Fuel Ethanol in Europe

Outlook in the light of policy uncertainty

LMC International, Oxford, UK

Platts Biofuels Conference, June 2013

www.lmc.co.uk
The EU Fuel Ethanol Market in Context

Demand for ethanol in the EU-27 by sector in 2012 (million liters)

- Fuel: 5,778, 71%
- Industrial: 1,331, 16%
- Potable: 1,040, 13%
EU Biofuel Policy (RED/FQD)

- Fuel ethanol demand is driven by the RED (2009/28) which mandates that all states should replace 10% of transport fuels (by energy) with biofuels by 2020. The expectation was that the mandate would be met mainly with ethanol and biodiesel.

- The RED introduced “double counting” – biofuels produced from wastes and residues count double for the purpose of mandates. Thus the 10% target could be met with just 5% biofuels produced from wastes.

- The RED introduced environmental criteria for biofuels mandating GHG savings of 35%, rising to 50% in 2017 and 60% in 2018.

- The FQD (2009/30) permits the use of E-10 and B-7. It also has a requirement to reduce GHG emissions of road fuel by 6%.

- In 2012, biofuels accounted for 4.7% (cal.) of transport fuels.

- To meet both the RED and FQD, the average GHG savings of biofuels would need to be 60%.
Proposal to amend RED & FQD

- In September 2012, the EC proposed new legislation to limit the volume of biofuels produced from food crops to 5% (by energy). The proposal also suggested quadruple counting of biofuels together with the use of ILUC factors for reporting.

- In February 2013, an EC ministerial meeting suggested the limit might be raised to 6-7% and that separate limits on ethanol and biodiesel could apply.

- In June 2013, a progress report suggested that most delegates oppose drastic action and that the protection of investments is a widely shared priority. The president of the EU Council proposed to establish a mandatory 2% sub-target for advanced biofuels instead of a direct limit on conventional biofuels.

- The policy is unlikely to be finalised until mid 2015 creating a high degree of uncertainty in the market.
Limiting food based biofuels to 5% or 7% will severely limit future growth in demand for fuel ethanol.

Forecast EU fuel ethanol demand to 2020 under the status quo and with 5% and 7% limits on food based biofuels.
Ethanol could expand strongly at the expense of biodiesel which will be limited by the blend wall; however, the contribution of second generation ethanol will be small.

### Forecast of EU-27 biofuel demand in 2020 with 7% limit

<table>
<thead>
<tr>
<th></th>
<th>Units</th>
<th>2012</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food based ethanol</strong></td>
<td>bn lts</td>
<td>5.70</td>
<td>10.99</td>
</tr>
<tr>
<td><strong>Quadruple counting ethanol</strong></td>
<td>bn lts</td>
<td>0.07</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>Total ethanol</strong></td>
<td>bn lts</td>
<td>5.78</td>
<td>11.47</td>
</tr>
<tr>
<td><strong>Food based biodiesel</strong></td>
<td>mn mt</td>
<td>10.08</td>
<td>10.91</td>
</tr>
<tr>
<td><strong>Double counting biodiesel</strong></td>
<td>mn mt</td>
<td>1.35</td>
<td>2.30</td>
</tr>
<tr>
<td><strong>Total biodiesel</strong></td>
<td>mn mt</td>
<td>11.43</td>
<td>13.21</td>
</tr>
<tr>
<td><strong>Biofuels % transport fuel</strong></td>
<td>% cal</td>
<td>4.7%</td>
<td>6.3%</td>
</tr>
<tr>
<td><strong>Double counting biofuels % transport fuel</strong></td>
<td>% cal</td>
<td>0.9%</td>
<td>1.5%</td>
</tr>
<tr>
<td><strong>Quadruple counting biofuels % transport fuel</strong></td>
<td>% cal</td>
<td>0.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Other renewable fuels % transport fuel</strong></td>
<td>% cal</td>
<td>1.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td><strong>Biofuels % transport fuel including double &amp; quadruple counting</strong></td>
<td>% cal</td>
<td>6.5%</td>
<td>9.4%</td>
</tr>
</tbody>
</table>

Note: Other biofuels includes bio-butanol, renewable diesel, biogas and hybrid electric cars and hydrogen.
EU-27 demand for ethanol (fuel and non-fuel) could grow by 6 bn lts (2013-2020)

EU-27 demand (non-fuel = industrial & potable) under 7% limit
Following rapid industry expansion 2008-2010, fewer new ethanol plants will come onstream in future.

<table>
<thead>
<tr>
<th>Year</th>
<th>New Plants</th>
<th>Expansions</th>
<th>Total</th>
<th>New Plants</th>
<th>Expansions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>972</td>
<td>988</td>
<td>1,960</td>
<td>10</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>2009</td>
<td>680</td>
<td>0</td>
<td>680</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>1,074</td>
<td>0</td>
<td>1,074</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2011</td>
<td>78</td>
<td>15</td>
<td>93</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>2012</td>
<td>285</td>
<td>0</td>
<td>285</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2013</td>
<td>475</td>
<td>0</td>
<td>475</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2014</td>
<td>685</td>
<td>240</td>
<td>925</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2015</td>
<td>205</td>
<td>0</td>
<td>205</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Rising EU-27 demand coupled with weak output growth could push net imports to > 4 bn lts

EU-27 ethanol production, consumption and trade to 2020

- Net Imports
- Production
- Consumption

Forecast
EU prices tend to follow the cheapest source of imports. In recent years, E-90 from the US has been very cheap. However, the tariff reclassification and anti-dumping duty on US ethanol has made this origin more expensive.

