



# 3

## Neoliberal Bioeconomies? Co-constructing Markets and Natures

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### 3.1 Introduction

If we are to meet the targets of the 2016 Paris Agreement—especially, as stated in the document, ‘to pursue efforts to limit the [global] temperature increase even further to 1.5 degrees Celsius’ by 2030—then we need to do more, much more, and do so now. Primarily, we need to find ways to transition our carbon economies and societies to a low-carbon future, and do so with some urgency. How we go about this transition is the real issue we face now. At points like this, I am always reminded of Bill McKibben’s 2012 *Rolling Stone* article—‘Global warming’s terrifying math’—when it comes to the urgency of climate change: simply put, to keep to 2 degrees Celsius, he argued that humans can only release another 565 gigatons (Gt) of carbon dioxide. And that was back in 2012, we are now at somewhere around another 350 Gt.

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Several low-carbon transition pathways have been suggested in response to this very urgent imperative. One such pathway is called the ‘bioeconomy’. The bioeconomy—or, ‘bioeconomies’—is premised on replacing fossil fuels with renewable biological materials (e.g. plants, algae etc.) as the key underpinning resource in our economies (European Commission 2012; The White House 2012; German Bioeconomy Council 2015a, b). It is usually presented as a market-based transition pathway, rather than a wholesale transformation of our societies or economies—although it is also portrayed as the latter by some (e.g. Schmid et al. 2012). The bioeconomy is supposed to be a more sustainable (capitalist) economy because it is based on renewable resources that produce fewer greenhouse gas (GHG) emissions over their industrial life-cycle (Birner 2018). As a transition pathway, then, the bioeconomy entails a specific material political economy in which markets and natures are co-constructed. While this might seem like a classic case of the *neoliberalization of nature* (Castree 2008a, b; Bakker 2009; Bigger and Dempsey 2018), a more complicated process is at play, as I have discussed elsewhere (Birch 2019).

The bioeconomy is often presented as a ‘business-as-usual’ approach to resolving the problems of climate change, which tend then not to provide an actual solution to these problems (see Tyfield 2017). It has, as a result, been criticized for being too market-centric—or ‘neoliberal’—by a number of people, including myself. Despite the value in this ‘neoliberal natures’ approach (e.g. Kenney-Lazar and Kay 2017), I have found that this neoliberal natures framing frequently closes down debate about the bioeconomy, leaving little room to develop alternative bioeconomy approaches (e.g. agroecology). In particular, the neoliberal natures literature tends to reduce the relationship between markets and natures to a problematic imposition of markets as a social aberration on romanticized natures, even presenting nature as contesting or fighting back against neoliberalism. In this chapter, my aim is to problematize this neoliberal framing of the bioeconomy by exploring the co-construction of markets and natures, rather than the imposition of one on the other. I start by outlining what I mean by neoliberalism and neoliberal natures; I do so in order to emphasize the particularities and limitations of this approach. I then discuss the co-construction of

markets and natures in the bioeconomy as a way to try and understand ‘neoliberal bioeconomies’.

## 3.2 Neoliberalism

### 3.2.1 What Is Neoliberalism?

Neoliberalism is a term usually used to critique the prevailing *market*-based logics and responses to climate change, acknowledging that the term is increasingly contested (Springer et al. 2016; Birch 2017). It has been used in various ways over the last few decades, which means it can be difficult to parse what is meant when scholars—or others—use the concept. However, it is commonly used—across different critical traditions—as a way to characterize the expansion and extension of markets as the main way to organize society—across several different neoliberal schools of thought. In this sense, it is very much a political and analytical term, since it is frequently used to refer to a particular ‘market ethic’ (Harvey 2005) in which liberty and freedom are assumed to arise from private property rights and market contracts—see, for example, the arguments of people like Hayek (2001, 2011) or Friedman (1962). As mentioned, there are a number of schools of neoliberalism and numerous analytical traditions that are critical of these neoliberal schools and their ideas. I can only briefly discuss some of the differences here, before outlining how the extension of markets to environmental issues has been criticized.

