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## Resolving the policy paradox: the case of biofuel production in Ireland

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# Resolving the policy paradox: the case of biofuel production in Ireland

Resolving the  
policy  
paradox

659

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## Abstract

**Purpose** – The purpose of this paper is to determine the status of policy design and policy implementation in the biofuel sector in Ireland. The focus of the work addresses the overarching operational context of the biofuel sector in Ireland and the role of different actors in shaping and resolving inconsistencies in policy outlook and practice.

**Design/methodology/approach** – This study used a qualitative research approach involving a series of semi-structured interviews with members of the relevant sub-groups concerned. This study sought to address two questions – whether current or proposed policy is likely to affect consumption of indigenous biofuel feedstocks in the biofuel sector and what are the controlling factors in the demand for indigenous feedstocks for biofuel.

**Findings** – Outcomes suggest that while Irish government policy recognises the need to support the development of renewable energy, it also operates under a number of parallel and potentially inconsistent paradigms in relation to biofuels as a renewable energy commodity. It is contended that the outcome of this position is a lack of coherent and coordinated policy in the area of biofuel production, including second generation biofuel using indigenous feedstocks.

**Originality/value** – This paper provides a new cross sectoral perspective on the status of biofuel policy in Ireland with particular reference to second generation biofuel feedstocks. It focuses analysis on the nature of policy-operational inconsistencies and the need for a deeper ecological perspective in governance.

**Keywords** Decision-making, Interviews, Surveys, Biofuels, Renewable energies, Policy, Carbon emissions, Regulation, Options value

**Paper type** Research paper



## Introduction

The development and promotion of biofuels has been seen as a key response to the challenges of climate change. In keeping with European Union (EU) obligations the Irish government has developed policies to promote the development of renewable energies including biofuels. This policy development process has embraced a multiplicity of

actors and a narrowing of complex problems to a limited set of techno-scientific issues. However, there remains considerable uncertainty over the status of an indigenous biofuel production sector in Ireland. Therefore, this study seeks to address two questions:

- Q1. The nature and influence of current policy on the production and consumption of indigenous biofuel using local feedstocks.
- Q2. What are the controlling factors in the demand for indigenous biofuel and the utilisation of local feedstocks?

Various definitions have been advanced over the years regarding the classification of biofuels in the context of petroleum substitutes or additives. However, given that this is a rapidly evolving and dynamic field, a more rigorous and scientific approach to the definition of biofuels is required at the outset. One of the primary characteristics used to define biofuel concerns the origin of the embedded carbon. In this context, first generation biofuels are defined by reference to carbon derived from plant sugars, lipids or starch, where the plants concerned are either actual or potential competitors to food crops and use land that could otherwise be used for food production. In contrast with this are second-generation biofuels, where the carbon for the fuel source is derived from non-edible lignocellulosic materials, where the source of carbon is incidental to food production (e.g. stalks of wheat, rice husks, etc.). It may also include such sources as paper and board, recycled vegetable oil and tallow or whole plant biomass produced on land not suitable for food production (Charles *et al.*, 2007; Carriquiry *et al.*, 2010). Again the end product is similar to that classified as a primary biofuel (e.g. biodiesel, bio-alcohols and biogas).

The global production of biofuels has increased significantly since 2000, although the past few years have shown uncertainty and fluctuations in volumes (International Energy Agency, 2010; REN21, 2014). This overall increase has followed a number of significant strategic initiatives, viz., to mitigate the general increases in global fossil fuel prices, to increase the range of available alternative fuel sources and to address the environmental consequences of energy use (Oladosu and Msangi, 2013). According to Schweizer *et al.* (2013), governments' involvement in policy development and implementation in biofuel production and in addressing environmental concerns in energy use is often problematic. Indeed, contrasting emphasis in biofuel policy at EU and member state level in recent years has been well flagged by Bowyer *et al.* (2015). Dupuis and Knoepfel (2013) outline difficulties and barriers to adaptation and implementation of environmental policy. This occurs for many reasons, most notably because of uncertainty in scientific knowledge, which inhibits decision-making (Wilby and Dessai, 2010); the lack of economic resources (Global Environmental Facility, 2010); and the weakness of state institutions affecting their ability to design and implement public adaptation policy (Yohe *et al.*, 2006; Adger *et al.*, 2009). However, according to Biesbroek *et al.* (2013), the concept of barriers to adaptation and implementation of environmentally driven policy is somewhat under-theorised, with research being used to list existing hindrances to public adaptation policy, leaving aside the explanation of their origins or the causal mechanisms by which they operate. In the area of biofuel policy more particularly, controversy has emerged on its general impact from a number of different sources, most notably the displacement of land-use from food crops to fuel crops (Charles *et al.*, 2007; Di Lucia *et al.*, 2012). It has become a contestable issue, often

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described as a “wicked” problem (Levin *et al.*, 2012). In response, Vogelpohl *et al.* (2013) have encouraged viewing the biofuel debate from an inclusive science-policy-society perspective. To date, they aver that the focus in EU biofuel policy has been on the technical aspects of the debate and less on the impact of the policy to wider society.

