

**Synthesizing the Biofuel Policies of Europe**

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The last few decades of the twentieth century saw the rise of energy security and concern over greenhouse gas (GHG) emissions toward the top of policymakers' agendas. In response to this, there has been a push for the development of alternative fuel industries. Biofuels, such as bioethanol and biodiesel, are two alternative fuels promoted with potential to reduce dependence on fossil fuel imports. They also have the potential to reduce GHG emissions into the atmosphere, although the extent of this reduction is still debated and depends on a variety of factors including the type of crop input used and the choice of production processes.

In an effort to encourage the development of the biofuel industries, policymakers have been designing and implementing policies and legislation rewarding the producers and consumers of biofuels. This is especially true in Europe, where there is a region-wide push for the development of alternative fuel industries. Indeed, European states have indicated they want the region to become the global leader for the development of this industry. As a result, Europe as a region has been very active in setting the standards for member states to adopt to allow this to happen. Some member states have also unilaterally taken the initiative to go beyond the directives and recommendations of Europe and establish their own standards.

This paper provides a synthesis of these European policies. The first section summarizes those policies established to date at the regional level. The second section looks at the policies put forward by the individual states. The final sections look at the issue of the sustainability of the biofuel industry and the major issues likely to be driving these policies into the future.

### **Regional European Strategies**

In fulfillment of its Kyoto Protocol commitments and driven by its overarching objectives of security of energy supply, environmental sustainability, and economic competitiveness, the

European Union (EU) has been developing integrated energy and environmental policies across its Member States that cover the wide spectrum of energy production and use including power generation and distribution, energy efficiency in industry and homes, and use of renewable energy particularly in transport.<sup>1</sup> The transport fuel market is responsible for more than a fifth of greenhouse gas emissions that contribute to climate change in the European Union.<sup>2</sup> Therefore, the EU has made renewable fuel for the transportation sector a priority.

This paper looks into the policies that relate to renewable energy for transport, particularly biofuels. While these policies span cross-cutting issues, for ease of reference, these policies have been categorized into the following five themes:

- (1) Biofuel production and consumption
- (2) Environmental sustainability and standards
- (3) Technology and innovation
- (4) External cooperation and trade
- (5) Harmonization of energy policies in Europe

While a few European countries have taken interest in biofuels in the 1990s, the European Union began to pay serious attention to biofuels in 2001<sup>3</sup> when the Commission of the European Communities (“the Commission”) issued Com/2001/547.<sup>4</sup> This Communication identified biofuels as one of three key potential alternative fuels (the others being natural gas and hydrogen) that could each be developed up to a level of over 5 percent of the transport fuel

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<sup>1</sup> Under the Kyoto Protocol, the European Union committed to cut carbon dioxide emissions by 8% from 1990 levels by 2008-2012. In this regard, it has imposed quota limits to the amount of carbon dioxide emissions of energy-intensive industries. Its limits on carbon dioxide emissions from cars are also being progressively tightened. In addition, it is pushing for the successor to the Kyoto Protocol post-2012; the European Union has taken the lead in discussing tighter limits across a wider range of industries including air transport (Overviews of the European Union Activities: Energy cited in [http://europa.eu/pol/ener/overview\\_en.htm](http://europa.eu/pol/ener/overview_en.htm))

<sup>2</sup> Boel 2008

<sup>3</sup> Commission of the European Communities 2007A, p.3

<sup>4</sup> Commission of the European Communities 2001

market by 2020.<sup>5</sup> The Commission saw biofuels as a short to medium-term substitute for transport fuels because they are practically 100 percent indigenous (when based on crops grown within the European Union) and – at that time – viewed them as carbon dioxide neutral because the indirect and direct energy consumption of growing the crops and producing the fuels could offset half or more of the carbon dioxide benefit of biofuels.<sup>6</sup> They could also be applied to the existing vehicle and distribution systems. The Commission, however, did not see biofuel production as a long-term high volume substitute because of land limitation.

Nonetheless, the Commission aimed to lay out the approach that the region would take to achieve the medium-term goal of 20 percent substitution of conventional transport fuel by alternative sources. It includes agriculture policy, taxation measures, and biofuel content requirement in the transport fuel market.<sup>7</sup> In this regard, the Commission proposed two landmark directives. The first aimed to promote the use of biofuels for transport. The second aimed to reduce the excise duty rate on biofuels as well as certain mineral oils containing biofuels.

The proposals made by the Commission in Com/2001/547 were adopted in the Directive 2003/30/EC.<sup>8</sup> The Commission, through this Directive, aimed to promote the use of alternative fuels for transport, particularly biofuels, by providing a non-mandatory requirement for Member States to ensure a minimum proportion of biofuels or other renewable fuels for transport in their markets. The reference value was set at 2 percent biofuel content in the transport market of each Member State by December 31, 2005 and 5.75 percent by December 31, 2010.<sup>9</sup> The 2005 indicative target, however, was not achieved and the Commission, in its Biofuels Progress

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<sup>5</sup> Commission of the European Communities, 2001, p.5

<sup>6</sup> Ibid.

<sup>7</sup> Ibid.

<sup>8</sup> European Parliament, 2003A

<sup>9</sup> European Parliament 2003A, p. L123/44

Report of January 2007, concluded that the target for 2010 is unlikely to be achieved either; the expectations are for a share of about 4.2 percent.<sup>10</sup>

While non-mandatory, Member States are instructed under Directive 2003/30/EC to provide annual progress reports (submitted before the 1<sup>st</sup> of July) to the Commission on measures taken in the promotion of biofuels and other alternative transport fuels as well as the share of biofuels in total sales of transport fuels. In addition, under the Directive 2003/30/EC, the European Parliament and the Council of the European Union required the Commission to draw up an evaluation report on the progress made by Member States by the 31<sup>st</sup> of December 2006 and every two years thereafter. This evaluation report covers cost-effectiveness of the measures to promote biofuels, the impact on climate change and carbon dioxide emissions including the economic aspects of their environmental impact, the sustainability of the crops used, and the potential long-term options concerning energy efficiency in the transport sector.<sup>11</sup>

In support of Directive 2003/30/EC, the Council of the European Union introduced Council Regulation 1782/2003<sup>12</sup> and Directive 2003/96/EC.<sup>13</sup> The former is part of the direct support schemes under the Common Agriculture Policy (CAP) of the European Union; it provides an aid of €45 per hectare per year for energy crops sown in non-set-aside land. These energy payments are in addition to the CAP incentives for set-aside land and are restricted to a maximum of 1.5 million hectares (and later amended to 2 million hectares).<sup>14</sup> It is likely, however, that these energy payments could be eliminated following a Health Check of the CAP on May 20, 2008.<sup>15</sup> On the other hand, under the Directive 2003/96/EC, Member States are

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<sup>10</sup> Commission of the European Union, 2007, p.6

<sup>11</sup> European Parliament 2003A, p. L123/45

<sup>12</sup> Council of the European Union, 2003A

<sup>13</sup> Council of the European Union 2003B 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity

<sup>14</sup> Council of the European Union, 2003A, p. L270/29

<sup>15</sup> Boel, 2008

allowed to apply a tax exemption or a reduced tax rate on products produced from biomass or products with biomass components.<sup>16</sup>

