

This response was submitted to the consultation held by the Nuffield Council on Bioethics on *New approaches to biofuels* between December 2009 and March 2010. The views expressed are solely those of the respondent(s) and not those of the Council.

Swan Institute, Newcastle University

I am responding to the above consultation on behalf of the Sir Joseph Swan Institute for Energy Research at Newcastle University. The Sir Joseph Swan Institute for Energy Research is an interdisciplinary research institute within Newcastle University. It provides the focus for energy related research across the University and incorporates researchers from eleven academic schools. The mission of The Sir Joseph Swan Institute (SWAN) is to provide an intellectual lead in the pursuit of the low-carbon economy of the future, by developing new technologies which reconcile human needs for energy conversion and use with social and ecological needs. Formed in 2007, SWAN now has about 100 members whose expertise reaches into most of the disciplines of relevance to clean and renewable energy, providing an extensive academic and industrial contact base around the world.

The main focus of energy-related research at Newcastle University is currently in the following areas: novel bio-energy; novel geo-energy; energy conversion, storage & distribution; social impact & policy.

I have also attached a paper which addresses many of the questions posed in the consultation document.

Q1

We are strongly supportive. Internal combustion engines will be used for a long time to come around the world. There are few alternatives to crude oil when it comes to transport, which is quite different to the broader energy picture (including heat and electricity). There is therefore a strong case for channelling a significant volume of biomass into liquid biofuels for transport.

Q2

Genuine carbon reduction overall and a fair deal for developing countries.

Q3

Yes. Journals and conferences. We also have strong industrial links. Whilst I am submitting this response as Director of the Sir Joseph Swan Institute for Energy Research at Newcastle University, I am also Chairman of North East Biofuels.

Q4

The dominant factor depends on location: in Europe it is carbon reduction; in the US it is energy security; in developing countries it is agricultural and economic development.

Q5

It has been shown that CO₂ savings of 94% can be achieved on first-generation biodiesel made from oilseed rape if every possible step is taken to achieve that aim. Obviously the savings achieved in practice are much lower. The point is: the scope for greenhouse gas reduction with first-generation biofuels is often underestimated. Second-generation biofuels can offer large CO₂ savings but they are not a bankable prospect at present. A key point to bear in mind is that the second generation will build on the first in order to find its way into the marketplace. The philosophy should be to support 1st generation until 2nd generation is ready. If we want investors to invest we need to send very clear signals to that effect.

Q6

Long-term, encourage a large proportion of biofuels from waste since waste tends to grow with population size and affluence. But don't try to get there in one step. Investors need to be confident in fiscal support during the payback period of their proposed investment.

Q7

Taking a global perspective, there is an opportunity for huge increases in biomass yield by developing agronomy practice. It is not happening at present because the usual response to famine is "dumping" of

surplus food from developed countries as emergency aid. This repeat behaviour undermines local agriculture. These countries need secure domestic and export markets for biomass. The attached paper elaborates on this line of argument.

Q8

All of the approaches are important. We are working on all of them at Newcastle University. Rather than trying to determine which will work best commercially in the long term, we are looking at ways of using them in combination. At our Centre for RENEWABLE Energy from Land (CREEL) we can use by-products from one process as feedstocks for another or for improving crop growth, and find out what works financially and in carbon-reduction terms. There is also the appealing prospect of a biorefinery which can combine thermochemical and biochemical processing routes and convert a wide range of feedstocks into fuels and chemical intermediates.

Q9

We need to accelerate the process of developing novel biomass feedstocks. GM is an important tool in that regard. If, for example, we want to develop a wheat crop that is high in starch rather than high in protein, or if we want to develop crop varieties that grow in the dark with consequently lower water take-up, GM and advanced breeding technologies will speed up the process considerably.

Q10

Q11

The move for biofuels over the last 2 years from “silver bullet” to “environmental pariah” in the popular press has adversely impacted the R&D funding environment. The emergence of electric vehicles as the next “silver bullet” is diverting interest and funding. None of these extreme portrayals, are justified, but they have an impact.

Q12

We would argue for a strong voice for end users in the sense of the auto/aircraft/rail/shipping industries, challenging them to articulate a long-term perspective.

Q13

There are good biofuels and bad biofuels. The attached paper expands on this point considerably. There is a danger that the EU (and even more so the UK) pose the iLUC question in such a way that it can never be answered, and succeed only in slowing down the development of a much needed industry. The result will be that other countries will develop the industry in a much less environmentally aware manner.

Q14

The whole “food versus fuel” debate appears to be badly informed. The attached paper offers some perspectives and data.

Q15

See response to Q13. There is a case for identifying a few crude interventions to avoid really gross iLUC effects and thereafter leaving the industry to find its feet. A more sophisticated approach can follow later.

Q16

Q17

We can have food and fuel and animal feed. Current yields (worldwide) are low. Secure markets will encourage improvements in agronomy as explained in the attached paper.

Q18

Developing countries have a particularly acute need for secure markets for the products that they grow on their land.

Q19

Yes, there are serious risks of exploitation. The first step will be part of the Carbon and Sustainability standards that are being developed. Thereafter we can rely on Corporate Social Responsibility and reputation management as seen in fashion businesses.

Q20

See response to Q19.

Q21

Until governments around the world are prepared to confront their electorates with the true cost of CO2 emissions there will be a requirement for incentives or regulations to make the transition away from fossil fuels happen. As ever, the judgement is about the level at which to set these in order to encourage the private sector to make their investments.

Q22

Q23

Your own final sentence captures the key point: "The changeable nature of biofuel governance has created a lack of investor confidence." A period of stability is vital,

Q24

See attached paper.

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