It is possible to identify different schools of neoliberal thinking. The most well-known include the Austrian, Freiburg/Ordoliberal, Chicago, and Virginia schools (Birch 2015). However, when most people write about neoliberalism nowadays, they generally erase the nuances between differing schools by associating neoliberalism with the (later) Chicago and/or Virginia Schools. These two schools assume that everything can be treated as a market because they conceptualize everything as already a market (see Amadae 2016). The effects of this are to naturalize markets, thereby legitimating the installation of markets everywhere and the removal of state intervention in a naturalized ‘free’ market (Birch 2017).

The critical analytical traditions that have arisen in response to these schools of neoliberal thought are also pretty varied. Each critical tradition is different, but they share one commonality: the idea that neoliberalism entails the spread and entrenchment of markets (or market proxies) across society.

First, one of the earliest analysts of neoliberalism was Michel Foucault (2008), whose lectures on *The Birth of Biopolitics*, held between 1978 and 1979, provide the groundwork for a lot of later scholarship. In particular, Foucault outlined two modern variants of liberalism—Chicago neoliberalism and Ordoliberalism—that share similar political rationalities while differing in terms of the technologies they deploy in the governing of national populations. Later work by Dardot and Laval (2014), amongst others, draws on these insights to update Foucault for the twenty-first century. Generally, they are concerned with how neoliberalism produces specific subjectivities, identities, social relations, and so on; these are largely configured by the ‘economization’ of social life through the construction of individuals as what I call *market monsters* (Birch 2017). Here, these modern Foucauldians stress the individual transformation into an ‘entrepreneur of the self’—that is, the reconstruction of our selves through our acquiescence to a market (or business) logic in our ways of engaging with the world. We come, in this Foucauldian sense, to think *always* like a market.

Second, a similar tendency to subsume individual reflexivity under all-consuming market logics is also evident in the various Marxist—or Marxist-inflected—takes on neoliberalism. One set of perspectives frames neoliberalism as an elite class project, entailing the dispossession of our commons (e.g. nature) with an ideological worship of markets (e.g. Harvey 2005). Critically, this perspective acknowledges that elite interests often end up side-lining market-based rationales and legitimation where they come against the restoration of elite class power (ibid.). Class also figures in other Marxist perspectives, such as the state-theoretic approach of regulation thinkers, which has influenced much of the geographical and sociological literature on neoliberalism (Birch 2017). In particular, the geographical analysis of neoliberalism has tended to frame it as a ‘process’ of uneven political-economic restructuring—which generates messy and uncertain outcomes (e.g. Peck and

Tickell 2002; Larner 2003; Castree 2008a). One of the issues with this critical geographical take is that it rolls everything into the ‘neoliberalization’ process such that state, market, and non-governmental actors all end up implicated in the roll-out of markets—especially when it comes to resolving environmental problems, which I discuss below.

Finally, more recent critical literature on neoliberalism has tended towards ideational analyses of neoliberal concepts and their influence. Much of this tradition is based on philosophy, history, and political science. Key exponents of this view include Mirowski (2013) and his collaborators. They place greater emphasis on the power of ideas to shape material interests and political decision-making, especially through the creation of ‘thought collectives’ (ibid.). The epistemic tradition equates the spread of neoliberalism with—usually right-wing—political movements, meaning that they are concerned with how market-based logics are taken up.

### 3.2.2 Neoliberalizing Nature

While the above can only provide a brief introduction to the theoretical complexities of neoliberalism, it is helpful for introducing the key conceptual approach used to understand and critique the deployment of market-based instruments to solve environmental problems. Emerging over the last decade or so, this approach is generally defined by its focus on ‘neoliberal natures’ and has gradually built up a significant scholarship on a range of topics (see Bigger and Dempsey 2018). These topics, listed alphabetically, include agriculture (e.g. Essex 2016), biofuels (e.g. Birch et al. 2010; Levidow et al. 2012), climate change (Lohmann 2016), ecosystem services (e.g. Dempsey and Robertson 2012), forestry (e.g. Prudham 2005), genetics and genomics (e.g. McAfee 2003), and water (e.g. Loftus and Budds 2016). Several thorough reviews of this literature have also been produced over the last decade or so, including those by Castree (2008a, b, 2010a, b), Bakker (2009, 2010), and Collard et al. (2016).