This paper seeks to explore this challenge from a policy perspective, yet utilising a scientific lens drawing on the authors’ collective experience in the areas of science as well as policy and government action. According to Dupuis and Knoepfel (2011, 2013), the limited extent to which knowledge, theories and conceptual frameworks from sociology and the policy sciences have been considered in explaining factors that might hinder or facilitate the development and adaptation policy process in the area of sustainable environmental management is surprising. This is a gap that this paper seeks to fill.

## **Biofuels and the environment**

### *Biofuels and the drivers of change*

*Biofuels and sustainable land-use.* The biofuel industry has come under increasing pressure in recent years to resolve the conflicts between the demand for land-use in energy crop production and land-use in food crop production. In some developing nations, there is concern that biofuel crops are being grown instead of food crops (Valentine *et al.*, 2012). A number of studies have linked the production of first generation biofuels to rising food prices (HLPE, 2013; Fargione *et al.*, 2008; Mitchell, 2008). These concerns were particularly acute during the period from 2005 to 2008, when the increases in biofuels production coincided with historically high agricultural commodity prices (Oladosu and Msangi, 2013; Valentine *et al.*, 2012). However, what was initially seen as a simple switch in land-use and a movement away from food production in favour of energy crop production has now been recognised as a more complex process involving many factors. Indeed, several factors in addition to biofuel production converged during the high food price episodes from 2005 to 2008 and from 2010 to 2011 (Oladosu and Msangi, 2013). More recent studies have suggested that the impacts of biofuels on food markets may be less than originally considered and that weather patterns and other policy measures have had a significant contribution (Zhang *et al.*, 2008; Ajanovic, 2010; Baffes and Hanjotis, 2010; Kim and Dale, 2011; Gallagher, 2010; Babcock, 2011; Oladosu and Msangi, 2013). Nonetheless, the challenges represented by the use of land for fuel production as opposed to food production remain and where land-use is deflected away from food production to energy crop production, there is an effect on food pricing as supplies are altered or production opportunities foregone. However, the significance of this reallocation of land can be particularly difficult to assess, and its implications for current and future policy development uncertain. Despite these uncertainties, Ireland along with the wider EU has sought to implement policy on the development and promotion of a renewable energy market including biofuels. In Ireland, a number of specific measures have been implemented to give effect to these policies over the past decade. This has resulted in the allocation of lands for energy crop production and the establishment of indigenous processing facilities. However, the scale of the Irish market is very small, and the range of measures used to promote market growth while initially demonstrating some success has not been able to maintain growth within the open market context in which Ireland operates. The reasons for this outcome have been described as largely dependent on a shift in

supporting policy (Irish Farmers Association, 2010). Systems of market support are traditionally associated with distortions of the market system in a way that strives to achieve economic equity. The question arises as to how significant Irish policy, and its implementation has been in shaping the current state of the Irish biofuels industry and what factors are fundamental to its future success.

*Biofuels, climate change and sustainability.* It has been argued that from a carbon cycle standpoint, biofuels can represent a near neutral balance with respect to their contribution to the enhanced anthropogenic greenhouse effect – a situation that contrasts significantly with conventional petroleum sources (Tyner, 2007). It has even been suggested that under certain production conditions biofuel production can actually result in carbon sequestration (Tyner, 2007). However, others strongly question the veracity of these claims and to a significant extent the issue rests on the accounting procedures used (Charles *et al.*, 2007). Notwithstanding these concerns greenhouse gas (GHG) emission reduction is an expectation of current EU policy (Directive 2009/30/EC, 2009; Bowyer, 2010; Bowyer *et al.*, 2015). Biofuels as a renewable source of energy are seen as an important component in the suite of options available to address the challenges presented by anthropogenic GHG emissions. However, the carbon balance of any given biofuel depends to a considerable extent on the type of land used in the production process and the extent to which this land has changed use in association with the energy crop concerned. Some land uses change the carbon flux rates more than others, and it is difficult to generalise about biofuels and land categories. It may not be appropriate to address this challenge from a globally averaging perspective as local conditions vary in space and time. A more pragmatic resolution to this dilemma requires flexibility in the approach to scale and context, as well as recognising the temporal fluxes of carbon inherent in natural systems. Similarly, there is little agreement on a suitable market mechanism to “price” GHG-emission reductions achieved by biofuels. Thus, if it is seen as appropriate to credit biofuels for that reduction, it will be necessary to incorporate an explicit GHG credit into the subsidy mechanism (Tyner, 2007).