Recognizing the need for an all-encompassing approach to biofuels, the Commission developed *An EU Strategy for Biofuels*.<sup>17</sup> This Strategy has a threefold objective which includes the promotion of biofuels within the European Union as well as in developing countries, preparation for large-scale use of biofuels including second-generation biofuels, and exploration of opportunities for the production of biofuel feedstock and biofuels for developing countries.<sup>18</sup> The Commission proposed to meet these objectives through seven policy measures including stimulating demand, capturing environmental benefits, developing the production and distribution processes, expanding feedstock supplies, enhancing trade opportunities, supporting developing countries, and supporting research and development.<sup>19</sup>

The Commission emphasized, in its *Biofuels Progress Report*, that without mandatory objectives, it will be impossible to achieve a satisfactory level of consumption of biofuels.<sup>20</sup> To address this and in response to the need for a long-term approach to renewable energy, the Commission established the *Renewable Energy Road Map*<sup>21</sup> and crafted the *Proposal for a Directive on the Promotion of the Use of Energy from Renewable Sources*.<sup>22</sup> Both of these move towards the establishment of a mandatory target of 20 percent for the overall share of energy from renewable sources and 10 percent for the share of biofuels and other renewable fuels for transport by 2020.<sup>23</sup> Article 18 of the proposed directive provides that the contribution of second

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<sup>16</sup> Council of the European Union, 2003B, p. L283/57

<sup>17</sup> Communication from the Commission, 2006D

<sup>18</sup> Commission of the European Communities, 2006D, p. 4

<sup>19</sup> Commission of the European Communities, 2006D, p. 7-16

<sup>20</sup> European Economic and Social Committee, 2007

<sup>21</sup> Commission of the European Communities, 2007D

<sup>22</sup> Commission of the European Communities, 2008

<sup>23</sup> Commission of the European Union, 2008, p. 22

and third generation biofuels towards these targets would be weighted twice as much as their first generation counterparts.<sup>24</sup>

## **Environmental Sustainability and Standards**

The second bucket of policies is underscored in the Commission's *Proposal for a Directive on the Promotion of the Use of Energy from Renewable Sources*. In addition to establishing mandatory targets for the contribution of biofuels to the market for transport fuel, it also establishes environmental sustainability criteria for biofuels which comprise a minimum greenhouse gas emission saving of 35 percent from the use of biofuels, and a ban on the use of raw materials from land with high biodiversity and high carbon stock.<sup>25</sup> There is more on this under the Sustainability Issues section of this paper. In addition, it emphasizes that the use of agriculture raw materials from the Community shall be subject to established requirements and standards prescribed by the Council of the European Union relating to the conservation and preservation of natural resources.<sup>26</sup>

Prior to this, the European Parliament and the Council of the European Union passed Directive 2003/17/EC, amending Directive 98/70/EC,<sup>27</sup> to include environmental specifications for biofuels in addition to petrol and diesel. Related to this, the European Committee for Standardization (CEN) has developed standards for alternative fuels for transport. Working with stakeholders including car manufacturers, petroleum companies and biofuel producers, CEN has developed European standards, requirements and test methods for biodiesel under EN 14214:2003.<sup>28</sup> These include setting the limits on biodiesel blending to a maximum of 5 percent

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<sup>24</sup> Commission of the European Union, 2008, p. 36

<sup>25</sup> Commission of the European Union, 2008, p. 32-3

<sup>26</sup> Commission of the European Union, 2008, Annex III

<sup>27</sup> European Parliament 2003B

<sup>28</sup> European Committee for Standardization, 2003

share in terms of volume.<sup>29</sup> In addition, EN 15376:2007 lays down the ethanol characteristics as a blending component for petroleum.<sup>30</sup> CEN observed that these standards helped expand the market and has contributed to the 65 percent growth in the production of biodiesel between 2004 and 2005; these standards have facilitated trade and brought down costs as a result of economies of scale.<sup>31</sup>

## **Technology and Innovation**

The European Union has introduced programs to encourage competitiveness and innovation in energy efficiency and renewable energy. One of these programs is Intelligent Energy – Europe (IEE). The IEE is the European Union's tool for funding action to exploit untapped opportunities to save energy, encourage the use of renewable energy sources, and move towards a more energy efficient Europe. To date, the program has supported over 400 projects as part of the €3.6 billion Competitiveness and Innovation Framework Program which runs from 2007 to 2013.<sup>32</sup>

Another noteworthy program is the Global Energy Efficiency and Renewable Energy Fund (GEEREF) that aims to fill the gap in financing high-risk energy efficiency and renewable energy projects mainly in developing countries.<sup>33</sup> It is an innovative financing instrument, established as a global public-private partnership. By helping create and fund regional sub-funds or scale-up existing initiatives, GEEREF will be tailored to the needs of regional energy efficiency and renewable energy markets. It will focus on projects that are below €10 million – typically ignored by commercial investors and international finance institutions. The

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<sup>29</sup> Schnepf 2006, referencing standard EN 590 discussed in EC Memo/06/65, p. 6

<sup>30</sup> European Committee for Standardization, 2007

<sup>31</sup> Ibid.

<sup>32</sup> The Competitiveness and Innovation Framework Program aims to encourage competitiveness among European enterprises particularly the SMEs. The program is divided into three categories. One of these categories is IEE.

<sup>33</sup> Commission of the European Communities, 2006C

Commission has committed to contribute €80 million of the initial funding target of €100 million; several international financing institutions have also expressed interest in contributing including the European Investment Bank and the European Bank for Reconstruction and Development.

In addition to these programs, the Commission has put forward a *European Strategic Energy Technology Plan (SET-Plan)*.<sup>34</sup> Its main goal is to accelerate the development and implementation of low carbon technologies to help the European Union reach its energy and climate change targets for 2020 and 2050. To achieve this goal, the Commission proposes to leverage the potential of the European public sector, industry and research communities by: (1) creating European Industrial Initiatives which will strengthen energy research and innovation by bringing together resources and actors in specific industry sectors; (2) creating a European Energy Research Alliance to enable cooperation among universities and research institutes across Europe; (3) establishing a common understanding and plan for integrating European energy infrastructure network and systems; (4) creating a European Energy Technology System that will monitor progress and inform policy-making; and, (5) establishing a European Community Steering Committee on Strategic Energy Communities to plan joint actions and coordinate policies and programs.<sup>35</sup>

## **External Cooperation and Trade**

The European Union emphasizes the importance of external dialogue and cooperation in achieving its objectives of security of energy supply, economic competitiveness and environmental sustainability. This is reflected in many of the European communication on

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<sup>34</sup> Commission of the European Communities, 2007C

<sup>35</sup> Commission of the European Communities, 2007C, p. 9-11

biofuels including the *White Paper on Internationally Compatible Biofuels Standards*<sup>36</sup> initiated by CEN together with the standards agencies of the United States and Brazil.

