When is Policy Failure? The dynamics of biofuels policies in the EU and US

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This paper presents work that is at a very early stage:
all (constructively critical!) comments welcome
Citation is not advised!

Apology to Discussant and Workshop Participants
I have (just) had time to get a draft of this paper together, but no time to refine the arguments nor the writing. I am aware that the discussion of biofuels policies does go on a bit through Sections 2 and 3…

Abstract

This paper uses EU and US biofuels policies to interrogate certain issues relating to the concept of policy failure. It utilises recent work classifying policy success, policy failure, and the space in between to explore how we might understand these ideas better in the context of policies designed to run over a set period of time, but which are designed to address problems which are long-term and ongoing – specifically energy security and climate change. A specific policy with specific targets defined over a specified time-period may be judged as success or failure. But insofar as any particular policy, under these circumstances, is intended first and foremost to be taking markets and market outcomes in a specific direction, the judgement of policy success or failure may need to be subordinated to considerations of how policy-makers are able to steer policy, putting it back on track if it veers off, accepting a slower speed of travel if initial targets are overly-ambitious. This ability to reflect on policy and to learn from experience may ultimately be crucial to defining the success or failure of 'policy', over and above judgements made about 'this particular policy'.

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1. Introduction

Notions of success, failure, recognising the difference and knowing how to respond have particular salience for public policy. Policies are intended to deliver specified outcomes, at a point in time or on an ongoing basis. Knowing when to determine if we have failure, and to consider policy reforms – be they minor tweaks or major changes – are key challenges facing policy-makers. An important recent contribution to the literature on policy failure is Howlett, 2012, who examines multiple dimensions of policy failure. He also reproduces a useful definition of policy failure from the writing of Allan McConnell, as "a policy fails insofar as it does not achieve the goals that proponents set out to achieve and no longer receives support from them" (quoted in Howlett, 2012: 542).

This immediately raises the question: when should a decision over success or failure be made? The temporal dimension of policy is central to the determination of policy success and failure. It is also central to the determination of whether policy change is required, when it is required, and what form and magnitude it should take. This, in turn, raises fundamental questions about the policy cycle – notably, if 'evaluation' is recognised as a distinct step in the policy cycle, does that mean that such a decision is only taken at one point in time? Or should we instead see the policy cycle as a wheel in perpetual motion, as a result of which 'evaluation' of the progress of a policy is itself ongoing and continual? For a concise summary of the concept the policy cycle and its application, see Howlett *et al*., 2009: 10-14.

Biofuels policies have multiplied in the last decade, as governments around the world seek responses to a range of pressures: greenhouse gas emissions and anthropogenic climate change; energy security; and concerns over rural and/or agricultural development. In this paper we focus on policy developments in the EU and US. In both, policy-makers have sought to expand significantly biofuels production and use in transport fuel in a relatively short period of time. These have, as their long term superordinate target, fully-functioning biofuels markets. Within this, timetables are set endogenously to plot out progress, quantified in terms of the scale of the biofuels market. Failure to attain the near-term goals does not necessarily undermine the general direction of travel, and thus helps such policy failures avoid becoming political failures. Indeed, it is not automatically the case that failure to deliver short term goals constitutes policy failure; instead, this may be a consequence of temporary and reversible policy disruption.

Given the newness of the superordinate policy goal defined for biofuels policies, they represent exploratory cases which have an experimentalist dimension, in which learning about how to line up market, policy and technological developments is at its core. Experimentalism requires tolerance of failure (or at least, less than total success). Built around EU and US biofuels policy cases, the present paper takes an inductive approach. These policies have set out, within a specified timeframe, to deliver specified increases in biofuels production and use. Two dimensions key to biofuels policies but not necessarily common in public policies are thus the enumerated targets and their various timeframes. The short-term targets represent points for monitoring progress, allowing for judgments whether the *policy* or the *politics* might *be failing*, or *have failed*.

Late 2013/early 2014 is proving to be a critical time for biofuels policies and therefore an ideal time to be asking these questions. The current status of biofuels policies in both the EU and US is raising questions about whether or not the design and subsequent implementation dynamics of policy constitutes policy failure. In the EU, proposals for reform of the biofuels policy have been on the table for over a year. Attempts to conclude agreement on the reform in late 2013 failed and, with European Parliament elections in 2014, those proposals are not expected to be returned to until 2015. The main elements of this reform, it is argued below, represent responses to "problem worsening" (Howlett, 2012: 542); but, importantly, problem worsening arising endogenously, in particular in relation to the climate change driver of biofuels policy. Moreover, given the 'salami slicing' (Zahariadis, 2003: 15) approach to policy-making over some of the (politically) most challenging aspects of policy, the current reform proposals do not represent a critical juncture in policy, but can be seen essentially as part of the iterative development of policy. An interesting dimension to this is the extent to which the endogenous problem worsening is being caused or ameliorated by particular slices of salami being introduced into the policy over time.

In the US, the current (and still uncertain) picture is rather different. The policy as set down in 2007 was more complete than the salami-sliced EU policy, with *annual* quantified targets for the volumes of different biofuels to be blended into the (fossil fuel-dominated) road transport fuel mix through to 2022. Persistent failure to deliver sufficient volumes of some types of biofuel has brought the policy into question. Significantly, however, the current state of the debate suggests that this failure, which can be identified as applying to specific parts of US biofuels policy, is potentially threatening the direction of travel of the entire policy. In terms of McConnell's definition of policy failure, quoted earlier, this raises a fundamental question over the extent to which US biofuels policy continues to have the support of key policy actors. An alternative reading is that the US case is heading for political failure in the absence of policy failure. Biofuels policies have therefore, in both jurisdictions, been subject to disruptions to the policy cycle. In the EU, some key disruptions have been essentially unexpected, whereas those in the US have, many would argue, been foreseeable and foreseen for some years.

A further dimension of the empirical analysis presented here, draws on the literature of historical institutionalism – notably, the notion of 'policy' being more accurately represented as a matrix or nexus of multiple institutions and policy elements (see, *inter alia*, Streeck and Thelen, 2005; Mahoney and Thelen, 2010; with an application of these ideas in Ackrill and Kay, 2006). Thus a 'policy' consisting of multiple institutions, elements, and instruments, may experience different degrees of success/failure at different points in time. Hence the (deliberately grammatically questionable) wording of the title of this paper.

The paper proceeds as follows. In the next Section we presents salient features of our biofuels policy case studies, with a brief introduction to the policies followed by a more in-depth exploration of key issues pertinent to the current paper. Section 3 highlights challenges faced by, and currently facing, our two cases; whilst, in keeping with the inductive approach adopted in this first version of the paper, Section 4 introduces some of the key concepts of the policy failure literature and uses this to consider whether biofuels policies in the EU and US are examples of policies that have succeeded, failed, or are work in progress. Section 5 offers some initial concluding thoughts.

2. Biofuels Policies in the EU and US

2.1 A Brief Introduction to the Basics of Biofuels Policies

Biofuels are a form of renewable fuel. For current purposes, there are two variants – ethanol (derived from sugars and blended with petrol/gasoline) and biodiesel (derived from fats and blended with diesel). A further feature of biofuels, crucial for our subsequent analysis, is the distinction between conventional (or first generation) biofuels, and advanced biofuels. First generation biofuels are derived from feedstocks that can be used as food for humans. As a result, they create the potential for competition between fuel and food, and for land use (they also could create competition for other resources, such as water, but this has not yet entered the biofuels debate in a significant way at the level of ideas and policies).

