Framework for Transport-Related Technical and Engineering Advice and Research (PPRO 04/45/12)

Lot 2 (Road Related Technical Engineering And Advice)

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Advanced Biofuel Demonstration Competition Feasibility Study

Annex 2: UK value and jobs analysis: methodology and assumptions

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In partnership with:

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1. Global production estimates

E4tech's Auto-Fuel project was used to provide global and EU deployment ranges for 2020 and 2030, based on potential technology ramp-up rates and bottom-up estimates of international development activity. These cumulative production capacity figures to 2020 are based on operational and planned facilities, with projections to 2030 made based on assumed build rates and plant sizes. Low, Medium and High scenarios were validated with a consortium of automakers and oil majors during 2013, and form the underlying basis of this UK value and jobs analysis.

UK deployment figures are estimated based on a share of EU production, estimated at 18% due to the relative sizes of the UK and EU transport sectors (53 Mtoe/yr vs. 288 Mtoe/yr).

2. Export value for a global market to the UK

Global deployment figures are used to estimate the potential net value added (NVA) contribution to the UK economy across the various supply chain options, from feedstock, through technology construction and operation, to downstream distribution of finished fuels. The methodology, adapted from the Bioenergy Technology Innovation Needs Assessment (TINA) for Carbon Trust is outlined below.

- Firstly, global turnover figures are calculated by using global deployment scenarios (Mtoe/yr) and expected technology costs (£20-35/GJ in 2020 falling to £15-30/GJ by 2030).
- Of the total turnover, feedstocks account for around 40-45% of this value, technology capex and opex 42-50%, and downstream distribution 10-13%.
- Turnover figures are then converted to GVA figures based on known turnover-to-GVA ratios for similar industries. Feedstock supply and fuel distribution are estimated at 50%, whilst high-capex technology development is estimated at 65%.
- The proportion of the global market that might be accessible (or 'tradable') to UK based companies is estimated at 20% for feedstock supply and fuel distribution, with 60% estimated for the conversion technology itself. Whilst advanced biofuel developers should be able to build projects in any country, around a third of costs (for installation and engineering) will likely be local.
- Finally, the proportion of the globally accessible market that the UK can capture is estimated based on its competitive advantage. The UK's competitive advantage is graded from low to high, which is used to estimate a percentage (1%, 3%,5 %, 7%, 10% or 20%) of the available market which the UK could potentially be expected to take (based on Comtrade data from other existing industries). Within each subcomponent market these numbers are adjusted to account for the specific nature of the UK's strengths. Based on the TINA results, we assume 3% for feedstock supply and product distribution, and 5% for the technology step.
- We consider that it would be appropriate to apply a displacement effect factor, since part of the value will be due to a shift of resources and thus partly cancelled out by loss of value in other sectors (e.g. fossil fuel supply and refining). Expert interviewee opinions in the TINA project assessed this effect to be between 25% and 75%, hence we applied a flat 50% to convert Gross Value Add (GVA) into Net Value Add (NVA).

3. Value of a domestic market to the UK

UK deployment figures are used to estimate the potential gross value added (GVA) contribution to the UK economy across the various supply chain options, from feedstock, through technology construction and operation, to downstream distribution of finished fuels.

- UK turnover figures are calculated by using UK deployment scenarios (Mtoe/yr) and expected technology costs (£/GJ as above).
- Turnover figures are converted to GVA figures based on known turnover-to-GVA ratios for similar industries (as above)
- Finally, the proportion of the UK market that is <u>not</u> accessible (or 'tradable') to foreign companies. This is estimated at 80% for feedstock supply and fuel distribution, and 40% for the conversion technology. The UK is expected to take 100% of this non-tradable market.
- A displacement factor of 50% converts GVA into NVA.

4. Estimates of UK employment

Using the TINA methodology, each of the NVA figures was then converted into the number of Full-time equivalents, using the following metrics: £50k of NVA per employee for based material production (i.e. feedstock supply), £40k for operation of basic assets (i.e. downstream distribution and plant operation), and £450k for capital intensive basic material production (i.e. conversion technology capex).