This tripartite White Paper called for the alignment of existing standards for bioethanol and biodiesel to help establish internationally compatible standards to facilitate trade, improve production efficiency, and promote innovation and economic security. This White Paper showed that current bioethanol specifications among the three regions are more aligned than biodiesel specifications. While bioethanol standards among the three regions are similar – due mainly to the fact that they originate from Brazilian specification – a fundamental difference among the three regions exist on water content. This is due to the varying ethanol concentrations permitted i.e. the United States has the highest limit of 1.0 vol%, Brazil does not have a maximum limit but water levels are calculated to be a maximum of 0.4 vol%, and the EU has the lowest limit of 0.24 vol%. While this does not constitute an impediment to trade, Brazilian and U.S. exporters to the European Union are required to pursue further drying and testing in order to comply with EU standards.<sup>37</sup>

On the other hand, the White Paper showed fundamental differences in the three regions' biodiesel standards. Those of Brazil and the United States apply to both fatty acid methyl esters (FAME) and fatty acid ethyl esters (FAFE) whereas those of the European Union apply only to FAME. In addition, standards of Brazil and the United States refer to biodiesel as a blending component whereas those of the European Union refer to biodiesel as both blending component and stand alone.<sup>38</sup> The White Paper proposed to update the *Biofuels Standards Roadmap* created in April 2007 by April 2008 and perform a trade implication analysis by May 2008.<sup>39</sup>

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<sup>36</sup> Tripartite Task Force 2007

<sup>37</sup> Tripartite Task Force 2007, p. 9-10

<sup>38</sup> Tripartite Task Force 2007, p. 8-9

<sup>39</sup> Tripartite Task Force 2007, p. 13

The European Union has also signed up to become a member of the International Biofuels Forum, a governmental initiative among Brazil, China, India, South Africa, and the United States launched in March 2007. The Forum aimed to promote the sustained use and production of biofuels worldwide for environmental, economic as well as social benefits for both developed and developing countries by helping create a world market for alternative fuel for transport.

On the external trade front, biofuel imports of the European Union are governed by the Most-Favored Nation (MFN) as well as preferential trade agreements; between the period 2002-2004, about 36 percent of EU imports entered the market under the Most-Favored Nation (MFN) agreement and were subject to import duties of about €10.2/hectoliter or €0.39/gallon for denatured alcohol<sup>40</sup> and €19.2/hectoliter or €0.73/gallon for undenatured alcohol.<sup>41</sup>

The balance of 64 percent entered the market under the General System of Preferences (GSP), the Everything But Arms (EBA) initiative for least developed countries, and the Cotonou Agreement for Africa, Caribbean and Pacific countries. These provide up to 100 percent duty reduction and no quantitative restrictions to beneficiary countries.<sup>42</sup> Other preferential trade agreements allow unlimited duty-free access to Bolivia, Ecuador, Guatemala, Nicaragua, Panama and Peru through drug diversion programs, Egypt through the Euro-Mediterranean Agreement, and Norway within the framework of tariff rate quotas.<sup>43</sup>

Biodiesel imports, on the other hand, are subject to an *ad valorem* duty of 6.5 percent. There has been no significant trade in biodiesel since its production outside of the European

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<sup>40</sup> Commission of the European Communities 2005, p. 32; There is no specific customs classification for bioethanol or biodiesel. It is traded under code 22 07 which covers denatured alcohol with HS Code 220720 and denatured alcohol with HS Code 220710

<sup>41</sup> Schnepf 2006, p. 6

<sup>42</sup> Commission of the European Communities 2005, p. 33-34

<sup>43</sup> Ibid.

Union has been limited. The European Union, however, has begun importing more feedstock to ease the pressure on indigenous rapeseed oil production.<sup>44</sup>

### **Harmonization of energy policies in Europe**

At the 2008 World Biofuels Market Congress in Brussels, Mariann Fischer Boel stated, “...with regard to biofuels, a patchwork of different approaches across Member States simply will not deliver results”. Ms. Boel is a member of the European Commission responsible for Agriculture and Rural Development. In this speech, she encouraged Member States to move together in order to achieve a well-functioning internal market for biofuels, bring down production costs particularly for second-generation biofuels, and build confidence among renewable energy investors.<sup>45</sup>

Recognizing the benefits of adopting a common approach to attaining energy efficiency and promoting the use of renewable energy sources, the European Union is moving towards a harmonized energy policy for Europe. Two documents have laid out the foundation for an Energy Policy for Europe (EPE): a Green Paper calling for a European strategy for sustainable, competitive and secure energy<sup>46</sup> and a Communication on an Energy Policy for Europe.<sup>47</sup> Hailed by the Commission as an important milestone in developing an energy policy for the European Union, the Green Paper was the basis for an Energy Policy for Europe. It set out the European Union’s three core objectives of environmental sustainability, economic competitiveness, and security of energy supply.

The Green Paper put forward proposals for implementing a European energy policy in six priority areas: (1) internal gas and electricity market to address the issues of high prices and

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<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Commission of the European Communities 2006A

<sup>47</sup> Commission of the European Communities 2007B

uncompetitive infrastructure due to protectionism and domination of a few players; (2) uninterrupted energy supply by creating a European Energy Supply Observatory to monitor the energy market and identify possible shortages, and a mechanism for rapid response to crises; (3) a Strategic EU Energy Review that will provide Member States with a framework to help them choose an energy mix that is sustainable, efficient and diverse; (4) positioning the European Union at the forefront of tackling climate change, emphasizing the role of renewable energy sources; (5) the setting up of a strategic energy technology plan to help structure research and bring new technologies to the market; and, (6) an external energy policy to enable the European Union to respond collectively to the energy challenges its faces.

These policies set the stage for an effective, long-term energy policy for the European Union and call for coherent and consistent actions across Member States in fulfilling the objectives of ensuring secure energy supply, economic competitiveness, and environmental sustainability.

### **National Biofuel Policy**

While the European Union has been active in advocating biofuels and promulgating targets for biofuel use, implementation of policies to achieve those objectives has been left to the member states, as dictated by the European Union's principle of subsidiarity. As it is at the EU level, biofuel policy at the national level is a cross-cutting issue, falling within the scope of energy, agricultural, environmental, and transport policy. In fact, the policies of the EU member states on biofuels have developed out of various key concerns, namely, climate change and sustainable development (or more broadly, the environment), energy security, economic security

in the face of variable energy prices, economic competitiveness and growth, and support for the domestic agricultural sector.

The policy approaches adopted by the member states have been a function of national characteristics, particularly energy endowments, efficiency of energy consumption, the political influence of industries with interests in biofuels, the influence of the agricultural sector, and the level of public support for environmentally-friendly initiatives. Tax preferences and subsidies for biofuel production, in the spirit of traditional agricultural support, were the earliest, and have been the most common, measures for promoting biofuels. In recent years, however, EU member states have scaled back tax breaks and subsidies out of concern for competitiveness, environmental sustainability, and rising food prices. Furthermore, such measures require the approval of the European Union, which restricts tax exemptions and subsidies that may undermine competition. While the European Union considers plans to bolster its Greenhouse Gas Emission Trading Scheme (ETS), a few member states have implemented national trading systems on a limited basis with the goal of reducing greenhouse gas emissions or increasing renewables use. Due to the promise held out by cellulosic ethanol and other renewable technologies, investment in R&D in second generation biofuels and other clean energy technologies is another common component of energy policy in the member states. EU member states have only recently begun adopting mandatory renewable obligations, with the United Kingdom as the latest example.