Advanced biofuels are derived from non-food feedstocks. This avoids the potential fuel-food competition but, since some advanced biofuels are derived from feedstocks which require land specifically for their cultivation, these retain the possibility of competition for land. Second generation biofuel feedstocks include non-food biomass (for example the non-edible parts of grains such as the stover, as well as wood waste), but also certain grasses which are a cultivated crop in their own right. Second generation biofuels also include biodiesel derived from animal fats. We include in this category biodiesel derived from recycled used cooking fats and oils, as these too avoid competition with food.

Beyond this are biofuels derived from algae, and biofuels derived from crops engineered for optimal performance as sources of biofuel. Both are referred to in the literature as third generation biofuels. Fourth generation biofuels are those which, it is hoped, will reduce the total amount of carbon, by storing (in their growth and in their conversion to biofuel) more carbon than they release. We note third and fourth generation biofuels for completeness – our principal focus in this paper is on the differences between first generation and advanced biofuels – for which second generation is a more than adequate exemplar. Currently, however, about 99% of biofuels produced globally are first generation.

In the period since the millennium, the EU and US have developed their biofuels policies, turning what was a minor source of transport fuel into a central plank of their efforts to transform their energy matrices. Biofuels policies have three key drivers – promoting energy security, helping tackle climate change by reducing carbon dioxide emissions from transport and transport fuel, and promoting rural/agricultural development. All three drivers play a role in the discourse around both EU and US policy. That said, different arguments have been utilised at different times, and to different degrees, in each case.

US policy, coming in the wake of the terrorist attacks of 2001, has been driven as a policy promoting energy security by reducing dependence on imported (Middle Eastern) oil. Alongside this has been a strong agricultural policy dimension, with an ethanol-promoting policy explicitly providing an outlet for corn, following changes to the requirements for oxygenates in gasoline in 2005. In the EU, the dominant driver in the policy discourse has been climate change mitigation. Biofuels policy has direct antecedents in the international climate policy arena, in which the EU was particularly active from 1992 (at the Rio Earth Summit) as, led by the European Commission, it sought to recover from internal strife by identifying a policy area in which it could be a global leader (see, *inter alia*, Oberthür and Pallemaerts, 2010; Wurzel and Connelly, 2010).

Whilst the political systems have notable differences, and drivers of biofuels policy varied in importance between the two cases, it is the case that both policy debates and, subsequently, the policies themselves, emerged at around the same time. In the EU, the 2003 *Biofuels Directive* laid down voluntary targets for the blending of biofuels into transport fuel; whilst, in the US, a mandatory Renewable Fuel Standard (RFS) was established in the *Energy Policy Act* of 2005 (EU, 2003; US Senate and House of Representatives, 2005, respectively).

These were relatively swiftly replaced by legislation that, at the time of writing, remain in place: the EU's 2009 *Renewable Energy Directive* (RED) and the US 2007 *Energy Independence and Security Act* (EISA) (EU, 2009; US Senate and House of Representatives, 2007, respectively). The RED moved the EU from a voluntary to a mandatory target for the blending of biofuels in transport fuel; and both RED and EISA increased considerably the targets for biofuels blending, looking to develop the markets well beyond their size at that time. The EU target is for biofuels to contribute (the vast majority of) a 10% share of renewable fuels in total transport fuels by 2020. The US target in the EISA is for transport fuel to include 36 billion gallons of biofuels by 2022. On initial projections this figure equated to between 20% and 25% of the total transport fuel mix.

EU policy does not target specific types of biofuel, although any advanced biofuel, not derived from agricultural commodities, counts double towards the mandate. US policy, however, divides the 36 billion gallon mandate explicitly between different biofuels (see Table 1, below). By 2015, 15 billion gallons are mandated to come from conventional biofuels, the definition of which requires them to deliver at least a 20% reduction in Greenhouse Gas (GHG) emissions relative to fossil fuels. The advanced biofuel mandate rises to 21 billion gallons in 2022, of which at least 16 billion must come from cellulosic biofuels, delivering a 60% emissions-reduction. At least 1 billion must come from biomass-based diesel delivering 50% reductions (as must non-cellulosic advanced ethanol).

Appendix Table: The US Renewable Fuel Standard (billion gallons)

Year	Conventional	Total Advanced Biofuel	o/w Cellulosic	o/w Biomass-based diesel	o/w non-cellulosic advanced	Total
2008	9					9
2009	10.5	0.6		0.5	0.1	11.1
2010	12	0.95	0.1	0.65	0.2	12.95
2011	12.6	1.35	0.25	0.8	0.3	13.95
2012	13.2	2	0.5	1*	0.5	15.2
2013	13.8	2.75	1	1	0.75	16.55
2014	14.5	3.75	1.75	1	1	18.15
2015	15	5.5	3	1	1.5	20.5
2016	15	7.25	4.25	1	2	22.25
2017	15	9	5.5	1	2.5	24
2018	15	11	7	1	3	26
2019	15	13	8.5	1	3.5	28
2020	15	15	10.5	1	3.5	30
2021	15	18	13.5	1	3.5	33
2022	15	21	16	1	4	36

Source: based on US Senate and House of Representatives, 2007.

Note: * The EPA shall set each year a figure of at least 1 billion gallons.

It should be noted that the RFS uses the term ‘advanced biofuel’ slightly differently to its more common meaning outlined earlier. The RFS definition is based on their GHG emissions reduction performance. Thus, for example, Brazilian sugarcane-ethanol is a first generation biofuel which, in the RFS, is classified as advanced because of its outstanding GHG emissions reduction capabilities. This point notwithstanding, it was anticipated that most of the biofuels utilised to satisfy this Federal target would be produced domestically. In the EU, however, interviews with senior Commission officials made it clear that it was understood clearly from the outset that EU policy would entail significant imports.

In terms of the three drivers of biofuels policy, to the extent that biofuels substitute for fossil fuels, and (more or less) by definition diversify the source countries from which energy supplies are obtained, biofuels enhance energy security. Second, biofuels do provide an outlet for farmers selling their crops. Moreover, the production of biofuels from feedstocks will tend to be located near to agricultural areas. Thus, without getting diverted by semantic debates over the meaning of ‘rural development’ we can, very broadly, say that biofuels do deliver market opportunities and rural jobs. On the other hand, to the extent to biofuels utilise food commodities as feedstocks, and utilise land suitable for food production, this dimension of biofuels does raise questions about their side-effects, discussed further below.

With the third driver, there is much more uncertainty and debate. According to a saying we heard several times on fieldwork trips to Brazil, ‘there is no such thing as good biofuels and bad biofuels – only biofuels done well and biofuels done badly’. There is nothing intrinsically good or bad about biofuels. What matters is that every combination of feedstock type, location for growing, and technology pathway for conversion into biofuel delivers different GHG emissions performances. Referring to biofuels done well or done badly is not a statement about the motivations of biofuels producers, but merely a statement reflecting the truism that some biofuels deliver better GHG emissions reductions than others.