Across this *neoliberal natures* literature, the proponents of market-based instruments and mechanisms are framed as advocates of certain

political-economic processes as well as certain policies (e.g. carbon pricing and trading) and technological solutions (e.g. biotechnology) as ways to resolve environmental problems. Markets are meant to solve a range of environmental problems, including the over-use of commonly-held resources (e.g. wetlands, oceans) through the extension of private property rights; the externalities generated from industrial activity (e.g. pollution, fertilizer runoff) through the creation of new quasi-commodities like emissions credits; and declining ecological and agricultural productivity (e.g. crop growth, bee loss) through new technologies like genetically modified seeds. Here, the role of the state is framed as an advocate and supporter of market-based solutions, facilitating their roll-out, rather than as a political means for collective action. Much of the critique of these market-based instruments and mechanisms centres on an understanding of them as a process—that is, on the neoliberalization of nature. Scholars working in this critical field are concerned with the specificities of this neoliberalization process, especially with the changes caused by the privatization, commodification, and marketization of nature. For example, *privatization* represents a sale of public assets (e.g. forest) to private sector actors; it is similar to *dispossession* although the latter entails the wholesale transfer (cf. sale) of public assets to the private sector without monetary returns.

There are at least two aspects of these debates worth considering more critically when it comes to understanding the bioeconomy, to which I turn in the next section. Both relate to the analysis of the biophysical materialities of markets and nature—and they both problematize the critique underlying the idea of the neoliberalization of nature (Birch 2019).

First, part of the analytical value of the neoliberal natures literature is the promise of theoretical consistency across various strands of research and substantive topics, outlining precisely what ‘neoliberalization’ process applies to what ‘nature’ (Bakker 2009). Something like marketization, for example, should share analytical similarities in its use throughout this literature for it to make sense to use the term ‘neoliberal’ as a way to define various happenings. Castree (2008a, p. 142) defines marketization as ‘the assignment of process to phenomena’ where, it is important to stress, something was ‘previously shielded from market

exchange'. Later, Castree (2010b, p. 1728) defines marketization as 'rendering alienable and exchangeable things that might not previously have been subject to a market', which is similar but also slightly different from the earlier definition. Both, though, treat the 'market' as a given (i.e. already existing), rather than social construct or instituted process (Polanyi 2001 [1944]), a point I will come back to. More broadly, Bakker (2010, p. 723) defines marketization as when 'markets determine resource allocation and pricing'—again, markets are treated as given, although she pluralizes them. Both scholars treat marketization as a 'political-economic' transformation, as something that happens to or is imposed on environmental phenomena (which was not subject to pricing beforehand). Markets are treated as an alien imposition on a natural phenomenon, as outside a set of natural/naturalized processes (e.g. rivers, forests, etc.).

Second, the neoliberal natures literature tends to valorize nature/s and represent nature/s as 'resisting' or 'contesting' market mechanisms, instruments and logics—this includes a range of environmental processes or systems (e.g. trees that do not grow straight, making it more difficult to harvest them). Nature resists neoliberalism to many of these thinkers; it has an agential materiality. An example is Castree's (2010a, p. 1752) comments that neoliberalism is 'defined by its engagement with the non-human world' and the 'challenge' nature represents to 'neoliberal policies over time'. Other examples include McCarthy and Prudham (2004), who argue that nature represents a 'check' on neoliberalism; Fletcher (2014), who argues that natural 'recalcitrance' limits neoliberalism; and Roff (2008), who argues that nature represents a fundamental challenge to neoliberalism. Such contestation is framed as reconfiguring neoliberalism; for example, privatization of water is disrupted by its biophysical materialities (Bakker 2010). Across this neoliberal natures literature, then, markets are characterized as an aberration of nature—its antithesis. As such, it actually repeats and reinforces the notion that political-economic and natural processes are distinct from one another, whether that is the intent or not. In a way, it naturalizes the idea that our biophysical world is the starting condition *on which* we end up acting.

