

Sustainability issues associated with liquid biofuels

Project summary

The aim of this study is to better understand the carbon footprint of liquid biofuels and to investigate current understanding of other sustainability issues involved in their production, supply and use.

Project rationale

Liquid biofuels currently make up a relatively small but important proportion of primary fuel supplies in the UK. However, with legislation requiring wholesale cuts in greenhouse gas emissions, this is likely to increase. There is a lack of low carbon alternative sources of fuel in such sectors as aviation, marine, defence and heavy duty transport. While better traffic management and other efficiency gains are foreseeable in these sectors, there will be a continued need for low-carbon liquid fuels with high energy densities if these sectors are to successfully reduce greenhouse gas emissions. As a result, there are significant international efforts to develop viable liquid biofuel markets and industries.

If biofuels are to be used more, it is important that they deliver in terms of reducing greenhouse gas emissions. The key aim of this study will therefore be to better understand the carbon footprint from the production, supply and use of liquid biofuels and its co-products. In addition, there are wider sustainability issues that may need to be anticipated and mitigated, for example, conflicts of land use and other associated issues in the production of biofuels such as water use, soil erosion, impacts on biodiversity and production and transport infrastructure. There are also some significant economic opportunities that need to be analysed and appraised such as greater national energy security, new uses for waste streams from certain sectors such as agriculture, and better utilisation of marginal land.

Scope

The study will focus on:

- liquid biofuels currently used in the UK, either produced indigenously or imported
- emerging advanced liquid biofuels proposed for large-scale production in the UK.

The carbon footprint of these biofuels will be the primary focus of the study. This will include an assessment of current Life Cycle Assessment (LCA) methodologies and standards with a focus on greenhouse gas emissions, energy requirements and land-use changes. The assessment will include consideration of co-products related to the production of biofuels.

Broader sustainability issues, incorporating economic, social and other environmental aspects, will be identified and analysed. An assessment will also be made of the potential level of supply that the UK could sustain in the future, including from advanced, next generation biofuels.

Given the international nature of the trade in biofuels, the project will seek to draw on similar work underway internationally, for example, research funded by the Australian Renewable Energy Agency (ARENA).

Project work plan

A Working Group (WG) will be established under the auspices of the Engineering Policy Committee. It will be chaired by a Fellow of the Academy and include up to seven experts in the field, with at least three Fellows. The work shall be directed and overseen by the WG but mainly carried out by the policy team of the Academy. Government funding will be used to employ an additional researcher with experience in the field to carry out specific research or drafting tasks.

The general sequence of work will be as follows:

- As this is primarily a metastudy of available knowledge, a comprehensive literature review will be conducted on:
 - current LCA methodologies applicable to the appraisal of liquid biofuels, and
 - LCA and sustainability studies that have been conducted on liquid biofuels to date.
- An open call for evidence will be issued. This will be followed by panel sessions at which oral evidence will be provided to the WG. Interviews will also be conducted with relevant stakeholders from industry, academia, and government as needed.

- A report will be produced that draws together the findings of the literature review, expert evidence, stakeholder interviews as well as the insights and recommendations of the WG.
- The complete report will be subject to the Academy's quality control process and will be reviewed according to Academy procedures.
- The final decision to publish will be made by the Academy's Engineering Policy Committee (EPC).