The most critical issue currently influencing biofuel policy in the EU member states is environmental sustainability. National policymakers continue to reevaluate policies in light of new findings on the environmental impact of biofuels. However, the struggle to effectively promote sustainable biofuel production and consumption mirrors a broader struggle to balance

the benefits of energy security and environmental sustainability with the costs of policy implementation and the transition to an energy-efficient economy.

### **Selection of Countries**

The following section is a short survey of the biofuel policies in six EU member states—Denmark, France, Germany, Spain, Sweden, and the United Kingdom—selected on the basis of the size of their energy markets, their level of production of biofuels, their political influence in the European Union, or their leadership in the use of renewable energy. The section is intended as an illustrative snapshot of the policies in EU member states rather than a set of comprehensive case studies.

### **Denmark**

Denmark, along with Sweden, has long been model for sustainable development at the national level and has helped spearhead action at the EU level. From 1994 to 2005, Denmark increased the share of energy it consumed that came from biomass from 6.7% to 13.2%, while consumption of energy from biomass rose to only 4.5% in the European Union as a whole.<sup>48</sup> Over the same period, Denmark also led the European Union in consumption of wind energy, meeting 2.9% of its energy needs with wind power, as opposed to 0.3% for the European Union.<sup>49</sup> Since 1999, Denmark has been a net energy exporter, owing to the exploitation of North Sea oil reserves. Nevertheless, by 2005, over 16% of Denmark's energy came from renewable

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<sup>48</sup> Eurostat, "Biomass & Wastes," 2007

<sup>49</sup> Ibid

sources.<sup>50</sup> Denmark's agricultural workforce and industrial sector are modest but not insignificant.

Energy security became an important policy objective for Denmark following the energy crises of the 1970s.<sup>51</sup> By the beginning of the 1980s, Denmark had begun offering investment subsidies in wind, solar, and biogas technology.<sup>52</sup> By the early 1990s, Denmark had implemented production subsidies for renewable energy producers, a renewable energy consumption obligation for utilities, and carbon emissions taxes, primarily for the promotion of wind power production, but benefiting other renewable energy producers as well.<sup>53</sup> Although Denmark's agricultural sector produces some biodiesel and the Danish government supports research in second generation biofuels, the bulk of Denmark's renewable fuel production has come from organic waste. Energy efficiency has also been an important element of Denmark's approach, and improvements in infrastructure have enabled it to increase the efficiency gains from combined heat and power generation.

While Denmark has not been a high-profile leader in promoting energy and climate policies at the EU level, its achievements in implementing sustainable energy policy at the national level have raised it above the political wrangling and conferred on Denmark moral leadership. In policy reports to the parliament, the Danish Energy Authority professes a firm desire for Europe to lead the response to global climate change. In public statements, Danish Prime Minister Anders Fogh Rasmussen has expressed his approval for the latest European directives. In this respect, there is a natural harmonization between Danish domestic policy and

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<sup>50</sup> Eurostat, "Energy Dependency," 2008

<sup>51</sup> Danish Energy Authority, 2008

<sup>52</sup> Energy Information Agency, 2005, p. 16

<sup>53</sup> Ibid

the objectives of the European Commission, which may be facilitated by the presence of Mariann Boel Fischer as the Commissioner of Agriculture and Rural Development.

## **France**

While France was a pioneer in the production of biodiesel in the 1990s, it has been slow to implement the policies of the European Union in regard to energy markets and resistant to accept stricter emissions targets for industry. France's national policies reflect its strong agricultural sector and willingness to maintain protection for French industry. On the other hand, French leadership under president Sarkozy could represent a break from the past if France accepts greater market liberalization.

Nuclear power still dominates French energy consumption. France's consumption of energy from renewable sources as a percentage of total energy consumption declined slightly over the period from 1994 to 2005 (from 7.7% to 6%), reflecting a drop in the share of energy from hydropower.<sup>54</sup> Since the 1990s, however, France has been one of the largest producers of biodiesel. France's support for biodiesel reflects the power of France's agricultural sector—the French government recognizes the production of energy from biomass as being central to the France's strategy to combat climate change and achieve energy independence.<sup>55</sup>

Since 2000, France has undertaken a number of measures to promote energy efficiency through consumption choices, such as by promoting energy efficient devices. The government has also negotiated voluntary emissions reduction agreements with some industries and implemented energy efficiency regulation for others. Over the past few years, France has scaled back subsidies for biofuel production. France's current biofuel policy consists of providing tax

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<sup>54</sup> Eurostat, "Biomass and Wastes," 2007

<sup>55</sup> French Ministry of Agriculture and Fishing, 2008

preferences for biofuel production and enforcing an environmental surtax on producers who fail to meet a minimum biofuel incorporation rate, set at 3.5% in 2008.<sup>56</sup> France hopes to achieve a rate of consumption of biofuels of 7% of total fuel by 2010 and 10% by 2015, thereby exceeding the European Union's last set of targets.<sup>57</sup>

While biofuel policy has not been a major area of contention with the European Union, France has been slow to adopt policies from Brussels that require liberalization of energy markets and opening of French industries to competition. Like Germany, France has also balked at the rigor of European Union's proposed emissions standards for industry, which do not include exceptions for energy-intensive sectors. Nevertheless, President Sarkozy's statements have suggested a willingness to consider reforms that might encompass further liberalization of the energy market. Furthermore, France will assume the presidency of the European Council in July 2008, and Prime Minister François Fillon has indicated that his agenda will include a European agreement on climate change.

## **Germany**

As the largest and most important economy in the European Union, Germany's approach to biofuel policy and sustainable energy policy has had mixed results. The country has struggled to balance energy demand with sustainability. Prime Minister Merkel's environmental leadership during her presidency of the Council of the European Union has contrasted with her current opposition to tougher emissions standards for industry.

Although Germany is the largest energy consumer in Europe and has a high dependency on foreign energy imports, Germany has also actively sought to develop renewable energy

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<sup>56</sup> Global Agricultural Information Network, "French Biofuel Production Plans," 2007

<sup>57</sup> French Ministry of Agriculture and Fishing, 2008

sources. Over the period 1994 to 2005, Germany's share of energy consumption from renewable sources rose from 1.9% to 4.8%, particularly due to an increase in biomass consumption.<sup>58</sup> Germany is Europe's largest producer of biodiesel. As a percentage of total employment, however, Germany has a relatively small agricultural workforce at just 2.3%.<sup>59</sup> On the other hand, Germany has a significant industrial workforce. At 29.6% of total employment, it is among the highest in the European Union.<sup>60</sup>

Like Denmark, Germany began to pursue alternatives to fossil fuels after the energy crises of the 1970s.<sup>61</sup> From the start, Germany invested in research and development, especially in wind power generation. In the 1990s, Germany also favored demonstration projects, for example, experimenting with solar power in the early and again in the late 1990s. Germany's Electricity Feed-In Law of 1991 played an important role in creating a market for renewable fuels by requiring utilities to purchase some energy from renewable sources.<sup>62</sup> Germany began offering incentives to biofuel producers through subsidies. Meanwhile, Germany created its first Climate Protection Plan in 2000, which set non-binding targets for industries to reduce emissions by 2005.<sup>63</sup> Germany issued subsequent plans in 2005 and again in 2007, which focused on increasing the energy efficiency in new construction and set targets for biofuel use and carbon emissions reduction. In the last two years, Germany has actually gradually reduced subsidies paid to biodiesel producers according to a set schedule intended to prevent the industry from relying on government support. Production at German plants has been cut back severely.