*Biofuels and strategic energy planning.* Interest in alternatives to petroleum fuels tend to peak during periods of crisis as occurred during the oil crisis of the 1970s and has been driven in more recent times by pricing and forecasts on supply availability and stability (Tyner, 2007). It is now widely recognised that governments need to explore alternative fuel sources given the current high dependency on fossil fuels. Dependency on a narrow range of energy sources creates a situation, where the risk to national security and social and economic stability are high. Political and social stability are underpinned by the very real and important link between energy production and food security. In 2012, nearly 60 countries had mandates or targets in place for biofuels production, motivated variously by the attraction of energy security, savings in energy import bills in a context of sustained high oil prices, perspectives for an improved balance of payments, new sources of income, employment and agricultural and rural development (HLPE, 2013). The typical methods associated with the incorporation of externalities, such as energy security or GHG emission reduction in biofuel production, have included such measures as taxation, subsidies or some type of regulatory mechanism. However, traditional economic models are limited in their ability to incorporate energy-security or sustainability cost in the market transaction. Nonetheless to correct such deficiencies, it is still seen as appropriate to either add an additional strategic tax on petroleum fuels, subsidize alternatives to petroleum or develop schemes such as fuel standards that

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require vendors to procure a certain percentage of their fuels from specified alternatives (Tyner, 2007). Although it has been recognised that biofuels can make a significant contribution to energy supply and security, their development has been limited by feedstock costs, production limitations and availability of appropriate land (Carriquiry *et al.*, 2010). These considerations do not take away from the importance of developing an appropriate response to the need for secure and sustainable energy.

### *European and Irish policy context*

*Renewable energy policy.* In recognition of the need to have a coordinated and strategic approach to the global challenge in energy security and climate change, the EU has been developing a regional policy to promote the development of the renewable energy sector (Bowyer *et al.*, 2015). This has been set out in the 2009 EU Renewable Energy Directive (Directive 2009/28/EC, 2009), which will require 20 per cent of all energy in the EU to come from renewable sources by 2020. The Renewable Energy Directive seeks to supply at least 10 per cent of the total transport fuel demand from renewable sources (Fonseca *et al.*, 2010). The Renewable Energy Directive (Directive 2009/28/EC, 2009), along with the Fuel Quality Directive (Directive 2009/30/EC, 2009), has also set criteria for the sustainability of biofuel production and the procedures for compliance verification. Additionally, the directive requires a 6 per cent reduction in the GHG intensity of fuels used in road transport by 2020 with obvious implications for the biofuel contribution. The details of these procedures are implemented at the member state level through the development of a National Renewable Energy Action Plan (NREAP) (Directive 2009/28/EC, 2009).

The Irish NREAP has set the context for the development of regulatory mechanisms directed at promoting the renewable energy sector in Ireland. The current scheme dealing with petroleum substitutes, known as the Biofuels Obligation Scheme, was launched on July 2010 under the provisions of the Energy (Biofuels Obligation and Miscellaneous Provisions) Act 2010. The act also established the National Oil Reserve Agency (NORA) to administer the Scheme. The Biofuel Obligation Scheme superseded the Mineral Oil Tax Relief Scheme (MOTR Scheme), which ran from 2005 to 2011. There were 11 Biofuel Obligation Scheme obligated parties and three companies that produced or supplied biofuels (registered as account holders) in Ireland in 2014.

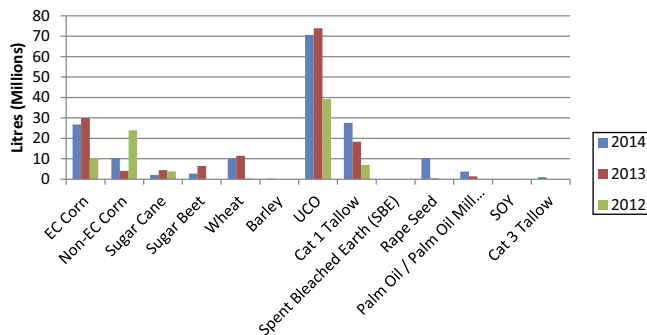
Feedstock for biofuel production in Ireland has been spread across a range of sources with used cooking oil making up the largest contribution (Figure 1). However, it is significant that of the approximately 167 million litres of biofuel placed on the Irish market in 2014, nearly 85 per cent of the feedstock for this biofuel was imported (Ó Cléirigh and Casey McGrath, 2015).

*Renewable energy and the policy development paradigm.* There is a general principle in policy that government is there to maximise the welfare of individuals and that the justification for government rests in its capacity to advance the greatest good for the greatest number (Jenkins Smith, 1990; Colebatch, 2009). Much attention has been devoted to finding ways to evaluate this outcome and to calculate the best policy option. This approach is often based on a calculation of the relative advantage to different interests of achieving the desired goals of each of the options. The Bioenergy Action Plan, published in 2007, and the NREAP 2010, set out future policy for biofuels in Ireland and can be evaluated in the context of ideas expounded by Jenkins Smith (1990) and Colebatch (2009). It is significant that the decision to proceed to an obligation system



was based on a series of research documents, most notably “Policy Incentive Options for Liquid Biofuels Development in Ireland” prepared for the then Department of Communications, Marine and Natural Resources (Hamelinck *et al.*, 2005). This document reviewed the various policy options available and came to the conclusion that an obligation type approach had a number of advantages. As such, the commitment to introduce an obligation was outlined in the White Paper on Energy Policy in 2007, the then Programme for Government, and has continued to guide thinking in this area. Thus, in terms of biofuel policy it is relevant to ask, does this represent a balance that generates the greatest welfare and achieves the greatest good, and indeed, who should be, or at least who are, the relevant interests?