When judging the success or failure of a policy, the policy itself will specify targets against which it can be judged. With biofuels policies, however, these three policy drivers provide an additional benchmark against which to judge performance. In this section we have identified briefly the key goals of biofuels policy. In the next sub-section, we identify key features of biofuels policies which might represent points of potential conflict and debate. It is these which, in Section 4, we analyse to see if either or both of our biofuels policy cases might be judged as failure, success, or merely challenges for policies which remain work-in-progress.

2.2 Biofuels Policies – Identifying Key Policy Issues

The RED and EISA established targets for biofuels blending through to 2020 and 2022, respectively. Moreover, in the US the RFS sets out annual targets – although, importantly (as we shall see), the Environmental Protection Agency (EPA) has the power to amend those figures each year in line with expected production. Before looking at these figures in more detail, in order to put them in context an important aspect of policy in both of our cases needs to be introduced. Our fieldwork interviews in both Brussels and Washington DC (in 2010 and 2011) revealed that policy-makers saw first generation biofuels as a ‘bridge technology’, establishing a market which is then developed and reinforced by expanding advanced biofuels production and use.

Given political concerns over, in particular, energy security and climate change, initial legislative efforts (2003 in the EU, 2005 in the US, as detailed earlier) promoted ‘biofuels’, but with an implicit focus on first generation biofuels. First generation biofuels use available feedstocks, long-established technologies for processing into biofuels, and existing engine technologies to utilise the biofuels. Thus production could be brought on-stream relatively quickly and politicians are seen to be responding decisively to energy security and climate change concerns. Meanwhile, policy-makers have been supporting companies in their research and development efforts towards advanced biofuels – not from first principles (most of the technologies, especially for second generation biofuels, are well-known), but in being able to achieve full commercialisation of those technologies.

The importance of this is seen in the earlier description of biofuels, where first generation biofuels compete with food markets for feedstocks and for land-use. With second generation biofuels, whilst some land-use competition may remain (depending on the feedstock), there is no competition with food markets for feedstocks. In short, a successful transition from first to second generation biofuels will, of itself, help mitigate the potential downsides of first generation biofuels. As a result of this, biofuels policies in both cases have effectively bifurcated. This process is seen clearly in one of the main differences between the 2003 (EU) and 2005 (US) legislation on the one hand; and their replacements, the RED and EISA, on the other. With the latter, promotion of advanced biofuels is explicit – albeit in different ways in each case, as explained above.

As a result of this policy bifurcation, policy-makers face significant challenges. They must tackle potential shortcomings in first generation biofuels, whilst maintaining the development of biofuels markets through those biofuels, at the same time delivering credible, sustained, support to, importantly, private business actors, who are the ones required to deliver on those policy goals. Given the uncertainty inherent in basing policy on undeveloped technology such a policy, in implementation, requires flexibility and adaptability. As explored below, disruption has also been felt as anti-biofuels groups put pressure on policy-makers, ostensibly because of the potential downsides of first generation biofuels but, given the role of these in establishing biofuels markets, with potential consequences for all biofuels.

The consequences of this are seen most clearly in the structure and sequence of targets within the RFS (Table 1). This provides for expansion in biofuels production to be led by first generation (or ‘conventional’) ethanol up to 2015. This, in turn, will be dominated by domestically produced ethanol derived from corn. After 2015, with the volume of conventional ethanol now fixed, the expansion of total biofuels production up to 36 billion gallons in 2022 is to come from a variety of advanced biofuels.

This has not happened on the scale envisaged. Whilst production of biodiesel has developed expanded, and non-cellulosic biofuels (such as imported Brazilian sugarcane ethanol) have been brought to market, cellulosic ethanol has materialised in only modest volumes. Thus, for example, the first cellulosic ethanol target in the RFS, for 2010 (set at 100 million gallons) was, in the EPAs final rule for 2010, reduced to 6.5 million gallons (ethanol equivalent). For 2011 the figures were 250 million gallons and 6 million gallons (ethanol equivalent), respectively; for 2012 the original figure of 500 million gallons (ethanol equivalent) was reduced to 10.45 million gallons (ethanol equivalent) but, after legal action was brought, the EPA set the 2012 figure at zero; and, for 2013, the original target of 1 billion gallons was scaled back to 14 million gallons (ethanol equivalent) (Schnepf and Yacobucci, 2013: 3). The situation for 2014 is discussed further below. In the EU, with no intermediate targets, the same comparison cannot be made. That said, for various reasons a number of aspects of the EU mandate is up for reform. Again, we return to this later.

With the lack of advanced biofuels delivered to market thus far, attention has been paid primarily at efforts to contain the potential downsides of first generation biofuels. These are linked primarily to the climate change policy driver. These potential downsides were known about at the time the RED and EISA were being prepared because provision is made, in different ways, to try to accommodate them. First, there are a range of issues that relate directly to the GHG emissions performance of biofuels, notably in terms of the production conditions of the primary feedstock. These were dealt with through the adoption of ‘sustainability criteria’. In both of our cases, these come in two parts, minimum GHG emissions reductions required for biofuels to count against the mandate (and thus be eligible for financial incentives such as tax breaks), followed by specific criteria on feedstock types and/or production conditions.

In the EU, biofuels must deliver GHG emissions reductions over fossil fuels – of at least 35% initially (or from 2013 if the production facility was operating before 2008); and at least 50% from 2017. From 2018, biofuels produced in plants which began production in 2017 must deliver savings of at least 60%. There then follow a series of *exclusionary* criteria. Biofuels cannot be produced on certain types of land, to preserve biodiversity (such as primary forests, land protected by law, and highly biodiverse grassland). Also, biofuels cannot be produced on certain types of land, the cultivation of which will release carbon stored therein (wetlands, continuously forested area, and undrained peatland).

In the US, the EISA requires a life-cycle GHG emissions reduction of 20% for ‘standard’ renewables compared with the fossil fuels they replace, 50% for ‘advanced biofuel’ and for ‘biomass-based diesel’, and 60% for ‘cellulosic biofuel’. Unlike the EU, in the US older ethanol plants are grandfathered. The sustainability criteria are then specified in terms of *inclusionary* conditions which, together, constitute the definition of ‘renewable biomass’. Crops, trees and residues thereof can be used if the land was already actively managed before 19 December 2007 (as with the EU criterion, to avoid releasing carbon by bringing land into agricultural production). Also eligible is animal waste and byproducts, yard waste and food waste. Biomass cleared from near buildings or in areas at risk of wildfire can be utilised, as can slash and thinnings from non-federal forestlands, so long as those forests are not imperilled or rare (again, like the EU, preserving biodiversity). Unlike the EU, the US also explicitly identifies algae, a third generation biofuel feedstock.

It is beyond the scope of the present paper to go into detail about how life-cycle (‘paddock to pump’) GHG emissions are calculated. An important point to note, however, is that understanding of the demands of these estimations has evolved over time.[2] This applies to the values incorporated into emissions models – but, critically, it also involves a developing understanding of which variables to include. The example of this, *par excellence*, is land use change (LUC), especially indirect land use change (ILUC). The idea behind ILUC is that if agricultural feedstocks are switched from food to biofuel end-uses, this will put upward pressure on agricultural and food prices. This, in turn, will induce other farmers (who could be located anywhere in the world) to respond by diverting land into the production of these higher-priced commodities. This, the argument goes, has resulted from biofuels production and therefore the emissions impact of ILUC, of bringing that land around the world into the production of the given commodity, should be attributed to the biofuel triggering it.