Elsewhere, I have sought to push against these analytical assumptions, or starting points (Birch 2019). I think it is important to problematize

the idea that material nature is transformed by social-economic processes, on the one hand, and that markets are aberrations of a pristine nature, on the other hand. In contrast, I have sought to analyse the co-construction of markets and natures in order to understand the entanglement of our political-economic artefacts (e.g. markets) and biophysical materialities (e.g. nature). My point here is that nature and political economy are not distinct from one another. As Jason Moore (2015) notes, capitalism has an ecology to it. Markets and natures are co-constructed, meaning that specific markets emerge in conjuncture with specific natures. The question we need to ask then is what type of market-natures are we dealing with and how are they co-constructed.

### 3.3 Neoliberal Bioeconomy? Co-constructing Markets and Natures

As noted, a simple definition of the bioeconomy is the use of biomass (e.g. plants) as the main resource in the production of energy, goods and services, although this definition obscures the different emphases that different people place on it (see Birch 2019). The bioeconomy first emerges as a key policy strategy in the mid-2000s when both the OECD and European Commission (EC) produce policy visions and frameworks for its development. More recent policy strategies include those by the EU and the White House (e.g. European Commission 2012; The White House 2012). Although a rather esoteric concept—in that it was and still is rarely discussed outside of policy circles—the bioeconomy has become a major strategy in a growing number of countries (German Bioeconomy Council 2015a, b). There have been several reviews of the bioeconomy as a policy concept, strategy and framework, including work by myself (e.g. Birch et al. 2010; Birch 2016a, b, 2019). Others have stressed a range of dimensions to the bioeconomy, including its national and subnational characteristics (e.g. McCormick and Kautto 2013; Staffas et al. 2013), its relationship to sustainability (e.g. Pfau et al. 2014; El-Chickakli et al. 2016), its diverse manifestations and geographies (e.g. Bugge et al. 2016; Calvert et al. 2017b; Hausknost et al.



2017), and its political implications (e.g. Frow et al. 2009; Richardson 2012; Mukhtarov et al. 2017).

Rather than dwell on these aspects of the bioeconomy, though, my focus here is on how it has been implemented and how this entails the co-construction of specific markets and natures. As a potential transition pathway, then, the bioeconomy cannot be imposed top-down on an economy or natural environment as a simple policy proposal and policy framework. Its success necessarily depends on the configuration of a new political economy and a new natural environment, which can happen in different ways and involve different bioeconomies, some of which receive more policy support than others. As many authors note (e.g. Levidow et al. 2012; Schmid et al. 2012), bioeconomies can be very different from one another, and this impacts how we understand the bioeconomy and its potential. For example, a bioeconomy based on agroecology will involve a very different configuration of political economy and natural environment than one based on hi-tech biological technologies. The former has the potential to be more distributed, localized and democratic compared with the latter, which is determined more by centralization tendencies and capitalist imperatives. Evidently, these differences are important to study and analyse because they frame how we might want to roll-out the bioeconomy as a policy strategy and low-carbon transition pathway.

### 3.3.1 Market Development Policies for the Bioeconomy

To date, the bioeconomy has mostly been implemented through the roll-out of ‘market development policies’ (MDPs), driven by prevailing capitalist logics rather than challenging them. These MDPs are especially evident when it comes to the development of biofuels markets, which is the focus of the rest of this chapter. All such MDPs for biofuels are good examples of the way that markets are socially *instituted* and *organized* (à la Polanyi 2001 [1944]), rather than being some sort of naturalistic mechanism or set of economic laws. In examining these MDPs, it also becomes possible to see how their implementation is co-constructed with

specific biophysical materialities. At their base, these MDPs include a range of policy actions, including subsidies to support research and development as well as pilot or demonstration projects; mandates to regulate supply and demand; standards to integrate sustainability criteria and measurement; and physical infrastructure to embed supply chains (see Daemmrich 2015 on bioplastics and Birch 2019 on advanced biofuels for examples). A range of MDPs have been implemented around the world (see Table 3.1).

As this chapter draws on empirical material from Canada on the development of markets for conventional and advanced biofuels, I am going to outline briefly some of the relevant MDPs implemented in the Canadian context. I draw on Birch (2016a, 2019), Birch and Calvert (2015), and Calvert et al. (2017a) as my main sources for the rest of this section. These MDPs cut across federal and provincial scales and include those discussed in Table 3.1 (e.g. biofuels mandates, subsidies, standards), as well as others not included (e.g. feedstock supply chains).