In terms of policy development, it has been recognised that while the rational model represents the more preferable model for decision-making, the incremental model best describes the actual practice of public policy design. Thus, the logic of the participants rather than the logic of the system will have a significant role to play in determining the outcome (Lindholm and Woodhouse, 1993; Moe, 2015). The question that this raises in terms of the Biofuel Obligation Scheme and renewable energy policy in Ireland is intriguing because it focuses interest on the logic of the participants as competitors seeking to control resources, draw attention to their needs and frame the policy question. Policy design takes place within a context of culture and practice, and, hence, it is important to understand the dynamics and forces of this system because it has a bearing on the emerging priorities and the shape and fashion of the resultant policy (Dovers and Hezri, 2010; Pilgrim and Harvey, 2010; Upham *et al.*, 2011; Pettigrew, 2014). The biofuel industry in Ireland has been the subject of significant changes in policy in recent years, and its fate has been the subject of considerable uncertainty in the light of more recent policy initiatives such as the Biofuel Obligation Scheme. It has been noted that the transition from the MOTR scheme to the Biofuel Obligation Scheme saw the decline of many indigenous feedstocks as a source for Irish biofuels even allowing for the emphasis on indigenous second generation feedstocks in production (IFA, 2010; Gusciute *et al.*, 2014). Markets and costs have often been cited as the dominant factors associated with this decline, but the more revealing question is what has shaped these issues and why have they arisen in the first place? Hence, conflicting perspectives remain as to the principal drivers of this reduced activity and to what has defined their nature. This is all the more intriguing given the on-going promotion of the renewable



**Figure 1.**  
Quantities of biofuels placed on the Irish market by reference to feedstock (2012-2014)

**Source:** Ó Cléirigh & Casey McGrath (2013, 2014, 2015)

energy sector by European and Irish policy. The promotion of renewable energy by European and Irish policy continues to evolve in this area but it is appropriate to ask whether this policy is more reactive than proactive and, indeed, whether the levers of control fall within the context of current policy design. Given the importance of promoting renewable energy generally and biofuels in particular and the potential benefits of an indigenous biofuel production industry, it is important to explore the factors that have shaped this outcome and are likely to guide its future form.

## Methodology

### *The research approach*

The research approach can be classified as exploratory in that it seeks to go beyond description and generate an explanation or theory that helps understanding of the processes and interactions of biofuel policy as currently manifested in Ireland. Implementation involved a series of semi-structured interviews with members of the relevant sub-groups concerned, including producers and their representative bodies; the oil companies (obligated parties) and their representative bodies; independent research entities; and government departments and the agents of government. The research strategy adopted involved a non-probabilistic method which combines both judgemental sampling and quota sampling, where the latter includes a minimum of one participant from each of the sub-groups concerned. Key participants in the production, distribution and retail of biodiesel in Ireland, as well as those involved in policy development and implementation were identified.

In total, 12 semi-structured interviews were undertaken, 3 of which were conducted over the telephone (Table I). The questions were left sufficiently broad to build up a picture of the context and processes in the sector as perceived by the respondents. Transcriptions were contemporaneous so as the findings and other crosschecked notes would be fresh. This allowed for follow up with regard to documents or key respondents

Sector	Company
Biofuel companies	Green Biofuels Ireland Limited (GBIL) Biogreen Energy Products Limited (BEPL)
Oil companies	The Maxol Group Topaz Energy Group Limited
The government sector	The Department of Communications, Energy & Natural Resources (Dept. CENR) (Sustainable and Renewable Energy Division) The Sustainable Energy Authority of Ireland (SEAI) The National Oil Reserves Agency (NORA)
Industry association	The Irish Bioenergy Association (IrBEA)
Independent expert	Dr. Kevin McDonnell, School of Agriculture & Food Science, University College Dublin (UCD – Bioenergy Research)
Grain merchants	Glanbia plc* Dairygold Co-operative Society Limited*
Government sector	Department of Agriculture, Food and the Marine (Bioenergy Policy Section) (Dept. AF&M)*

**Note:** \*Telephone interviews

**Table I.**  
Survey of  
respondents in the  
Irish biofuel sector



that were mentioned during the interviews. Therefore, data analysis proceeded as data continued to be gathered. Through this process under the headings of “policy in the Irish biofuel sector” and “factors controlling the demand for Irish feedstocks in biofuel generation”, a number of core themes were identified in the study, which will now be outlined.

## Results

The outcome of this study is based on a series of semi-structured interviews with four significant sub-groups in the biofuel sector, viz., the regulatory authorities, which includes government and its agencies (e.g. SEAI); the oil companies or principal retailers of biodiesel; the producers of biofuel whether as the only product or as part of a range of related products; and independent research interests (i.e. the university sector). Following the literature review, two key areas were identified – the policy influence with regard to the Irish biofuel sector, including second generation biofuel, and the factors controlling the demand for Irish biofuel and the role of indigenous feedstocks. These areas framed the context for the implementation of the research approach and a number of themes emerged within these headings that are significant.

