JOINT NATURE CONSERVATION COMMITTEE

Transport Biofuels and Biodiversity

JNCC Position Statement

Key messages

1. The production and use of biofuels must not be undertaken at the expense of the environment and society of the EU or any other part of the world.

2. JNCC recognises the positive contribution biofuels could potentially make to reducing greenhouse gas emissions, ensuring energy security and supporting rural development. However, we are concerned that without appropriate safeguards, the rapidly growing biofuel industry and trade – incentivised by the European Union's biofuels target – will add another significant pressure to the environment with damaging consequences for biodiversity, both within the UK and globally.

3. JNCC therefore believes that any biofuel policy should as a minimum:

   i. sit within a policy context that improves energy efficiency and reduces total energy and transport fuel demand;

   ii. deliver reductions in greenhouse gas emissions of at least 50% compared to conventional fuels, based on a whole life-cycle carbon assessment;

   iii. fully assess both the negative and positive environmental impacts of all aspects of biofuel production and use;

   iv. be consistent with the existing environmental policy framework, and in particular should not compromise the EU and global commitments to address biodiversity loss by 2010, and where possible should provide biodiversity and wider environmental benefits; and

   v. consider the impacts of biofuel production on ecosystem services, and ensure that production is consistent with the long-term sustainable use of natural resources and does not exacerbate poverty.

4. Since the biofuel industry is developing so rapidly, and is moving ahead of the regulatory framework and the ability to assess environmental impacts, it is essential that decision-making is based on the Precautionary Approach.[1]

5. International sustainability criteria must be developed which encourage sustainably produced biofuels, whilst deterring environmentally unsustainable production. Such criteria should be developed ideally at a global level and applied to all biofuel production and trade.

6. JNCC supports the UK Government's and the EU's efforts to develop sustainability mechanisms and criteria for biofuel production,[2] building on existing initiatives for palm oil, soya and sugarcane.[3]

7. The development of second-generation biofuel technology should be further encouraged. There must be sufficient research investment to enable a rapid move away from feedstocks based on food crops to a broader feedstock base, which is environmentally more sustainable and ensures greater reductions in greenhouse gas emissions.

Background

8. Biofuels are defined as solid, liquid or gas fuels derived from biomass, which can be used for energy generation in three sectors: transport, electricity generation, and heating and cooling.[4] This position statement refers solely to transport biofuels, defined as liquid or gaseous transportation fuels derived from biomass.[5] Biofuels for transport are a potential renewable alternative to mineral-oil-based gasoline (petrol), diesel and liquefied petroleum gas. Transport biofuels are principally bioethanol and biodiesel; the former currently dominates in terms of global production. Bioethanol is produced from starch- or sugar-rich crops, including sugarcane, corn, sugar beet, wheat and sorghum. Biodiesel is made from oil-rich seeds, such as rapeseed, sunflower, soya, palm, coconut and jatropha.[6]

9. Although efforts to produce biofuels date back to the early days of the automobile, they have only recently been recognised as a serious alternative to fossil fuels. The main drivers behind the recent interest in biofuels are the current high oil prices and the desire to be less dependent on mineral oil, energy security, climate change mitigation (through reduced carbon emissions compared to conventional fuels), and the development of new agricultural markets.

10. Biofuel crops (feedstocks) can undergo various processing techniques to make them a practical source of energy. The types of feedstock and processing techniques used are currently understood in the context of first- and second-generation biofuels. In general, first-generation biofuels rely on harvestable food crops, whereas second-generation technology broadens the feedstock base to include all plant material,[7] from agriculture (e.g. grasses) and forestry.

11. As a result of subsidies in many parts of the world, production of first-generation biofuels is already commercially available and widely applied using well-established technologies. Second-generation biofuels are either in development or are in limited use pending further developments (technical, political or economic) that will allow wider application and provide environmental benefits. These benefits include generally greater reductions in greenhouse gas emissions, reduced land area necessary for growing the feedstocks, and potentially more extensive agricultural production, with associated benefits for biodiversity, and soil and water quality.