The problems with this are, however, manifold. Central to this is the fact that ILUC cannot be observed directly, only estimated by economic modelling. This immediately creates space for uncertainty and contestation. Interviews in Washington DC (and Brasilia) revealed great scepticism amongst policy-makers over the very existence of ILUC on any scale. The economic challenges of modelling are extensive. Assumptions must be made about the

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impact of a given volume of feedstock on domestic prices, thence on international prices, then on farmers' production decisions across the globe, whilst also trying to isolate the impacts of biofuels from all of the other factors (for more on ILUC modelling see, *inter alia*, Bouët et al., 2010; Edwards et al., 2010, and the references contained therein).

Second there is the impact that the use of food crops for biofuels could have on food prices. Thus, for example, the limit on conventional biofuels in the RFS was set at 15 billion gallons because, as several interviews with policy-makers and civil servants confirmed, this was seen as the maximum that could be delivered without corn markets being affected significantly (although our interviewees failed to agree on who actually came up with that precise figure, with at least three candidate bodies being mentioned). In terms of a biofuels policy supporting agriculture, this figure is also significant as it, effectively, represents an ethanol volume ring-fenced for US corn producers. This is the case *de facto*, even though it is not so, *de jure*. Furthermore, by effectively classifying the main source of ethanol from the world's second largest producer, Brazil, as 'advanced', it effectively allocates different parts of the RFS to the two biggest ethanol producers.

The 15 billion gallon figure raises another issue of profound importance for US policy: the blend wall. Because the US biofuels mandate is expressed in terms of an absolute volume, what matters is not only the volume of biofuels to be blended into fossil fuels, but also the volume of fossil fuels into which biofuels can be blended. This applies in particular for the dominant form of fuel in the US – petrol/gasoline. This is because (unlike biodiesel, a minority fuel in the US), standard internal combustion engines can only function normally on relatively low ethanol blends, before adaptations are required. That said, there is no agreement on what this blend actually is. Formal US policy is two-tiered – a 10% blend for older vehicles ('E10'), but a 15% blend for newer vehicles ('E15'). Meanwhile, petrol sold in Brazil is typically E25 (sometimes reduced to E20, depending on market conditions). Brazil's domestically-produced vehicles are flex-fuel and have thus been adapted to accommodate any petrol-ethanol blend, but increasing wealth has seen increasing imports of (usually more expensive) vehicles, all of which have to run on the E20 or E25.

In the US, however, the demand for petrol has not grown as forecast when the EISA was agreed. As a result, the petrol market is very close to the blend wall, at which point, no more ethanol can be blended into petrol. One solution is to fit vehicles with flex-fuel engines, but this faces two constraints: there are not enough of these to move back the blend wall very far; combined with a fuel distribution infrastructure not well-adapted to supplying a completely new type of fuel. This creates an interesting dynamic for US policy. At the blend wall, demand is very roughly equal to the RFS mandate for first generation (principally domestically-produced corn-based) ethanol. Beyond this, production of 'advanced' and cellulosic ethanol is limited, but so is the scope for blending much more ethanol into fuel.

In this sub-section we have outlined a number of key policy issues, related principally to the climate change mitigation driver of biofuels policy, which might represent points of policy failure. As noted right at the start, however, the issue of time is extremely important in such an analysis. Thus we bring our analysis below up to date by looking not only at points of historical interest, but also at the current debates over policy developments. Specifically, the EU has had a proposal for reform of the RED (and related legislation) on the table since October 2012; whilst the US has seen a great deal of politicking over what the EPA is going to lay down as its final rule for the RFS targets in 2014. This will help bring some of the earlier policy features into sharp relief.

3. Biofuels Policies: Where Might Failure Arise?

A key feature of biofuels policies, as noted above, is the bifurcation of policy between containment of the potential downsides of first generation biofuels, and supporting the development and commercialisation of advanced biofuels. This, of itself, is not policy failure. Indeed, given the fact that the three policy drivers embrace different, even incommensurable, values, a biofuels policy which promotes both first and second generation biofuels can, if not reconcile these differences, help hold together a diverse pro-biofuels coalition. Thus if policy failure does exist, it will be *within* one or both of these policy dimensions. First, it is worth noting that energy security can be satisfied by any biofuel, of any generation. Rural development is a contested concept, but in the US, where interviews confirmed ethanol policy is partly a policy for 'Big Ag', such a policy will only deliver via first generation biofuels. Broader notions of rural development, however, can be satisfied by advanced, as well as first generation, biofuels.

With the climate change driver of biofuels policies, we need to return to the Brazilian biofuels 'mantra' stated earlier. Specifically, Brazilian sugarcane ethanol is 'a first generation biofuel with advanced biofuel performance' (a quote from a senior civil servant in Brasilia in

2010, one of Brazil's most senior officials working on biofuels at that time). In most other cases, however, first generation biofuels deliver rather less spectacular GHG emissions reductions relative to fossil fuels. Indeed, 'biofuels done [very] badly' can even deliver higher emissions than fossil fuels.

The question then becomes, how successful have the two parts of biofuels policy (promoting advanced biofuels whilst seeking to contain the potential downsides of first generation biofuels) actually been? In the last decade, as the production and use of first generation biofuels has expanded rapidly in the EU and US, so too has opposition grown to these biofuels. Meanwhile, the continued failure to deliver more than a trickle of second generation biofuels to market has also led to opposition – in particular in the US, where separate mandates expose this failure most clearly. Thus both dimensions of policy are under threat from different directions.

EU policy has been challenged, and the policy process disrupted, in significant ways. This has manifested itself increasingly as the consequences of policy – the expanded production, import and use of biofuels – have become more apparent. As stated earlier, the downsides of first generation biofuels, such as possible food-price effects, and multiple land-use change issues, were known prior to 2007 – hence reference to such concerns in the EISA and, albeit structured differently, in the RED. The EU policy response, reflecting the time taken by the salami slicing approach, has ended up lagging behind the wider debate over biofuels and their downsides. Moreover, given the global reach of biofuels supply chains, this debate has been focused on EU policy far more than US policy.

For example, in February 2010 the EU was in the process of negotiating the detailed proposals for implementing legislation regarding the sustainability criteria. This process was disrupted when Friends of the Earth Europe leaked a draft version which suggested palm oil plantations could potentially replace rainforests and still count as a sustainable source of palm oil for biodiesel. Given widespread concerns about oil palm, deforestation and habitat loss, such a measure inevitably attracted a great deal of attention. In the end, this element did not appear in the final version. Relatedly, the EU faces a very different challenge, in that demand for palm oil for food uses is growing rapidly – thus (as noted earlier) disentangling the consequences of biofuels and of food for the expansion of oil palm plantations is a very challenging exercise. Even a highly-location-specific ground level study may give misleading information, if the product from a given plantation is sent to different buyers, for different end uses, over time.

The EU process for implementing sustainability criteria includes utilising existing independent (non-state) bodies as authorised providers of standards certification. Actors such Bonsucro (for sugarcane, formerly the Better Sugarcane Initiative) and the Roundtable on Sustainable Palm Oil (RSPO), have submitted their certification schemes to the European Commission, who judge the certification standard against the EU criteria. Once approved, all biofuels carrying that certification are deemed to conform to EU standards.[3] One challenge has been that this process is very time consuming, as a result of which, in the early years a significant proportion of biofuels utilised in the EU had not been certified as sustainable. On the other hand, this is a dynamic situation. For example, in the UK, 31% of biofuels were certified in 2009-10, rising to 53% in 2010-11. The latest estimates for 2013-14[4] indicate the figure is now 98%. Meanwhile, given the significance of the potential environmental and emissions damage that can be caused by oil palm, it is interesting to note that, in 2012, a news item on the Jakarta Post website[5] reported 'that EU countries were showing a commitment to switch to [certified sustainable palm oil] by 2015.' Thus whilst EU countries will continue to import uncertified palm oil until at least 2015, the issue of whether this represents a policy failure is a different matter.