### *Policy in the Irish biofuel sector*

*Policy focus in the biofuel sector.* It was acknowledged that there is an imperative on government to meet the EU 2020 renewable energy target of 10 per cent within the transport sector while, at the same time, keeping costs to the exchequer and the consumer at a minimum. Indications are that this target is likely to be almost completely met from the use of biofuels and that the majority of these biofuels will, in all likelihood, be imported. The interviewees were of the view that it was unlikely that indigenous feedstock supplies will see much growth in the short term largely because of the cost structures involved and the lack of incentives for local feedstock producers, despite the provisions of the Biofuel Obligation Scheme. Additionally, government objectives are perceived by many interviewees (non-government) as short term and focused on market regulation mechanisms such as the Biofuel Obligation Scheme to generate indigenous supplies. It was suggested that there is little evidence of strategic thinking with regard to the medium or long-term outlook. Many non-government respondents reported a lack of clarity on the need to address the availability of a broader feedstock base, including second generation biofuels.

*Policy and outcomes of the biofuels obligation scheme.* Obligation schemes are designed around the concept of quotas and thresholds with financial penalties for non-compliance. Oil companies trading in Ireland (the obligated parties) have to sign up to the Biofuel Obligation Scheme. While in principle, these schemes have many laudable characteristics, in practice, their operation has proven to be more complex and feedback in terms of the Biofuel Obligation Scheme suggests that this is no exception. One of the key features of the Biofuel Obligation Scheme has been the establishment of a “Certificate Market” attached to biofuel production which favours second-generation processes (double certification). However, interviewees report that there has been widespread uncertainty over the value of certificates associate with biodiesel production in Ireland. They suggest that most of the obligated parties have shown little or no interest in buying the certificates which consequently have little or no value. Findings also suggest that there may be a level of cooperation either explicitly or implicitly

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between certain oil companies operating in the Irish market to control the purchase of certificates, and, in so doing, the price that they are prepared to pay for these certificates. It has been suggested that the existence of these practices could be seen as anti-competitive and likely to restrict the development of indigenous biofuel production in Ireland. This outcome has a number of possible reasons most notably a reluctance by oil companies to engage with indigenous biofuel providers and the ability to import pre-blended fuel from the UK and elsewhere. However, it may also be seen as a statement on government attempts at regulation. It was reported that because of the import of pre-blended fuel and the economics of biofuel production elsewhere, the obligated parties have limited financial exposure and so greater leverage in this area. Many interviewees report that even if the system was working better than it currently is, this would still lead to a system with great swings in market values as the biofuel contributions are met in different ways. Many respondents were of the view that the degree of perceived “over regulation” in the Biofuel Obligation Scheme was likely to close down the industry.

*Policy and the balance of power.* Oil companies operating in Ireland are closely linked with UK oil company interests and wider global operations. It was reported in interviews that there are certain sections within the oil industry that would prefer a slower pace in the development of biodiesel. It was also suggested that individual operators (biofuel producers) in Ireland have been discouraged from development and expansion of biofuel production because this is seen as an unnecessary burden on traditional operations. Indeed, it was reported that Irish-based oil companies generally prefer to import pre-blended fuel rather than set up a local blending operation in Ireland. However, it is also acknowledged that because fuel is a high value market if oil companies operating in Ireland are required by regulation to blend in Ireland, then they will comply as it is still in their interest to do so. They suggested that in such circumstances they would prefer the blending to occur at the port of entry. It was noted that this raises significant operational challenges and undermines indigenous biofuel production capacity. Given the perceived standing and direction of current Irish government policy, this was seen as unlikely to change in the short term.

#### *Controlling factors in the demand for Irish biofuel and local feedstocks*

*Commitment to research.* It was noted by participants that the state body (SEAI) for promoting and mediating research on sustainable energy development in Ireland has not been pursuing any major research initiatives in the area of alternative feedstocks for biofuels and biodiesel since 2009. Research by Irish government bodies in this area is influenced by the perception that second generation technology in the biofuel sector will remain uneconomic for some time and that it may well be post 2020 or later before a change is seen in this regard. However, research elsewhere regarding alternative feedstocks has been broadening the range of options available for the production of biodiesel. Recent initiatives in this area suggest that products such as mustard oil which accounts for 12 per cent of the world’s vegetable oil production (third largest source after soy and palm oil) could represent a new feedstock for biodiesel (Chakraborty *et al.*, 2014, 2015). Nevertheless, the current and probable future focus of government mediated research interest is likely to remain on other forms of renewable energy and on the development of primary feedstocks with regard to biofuels (SEAI/Dept. CENR / Dept. AF&M).