First, the Canadian federal government's *Renewable Fuel Regulations* (RFR)—enacted in 2006 and implemented in 2010/2011—is the main biofuels mandate, stipulating 5% renewable content by 2010 for petroleum and 2% for diesel by 2011. The RFR does not mandate advanced biofuels, unlike similar biofuels mandates in countries like the US. Second, Canada has and has had a range of subsidies for the development of conventional and advanced biofuels: it started with a tax exemption scheme that was phased out in 2008 and replaced with a production credit, largely as a way to support domestic producers since anyone could claim the earlier tax exemption. Other initiatives included support for building new refineries. Third, Canada put in place feedstock supply chains as a way to ensure continuous supply through long-term contractual arrangements, like long-term timber cutting leases. Finally, Canada has participated in the development of international biofuels standards (e.g. ISO/TC 28/SC 7 Liquid Biofuels), although there have been significant limits on whether these standards can incorporate non-technical elements (e.g. sustainability, environmental and social goals).

**Table 3.1** Market development policies around the world

Policies	Details	Examples
Mandates	Covers biofuel blending mandates and renewable fuel standards (RFS) that require a particular percentage of biofuels in retail petroleum or specific volume of biofuel production	The US has a RFS stipulating the production of 136 billion litres of biofuels by 2022; the EU's 2009 Renewable Energy Directive (RED) set a 10% target for biofuels in transport fuels by 2020
Subsidies	Covers range of subsidies for bio-based products and energy, including biofuels. These subsidies range from incentives for energy production through funding for demonstration plants to loans and grant support for facility construction	Germany and the UK provide financial support for the development of demonstration and pilot plants
Research funding	Covers basic and applied research funding	Most countries have research support specifically directed at areas like biotechnology, biofuels, renewable energy, bio-based products, etc.; the EU, for example, has focused a significant proportion of Framework Programme 7 funding on the cross-cutting theme of the 'knowledge-based bio-economy'
Standards & certification	Covers the establishment of standards and the certification of new products and services, especially where this might involve the incorporation of sustainability criteria	The EU has established standards for bio-based products (e.g. CEN/TC 411)

(continued)

**Table 3.1** (continued)

Policies	Details	Examples
Labelling	Covers the creation of labels designed to create greater consumer awareness of new products and their sustainability characteristics	France has established the label <i>batiment biosourcé</i> for bio-based buildings

Source Adapted from Birch (2019)

### 3.3.2 Co-construction of Markets and Natures in the Bioeconomy

While the MDPs outlined above provide some insight into the policy development of the bioeconomy, at least in relation to biofuels, they also only provide a one-sided take on the instituting of markets as a solution to environmental problems. In particular, focusing on MDPs in this way obscures the materialities of markets, by which I mean the ways that markets and the natures are co-constructed (Birch and Calvert 2015; Becker et al. 2016; Birch 2019).

Starting with *biomass availability* for the bioeconomy, it is evident that the bioeconomy is premised on more than the total amount of biomass available; the biophysical materialities of the biomass itself configure the bioeconomy. A considerable proportion of Canada's land, for example, is Crown Land (i.e. it is owned by the state), including land harvested for biomass (e.g. forests). Rights to harvest on Crown Land are leased on a long-term basis and the harvest covers a variety of tree species; access to those trees depends on the materialities of access to the biomass. In Ontario, for example, the development of advanced biofuels from forest biomass is only viable economically if biofuels developers do not have to build the physical infrastructure to access the biomass (e.g. forest roads); the Provincial Government, instead, builds and maintains forest access roads. This enables timber harvesting by holders of long-term forest licences—who can sell their licence to others—but it does nothing for private woodlot owners who lack the public support and funding to access their forest assets. As such, the political-economic materialities here actually limit market competition—contrasting with

the arguments made in the neoliberal natures literature—and mean that the bioeconomy does not have to be subject to the same market pressures as emphasized in current scholarly debates on neoliberalism (e.g. Castree 2008a; Bigger and Dempsey 2018). Rather, biomass availability is constituted by an interplay between the biophysical (e.g. geophysical location) and socio-economic (e.g. licensing contracts).