A related disruption to EU policy has been debate over land-use change, especially ILUC, and its role in etimating the life-cycle emissions of biofuels (again, given the principally domestic focus of US policy, this has been a feature mainly of EU policy discourse). Interviews in both Brussels and Washington revealed that it was with the publication of Searchinger *et al*. (2008) that opposition to biofuels on the basis of ILUC effects took off. In particular, environmental NGOs were concerned that, outside of the bounds defined by sustainability criteria (which only cover *direct* land use changes), biofuels would indirectly impact on emissions and biodiversity.

[3] For details see http://ec.europa.eu/energy/renewables/biofuels/sustainability_schemes_en.htm (last accessed 4 February 2014).

[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255318/rtfo-2013-14-year-6-report-1.pdf

[5] 'Musim Mas expects more demand for certified palm oil', 17 July 2012, accessed 19 July 2012.

As an idea, ILUC gained a lot of traction very quickly with anti-biofuels NGOs, both those concerned with the environment and, often for different reasons, development NGOs. Interviews in Brussels confirmed that Professor Searchinger gave a seminar in Brussels in early 2008 about this research – and one interviewee, a policy insider within the Commission, was astonished that this research, and the concept of ILUC, had no impact on the RED. On the other hand, one could argue that it was scheduled to be in the third policy salami slice: after the RED and the detailed implementing legislation for the sustainability criteria came discussion over how to address land-use changes in GHG emissions calculations. Eventually emerging months later than planned, this is part of the proposed legislative reforms that, in early 2014, remain on the table.

One aspect of US policy is worth particular note. Most biofuel used in the US is domestically produced ethanol, derived from domestically produced corn. This, however, delivers a relatively modest GHG emissions saving relative to fossil fuel – indeed, a saving that is insufficient for the thresholds laid down by the California Air Resources Board (CARB). As a result, Brazilian sugarcane ethanol has been imported into California. Meanwhile, in recent years Brazil has suffered a range of problems which has hit domestic ethanol availability, including poor cane harvests and high sugar prices. As a result, in order to maintain at least a 20% ethanol blend in petrol, US corn ethanol has had to be imported. This circular trade improves the net emissions performance of California's fuel, reduces the net emissions performance of Brazil's fuel, creates emissions from transporting the fuel (which, currently, is not part of any emissions calculation), and has led to a lot of mockery. Whether or not this trade and its consequences constitutes policy failure is unclear, but it certainly represents sub-optimal policy performance. It may not conform to the formal definition of a 'policy fiasco' outlined later, but the word fiasco is apposite, nonetheless.

Another important aspect of sustainability criteria is what they do not contain. Key omissions were made, in large measure, as a result of concerns over the WTO compatibility of the criteria (so-called 'regulatory chill – see Lydgate, 2012). It is beyond the scope of the present article to consider this issue in detail (see, *inter alia*, Ackrill and Kay, 2011, and the references contained therein). Within the EU, there was debate over the possible inclusion of social sustainability and labour standards in the sustainability criteria. In the end, interviews within the Commission revealed that although the European Parliament was in favour, the decision was taken to omit them: there was concern that their inclusion would cross some countries' 'red lines', risking an action being brought in the WTO that could threaten the whole biofuels policy. Instead, a process was introduced that the Commission would report every two years on the implementation and impact of EU biofuels policy, including specific elements addressing these concerns.

The reporting process is also required to address the impact of biofuels production on agricultural commodity prices and (especially) on food prices. As with ILUC, estimating the effects of biofuels production on food prices is no easy matter. One piece of informal evidence was seen in the US in 2008 and 2009. 2008 was a year when the prices of many food commodities spiked globally. In the US, bodies such as the Grocery Manufacturers Association (GMA) highlighted the rise in corn going to produce biofuels, the rise in biofuels production, and the rise in corn-related food prices in that year. In 2009, the amount of corn going to biofuels continued to rise, as indeed did that volume expressed as a share of the total corn crop, yet commodity and food prices fell back again. Informal conversations in the US suggest that the lobbying against biofuels (from organisations such as the GMA) tends to fluctuate with food prices, rather than biofuels production. A further challenge facing US policy that the broader fiscal debate may pose a major threat to biofuels policies (Chite, 2012: 46). He also suggests (on page 47) that the food versus fuel debate could impact significantly on US biofuels policy going forward (bearing in mind also the failure to deliver significant volumes of cellulosic ethanol).

In the EU, whilst the reporting process includes monitoring the possible food price impacts of biofuels, policymakers have been reticent to accept a causal link. With debate still at the level of ideas and with information over the magnitude of links still strongly contested, there has so far been no policy shift. Indeed, this applies to all of the pressures on policy discussed in this section. In short, despite the economic connections binding biofuels to multiple markets and to multiple arenas of policy debate and contestation, including those which suggest that biofuels policies, in some sense, are not working, biofuels policies remain unaltered.

[Comments please on this, especially with reference to any of the policy failure literature I may have missed!]

We turn now to the current pressures faced by our two cases. Legislative proposals for reform of the EU biofuels policy were tabled in October 2012 (European Commission, 2012). The proposed approach to dealing with ILUC is to introduce a series of flat-rate ILUC factors into the GHG emissions calculations, distinguished by (first-generation biofuel) feedstock group and expressed as grams of CO_2-equivalent per megajoule of biofuel energy: 12 for cereals and other starch-rich crops, 13 for sugars and 55 for oil crops. To avoid double-counting and double-penalties, feedstock production which gives rise to direct land-use change is to be excluded from ILUC-related emissions.

A second element of the proposals involves altering the timing of changes to minimum GHG emissions thresholds. It is proposed that whilst new bio-refineries will have to deliver a 60% GHG emissions reduction sooner (this applies to plants starting operating from 1 July 2014, compared with 1 January 2017 previously), those refineries in operation on or before 1 July 2014 would now have an a full extra year, until 1 January 2018, to deliver a 50% GHG emissions reduction (albeit including the new ILUC-factor).

A third element is the proposal to place a cap on the share of the renewable fuel mandate that can come from first generation biofuels. The proposal is 5%, roughly equal to the actual share of first generation biofuels in total transport fuel in 2012. The 10% overall target remains, with some advanced biofuels now to count four times towards that target rather than twice. Thus there are further efforts to encourage the development and commercial production of advanced biofuels, with part of the biofuels mandate now given over explicitly to them. That said, in conversations with leading figures from fuel companies, we were told that these proposals would have no impact on encouraging the development of advanced biofuels, because they provided no guarantees regarding returns on any investment.

Negotiations on these proposals ended in December 2013, with an expectation that discussion would not resume until late 2014 or 2015. Thus the (possible) introduction of an ILUC factor have been delayed; and the changes to GHG emissions threshold minima will, with the delay in agreeing reforms, be at most only marginally different to the existing policy. The state of negotiations in 2013 suggested a compromise figure of a 7% share of first generation biofuels in the total renewable target was a plausible compromise outcome – which is unlikely to be significantly below what is possible by 2020 anyway.