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<sup>58</sup> Eurostat, "Renewable Energies," 2007

<sup>59</sup> Eurostat, "Agriculture and Rural Development," 2008

<sup>60</sup> Ibid

<sup>61</sup> Energy Information Agency, 2005

<sup>62</sup> Ibid

<sup>63</sup> International Energy Agency, 2008

While implementation of policy at the national level has proceeded apace, Prime Minister Merkel has stated in no uncertain terms that any new EU policy must be friendly to the German automobile industry, which accounts for a sizeable portion of Germany's industrial sector. Specifically, Germany wants to include exemptions for heavy industry in the proposed emissions trading scheme to preserve competitiveness unless the trading scheme is implemented globally.

## **Spain**

Spain has not been an outspoken leader at the EU policy level but it has effectively harnessed its natural endowments and energy expertise to lead Europe in the production of bioethanol and increase its renewable capacity. From 1994 to 2005, the percentage of Spain's energy consumption that came from renewable sources was a stable but respectable 6.1%.<sup>64</sup> While biomass production was fairly constant, Spain's production of energy from wind has steadily increased. Spain's agricultural sector accounts for 4.8% of its workforce, which is relatively high, as compared to its Western European neighbors. Spain's produce, olives in particular, is also well-suited to biofuel production since the waste left over from pressing olives into oil is high in energy.

Spain has, however, been slow to develop a comprehensive energy policy and continues to be highly dependent on foreign energy. The measures that it has taken have been focused on Spain's utilities. In June 2007, it issued a new law that will require that fuel suppliers use a minimum level of biofuels beginning in 2009. At the same time, Spain established variable incentives for biofuel producers that adjust to changes in the electricity market. In November 2007, Spain issued its Strategy for Sustainable Development. While situating the program in the context of the EU strategy—with reference to ensuring economic prosperity, protecting the

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<sup>64</sup> Eurostat, "Renewable Energies," 2007

environment, and ensuring the integrity of natural resources—the program also cites social cohesion and supporting sustainability in less favored countries as important issues. As for France, the promotion of biofuels will be the centerpiece of Spain’s approach to sustainable development.

## **Sweden**

Sweden’s success in implementing a renewable energy policy closely resembles Denmark’s. Despite an already high starting point, Sweden increased its consumption of renewable energy considerably, from 23.5% in 1994 to 29.8% in 2005.<sup>65</sup> However, unlike Denmark, the majority of Sweden’s electricity generation comes from hydropower and nuclear power.

The goal of Sweden’s energy policy is to eliminate the need for non-renewable sources of energy in the long-term.<sup>66</sup> Sweden’s energy policy combines a number of different mechanisms to create the appropriate incentives to achieve this goal. Since 2003, Sweden has operated an emissions trading system which requires all users (except energy-intensive industries) to purchase renewable certificates. Since 2006, fuel suppliers have been required to sell biofuels, which has strengthened demand for bioethanol. Like Denmark, Sweden has also liberalized its energy market and fostered efficiency through the use of combined heat and power generation.

Nevertheless, effective energy policy has not meant energy self-sufficiency. The European Union recently approved Sweden’s application to maintain a loophole that favors the importation of bioethanol from Brazil. Sweden contended that Brazilian ethanol is cheaper and made more sustainably than bioethanol made in the European Union. However, within the

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<sup>65</sup> Eurostat, “Renewable Energies,” 2007

<sup>66</sup> Ministry of Enterprise, Energy, and Communications, 2008

context of the EU, the case highlights the conflict between sustainability, on one hand, and the principle of competition on the other. More generally, it also points to the balance between sustainability and fiscal responsibility facing policymakers.

## **United Kingdom**

The United Kingdom has been relatively late among Western European nations to enact major legislation on biofuels. With the launch of the Renewable Transport Fuel Obligation (RTFO) in April 2008, however, the United Kingdom becomes the first EU member state to impose a minimum biofuel requirement on fuel suppliers. Nevertheless, Prime Minister Gordon Brown has warned that the United Kingdom may reconsider the RTFO and other policies in support of biofuels in light of recent environmental impact studies.

Several factors account for the United Kingdom's approach to biofuel policy. First, due to its oil and gas reserves in the North Sea, the United Kingdom was a net energy exporter as recently as 2003.<sup>67</sup> While energy security has nevertheless been an important concern, this has mitigated the urgency to tap renewable sources and shifted the government's focus to long-term planning. Consequently, biofuel policy has been highly responsive to research findings in the United Kingdom, such as the 2006 *Stern Review on the Economics of Climate Change*. The United Kingdom also has a small and politically weak agricultural sector relative to its European peers. According to the most recent data available from the European Union, the United Kingdom has the smallest agricultural workforce as a percentage of total population (1.4% in 2006) in Europe.<sup>68</sup> Although British farmers have benefited from some subsidies and from the general rise in commodity prices, homegrown biofuels have not been a primary element of the

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<sup>67</sup> Eurostat, "Net Imports of Primary Energy", 2008

<sup>68</sup> Eurostat, "Employment in Agriculture and in the Other Sectors", 2008

United Kingdom's biofuel strategy. A report issued by the House of Lords European Union Committee on March 6, 2008 even proposed a reexamination and reduction of agricultural subsidies.<sup>69</sup>

While the United Kingdom began providing tax incentives for the production of biodiesel in 2001, its 2003 white paper, *Our Energy Future – Creating a Low Carbon Economy*, outlined its first comprehensive approach to sustainable development. The paper envisioned a range of measures to address the challenges posed by climate change, energy security, and an aging energy infrastructure.<sup>70</sup> The Energy Act of 2004 enacted many of the proposals of the white paper, including additional incentives for biofuels, research and development grants, and the RTFO. A new energy bill, which is currently being debated in the House of Commons, covers a range of issues related to energy regulation and infrastructure. Of note, it permits the government to expand the renewable fuel obligation to include electricity providers in addition to transport fuel suppliers. Lastly, the United Kingdom intends to unveil additional fiscal measures in next year's budget, including a tax preference for low-emitting vehicles and emissions trading scheme, to promote energy efficiency.

The RTFO, which entered into force on April 15, 2008, was established under the authority of the Energy Act of 2004.<sup>71</sup> It stipulates that biofuel (derived from any biomass) make up 5% of all transport fuel sold by major transport fuel suppliers in the United Kingdom. Each month, fuel suppliers are required to report the quantity of biofuels they have sold to an independent regulator known as the Renewable Fuels Agency (RFA). In return, the RFA issues Renewable Transport Fuel (RTF) certificates which the supplier uses to fulfill its obligation. If a fuel supplier does not meet its fuel obligation for a given period, it will be required to pay a

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<sup>69</sup> House of Lords, European Committee, 2008

<sup>70</sup> Department for Business Enterprise and Regulatory Reform of the United Kingdom, 2003, pp. 6-9

<sup>71</sup> Renewable Fuels Agency, 2008

penalty of 15p for every obligated liter of fuel that was not supplied. The RFA also encourages suppliers to report information about the source and sustainability of the biofuel it sells, which the RFA intends to make available to the general public.