The monthly import price of ethanol (c.i.f. Rotterdam) from the US and Brazil.
Recent price trends

• EU ethanol prices have been below denatured tariff paid replacement costs since October 2012.

• The antidumping duty of €62.3/m3 was imposed in March 2013 but this has not lifted prices.

• A significant volume comes into the EU duty free i.e., Pakistan has a duty free quota of 80,000 tonnes and imports from GSP+ countries and EBA countries are duty free. Imports of industrial alcohol are not subject to the anti dumping duty.

• In May 2013, ePURE requested that the Commission investigate E-92 being imported into Finland circumventing the denatured tariff and has asked the Commission to check the antidumping duty is being correctly applied.
Feed wheat prices in different regions are highly correlated. Prices have been on an upward trend over the last decade.

Annual average wheat prices in the US, Europe and Black Sea
Molasses accounts for 70% of the total cost of producing ethanol. Grains typically account for around 45% while sugarbeet is just over one third.

EU ethanol supply costs (av. 2015-20) delivered North Europe
The total future delivered cost of EU ethanol for grains is €575-750/m³. Sugarbeet produced in an annexed distillery is €500-650/m³.

Future (av. 2015-20) **full** cost of producing ethanol

Supply price (€/m³ ethanol)

Cumulative ethanol output 2020 (billion litres)
The bulk of EU supply is cheaper than both US imports and Brazilian ethanol (paying the denatured tariff but excluding US anti-dumping duties). If Brazil’s gasoline price were raised in line with oil prices, it would be very uncompetitive.
Movements in raw material prices will be a key influence on ethanol prices. US corn is expected to fall relative to EU wheat which will increase the competitiveness of US ethanol.

Projected raw material prices 2013-2015 (basis futures prices)
EU fuel ethanol prices are expected to remain elevated until the anti-dumping duty expires in 2017.

Forecast EU fuel ethanol prices (FOB Rotterdam) ($100/bbl oil price)
Conclusions (Demand)

- The future of the EU fuel ethanol market is uncertain. Imposing a limit for food based biofuels will restrict future market growth. With very little new capacity in the pipeline, the contribution of second generation biofuels to the RED will remain limited. Nonetheless, if a 7% limit on food based biofuels is adopted, there could be large scale fulfilment of the RED’s 10% target, at least on paper, thanks to double and quadruple counting.

- The bulk of member states have now implemented the RED so in theory, mandates should mean demand will grow. Food based diesel is close to the 5% limit, while ethanol would still have some scope to grow under such a limit.

- While biodiesel is cheaper than ethanol, it faces several other problems which will limit future growth. These include a B-7 limit on new diesel cars, poorer sustainability characteristics, potentially greater ILUC penalties and more limited access to raw materials.
Conclusions (Output)

- The proposal to amend the RED has damaged confidence in the fuel ethanol market. Investors are unwilling to invest because of policy uncertainty. Many first generation producers are developing second generation projects and therefore the proposal makes it less likely that such biofuels will be developed. No new wheat based projects are likely to be developed and those in the pipeline will struggle to complete financing.

- With capacity growth severely constrained, output will continue to grow slowly in the period to 2020. The proposed limit on food based biofuels could be beneficial to existing producers by creating a high barrier to entering the market.

- The fuel ethanol market will remain dependant on imports, mainly from the US and it likely that the import requirement will increase in the second half of the decade.
Other Risks to Growth in the Market

• The EC has proposed the reporting of ILUC penalties of 12gCO$_2$ eq. for biofuels from starch, 13g for sugar ethanol and oilcrops at 55g. The introduction of ILUC penalties would be disastrous for biodiesel, less so for ethanol.

• The roll-out of E-10 proceeds more slowly than anticipated. Infrastructure is a barrier as E5 must continue to be sold alongside E-10.

• Lower oil prices (<$100/bbl) which make gasoline cheaper than ethanol, increasing the incentive to buy-out of mandates.

• High volatility in grains prices. With global stocks expected to be at relatively low levels, the grain market is more vulnerable to supply shocks.

• A weakening of the Brazilian real would reduce supply costs, putting downward pressure on EU prices.
Thank you

www.lmc.co.uk

Acknowledgements:
New York
1841 Broadway
New York, NY 10023
USA

T +1 (212) 586-2427
F +1 (212) 397-4756
info@lmc-ny.com

Oxford (HQ)
4th Floor, Clarendon House
52 Cornmarket Street
Oxford OX1 3HJ
UK

T +44 1865 791737
F +44 1865 791739
info@lmc.co.uk

Kuala Lumpur
Level 2, No 33
Jalan Tengku Ampuan Zabedah B 9/B
Seksyen 9, 40100 Shah Alam
Selangor Darul Ehsan
Malaysia

T +603 5513 5573
F +603 5510 0092
info@lmc-kl.com

© LMC International, 2012
All rights reserved

This presentation and its contents are to be held confidential by the client, and are not to be disclosed, in whole or in part, in any manner, to a third party without the prior written consent of LMC International.

While LMC has endeavoured to ensure the accuracy of the data, estimates and forecasts contained in this presentation, any decisions based on them (including those involving investment and planning) are at the client’s own risk.

LMC International can accept no liability regarding information analysis and forecasts contained in this presentation.