

Bridging the biofuel generation-gap

Climate-change hopes are pinned on second-generation biofuels

Environmental and economic gains are elusive

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The environment ministers of the European Union could find themselves talking about chip-fat, algae and sewage when they meet for an informal get-together in Slovenia this weekend (11-13 April).

One of the stops on the ministers' itinerary is a visit to an exhibition on second-generation biofuels, technologies that are routinely touted as the surest way to make the Union's goals on biofuels environmentally credible.

Since last year, when EU leaders signed up to a target of getting 10% of transport fuels from biofuels by 2020, doubts have been growing about the environmental benefits of getting fuel from crops (first-gen-

eration biofuels). For instance, a recent study in the US journal *Science* found that corn-based ethanol would double greenhouse-gas emissions over the course of 30 years. As a result, second-generation technologies have become the great green hope for biofuels. These fuels can be made from almost any form of biomass, such as forestry or agricultural wastes, wild grasses or even algae and

50%

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sewage. The problem is that the technologies only exist in pilot projects and laboratories.

For advocates of biofuels, the promise of the second generation has become the

'get-out-of-jail card'. When the European Council set the 2020 target it agreed that it was 'subject to second-generation biofuels being available', along with other caveats, such as tough green safeguards. In January 2008 when the European Commission published its proposals on the EU's climate and energy package, José Manuel Barroso, the Commission president, promised more spending on second-generation biofuels.

But the US, which has prized biofuels more for geopolitical than environmental reasons, seems to be ahead in the quest for the second generation. In 2007 US President George W. Bush responded to criticism of corn-based ethanol by promising to spend money on new ways of producing the fuel, using wood chips, grasses and waste.

Scientific studies suggest that second-generation biofuels do deserve their green billing. An article in *Science* states that biofuels made from waste biomass or bio-

mass grown on abandoned agricultural lands 'incur little or no carbon debt and offer immediate and sustained greenhouse gas advantages'.

Green gold

But will this green gold be ready in time to help the EU meet its 2020 target? The Strategic Energy Technology Plan published in 2007 states that making second-generation biofuels 'competitive alternatives to fossil fuels' is one of 'the key technological challenges for the next ten years to meet the EU's 2020 targets'. But the Commission's Joint Research Council says that second-generation biofuels will still be 'much more expensive' than first generation technologies in 2020 and 'not competitive'.

Not all second-generation biofuels are equal in their environmental benefits. Some would pose the same problems as first-generation biofuels, for example if switchgrass (a spiky crop that thrives in arid places) was grown on

land used for food production, it could increase carbon dioxide emissions by 50%. Ariel Bruner at BirdLife International, a conservation group, says the EU would also have to consider what is 'waste', because stripping grassland or forests of organic matter would lead to problems for soil fertility. 'We should not really make the mistake of saying that this is a bad technology, this is a good technology. We should put in place a system with the right incentives [for clean fuels] and see what the market comes up with,' says Bruner.

The relative economic advantages do matter. Raffaelo Garofalo, secretary-general at the European Biodiesel Board and a member of the EU's Biofuels Technology Platform, suggests that it is ultimately not helpful to make a distinction between first and second-generation technologies. 'When you talk about second generation,' he says, 'it sounds as if the first generation is going

to retire and the second generation is going to replace everything. We are going to have different technologies which will complement and then let the market decide.' But the market can only 'decide' if it gets a strong signal from policymakers about which biofuels count towards the target.

The EU is currently wrangling over draft laws that will put in place green safeguards for biofuels. If these safeguards - sustainability criteria - are set too low, they will provide little incentive for producers to switch to riskier, more expensive technologies. The Commission has proposed to require that permitted biofuels should reduce greenhouse gas emissions by 35% compared to fossil fuels. But several countries think the criteria should be more stretching and want to see a 50% greenhouse gas savings.

The next generation of biofuels might be a greener alternative to fossil fuels, but it will not be an easy option.