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Looking beyond calculative spaces of biofuels: Onto-topologies of indirect land use changes

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ABSTRACT

By dedicating food to fuel, recent biofuel policy developments in the European Union have become part of the substantial substitution of existing land use patterns around the globe. This process has had various environmental and social consequences, commonly discussed under the topic of 'indirect land use changes' (iLUC). Although the European Commission has strived to mitigate the indirect biofuel related land use impacts, in this paper we show that the recent directive proposal on iLUC is rather a quick fix than a delicate attempt to grasp the topological and ontological polymorphism of the phenomenon. We will demonstrate this, firstly, by showing how the iLUC policy development of the Commission has been intertwined with the iLUC models that have quantified the indirect GHG impacts of various biofuel feedstocks. Secondly, we will examine how these calculative models have created a problematic ontological framing of the iLUC by concealing the manifold spatialities of this elusive phenomenon. Finally, the calculative models have not only posited iLUC into calculative nexuses of ordering; such calculations have also remained unable to explicate the heterogeneous topologies of actual biofuel production. We illustrate this crucial point by explicating three types of topological mediation – the fluid, the parasite and the fire – that cannot be acknowledged with the iLUC models or contemporary policies of European Union. In sum, by combining and rethinking the ideas of Heidegger, Latour and Serres, we argue for an onto-topological approach capable of taking into account manifold and complex topologies and ontologies of biofuel production.

1. Introduction

As a renewable energy source, which does not necessarily require major changes in the existing motor vehicle technologies or fuel distribution infrastructure, biofuels have raised high hopes of traffic de-carbonization, particularly in the European Union (EU). The EU now requires its Member States to reach a 10% share of renewable fuels in road transport by 2020 (EC, 2009a). During the last decade or so, we have witnessed a rapid growth in the EU's crop-based biodiesel and ethanol consumption. As has been argued, this has not happened without impacts on agricultural production (OECD/FAO, 2012). The re-allocation of crops to fuel has caused, almost without exception, changes in existing land use practices, thus catalysing a substantial amount of dispersed *indirect land use changes* (iLUC) (IPCC, 2011: chapter 2; Laborde, 2011). In short, iLUC occur through various mediators that range from a displaced community of subsistence farmers to changes in the world agricultural commodity prices, which are connected with *direct land use changes*, such as the conversions of forests and pastures into plantations that yield biofuel feedstocks. The European Commission has been compelled to find suitable methodologies for assessing the iLUC question and, if necessary, to design policies that can properly mitigate these negative consequences of biofuel development. Several attempts to model the scope of the iLUC have been undertaken; unfortunately, indirect land use changes remain quite elusive in nature, as their occurrence can have considerable temporal and spatial distance to those direct land use changes (dLUC), which have catalysed them in the first place (see Andrade de Sa et al., 2013). Whatever their success has been, it is clear that the models have had remarkable influence on the way in which iLUC has been discussed and framed in the European Union's policy making (Di Lucia et al., 2012; Levidow, 2013; Palmer, 2012).

In this paper, we focus on scrutinizing the calculative framing of the iLUC-question in the European Commission's biofuel policies. Even though geographical work on the subject is still relatively scarce (Bridge, 2010: 824–825), recently a growing interest in manifold geographies and political ecologies around crop-based biofuels has emerged. Attention, however, has been mainly centred on topics such as food security (Hought et al., 2012), deforestation (Gao et al., 2011), migrant workers (McGrath, 2013), the promotion of green capitalism (Prudham, 2009), and the influence of local mapmaking on biofuel politics (Neville and Dauvergne, 2012). Even

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though there has been some interest in the sustainability of the EU's biofuel policies (Levidow, 2013), or alternatively, in the scope of the political possibilities in climate change responses (Wainwright and Mann, 2013) or the calculative ontologies behind the politics of carbon economy (Lansing, 2010), we argue that a joint reading of space, politics and ontology allows us a more profound view of the problems behind the contemporary calculative politics of the EU's biofuel policies. Our aim here is twofold: to discuss the relation between EU policies and iLUC models, and to explore what we call 'onto-topological' implications of this relation. In this respect, our first aim is to show how the treatment of indirect land use impacts in the EU's biofuel policies has been based on a narrow politics of what we call by following Martin Heidegger the calculative 'enframing' (*das Gestell*). In particular, we will show how this is due to the use of different quantitative models as a basic signpost for approaching the iLUC question. Secondly, we will explain how such calculative 'enframing' has created topological insufficiencies to the EU's biofuel policies.