Although the United Kingdom's leadership has generally been supportive of the EU climate change agenda, Prime Minister Brown recently voiced serious reservations about policies promoting biofuels after his current and former scientific advisers expressed skepticism on biofuels' sustainability.<sup>72</sup> In addition to concerns that the policies would lead to environmental mismanagement, Brown has also urged action to counteract rising food prices. Meanwhile, despite the new policies, the government has faced criticism from opposition political leaders and from the research community that it is not doing enough to combat climate change. A study by the Committee on Climate Change on whether the government can improve its performance in climate change measures is due in December 2008.

### **Biofuel Sustainability: The Emerging Issue**

As discussed until this point, Europe has remained committed to becoming a world leader in biofuel consumption and pushed forward the legislation to achieve this goal. The benefits of this goal include reducing environmental pollution, contributing to the reduction of greenhouse gases emitted into the atmosphere, and improving energy security by reducing their dependence on volatile fuel suppliers. Additionally, European leaders could earn the legacy of having been the leaders who transformed the energy landscape by initiating the widespread use of renewable energies. Indeed, “[s]ince 1990, the EU has been engaged in an ambitious and successful plan to become world leader in renewable energy...The EU's renewable energy market has an annual

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<sup>72</sup> Randerson and Watt, 2008

turnover of €15 billion (half the world market), employs some 300,000 people, and is a major exporter.”<sup>73</sup>

Despite this concentrated strategy for becoming the alternative fuel global leader, a growing faction has emerged as of late who are very vocal in their opposition to biofuel production practices as they exist today. These opponents protest Europe’s biofuel consumption requirements, claiming they encourage the continuation of unsustainable production practices whose social and environmental costs often outweigh the benefits. Blindly pushing forward with the consumption and production quotas without a full assessment of their consequences is irresponsible and misguided, they claim. These arguments, many of which are empirically supported, have caught the attention of European policy makers. As empirical evidence is presented illustrating some serious costs associated with the production of certain biofuels, European policymakers have retreated from their zealous support of these alternative energy sources and are questioning not only the benefits of biofuels themselves but also the policies incentivizing their production. Indeed, as EU trade commissioner Peter Mandelson recently stated, Europe must act to prevent a biofuel boom that would put diverse ecosystems such as rainforests at risk. “Europeans won’t pay a premium for biofuels,” Mandelson stated, “if the ethanol in their car is produced unsustainably...”<sup>74</sup> This claim, it appears, is more than simply lip service and is gaining empirical support. The British bus company National Express abandoned its ambitious trial program for biofuels in its fleet after learning of studies concluding that certain biofuels may have a larger carbon footprint than their fossil fuel counterpart. The company is forfeiting valuable tax breaks they would have earned had they stuck with the plan.<sup>75</sup>

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<sup>73</sup> Commission of the European Communities 2006A, p.11

<sup>74</sup> *Birmingham Post*, 2007

<sup>75</sup> McQuillan 2007, p. 16.

There are many social and environmental costs critics associate with certain biofuel production processes. In certain cases, the costs of biofuel production are easily measured. Slash and burn techniques to prepare the land for crops like those sometimes used in Malaysia, for instance, creates a measurable amount of air pollution. In many other instances, however, the precise nature and degree of the environmental and social costs are debated. It can be difficult, therefore, to measure the net effect of biofuels and their production because of the lack of consensus on the elements to take into account when measuring these effects. Regardless, the foremost social and environmental costs that critics claim render biofuels unsustainable are introduced below.

While many unanswered questions remain concerning the environmental sustainability of certain biofuels and their production practices, the chief issues are presented and analyzed in the recent OECD report by Richard Doornbosch and Ronald Steenblik, *Biofuels: Is the Cure Worse than the Disease*, which framed the discussion for the OECD's 20<sup>th</sup> meeting of the Roundtable on Sustainable Development held in September, 2007. This influential work is responsible for much of the most recent backlash against biofuels in Europe, with policymakers citing it as their reason for retreating from their previous unwavering support of these energy sources. In it, the authors argue that:

There is little doubt that current patterns of fossil fuel-based energy use are unsustainable and that a change in direction is needed... The current push to expand the use of biofuels is creating unsustainable tensions that will disrupt markets without generating significant environmental benefits. The upward pressure first-generation biofuels create on food prices, and the increasing burden their subsidisation places on taxpayers, are likely to make policies that support them indiscriminately less and less acceptable to the public.<sup>76</sup>

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<sup>76</sup> OECD, 2007, p 42.

## Environmental Sustainability Issues

Some of the most often cited sustainability issues are associated with land use changes. Incentives for the cultivation of biofuel inputs such as sugarcane, maize, rapeseed, or palm encourages the shifting of land from previous uses to agricultural production. This threatens ecological balance as threatens biodiversity as entire ecosystems are disrupted or destroyed. It is estimated that in Indonesia alone, more than 18 million hectares of forest (44 million acres) have been cleared for palm oil development.<sup>77</sup> Of course, CO<sub>2</sub> emissions can also increase from such land shifts if peatlands or wetlands are being cleared for preparation. There are also implications for water resources, as more is diverted toward the plantations for biofuel crops.

According to Doornbosch and Steenblik, in a hypothetical situation where there were no adverse environmental effects from land use changes, focusing on biofuel production is still misguided because there is not enough land to produce the quantities of biofuels that could ultimately displace a substantial portion of fuel consumption from fossil fuels. They argue that less than one-fourth of all the earth's land could be used for rain-fed crop cultivation. Subtracting forested land, land already used for agriculture, and the projected increase in land used to satisfy the world's growing population food needs, the "gross" available land for energy crops is only 5.22% of the total earth's land surface, although most of this is already used as grassland for livestock production.<sup>78</sup> Their assumptions, however, are based on current technologies and productivity.

Advocates of biofuels often cite the environmental benefit of GHG reductions as a primary reason to push their production. The net GHG reductions has fallen under intense

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<sup>77</sup> Kanter, 2008

<sup>78</sup> OECD 2007, p 12-3.

scrutiny in recent years, however, as a number of lifecycle analyses (LCAs) have been developed that actually show negligible GHG reductions in many cases. This results from counting not only the GHG emissions from the tailpipe of biofuels relative to their fossil fuel counterpart but from also considering the GHG emissions from many upstream and downstream processes associated with biofuel production, such as the emissions from fertilizer production, from fuel transport, from the fossil fuels used for power during cultivation and processing, from clearing the land, from gathering and transporting feedstocks to the refinery, to name a few. Not only do such analyses show that the net GHG impact of biofuels relative to their fossil fuel counterpart are a function of the crop used and all the production practices associated with it, but the illustrated net impacts vary from one analysis to another because each takes into consideration different elements of the entire production chain. Because there is not yet a consensus establishing which elements should be included, LCA results will – although point in the same general direction – ultimately differ, creating confusion within the GHG impact discourse. The one ultimate conclusion that can be taken away from these analyses at this point, however, is that in some cases biofuels represent a positive net gain in GHG emission savings while in other cases the gains are negligible, at best.