*Government paradigm – internal rationality.* Many interviewees suggest a minimal role for biofuels, particularly second-generation biofuels in the Irish transport sector with regard to the 2020 targets as set out in the Renewable Energy Directive. Respondents did suggest that second-generation biofuels may come into their own towards the latter stages of the 2020-time frame, particularly with regard to the transport sector. However, it was acknowledged that even allowing for this, it remains uncertain as to whether this second generation biofuel will be generated indigenously or simply imported by operators in Ireland. Current indications are that any biofuel feedstock requirement will be met by importation given the absence of explicit strategic policies for the expansion of indigenous supplies. A caveat to this was the recognition that market forces are not completely deterministic and the possibility exists that new sources of second-generation biofuel may emerge with implications for indigenous and non-indigenous sources alike.

*Government paradigm – external rationality.* There was a strong indication from the non-governmental respondents that much of what is required in terms of developing the renewable component in the energy sector, particularly biofuel production, including second-generation biofuels, could be addressed given the right political mind-set. It was generally held that the failure in Ireland to respond in kind lay with the position adopted to date by the Irish government. This includes not just the current government but its predecessors as well. It has also been argued that this is not based on technological considerations but rather represents a philosophical barrier which defines the vision of those in power. Many interviewees reported the approach in Ireland as one of “technology taker”, in that the Irish policy response is to use “off-the-shelf” technologies in the biofuel sector. This has obvious merit in that existing biofuel technologies have been standardised and accepted by industry, for example, the transport sector. Nonetheless, the general experience in industry suggests limited action on the part of government to facilitate the integration and implementation of these technologies. Interviewees report that part of this perceived lack of action by government is a function of discontinuities between the various public sector players in the biodiesel industry, (e.g. Department of Finance and SEAI), where gaps and inconsistencies dominate. The Irish government has been perceived as generally unsupportive in driving biofuel production, particularly the production of second-generation biofuel–biodiesel. The support, where it is evident, tends to focus effort on solid primary feedstock biofuels because these are perceived by government as representing an area, where targets are easier to achieve. Many non-governmental actors in the field suggest that the major issues in terms of fashioning a response to the challenges of the Renewable Energy Directive, the EU 2020 targets and the general development of a viable biofuel sector are not technological but rather stem from a limited vision and an unwillingness to change structures and step outside established operating practices.

*Oil companies and the balance of power.* If there was to be a contrasting perspective on the determinants of the status of the biofuel industry in Ireland and second-generation biofuel in particular, then it was expressed from the oil company sector, where perceptions about government involvement were less critical. Oil companies operating in Ireland are supplies to the end-user and respondents in this area expressed the view that any indigenous suppliers of biodiesel need to supply a product on an economically competitive basis. They also indicated that schemes are

in place to assist in this regard, for example, they point out that second-generation biodiesel production receives double certification through the use of feedstocks such as recycled vegetable oil under the Biofuel Obligation Scheme. Indeed, this type of support coupled with methods that enhance the efficiency of biodiesel yield utilising such products as used frying soybean oil may present new opportunities (Chakraborty and Banerjee, 2010). Thus, they were of the view that current market schemes were not particularly deficient or problematic. They do recognise that there are limitations to the current government–industry interaction and are aware that indigenous biofuel suppliers in this area have made their case well known. However, oil companies based in Ireland import most of their current biofuel–biodiesel needs and are cost-focused. They are not of the view that they have any wider responsibility to the development of an indigenous biofuel industry or to the promotion of second-generation biofuel production, and they do not view current government strategy in this area as a priority. Notwithstanding this, respondents in this sector did recognise that government needs to take a more direct leadership role, reduce bureaucracy, co-ordinate administration and promote utilisation.

## Discussion

This study set out to explore the policy context of Irish biofuel production and the controlling factors in the demand for indigenous first and second-generation feedstocks in the biofuel sector. The outcomes of this study contribute to our understanding of the biofuel policy system in Ireland and, in particular, draw attention to the existence of inconsistency and uncertainty in Irish government policy design. In particular, it suggests a lack of meaningful consultation in the development of biofuel policy and limited prioritisation of research particularly with regard to second-generation sources. The study has also provided evidence of polarised perspectives between key parties within the general biofuel market and highlighted the effects this has on policy outcomes. It is suggested that the biofuel policy that has prevailed in recent years is hierarchical in nature and subject to process endorsement. Ultimately, these issues and the dynamics of their interplay are fundamental to the effectiveness of policy in this important area of renewable energy management and the wider context of social and economic sustainable development in Ireland.

### *Resolving the policy paradox*

*The ontology of Irish biofuel policy.* Having a formal policy decision is only the beginning of the policy process what is more important is the outcome or consequence. It is easy for the Irish government to state that they wish to enhance the supply of indigenous biofuel feedstocks – but what really matters is how outcomes change as a result of this decision. For this reason, it has been argued that policy has to be understood in terms of commitments and not just intent (Dearlove, 1973; Colebatch, 2009). Much of Irish policy, and Irish biofuel policy is no exception in this regard, is magnanimous on principle but often lacks implementation mechanism or explicit strategic commitments to give effect to a decision. Thus, policy must be understood not simply in terms of officially proclaimed goals but in terms of the way it is going to play out among a wide range of participants (Colebatch, 2009). Therefore, while the Irish government has a clear policy in terms of promoting renewable energy as evidenced by recently published legislation and regulations such as the establishment of NORA and

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the setting in place of the Biofuel Obligation Scheme, the evidence of this study suggests that the commitment is uncertain and the mechanism heuristically based (Directive 2003/30/EC, 2003; Directive 2009/28/EC, 2009; Ó Cléirigh and Casey McGrath, 2013; HLPE, 2013). This is an important consideration and represents a serious challenge to the establishment and promotion of the biofuel sector generally and the indigenous biofuel feedstock market in particular.