In the US, pressure has been building on the RFS in recent years, via the EPAs annual final rule-making on (revised) annual targets for different types of biofuel, especially cellulosic ethanol. As noted above, the target was even set aside in 2012, following a Washington court ruling which agreed with the American Petroleum Institute, a prominent oil industry lobby group, that the EPA mandates were 'unreasonable'. Whilst this has, thus far, had no lasting effect on the RFS and the decisions taken by the EPA, in the latter part of 2013 the EPA changed its framing of the issue, to one based on the blend wall and the ability of the market to accommodate more ethanol. Thus the focus has shifted from the supply of ethanol to the effective demand for ethanol. This provided the backdrop to the EPA's proposed rule for 2014, published in November 2013. This seeks cuts to all but one element of the RFS in 2014 (all figures in billion gallons, taken from an article on the Biofuels Digest website)[6]: cellulosic ethanol (1.75 to 0.017), advanced biofuel (3.75 to 2.2), corn ethanol (14.4 to 13.01), thus renewable fuel (18.15 to 15.21), plus biodiesel (1 to 1.28). Advanced biofuels are thus threatened with a 41.33% cut, corn ethanol with a 9.7% cut.

EPA discourse may have switched to the blend wall, but supporters of biofuels argue that the blend wall was known about in 2007,and that the expectation was that the fuel industry would do something about it: they have not done so and seemingly are now being rewarded for it (in the eyes of those biofuels supporters). Brent Erickson has put the issue thus: 'The RFS was intended not to codify that only ten percent of transportation fuel be biofuel, but instead to actually help break through the blend wall by incentivizing investments in higher blends of ethanol, drop-ins, and biodiesel as well as new advanced biofuels – and it has been working as intended.'[7]

It is also suggested (in the 17 November Biofuels Digest article) that, for reasons related to the rising cost of purchasing Renewable Identification Numbers (RINs), central to tracking the renewable element of transport fuels, the oil industry could get White House support for backtracking on the RFS by pointing to the impact of rising RIN prices on petrol prices for

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[6] These data, and the rest of this discussion, are taken primarily from 'Obama Messes with the RFS', an article published online on Biofuels Digest on 17 November 2013 and accessed on 18 November 2013: http://www.biofuelsdigest.com/bdigest/2013/11/17/obama-messes-with-the-rfs/

[7] Brent Erickson is Executive VP and head of the Industrial and Environmental section at the Biotechnology Industry Organization. This quote come from an article entitled 'EPS's Christmas Gift to the Oil Refiners', Biofuel Digest, 29 December 2013: http://www.biofuelsdigest.com/bdigest/2013/12/29/epas-christmas-gift-to-the-oil-refiners/ (accessed 6 January 2014).

consumers. A separate article on Biofuels Digest[8] argues that there is a deliberate policy of over-charging for E85 (comparing ethanol and gasoline price spreads on wholesale and retail markets), reducing demand and thus adding to the blend wall constraint.

4. Biofuels Policies: Policy Failure, Policy Success, or Work-in-Progress?

4.1 Policy Failure – a Review of Key Issues

A policy, for our purposes, involves a public body putting in place a series of measures, laws, guidelines, instruments, etc., to achieve certain goals, or outcomes. In principle, the notion of policy success or failure is very simple – has the policy delivered what was intended or not? As with most concepts, however, this is also deceptively simple. The notion of the policy cycle indicates different points in the life-cycle of a policy at which a success/failure judgement could be made. This is summarised in Table 2.

Table 2: Policy Cycles and Policy Failure

Agenda setting	Over-reaching governments establishing or agreeing to establish overburdened or unattainable policy agendas
Policy formulation	Attempting to deal with problems without investigating or researching problem causes and identifying the probable effects of policy alternatives
Decision-making	Failing to decide on a policy within a reasonable period of time or distorting its intent through bargaining and log-rolling
Policy implementation	Failing to deal with implementation problems including lack of resources, principal-agent problems, oversight failure, and others
Policy evaluation	Lack of learning as a result of a lack of, ineffective, or inappropriate policy monitoring and/or feedback processes and structures

Source: Howlett, 2012: 547.

Further, Howlett identifies four types of policy failure (Table 3). To this can be added the work of McConnell, 2010. Layered on top of the notions of types of failures is the idea that failure and success exist on a spectrum. Indeed, McConnell argues they exist in three spectra – policy as process, as programme and as politics. This gives us a nuanced toolkit with which to approach the question of policy failure. Even so, we also need to add time into the mix. A policy takes time to develop, it may be implemented a bit at a time (through salami slicing), it may be intended to operate over a defined time-period, with implicit or explicit goals, it may

[8] http://www.biofuelsdigest.com/bdigest/2013/12/04/stand-by-me-renewable-fuels-defenders-pull-out-the-stops-to-persuade-epa-to-continue-the-war-on-imported-oil/ (accessed 5 December 2013).

be time-limited but with the intention that the initial policy matrix establishes an ongoing or open-ended commitment to a particular policy and its related outcomes.

Table 3: Four Types of Policy Failure

Policy accidents	Good plans are not executed properly
Policy mistakes	Good execution is wasted on poorly developed plans
Policy fiascos	Poor planning and poor execution lead to very poor results
Policy anomalies	The most rigorous analysis and execution still did not result in the achievement of goals, against all reasonable expectations given an existing policy paradigm

Howlett, 2012: 551.

The foregoing introduction to the notion of policy failure will prove useful to us, but we must also consider a key additional factor – if any policy or element of policy is deemed to have failed, why might that be? We shall embed this discussion in what follows.

[Is there a glaring omission of literature here in terms of policy failure and time?]

4.2: Failure, Success, or Work-in-Progress?

Both policy cases have come under growing scrutiny and pressure over time. Both are, as I write, facing uncertainties over the future speed and direction of travel. Yet currently, there is no sign of biofuels being abandoned totally by policy-makers. We thus need to dig deeper in order to determine where, if at all, failure has occurred, is occurring, or may occur in the coming years. First, the EU.

EU policy lays down a rising volume and share of biofuels to be blended into transport fuel by 2020. This appears to be happening, although Eurostat data are only available currently up to 2011, in which year some countries experienced a sharp decline, pulling down the EU27 figure from 4.8% to 3.8%. At a more disaggregated level, climate change mitigation as a critical driver for EU policy has led to significant debate and attempted disruption: it also underpinned the current reform proposals. That said, this disruption was not sufficient to force the member states to agree a reform in December 2013. Disagreements remained over the cap on first generation biofuels, with countries such as Belgium and Denmark saying the 7% figure was too high, countries such as Poland and Hungary arguing the opposite. In theory, the introduction of the ILUC factor may impact on the GHG emissions performance of EU-consumed biofuels, but this will occur (by definition) only at the margin – and in the light of the increase in GHG emissions thresholds, (whether on the original schedule or that set out in the reform proposals) this is expected to have only a modest impact on the EU biofuels market.