### Social Sustainability Issues

Issues related to the social impacts of biofuels stem primarily from the “food vs. fuel” debate, which centers on the moral and ethical concerns over diverting land used for food crop cultivation to land for fuel crop cultivation, despite the millions who go hungry as it is. Constraining land availability to produce food constrains output, thus creating an upward pressure on food prices. Additionally, financial incentives exacerbate this issue as fuel crop production is much more profitable than food crop production. The OECD claims that bioenergy

will be a key factor in food prices, which are expected to rise 20-50% over the next decade.<sup>79</sup>

There are dissenters of this projection, such as the International Energy Agency, who regard increased productivity as mitigating much of the upward pressure on prices.<sup>80</sup> Other parties agree that diverting food crops to fuel crops will create an upward pressure on prices, although not to the extent proposed by the OECD.

There is empirical support that biofuels can very well lead to rising food prices or food shortages. Already in Europe, there are supply shortages of rapeseed oil used for cooking as more of it is going toward biodiesel production. In Malaysia, the local price for palm oil is increasing as more of the supply is exported for fuel use.<sup>81</sup> The International Energy Agency (IEA) concurs that this will be an issue of growing importance, especially beyond the displacement level of 5% of fossil fuels that are substituted by biofuels.<sup>82</sup>

As will be discussed in the following section, sustainability criteria have been recently introduced at the regional level. Some states have also unilaterally begun reforming their national biofuel policies in response to these concerns. Switzerland, for example, proposes that only certain types of biofuels, such as those derived from plant waste, may qualify for tax incentives while those derived from food crops will not qualify for financial incentives until their producers prove they satisfy a number of sustainability criteria throughout the lifecycle. Germany has repealed certain consumption tax incentives and is creating national sustainability criteria. Additionally, the Netherlands is no longer subsidizing palm oil imports because of the harsh

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<sup>79</sup> OECD, 2006, p 33.

<sup>80</sup> Ibid.

<sup>81</sup> Hermoso 2007, p S2/5.

<sup>82</sup> International Energy Agency, 2005.

environmental consequences of preparing the land for palm crops.<sup>83</sup> This is in addition to satisfying the sustainability criteria defined by the European Commission in January, 2008.

### **Europe's Sustainability Criteria**

On January 23, 2008, the *Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Resources* was issued. Article 15 of this proposal defined environmental sustainability criteria that both domestic and imported biofuels must satisfy. If the biofuels or bioliquids fails to meet any of the criteria, they will be exempt from financial incentives for biofuel consumption and will not be counted toward national compliance targets for renewable energy obligations.<sup>84</sup> Compliance will be monitored by member states. These criteria include a minimum GHG reduction requirement, limits on the types of land where conversion toward biofuel crop production is acceptable, and reinforcing best agricultural practices.

The first sustainability criterion defined in the European proposal is a 35% reduction in GHG emissions for biofuels relative to their fossil fuel counterpart. The GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). The default GHG reduction values for each fuel source and process are listed in Annex VII of the proposal. The formula for calculating the default values is:<sup>85</sup>

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{ccs} - e_{ccr} - e_{ee}$$

where:

$E$  = total emissions from the use of the fuel;

$e_{ec}$  = emissions from the extraction or cultivation of raw materials;

$e_l$  = annualized emissions from carbon stock changes caused by land use

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<sup>83</sup> Rosenthal, 2008.

<sup>84</sup> Commission of the European Communities, 2008, p 32.

<sup>85</sup> Commission of the European Communities, 2008, p 52.

change;

$e_p$  = emissions from processing;

$e_{td}$  = emissions from transport and distribution;

$e_u$  = emissions from the fuel in use;

$e_{ccs}$  = emission savings from carbon capture and sequestration;

$e_{ccr}$  = emission savings from carbon capture and replacement; and

$e_{ee}$  = emission savings from excess electricity from cogeneration

The default values illustrate that the emission reductions for a particular crop are a function of the production process employed. While wheat ethanol produced in a CHP plant would qualify, wheat ethanol produced with a conventional boiler would not. Most significant of these values is that of palm oil biodiesel, which has a default value 16% reduction relative to fossil fuels when the process is unspecified. If it is shown that there are no methane emissions at the mill, the palm oil has a default value of 51%.<sup>86</sup>

The second sustainability criterion relates to the preservation of diverse ecosystems. Paragraph 3 of Article 15 states that crops for biofuels “shall not be made from raw material obtained from land with recognized high biodiversity.”<sup>87</sup> Such environments include:

- a. “forest undisturbed by significant human activity,” where there has not been significant human intervention or where human intervention was long ago and the natural species composition and processes have been reestablished
- b. “areas designated for nature protection purposes”
- c. “highly biodiverse grassland,” which is species-rich, unfertilized and not degraded

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<sup>86</sup> Commission of the European Communities, 2008, p 50.

<sup>87</sup> Commission of the European Communities, 2008, p 32.

The proposal states that “the Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered.”<sup>88</sup> Areas designated for nature protection include not only national preservation laws, but those recognized by:

- UN Food and Agriculture Organisation
- UN Economic Commission for Europe
- Ministerial Conference on the Protection of Forests in Europe

The third criterion is established in Paragraph 4 of the Article, stating that biofuel crops and materials “shall not be made from raw material obtained from land with high carbon stock.”<sup>89</sup> These include wetlands and continuously forested areas. Continuously forested areas are “land spanning more than 1 hectare with trees higher than 5 metres and a canopy cover of more than 30%, or trees able to reach these thresholds *in situ*.”<sup>90</sup>

The final sustainability criterion relates to previous agricultural best practices recognized by Europe and are obtained in accordance with the requirements and standards listed in Annex III to Council Regulation (EC) No 1782/2003 under the heading "Environment" and “in accordance with the minimum requirements for good agricultural and environmental condition defined pursuant to Article 5(1) of that Regulation.”<sup>91</sup> Annex III references established legislation regarding: the conservation of wild birds; the protection of groundwater against pollution; the protection of the soil/environment when sewage sludge is used in agriculture; the protection of water against pollution caused by nitrates from agricultural sources; and on the conservation of natural habitats and of wild flora and fauna.<sup>92</sup> Article 5(1) states that agricultural land, especially used for production purposes, must be maintained in good agricultural and

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<sup>88</sup> Ibid.

<sup>89</sup> Commission of the European Communities, 2008, p 33.

<sup>90</sup> Ibid.

<sup>91</sup> Ibid.