*Process-based policy.* The results of this study suggest that as Irish biofuel policy has evolved means and ends may be seen as blended dimensions, analysis of practice is limited rather than comprehensive and the policy that emerges does so as a succession of changes rather than a single clear decision. However, viewing this as a successional or incremental approach has certain limitations as a conceptual model for the analysis of Irish biofuel policy because in many ways, policy in this area has been punctuated by steps or leaps (e.g. MOTR Scheme and the Biofuel Obligation Scheme). These elements are more in keeping with the widely embraced theory of punctuated equilibrium, where public policy and the institutional systems associated with them are subject to long periods of stability which are then interrupted or changed by a burst of policy activity that brings about the change in systems (Baumgartner and Jones, 2010). While acknowledging this dimension to the process, challenges remain regarding what time periods should be regarded as “long” and how to define a system as “stable”. Thus, a more balanced consideration reaches across these theoretical considerations drawing in elements of more than one model.

Irrespective of where Irish biofuel policy falls on the developmental spectrum, it has been well recognised that good decision-making is not only something that achieves known objectives but also an outcome arrived at through a process in which there is general agreement (Lindholm and Woodhouse, 1993; Colebatch, 2009). In this context, the implementation of the Biofuel Obligation Scheme as a regulatory mechanism based on imitation and “popularity” across the EU presents certain inconsistencies with the ideals of policy development. The role of policy, politics and management offer different ways of steering organisations and markets and each makes its own assumptions and holds its own view about the dynamics of the entities concerned. Thus, in steering organisations such as the obligated parties or the feedstock producers or the regulatory organisations (e.g. NORA) or the representative organisations (e.g. Irish Bioenergy Association), it is important to recognise the influence of these assumptions and perceptions. This has a significant bearing on how these organisations interact in the process.

The existence of policy addressing a particular topic may sometimes be seen as providing a measure of self-justification on the part of policy-makers. The inclusion of differing perspectives in the development of policy is generally well understood and indeed encouraged as a mark of inclusive decision-making. However, as this process moves to implementation, there is considerable opportunity for the various parties involved to develop divergent perspectives on the appropriateness of the measures proposed and adopted. The development of policy in relation to biofuels and second generation feedstocks has several distinct interest groups, including government and the agents of government, the oil companies, the biofuel producers and independent research groups, as well as the wider public. Different parties make sense of policy in different ways depending on their knowledge and expertise and their perspective. Therefore, all these parties have divergent perspectives on the

emphasis that should be given to the different measures adopted. Establishing effective policy in this type of area requires consensus building which is a difficult but necessary process. This in turn is best achieved through stakeholder engagement in the definition of the problem and the formulation of the policy response. Unfortunately, this study suggests that the involvement of the effected parties in biofuel policy development has been largely superficial and this in turn has led to a level of disenfranchisement on the part of many of the biofuel producers. Indeed, interviewees report that the integration of differing perspectives has been distinctly top down and the consequence of this is a disengagement with policy development and the “ownership” of the decision-making process. An obvious outcome of this is the withdrawal of participation in a fledgling industrial sector which is indigenous and has the potential to make a significant contribution in the area of energy, climate strategy, employment, etc. These outcomes are in keeping with findings of [Fonseca et al. \(2010\)](#) who suggest that the essential thing about policy is not its aspirations but the effects they have on the actions.

#### *Drivers of policy formulation and practice implications*

*Governance and the research agenda.* The outcomes of this study suggest that the Irish Government and its agents are not prioritising research in the development of biofuels, particularly second-generation biofuels. Although, it is acknowledged that much of the technology that applies to the production of primary biofuels can transfer to the utilisation of some secondary biofuel feedstocks there are also significant limitations in this approach as certain second generation feedstocks are less easily accessed and utilised. It is readily acknowledged that to promote the wider utilisation of second-generation feedstocks in biofuel production, it is necessary to enhance extraction efficiency and broaden feedstock substitutability. Addressing these two pillars requires a concerted effort in the area of research and development, yet this challenge continues to receive little government attention or investment. This presents certain inconsistencies with the rhetoric of government, where it concerns the development of indigenous renewable energy supplies. It seems evident that greater extraction efficiency and a greater range of feedstock supplies would widen the market for second-generation feedstocks and create new opportunities for indigenous supplies to be developed. It has been reported by respondents to this study that Ireland is prepared to wait for the technological steps forward to be made by other jurisdictions and to then adopt these technologies once they have become established and are readily available. However, this approach makes light of the inertia associated with technological transfer and market establishment and could leave Ireland struggling to play “catch-up”. When this general approach to the bio-green sector is set against that seen in other jurisdictions that demonstrate a strong commitment to renewable energy research and development, including explicit strategies for enhanced biofuel production technology and market development, then it suggests a narrow temporal and strategic context on the part of government.