Where EU policy is facing greater difficulty is in the lack of development of advanced (especially second generation) biofuels. Whilst the US had annual targets laid down in the RFS, all the EU has is advanced biofuels counting double towards the mandate and, towards the end of the timeframe to 2020, an increase in the GHG emissions threshold that, *inter alia,* is intended as an incentive for the development of commercial-scale advanced biofuels. This has not happened (the use of recycled cooking oil and the like has made a contribution, but data limitations prevent further analysis). Moreover, there is no evidence that significant volumes of second generation biofuels are likely to be forthcoming in the next few years – and certainly not in time for the 2017 increase in thresholds. Thus, barring miraculous progress, we can argue that even though we are several years away from 2020, this is an appropriate time to be looking at policy in terms of success or failure.

Given the failure of companies to commercialise second generation biofuels, how can this be categorised? One possible reading is that this is a principal-agent failure (policy implementation), whereby the policy-makers failed to ensure the private companies did what was expected of them. Alternatively, it could be seen as a failure of policy formulation, insofar as it failed to take full account of the challenges (private sector) companies faced in delivering the desired outcomes. If so, this would happen notwithstanding the efforts of the European Commission to work with and provide financial and technical support to companies in this development process. Interviews support the thesis that policy-makers recognised the challenging nature of the ambitions for advanced biofuels, but that the measures were deemed sufficient to ensure the private sector delivered.

The timing of the reform proposal is explained easily enough – the RED included provision for review of the biofuels market (including such concerns as the possible impact of biofuels on food prices) in 2012. Therefore the proposals can be seen as policy evaluation and policy learning. What is contested is whether or not those measures as proposed are sufficient to overcome the perceived downsides on first generation biofuels. Even so, we must not be too hasty in judging this as possible failure. Successive reforms of the Common Agricultural

Policy have demonstrated that as a result of EU structures and policy processes, policy reform can be incremental and take a long time. But as the recent reform of the sugar policy shows particularly well (see, *inter alia*, Ackrill and Kay, 2009), the Commission possesses sufficient determination to get the policy where it wants it to be…eventually.

What is worrying about the reform proposals is that they appear to offer nothing substantively new in terms of policy instruments. If offering double-counting advanced biofuels against the mandate has not encouraged firms to overcome the technical and economic difficulties they face, providing for quadruple-counting is unlike to work either. This suggests a severe shortcoming in ‘reflection capacity’ (Ackrill and Kay, 2012), whereby policy challenges faced as a result of difficulties on the road to the long-term superordinate policy goal are responded to by reflecting on what might have gone wrong, why, and how policy can be changed to correct the problem and return the policy to its original long-term path. The Danish Minister for Climate, Energy and Buildings argued that, with the ceiling on first generation biofuels, a sub-target for advanced biofuels would spur the production and delivery of advanced biofuels. This element, however, would add little to the ‘failed’ EU policy on advanced biofuels thus far, and also ignores the fact that US policy, which includes explicit sub-targets for advanced biofuels, has also failed to deliver those advanced biofuels. Indeed, private conversations with a leading figure in the UK renewable fuel sector revealed that a number of EU-based firms are looking to the US for support in developing advanced biofuels, as they believe it is more supportive.

Considering Table 3 above, a generous reading might see this as a policy anomaly, insofar as the existing policy paradigm (in the EU and US) was that mandates would suffice to get private companies to respond with advanced biofuels; but, unexpectedly, this did not happen. More like this is a policy mistake: the policy has been implemented correctly – indeed, as noted, the Commission continues to support firms in the development efforts – but what is being implemented is a policy which was over-ambitious in terms of what the private sector could – literally and metaphorically – deliver.

Has, though, the EU policy delivered on its climate change goal? It would take several papers to answer this with any degree of comprehensiveness. Suffice it to say briefly here, the latest UK report on its efforts estimates that the biofuels used in the UK have, excluding ILUC, reduced emissions by 70% relative to fossil fuels. Moreover, as noted above, in the latest year

98% of biofuels were certified sustainable. On the other hand, data limitations prevent a comparable commentary on other EU member states, whilst doubts remain over the efficacy of the certification process. Oil palm plantations, in particular, continue to give cause for considerable concern amongst development and environmental NGOs. This does, however, return us to the earlier debate over the challenges faced in estimating the environmental and economic impacts of biofuels when there are so many other factors simultaneously impacting on those same variables. Overall, there is no clear evidence of the original pro-biofuels coalition breaking up. What has happened is that, with concern in particular over food prices and the environment (for example via ILUC), more voices have joined the anti-biofuels coalition. Even so this pressure, which reflects international concerns, has failed to bring sufficient pressure to fracture the pro-biofuels coalition and influence domestic policy-makers to bring about significant reform – or even, we would argue, proposals that represent significant reform.

In the US, given the primarily domestic nature of US biofuels policy, the main pressures are internal. One key challenge is, like the EU, the failure to deliver significant volumes of advanced biofuels to market. To this one can apply the same logic, arguments and assessment to US policy as to EU policy. The blend wall, however, offers both a complex issue and one not faced by the EU. From the outset, a central question that arose from our fieldwork was how on earth 36 billion gallons could be accommodated in the US transport fuel mix. The earlier excerpts from the Biofuels Digest suggest one clear line of thought from the pro-biofuels lobby – a principal-agent failure in policy implementation, where they argue the government has failed to ensure the oil and fuel interests delivered on what was required to break through the blend wall. The earlier quote from Brent Erickson makes interesting reading in this light. First, he argues that, the lack of cellulosic ethanol notwithstanding, delivered volumes of advanced biofuels generally have been rising. This, as he says, 'has been working as intended'. The problems, therefore, are located towards the downstream end of the fuel supply chain, in distribution and retail. In addition, there is the car industry. They have been loathe to issue warranties on vehicles with petrol blended above E10, with much EPA testing prior to the green light given for E15 – and then only on newer vehicles. Flex fuel vehicles are available, meanwhile, but the availability of E85 has been limited.

As a result, there is no single point of failure regarding the continuing presence of the blend wall. Problems can be seen in terms of principal-agent concerns relationships between the government and both the fuel companies and car makers. That said, there is also a policy anomaly at work: when the EISA was being put together it was, quite reasonably, assumed that demand for transport fuel would continue growing. This would provide a larger absolute volume of fossil-fuel into which could be blended a larger absolute volume of biofuel. Even though financial markets in the US, via sub-prime mortgage markets, were starting to look wobbly, only very few economists were predicting the catastrophe to come in 2006/07. Calling that an anomaly seems something of an understatement!

The current state of play in US policy is that it is facing a critical juncture. The blend wall is, without question, presenting a fundamental challenge to the future of US biofuels policy – and that is the present reality, regardless of where the 'blame' lies. As it has presented an increasingly binding constraint, not only has the EPA deepened the cuts in its annual final rules on the RFS to reflect these constraints; it has also realigned its rhetoric with the blend wall issue. As such, its position has come to mirror ever more closely that of the anti-biofuels interests within Big Oil and the fuel companies.

This brings us to perhaps the most intriguing aspect of US biofuels policy. The big push for biofuels in the US was led by (Republican) President, George W Bush, from an oil state (Texas). It now appears to be under threat from a (Democratic) President, Barack Obama, from a corn-belt state (Illinois). Part of the explanation for this paradox can be found in the leading driver of US policy – energy security. After 2001 President Bush, in successive State of the Union addresses, identified biofuels as a way of helping improve energy (oil) security and reducing oil imports – ramping this up over time to the point where it led directly into the mandate laid down in the EISA and the RFS.