<sup>92</sup> Commission of the European Communities, 2003, 270/56.

environmental condition. It continues that Member States must define the minimum requirements for good agricultural and environmental condition, taking into account “the specific characteristics of the areas concerned, including soil and climatic condition, existing farming systems, land use, crop rotation, farming practices, and farm structures.”<sup>93</sup>

The inclusion of sustainability criteria in this proposal is a significant step toward ensuring that this industry develops in a way that produces the greatest net benefits for the foreseeable future, although there are concerns regarding how these criteria are developed. The majority of biofuel crops are most efficiently produced in tropic regions, home to much of the developing world. Questions arise to the extent the major commodity producers should have a voice in establishing criteria since they will be strongly affected by the measures. The proposal frames this in such a way to try and establish these specific criteria but also give flexibility as to *how* the targets are met. Others express skepticism as to the underlying motives behind the proposal regarding the extent to which these regulations could serve as the foundation for barriers to trade so Europe’s own producers can gain an advantage over those who more efficiently produce biofuel crops. The proposal responds to this perspective by stating that, “While the sustainability criteria themselves obviously pursue an aim of environmental protection, the Directive also prevents Member States from adopting certain measures which would obstruct trade in biofuels or raw materials.”<sup>94</sup> Furthermore, concerns arise over whether such measures will result in harmonization of policies on a regional scale or segmentation between the member states. Such issues are addressed in further detail in the following section, where the authors present issues that will likely drive the discourse into the future.

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<sup>93</sup> Commission of the European Communities, 2003, 270/8.

<sup>94</sup> Commission of the European Communities, 2008, p 8

## Moving Forward

As biofuels continue to capture a greater share of the energy market, the issue of sustainability will gain momentum. Immediately, the issues of implementation, verification, and certification of sustainability criteria are going to become the major issues. The January 23 proposal sets the standards for the region but the burdens of implementation and certification are carried by the member states.

At the national level, the proposal demands European states to undertake a number of measures to guarantee the criteria are satisfied. For one, each state must require economic operators using a “mass balance system” to show the criteria of Article 15 are fulfilled. Along with this, members must have proof of independent auditing of this system.<sup>95</sup> Other member state responsibilities demanded by the proposal include:

- § By 31 March 2010 - member states must submit to the Commission a list of entities that have cultivated the raw agricultural materials in such a way that the GHG emissions are less than the default values listed in Annex VII, part D of the directive (Article 17:1)<sup>96</sup>
- § By 31 March 2010 – member states must enact and enforce the laws and regulations necessary for compliance with the directive and report to the Commission the text of these provisions and a matrix table between the directive and their provisions (Article 23:1)<sup>97</sup>

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<sup>95</sup> Commission of the European Communities, 2008, p 33-4.

<sup>96</sup> Commission of the European Communities, 2008, p 35

<sup>97</sup> Commission of the European Communities, 2008, p 39

§ By 30 June 2011 – member states must submit a report to the Commission on the progress and promotion of renewable fuels in their state and an update report every two years thereafter (Article 19:1)<sup>98</sup>

Based on these provisions it can be argued that at the regional level, the European Commission lacks clear direction for the best way to move forward and implement the sustainability criteria. The EC will rely on the various tools member states employ to ultimately determine the most effective way forward.

### Certification Schemes

One of the most complicated issues to be addressed in the future is that of certification schemes. The EC directive suggests the “tracing” of biofuels, physically tracking them so that biofuels fulfilling the sustainability criteria are identified and rewarded with a premium in the market.<sup>99</sup> Developing a method of sustainability certification offers guarantees to consumers that the production practices satisfied certain, established criteria and encourages producers to take the often costly, inconvenient steps to ensure they are offering a sustainable product rather than the cheapest to produce. Such a system could involve independent third parties that visit the sites of cultivation, conversion, and production and following a thorough assessment provide their stamp of approval or recommendations for producers to come into line with international standards. Looking at existing certification schemes can provide insight into the best ways forward but also raises questions concerning the effectiveness of such schemes.

Certification schemes have been in effect for the forestry industry since the early 1990s in response to public concerns over tropical deforestation and the associated loss of biodiversity. The two main umbrella forest certification schemes are the Forest Stewardship Council (FSC)

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<sup>98</sup> Commission of the European Communities, 2008, p 36

<sup>99</sup> Commission of the European Communities, 2008, p 7

and the Programme for the Endorsement of Forest Certification (PEFC). The FSC was created in 1993, as an independent 3<sup>rd</sup> party whose mission is to “promote environmentally appropriate, socially beneficial, and economically viable management of the world's forests” by providing certification of sustainable forest management practices.<sup>100</sup> The FSC created ten general principles with many more indicators to critique harvesting practices.<sup>101</sup> The PEFC, on the other hand, does not develop standards itself but relies on international, inter-governmental principles developed and adapted for different forest regions in the world. These are based on a variety of criteria that varies from across locales and emerging from regional or local norms.<sup>102</sup> The FSC is sometimes criticized for its rigidity and financial costs while PEFC is criticized for being too flexible and endorsing weaker standards.<sup>103</sup>

Doornbosch and Steenblik highlight many of the challenges that have arisen from these forest certification schemes that are important to take into account when developing biofuel sustainability certification. They argue that it is very difficult to develop a system that can track a wood product throughout the chain-of-custody, from the forest to the finished product because “[w]ood is processed into many different products and sourced from many different wood species, origins and owners.”<sup>104</sup> Perhaps recognizing this can be true for biofuels as well, the EC demands the “mass balance” system of reporting, where only the proportion of sustainably produced biofuel going into a fuel mix is counted in the final mixture. The authors also argue that the documents are easy to falsify and that certification has created market segmentation because it is voluntary rather than compulsory.<sup>105</sup>

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<sup>100</sup> Forest Stewardship Council, 2003

<sup>101</sup> Forest Stewardship Council, 1996

<sup>102</sup> Vis et al., 2008, p 26.

<sup>103</sup> Ibid.

<sup>104</sup> Doornbosch and Steenblik, 2007, 41.

<sup>105</sup> Ibid.

Another concern goes back to the ability of developing countries to satisfy the certification criteria. While 28% of North American forests and 56% of Western Europe forests are certified under one of these forest certification schemes, there is limited application in LDCs, where less than 5% of forests are certified under one of these systems. In Asia, the high costs and little benefit prevents it; in Latin America illegal logging floods the market with cheap alternatives; and in Sub-Saharan Africa the government doesn't have the ability to enforce laws or employ forestry experts.<sup>106</sup>

Developing a certification scheme to satisfy the EU's sustainability criteria must be executed in such a way to ensure World Trade Organization (WTO) compliance. In commerce, states cannot distinguish between products due to their non-product characteristics like the manner in which they were produced or their source.<sup>107</sup> This would include sustainability criteria such as proposed by the EU. However, there are exceptions to the WTO rule including the ability to discriminate against a product due to the global environmental effect of the product or the way it was produced. In this case, the EU could discriminate on the basis of a biofuel's high GHG emissions, although not necessarily due to local land use changes that threaten biodiversity where the fuel crops were sourced.<sup>108</sup>

In conclusion, the EU is determined to pioneer sustainability standards for biofuel production. The entire discourse could be altered if second and third generation biofuels such as cellulosic ethanol are developed to a substantial degree. These are biofuels produced from agricultural wastes and byproducts and leave a much smaller carbon footprint than first generation biofuels. If the technologies develop to a degree that allows the mass production of

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<sup>106</sup> Vis et al., 2008, p 38-40.

<sup>107</sup> Stans, Ooms et al. 2007

<sup>108</sup> Ibid.

cellulosic based biofuels, the ability to reduce the GHG emissions emitted into the atmosphere during the production process will be greatly reduced. Until then, Europe will likely continue being a driver of global biofuel production trends and policies through its legislation.

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