We, of course, do acknowledge the positive impact the agro-economic models have had on the process of making the iLUC phenomenon solid enough to become tackled with the policy instruments of the EU. In what follows, we will nevertheless show how the problem with the biofuel policies is not so much of the reliability of the epistemic representations these models produce, but of the way the models ontologically purify the actual place-based land use changes by implementing spatially indifferent nexuses of calculative measurement upon the iLUC. In order to make a case for this thesis, we will further explicate why and how the ontological politics of calculative 'enframing' has remained incapable of taking into account the unpredictable topologies of biofuel production. We will do this, by discussing the iLUC question against the topological and ontological insights originating more or less in the works of Latour (1987, 1993, 2005), Serres (1982, 2007) and Heidegger (2003; see also Ryan, 2011; Malpas, 2012). By 'topology', we hence refer to the heterogeneous place-based 'assemblages' or 'gatherings' of biofuel production, which are constituted out of the multiple unpredictable connections (and potentialities) between human and non-human actors, 'enframing', in turn, denoting a set-up that ontologically aims to frame the way these gatherings come-to-presence as placeless reserves of calculative ordering. We will depict how iLUC models, owing to their calculative ontology, do not (and cannot) take into account the way biofuel production is fundamentally constituted through the active spatial connections created by the vital and active effects of material things and human action. All in all, our aim is not to analyse onto-topologies of singular biofuel production sites, or to continue discussions concerning the finding of the most suitable model to quantify iLUC in terms of GHG emissions, but rather to grasp those topological and incalculable forms of indirect land use relations that the calculative ethos behind Commission's policies is unable to attend to.

We will proceed in three stages. The first part of the paper starts by presenting those key EU policy features that have had a central role in catalysing indirect land use changes. We shortly trace the Commission's policy-development concerning the iLUC until the recent directive proposal (CEC, 2012a) and demonstrate how iLUC models have had a profound impact on this legislation. Our overall purpose in the first part is to show how the Commission's separation of biofuels and food crops is an important policy decision that leans on the knowledge produced by the iLUC models. We start the second part of the paper by scrutinizing those calculative frameworks that the Commission used to define, govern and unfold the indirect land use changes (iLUC) of biofuel production. We aim at a more fundamental exploration of biofuel politics, which operates already at the level of ontology – i.e., through the ontological 'enframing' of iLUC phenomenon. By this, we do not wish to undermine the power of the Commission's policy making. Our aim is rather to explore the limits of the ontological horizon, which the calculative modelling and framing of the iLUC phenomenon has enclosed. Accordingly, in as much as the ontological scaffolding of 'enframing' constitutes a horizon of *possibility* for the policy decisions, it *purifies* the diversity of indirect land use impacts into a quantifiable realm of existence. By building upon the ontological approach more or less set by Martin Heidegger, we scrutinize the relation that the ontological politics of carbon governance has with the indirect land use impacts of the EU's biofuel consumption. In the third part of the paper, we conclude by examining how these calculations are intrinsically unable to tackle the forms of relatedness, unpredictable connections, vital materialities and indirect effects, which we see as constitutive for the actual topological formations of biofuel production. Accordingly, we understand both human and non-human entities as active and capable of creating and catalysing effects. We argue that the topological insensitivity of the EU biofuel policies does not come from the lack of proper calculations, but from the constricted ontological relation to things, which the calculative models, and the policies based on them, constitute. By questioning the linear and causal understanding of the relationship between biofuel policies and their (direct and indirect) land use impacts, the paper ends by proposing a non-calculative and topology-sensitive approach capable of scrutinizing the complex onto-topologies of biofuel production.

2. Designing the governance of iLUC in the European Union's biofuel policy framework

We begin this section by identifying three processes that have increased the potentiality for iLUC impacts to occur as a result of the rapid biofuel development of the EU prior to scrutinizing the interrelations of the iLUC policy making and the modelling. First, since the EU set its policies to support the commercialization of biofuels, the growth rates have been staggering. In 2001, biofuel consumption was around 930,000 tons of oil equivalent (toe) and a decade later already 13,600,000 toe, showing growth of 1460% (Systemes Solaires, 2004, 2012). Indeed, it can be argued that the first priority of the Commission was to create political and economic surroundings for the fast biofuel development. However, the incentivizing biofuel policies implemented in the EU were rather poorly equipped to steer biofuel development away from the direct and indirect ecological, social, and climatic problems that began to emerge due to the actual consequences of the fast growth in consumption (see UCS, 2012). Secondly, the majority of the negative consequences of biofuels are related to the first generation fuels. These are crop-based and therefore more land demanding. In comparison, advanced biofuels that are refined from wastes, residues or algae (often referred as the second and third generation of biofuels) have smaller land use impacts. However, their speed of commercialization has been slower than expected, which is one of the reasons EU Member States planned their biofuel consumption for the coming decade on the increasing utilization of crop-based biofuels (Beurskens et al., 2011). Thirdly, at the moment already 65% of EU rape oil production is refined into biodiesel although the total share of biofuels in road transport remains still below 5% (OECD/FAO, 2012: 88). As ICCT (2013: 6) indicates, EU imports of palm oil that mostly originates from South East Asia have grown substantially in relation to the increasing biodiesel consumption of the EU – although the palm oil is not refined into diesel but used in other sectors, such as food industry. Nonetheless, due to the limited capacity of domestic agricultural feedstock in fossil fuels replacement, also the share of imported biofuels has grown rapidly in the EU: in 2012, the share of imported ethanol was 15% and 30% for biodiesel (see Systemes Sol-