What he could not have foreseen was the shale revolution. Shale oil and gas have, in little more than a couple of years, transformed the energy matrix in the US. Moreover, this new source of energy is relatively cheap; and it does not come with the associated bureaucracy of, for example, RINs attached to biofuels. Not surprisingly, therefore, the oil and fuel industries have responded completely differently to this than to biofuels and the RFS. In the last three State of the Union addresses, President Obama has been making fewer and fewer references to 'energy'. His references to energy security are now linked to shale deposits, and when discussing renewables, he names wind and/or solar, but not biofuels.

US policy is therefore facing a number of challenges. The structure of the RFS and the current provisional EPA rule for 2014 is looking to cut slightly the conventional ethanol element that is, in effect, ring-fenced for US corn ethanol. This, and the accompanying cuts to the various elements of advanced ethanol, have been justified on the basis of the blend wall. Only biodiesel, a totally different product and one not subject to a blend wall, looks likely to be allowed to expand. Given the failure to ensure the technical developments were delivered that could dismantle, or at least move, the blend wall, the EPAs decision looks to the pro-biofuels lobby like supporting the position taken by the fuel and car industries. Perhaps more seriously in the longer term, it risks creating significant tensions between corn/first generation ethanol interests and advanced ethanol interests. This could split the pro-biofuels coalition, possibly cementing the corn ethanol element but risking the long term future of the advanced ethanol industry.

The position of corn ethanol in this is particularly interesting, given that US ethanol policy has also been driven strongly by Big Ag. The blend wall, total petrol demand and the structure of the RFS always made it likely that the domestic market would settle into an equilibrium where the capacity for blending ethanol into petrol would be *roughly* equal to (capped) supplies of corn ethanol. The EPAs planned cut for conventional ethanol in 2014 is relatively modest. As such, the agricultural/ethanol lobby might be fighting a second best argument in a zero-sum game – that since the blend wall has stopped the growth of the market for ethanol, then they will seek to defend their share of it. Given also the observation above of Chite, 2012, that fiscal pressures might also be brought to bear, then arguably that second-best position really is the best one available. What this might mean for the pro-biofuels lobby, should first and second generation interests face themselves in conflict, is more problematic. With seemingly weakening support from the White House, and key individuals no longer in senior positions within Congress, a split in the pro-biofuels lobby risks major policy failure.

5. (Very Preliminary) Concluding Thoughts

Biofuels policies in both the EU and US have, in a very short space of time, turned a niche product into a significant element in the energy matrices of both regions. That said, both policies have faced difficulties and challenges. Thus far, these disruptions have not led to any significant policy change. In the EU, those changes that have occurred have been as a result of the salami slicing strategy and thus the elements of policy layered onto the original legislation were planned for from the outset. Similarly, in the US the major change to date has come in the form of annual EPA rules on targets for different components within the RFS – again planned for from the outset, through the granting of this power to the EPA. Moreover, in the first few years of operation, these adjustments were being made to what have so far been the more minor elements of the RFS.

By the start of 2014, however, the situation has changed significantly. In the EU a reform, tabled over a year ago, has been laid to one side, and is unlikely to be picked up again for a further year. That said, whilst this preserves the extant policy, it also ensures that the anti-biofuels interests will continue to challenge that policy. In the US, the binding constraint of the blend wall has created a critical juncture for policy. How this has come to pass is contested, but pro-biofuels interests argue that firms in the fuel supply-chain, especially those at the downstream end, have created this problem by failing to act to move or break the blend wall as they believe was the intention behind the EISA and the RFS. Whether this has been done deliberately, however, is, without further evidence, moot. The policy response for 2014 from the EPA also risks pushing the policy in such a direction that it could fragment the pro-biofuels lobby, between first generation and advanced biofuel interests.

In both cases, there are strong indications of principal-agent failures. We have seen this with regard to the lack of significant development of advanced biofuels on a commercial scale. In the US, we have also seen this with regard to the blend wall issue, and whether the pro-biofuels lobby is correct in assertion that the original policy was predicated on the fuel and car industries acting to (re)move the blend wall. This point is of particular interest insofar as biofuels policies are a manifestation of an emerging governance challenge. In a globalising post-Westphalian world, policy implementation requires governments and private sector firms to work together. With EU biofuels policy in particular, there is also the question of certification, undertaken in the main by separate private sector or non-governmental bodies. In both cases, there has also been a need to ensure policies respect WTO rules (ie there is also a governance role for International Organisations in policy governance).

The foregoing suggests that, within this new governance network (as distinct from hierarchy), a particular weakness appears to exist in the relationship between policy-makers and private sector firms. Specifically, private sector firms have interests which may diverge from that desired of them by the policy-makers and who, without sufficient mechanisms of agency control, will be able to deviate from specific courses of action sought by policy-makers.

But is this policy failure? Biofuels, on whatever scale, are contributing to energy security through diversification of energy type and source country. Biofuels are providing rural employment across a range of economic activities. On balance, we would argue that biofuels are contributing to GHG emissions reductions – although there continue to be questions about the GHG emissions performance of some biofuel feedstocks from some countries. What we can also say is that whilst both policies have failed to deliver the desired volumes to market – and look unlikely to deliver the volumes targeted for 2020 or 2022 – they have set the ball rolling on biofuels markets.

Moreover, are biofuels policies suffering from silver-bullet syndrome? Only a few years ago, some saw biofuels as the silver bullet, the solution to energy, fuel, emissions and climate change concerns. Very quickly, however, the discourse changed. By the time we undertook fieldwork interviews in 2010 and 2011, we were regularly having people tell us ‘there is no silver bullet’. Instead, biofuels are now seen as one of several responses to the challenges faced. In the EU, formal discussions have begun on energy policy through to 2030. Here, a role for biofuels is still envisaged, but no explicit target is being set. In the US there may be challenges to the expansion of biofuels, and to the RFS as an instrument of policy, but this is not the same as arguing for an end to the use of biofuels. And whilst President Obama, unlike his predecessor no longer promotes biofuels in State of the Union addresses, he continues to promote renewable energy.

Climate change is not going away – and biofuels will continue to be part of the policy response. The contribution they have made thus far is down to policies like those of the EU and US. Even though we can probably say now that policy will fail, in the sense that the 2020/2022 targets will not be met, we can also argue that they have put the policy on a certain path. Moreover, whilst they may well miss those superordinate targets in the RED and EISA, those targets are themselves intermediate targets in an ongoing fight against climate change. The lessons these two cases give us are, first, that governance challenges in a globalised economy raise specific questions over agency. The biofuels cases show us this is especially so when policy-makers wish to develop a new market and require the cooperation, in many different ways, of the private sector – who have not, thus far, been inclined to work towards it of their own volition. This should immediately warn policy-makers of agency challenges to come.

Second, the biofuels cases show us that when a given policy goal is open-ended, whilst passage through short term (perhaps annual) targets require flexibility of management as progress is made towards a medium-term (decennial or so) target, so too does interpretation of a policy towards the long term goal of seeking to contain climate change. Keynes may have been right that in the long run we are all dead – but unless we are the last generation, the dynamics of policies and the reading of policy targets which address open-ended challenges need to be understood in a similarly open-ended way. Here, policy learning becomes critical, to ensure that any deviation from an initial policy path is not allowed to result in permanent deviation – even if the speed of progress has to be compromised.

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