12. In March 2007, European Heads of State and Governments agreed a conditional minimum target of 10% for the share of biofuels in overall EU petrol and diesel consumption by 2020, subject to sustainability of production and commercial availability of second-generation biofuels.[8] The rapid development of the biofuel industry, the global trade in biofuels/biomass, and national target setting are currently moving ahead of the regulatory framework and the ability to assess environmental impacts. It is therefore essential that there is debate and sufficient research investment to establish a sound scientific base to determine how best to use the available biomass potential, and which energy crops provide the best energy yield to the least detriment of the environment.

Environmental and social risks

13. JNCC is concerned that, without appropriate safeguards, the negative effects on the environment and especially on biodiversity could outweigh any positive benefits derived from the production and use of biofuels. Recent evidence[9] demonstrates that the growing biofuel industry and trade adds another considerable pressure to the environment, with direct and indirect negative consequences for biodiversity.

14. Environmental degradation through biofuel production in the UK, Europe and globally may occur (and is already occurring in some parts of the world) through:

    i. land use changes to accommodate energy crop plantations which result in loss, fragmentation and degradation of valuable habitats (especially grasslands, forests, wetlands and extensive agricultural areas) and negative impacts on associated biodiversity and ecosystem services;

    ii. intensification of agricultural production, i.e. increased use of agro-chemicals and water resources which leads to biodiversity loss, water shortages, increased water pollution and eutrophication, and soil degradation and erosion;

    iii. the release of carbon from natural carbon sinks, such as peatlands and forests, through land use changes, negating any carbon savings made through the use of biofuels whilst at the same time increasing overall global greenhouse gas emissions;

    iv. displaced food production encroaching on valuable habitats (land leakage); and

    v. the unregulated use of genetically modified feedstocks (outside the EU), which may be damaging to wildlife, competitively displace native species or lead to gene flow with native species.

15. There is considerable variation in the greenhouse gas emissions associated with different biofuels. Some biofuels even have a negative greenhouse gas balance when their full life-cycle is analysed.[10] For example, biodiesel produced from south-east Asian palm oil grown on drained peatlands emits five times as much carbon along its life-cycle as conventional diesel.[11]

16. The draining of tropical peatlands and the clearance of tropical rainforests is a major source of greenhouse gas emissions. In terms of climate change mitigation it would be more effective to conserve and restore forests, peatlands and grasslands. Research has shown that, for instance, afforestation of an equivalent area of land to one set aside for energy crop cultivation would sequester two to nine times more carbon over a 30-year period than the emissions avoided by the use of biofuels.[12] Thus, some biofuels do not provide effective climate change mitigation.

17. While certain forms of biofuel production may provide economic and social benefits, potential negative consequences include:

    i. displacement of indigenous communities and small-holder farmers who are dependent on natural resources for their livelihoods;

    ii. increased commodity prices due to competition between food and biofuel markets, leading to food insecurity and potentially exacerbating poverty;[13] and

    iii. poor labour conditions and health and safety risks.

Sustainable production and use of biofuels

18. JNCC believes that sustainable biofuel production can and must be achieved by taking into account environmental and social considerations. It is important that bioenergy production does not exacerbate existing pressures on biodiversity and on water and soil resources. National and international biofuel targets must be met in an environmentally sustainable and socially equitable way, and incentives to encourage this should be set at levels that will prevent unsustainable practices.

19. JNCC recommends that, as a minimum, any measures to support biofuel production and use should be based on the following principles:

    i. biofuel policy should be set within an energy framework which as a first priority seeks to reduce energy and transport fuel demand, and improves energy efficiency;

    ii. the production and use of biofuels should deliver reductions in greenhouse gas emissions of at least 50% compared to conventional fuels, based on a whole life-cycle carbon assessment;

    iii. there must be consistency with existing environmental commitments, policies and legislation,[14] including the EU and global 2010 targets on biodiversity loss[15], and wider objectives such as the Millennium Development Goals;

    iv. biofuel production should not lead to the degradation of ecosystem services and consequent negative impacts on human well-being and the fight against poverty;

    v. further research should be encouraged into biofuel technology (such as second-generation) which leads to more efficient production and use with lower environmental impacts;

    vi. the principles of the Ecosystem Approach[16] and the Precautionary Approach should be adhered to;

    vii. biofuel production should be considered in the context of landscape/ecosystem-scale land use planning, supported by Strategic Environmental Assessment, Environmental Impact Assessment and other similar mechanisms at appropriate scales; and

    viii. the World Trade Organisation should be encouraged to apply sustainability criteria under its agreements.