A similar co-construction of markets and natures is evident in the management and organization of *feedstock supply*. Access to biomass is only one aspect of the overall value chain, with the identification of a suitable feedstock being another critical element; for example, softwood trees are more suitable than hardwoods for conversion into biofuels, but both types of species grow together meaning it is difficult to harvest and deliver homogeneous feedstock supply. Critically, advanced biofuels cannot be the prime timber user, commercially-speaking, as the cost of prime timber—at between C\$125 and C\$150 per bone dry metric ton—is simply not economically viable for biofuels that are meant to compete with petroleum. Instead, feedstock supply for advanced biofuels production is only viable if it uses ‘residues’ from primary timber production; for example, sawdust, offcuts, leftovers, etc. These residues have both a materiality (e.g. residual biomass from other uses) and a socio-economic quality (e.g. framed as a costless natural resource) to them. Again, this means that advanced biofuels production is only viable where markets are currently limited, especially for ‘residues’ since valuing those residues (i.e. pricing them) would immediately make the bioenergy derived from them uncompetitive with petroleum.

A final example of this co-construction of markets and natures is evident in the *technology conversion* processes deployed to produce advanced biofuels. Residues represent the key resource for these processes because they are cheap, while the technological processes are expensive—this contrasts with conventional biofuels where technology is cheap but feedstock expensive (Calvert et al. 2017b). Consequently, it is necessary to make the technology conversion processes ‘feedstock agnostic’ so that they can convert all sorts of ‘residual’ biomass into bioenergy. A critical reason for this is that the feedstock residues—discussed above—are diverse and because the biomass harvested is not homogeneous, neither in terms of tree species (with 6–8 main species across

Ontario) nor timber grades (ranging from knotty to sawdust). Moreover, the technology conversion processes have to produce a homogeneous, or fungible, commodity (i.e. sugar) from a heterogeneous feedstock (i.e. timber). However, creating a fungible commodity—meaning it does not matter who produces it since its quality is the same whoever does so—is dependent on the socio-material configuration of production, in that fungibility results from the infrastructure put in place to get a product to market rather than from qualities inherent within the product.

### 3.4 Conclusion

In outlining the co-construction of markets and natures in the bio-economy, it is clear that there is more going on here than the insertion of markets into an otherwise pristine or untouched nature. It is important to stress that I am not trying to say that the neoliberal natures literature is necessarily wrong. Rather, I am trying to emphasize that markets are instituted through and within nature; they are not aberrations of them: a market can only be instituted through the co-construction of biophysical materialities and socio-economic configurations. I thereby emphasize the inherent contingency of this process and highlight that we can actively identify points in this *socio-material* instituting (cf. Polanyi 2001 [1944]) at which we may want to intervene to shift or transform the process itself or its outcomes. As such, we can choose the bioeconomies that we want to see emerge (Kitchen and Marsden 2011).

The political implications of this are that we need to understand how markets and natures are produced together, rather than one being an imposition on or aberration of the other. When it comes to the bio-economy, for example, this approach provides the means to unpack the manner in which policy tools and biophysical materialities configure bioeconomies in certain ways, opening up room to intervene in the process. In the context of Canada, and especially Ontario, this is evident in the way that the Provincial Government enters into specific understandings and socio-material arrangements that configure forests as a ‘resource’ (Bridge 2009). Forests are made into resources through the Provincial Government’s claim to ownership of ‘Crown Land’, their

management of long-term harvesting licensing agreements, publicly funded access roads and support, and so on. This is not a recent phenomenon, nor is it a quick release of ‘natural’ assets (Birch and Muniesa 2020), but rather it is a reflection of a long-term and ongoing process (see Wang 2019 on edamame production for a similar example). Making alternative bioeconomies would entail picking apart the social *and* material arrangements in this current configuration, which might include handing forest lands back to indigenous First Nation bands, rethinking forest management or an end to logging roads.

**Acknowledgements** I acknowledge the financial support of the Social Sciences and Humanities Research Council of Canada for funding this research (Ref.: 430-2013-000751).

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