*Policy, stability and change.* Much of the study of policy has been grounded in the perceptions of the way organisations work and the gap between the way they *do work* and the way they *should work*. The development of Irish renewable energy policy can be viewed from this perspective. All stakeholders can be considered as having an interest in the development of biofuel policy. However, it is more



meaningful to resolve this group into what can be labelled as “vested interests”, i.e. those with a more immediate and material benefit dependent relationship with the phenomenon under investigation. Understanding the relationship of vested interests helps us understand why major change is so rare, what resistance must be overcome if it is to occur and why reform is often limited or incremental and tends to leave the core structures of the system intact, even if its performance is quite inadequate (Moe, 2015). This study provides some insight on the key relationships between the main parties operating in the biofuel sector and, hence, the level and nature of interest in maintaining the status quo. Moe (2015) notes that all institutions contain the seeds of their own stability and will use whatever power they have to protect and stabilise their environment. Thus, in formulating an understanding of current biofuel policy in Ireland, it is necessary to take account of the current Irish institutional and organisational environment and their desire to maintain stability. Pierson (2004) and Hall (2010) have rightly pointed out that recognising institutional stability is a foundational issue for the analysis of institutional change. In this respect, there is a degree of polarisation evident in the actors in this field with the oil companies (retailers) and the government sector and its agents as one interest group and the biofuel producers and their industry representative body as another. Where change threatens a future in which the benefits of one group are reduced or eliminated or there is considerable uncertainty about what their benefits will be, then resistance is expected (Moe, 2015). It was noted that the biofuel producers have struggled to operate under the current policy regime yet their desire to shape policy and see change that serves their interests is not simply a question of their ability to exercise power to the extent that they have it but rather to *overcome* the power of others.

*Biofuel policy and process endorsement.* The concept of policy is central to the way society and its component sectors are governed. It is part of the framework of ideas used to make sense of the way the world is and how it might be changed in the future. Thus, in exploring the dynamics of energy and environment as key elements of the societal infrastructure it is to be expected that weighty and protracted consideration will have been given to policy development in this area. As in other policy areas, the development of energy and environmental policy is fashioned by concepts, societal values and structure (Dearlove, 1973). Therefore, policy design in this area needs to give appropriate consideration to Ireland’s social order, its government and economic fabric. The evidence suggests that the balance of interest in shaping biofuel policy rests largely in the hands of government and the larger global oil producers. It is further evident that the policy is hierarchy based in that implementation flows from government down through the responsible authorities – this implementation process is seen as justification in itself, validating the very organisations through which it is channelled. This means that organisations such as the Department, Communications, Energy and Natural Resources (DCENR) or even NORA are defined by instrumentality which sees them as a device or tool acting in the pursuit of particular purposes set by others. This can create implementation rigidity and inflexibility to respond to change or challenge which has been evidenced in this study. It would seem that as far as biofuel policy is concerned, this dimension represents what has been widely recognised as process-based endorsement, often based on a narrow or limited course of action (Colebatch, 2009).

The outcomes of this study suggest that the level and nature of policy coherence in the biofuel sector is marginal. Clearly, the elements of policy are present and actions generally fit together in a form which is part of a single system. However, coherence aspires to, and is set against, the normative position – a standard that seeks to provide the “greatest good” for the widest pool of interests. This study suggests that biofuel policy has been falling short of this threshold.

## Conclusion

This study sought to explore the policy context of Irish biofuel production and the controlling factors in the demand for indigenous feedstocks in the biofuel sector. Additionally, the study sought to explore the underline context of the current status of policy in this area in Ireland. A number of factors have been identified that control the demand for indigenous biofuel feedstocks and the generation of indigenous biofuel including government support, organisational power, research investment, technological considerations and market perceptions. In many respects, these are the “what” factors in biofuel policy. However, of greater significance is the “why” factor. It is often the case that the question asked is what is the policy on biofuels, but this is misleading because it pushes us to look for a policy statement, which can be well presented by government. However, what really matters is the significance of this statement, what will determine how things are done? This is where the real revelation comes, where the paradox is resolved and where we seek to know “who” are the interests, “who” really controls the policy and “what” are the interests they are serving – whether explicitly or implicitly enunciated? This determines the implementation – the practice evident in the field. This is evident when one pushes to reveal who takes notice of the policy and in what contexts; is it linked to resources, investment and real implementation structures and the policy–practice divide? This study suggests that to achieve the outcomes of enhanced indigenous biofuel feedstock production, processing and consumption in Ireland as part of strategic energy planning it will be necessary to achieve a fundamental shift in how biofuel policy is formulated. It goes further and suggests that real change in this area will only arise, where governance and policy development are founded on the fundamental principles that underpin societal norms with regard to true economic, societal and environmental sustainability.

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