

Bioenergy Economics from the UK Renewable Energy Strategy

Several scenarios are developed in the strategy regarding the uptake of biofuels. The biofuel costs below are given for Scenario 1 which involves blending biofuels into petrol and diesel so that the transport fuel supplied in the UK is 10% biofuel by energy content by 2020; this being the minimum level required by the Government's obligation for biofuels. The costs are based on a total UK biofuel usage of 5 – 7.5 billion litres of biofuel, with two-thirds imported.

In this scenario four oil prices are assumed, US\$60/bbl, US\$80/bbl, US\$120/bbl and US\$150/bbl. US\$80/bbl is the central cost option. Costs for bioethanol and biodiesel taken from the strategy and converted into litres of petrol equivalent and New Zealand dollars are in the tables below. A currency conversion of UKP=2.25NZD has been used.

| Bioethanol | | | | |
|-------------------|-------------------|-------------------|--------------------|--------------------|
| Oil price | US\$60/bbl | US\$80/bbl | US\$120/bbl | US\$150/bbl |
| | NZ\$/lpe | NZ\$/lpe | NZ\$/lpe | NZ\$/lpe |
| Price in 2020 | 1.40 | 1.46 | 1.63 | 1.80 |

| Biodiesel | | | | |
|------------------|-------------------|-------------------|--------------------|--------------------|
| Oil price | US\$60/bbl | US\$80/bbl | US\$120/bbl | US\$150/bbl |
| | NZ\$/lpe | NZ\$/lpe | NZ\$/lpe | NZ\$/lpe |
| Price in 2020 | 1.44 | 1.53 | 1.74 | 2.05 |

Lpe = litres of petrol equivalent

These prices assume that the UK is a price taker, i.e. the volume of biofuels usage in the UK has no influence on the price of ethanol or biodiesel that is found in the EU.

In the strategy the biofuel prices that are assumed in the analysis are derived from outputs produced by the OECD-FAO Aglink-Cosimo model.

"The OECD-FAO Aglink-Cosimo model is a partial equilibrium agricultural commodities model that has a biofuels module attached to it. The biofuels component of the model is focused on four major economic centres: the EU27 group, the USA, Canada, and Brazil. Other important economic areas also enter the modelling, however, including Indonesia, Thailand, Argentina, and China. This gives good coverage of biofuel production: these areas accounted for 95% of world ethanol production and 82% of world biodiesel production in 2007. The model operates by taking a bottom up approach to estimating ethanol and biodiesel prices. Net cost production functions take into account feedstock prices, production costs, revenues from by-products and capital costs. These net cost functions interact with demand functions that are defined by mandates and the price of fossil fuel substitutes. This market clearing price mechanism operates in terms of a global market, taking into account prevailing restrictions on international trade."

Comment

As stated in the UK Strategy "The vast majority (over 90%) of current UK domestic biofuel consumption comes from imports. Specifically the largest imports come from Brazil, USA and Germany. In the scenarios analysed in this impact assessment, imports are assumed to still constitute around 2/3 of UK biofuel consumption emissions." The imported biofuels will be produced from a range of technologies, influenced by the costs and energy policies of the countries that produced them as well as the price of oil.

There is little information in the strategy regarding the technologies used in producing the biofuel. Biomass gasification is mentioned as one of the emerging alternative technologies for producing biofuels. Comment is made that "There are large unknowns relating to the speed at which such advanced biofuels will develop from prototype technologies to be commercially viable in terms of production on an industrial scale at a price that is competitive with 'first generation' biofuels and/or fossil fuels." It is suggested that advanced and waste/residue biofuel deployment will make up at least 2 of the 10% biofuel transport energy target in 2020.

The UK government is investing into research into the development of advanced bioenergy and biofuels. This includes some targeted research into the potential of algae for biofuels as well as pyrolysis techniques. It also intends to provide financial support for the creation, by industry, of a biofuels demonstration plant in England, which would use organic waste material to produce bioethanol and renewable power.

The technologies and the associated costs in the New Zealand strategy are for advanced types of technologies, i.e production from lignocellulose, rather than the more common ones that make up the bulk of the biofuels that will be imported into the UK. The New Zealand and UK biodiesel costs are reasonable consistent.

Clear comparison with the costings in the Options study is not possible, but it can be inferred that the costs of biodiesel production are in line with projected market prices, and the costs of ethanol production from the Options report are significantly higher than the (market-related) prices in the UK Strategy.

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References

UK Renewable Energy Strategy 2009: IA for the transport sector

UK Renewable Energy Strategy, July 2009