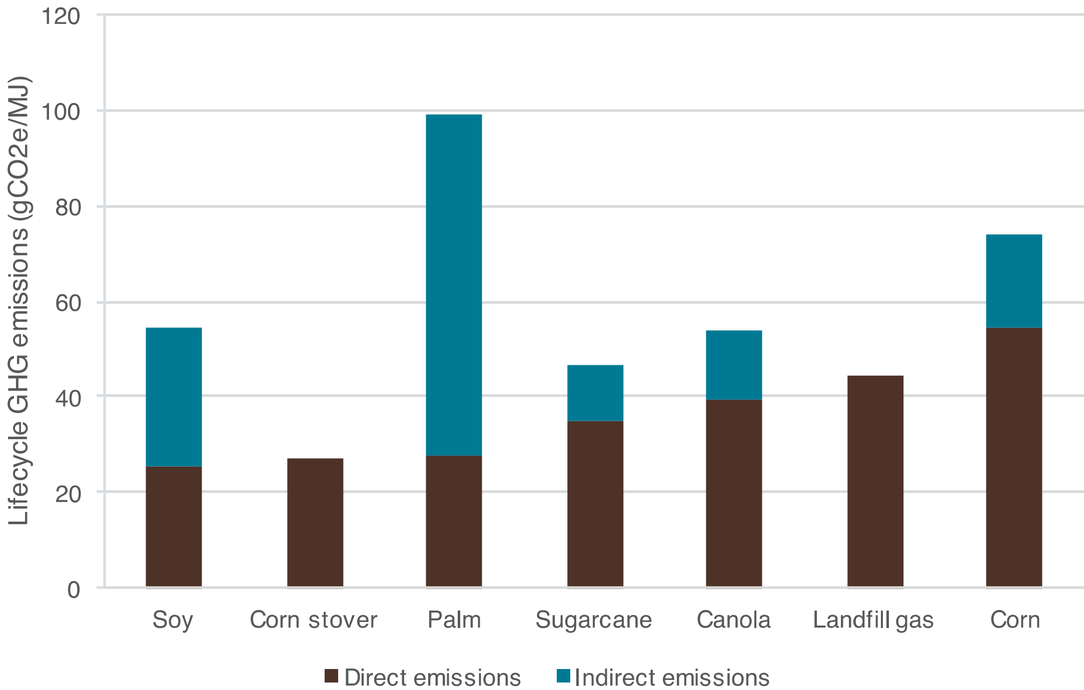

Figure 7: Lifecycle GHG emissions of common biofuel feedstocks with direct and indirect emissions. Source: ARB (2015a) and EPA (2012)

If the Clean Fuel Standard incentivizes different types of biofuels on the basis of GHG performance (presumably tradable credits), it would award greater credit values per liter to the wrong biofuels in the absence of proper ILUC accounting. Figure 8 compares the credit value that would be awarded on the basis of direct emissions alone to the actual GHG impacts when ILUC is accounted for. Palm biodiesel would perversely be awarded high credit value while actually worsening climate change, and very low-carbon pathways such as corn stover and landfill gas would be under-incentivized. **The benefit of differentiating pathways in a GHG standard would be erased if ILUC accounting is not implemented.**

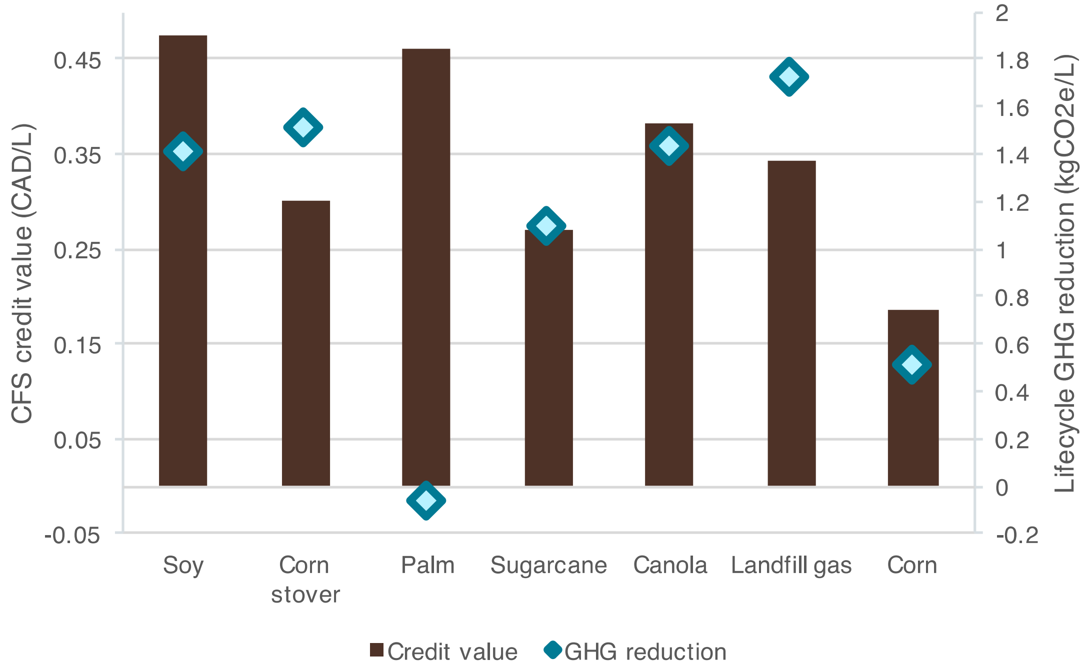

Figure 8: Estimated policy value of the Clean Fuel Standard for common biofuels compared to lifecycle GHG reduction per liter. Source: ARB (2015a) and EPA (2012)
**Note: Assuming CFS credit value of 200 CAD/tCO_2e reduction. Landfill gas is shown on the basis of gasoline-equivalent liters.*

Land use change emissions are not only a problem for food-based biofuels. Because the Clean Fuel Standard includes solid fuels, it is likely to incentivize the replacement of coal with biomass, as well as possibly the production of cellulosic biofuel from biomass. While using forestry residues and short-rotation woody crops on unused land with low carbon stocks can provide high GHG benefits (Valin et al., 2015), using stemwood for bioenergy results in a significant carbon debt. Forest stands store a substantial amount of carbon in biomass (IPCC, 2006). When that biomass is harvested for bioenergy, it takes many years to regrow. During that time, there is less standing biomass on the land and a greater total amount of CO_2 in the atmosphere. Eventually, the trees will regrow and be harvested again for energy, and after a period of time the climate benefit from displacing fossil fuels will exceed the carbon debt as well as the emissions from harvesting, transporting, and processing the biomass; this is called the payback time. The payback time represents the period of time at which the total emissions from harvesting trees exactly matches the avoided emissions of displacing fossil fuels; GHG reductions are only achieved **after** the payback time. Most studies estimate payback times for stemwood or whole trees to be very long. The European Commission's Joint Research Center performed a comprehensive review on estimated payback periods of stemwood and whole trees (JRC, 2014). The median payback time in this review was 38 years. The only Canadian-specific study included in this review reported a payback time also of of 38 years for stemwood displacing coal when used for electricity and over 100 years when stemwood is used for biofuel production in Ontario (McKechnie, 2011).

Low carbon fuel policies in the US and California estimate calculate GHG emissions on the basis of 30 years (EPA, 2010; ARB, 2015), while the EU calculates GHG emissions on the basis of 20 years (EU, 2010). If Canada follows this convention, **it is very likely that stemwood or whole trees used for fuel production in the Clean Fuel Standard would increase GHG emissions compared to fossil fuels.**

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