

## Bioenergy imports

In 2007 the UK imported 4.8 TWh/y of liquid and solid biofuels from overseas producers.

The International Energy Agency (IEA) estimates that 4–8 million km<sup>2</sup> of land could be used globally for growing energy crops by 2050. That area would produce around 42 000 TWh/y of bioenergy. The IEA assumes that 40% of this bioenergy would be exported from the producer countries, with potential global supply of 17 000 TWh/y. If exports were split equally across the global population then the maximum 'fair market share' for the UK would be about 140 TWh/y. The 2050 Calculator assumes that the bioenergy imported is already processed ready to use, and is half in solid and half in liquid state, as replacements for coal and oil respectively.

Considerable uncertainty remains about these estimates (including uncertainty about the potential for plant breeding and technology enhancements to improve yields), and there are important questions about the sustainability and impacts of bioenergy imports.

### Level 1

Level 1 assumes the UK does not import any bioenergy by 2050, with the amounts of bioenergy imported gradually declining from 2007 levels to zero.

### Level 2

Level 2 assumes a 10-fold increase of bioenergy imports from current levels by 2050, equating

to roughly 13 000 km<sup>2</sup> of production land in other countries. A total of up to 70 TWh/y may be imported, corresponding to half of what we have assumed to be the UK's fair market share.

### Level 3

Level 3 assumes that by 2050 the UK is importing its fair market share under the assumptions outlined above. This means a 20-fold increase of imports, using about 26 000 km<sup>2</sup> of land in other countries, providing up to 140 TWh/y of bioenergy.

### Level 4

Level 4 assumes that by 2050 the UK is importing bioenergy from a land area almost the size of the Republic of Ireland (52 000 km<sup>2</sup>), assuming an average power per unit area of 0.6 W/m<sup>2</sup> (Figure 1). This represents a 40-fold increase of imports (or twice the UK's projected fair market share), providing up to 280 TWh/y of biofuel. Importing this much biofuel presents a sizeable infrastructure challenge for ports and supply chains.

### Interaction with other choices

In the 2050 Calculator bioenergy is only imported if there is demand for it, up to the maximum limit allowed under the chosen level of imports and after all domestic bioenergy has been used up. For example, if level 2 imports is selected (maximum 70 TWh/y) but only 30 TWh/y is demanded, then only 30 TWh/y will be imported.



Figure 1. The area needed to grow the bioenergy imports assumed at level 4 is 52 000 km<sup>2</sup>, if they were to be grown close to the UK. This is equivalent to an area almost the size of the Republic of Ireland.