20. Further sustainability safeguards could be achieved through a pragmatic approach to prioritising support for particular sources of biofuels:

    i. existing waste sources (e.g. used cooking oil and forestry by-products);

    ii. sources that will provide a clear net benefit to biodiversity and natural resources (e.g. extensive cereal production and high-diversity cropping); and

    iii. sources that will have a net neutral impact on biodiversity and natural resources (e.g. farming in accordance with minimum environmental standards).

21. An assessment must be made as to whether sufficient biofuel feedstocks to meet current obligations could be sustainably grown within existing cultivated (forest and agricultural) areas. Other areas for cultivation must be subject to environmental assessment, and natural and semi-natural habitat should not be considered for biofuel production.

JNCC's role

22. JNCC is the Government's statutory adviser on UK and international biodiversity issues and has an important role in respect of biofuel production and sustainability. We will provide advice to the UK Government, the European Commission and to multilateral environmental agreements (especially the Convention on Biological Diversity and the UN Framework Convention on Climate Change) on:

    i. the possible positive and negative impacts of biofuel production on the environment;

    ii. the effects of transport biofuel obligations on the ability of the UK, and the wider international community, to meet international commitments such as significantly reducing the rate of biodiversity loss by 2010 and other World Summit on Sustainable Development targets, and achieving the Millennium Development Goals; and

    iii. potential measures for addressing unsustainable impacts and promoting sustainable practices, by providing information on environmentally, socially and economically beneficial solutions to national and international biofuel production through the development of internationally applicable sustainability criteria.

23. JNCC will work with the nature and landscape conservation and environmental agencies across the UK to develop strong advocacy to the UK Government and European institutions on the implications of increased biofuel production on land use in the UK, the EU and globally. In particular, we will consider the impacts on protected areas and other features of nature conservation importance (e.g. UK Biodiversity Action Plan priority habitats and species).

24. We will support the development of methods and models to assess where biofuel production is most suited geographically and environmentally. We will draw on our considerable expertise in the collection and dissemination of data and information on UK habitats and species, and on our developing work to collate biodiversity-relevant information on selected countries beyond the EU as well as the UK's ecological 'footprint' overseas.

25. JNCC has long-established and diverse links with multiple partners in the UK and internationally. We will continue to work with them to encourage a holistic approach to energy policy and to ensure climate adaptation and mitigation measures are scientifically sound and sustainable.

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Joint Nature Conservation Committee

The Joint Nature Conservation Committee (JNCC) is the statutory adviser to Government on UK and international nature conservation. Its work contributes to maintaining and enriching biological diversity, conserving geological features and sustaining natural systems. JNCC delivers the UK and international responsibilities of the Council for Nature Conservation and the Countryside (Northern Ireland), the Countryside Council for Wales, Natural England and Scottish Natural Heritage.

Endnotes

1. The Precautionary Approach was adopted by the UN Conference on the Environment and Development in Rio de Janeiro in 1992, and stipulates that in order to protect the environment a precautionary approach should be widely applied, meaning that where there are threats of serious or irreversible damage to the environment lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

2. JNCC in particular supports the UK Government's efforts to develop international sustainability criteria through the Global Bioenergy Partnership (GBEP).

3. Initiatives include the international Roundtable on Sustainable Palm Oil production (RSPO), the Better Sugarcane Initiative (Basel initiative), the Roundtable on Responsible Soy (RTRS) and existing regulatory frameworks such as the Convention on International Trade in Endangered Species (CITES) and the Forest Law Enforcement Governance and Trade initiative (FLEGT).

4. The Global Bioenergy Partnership. (2007). *Bioenergy: facts and figures*, FAO, Italy. According to the UK's Biomass Strategy the use of transport biofuels is the least cost-effective measure in terms of carbon savings, while biomass for heating comes out at the top of the hierarchy. DTI/Defra/DfT. (2007). *UK Biomass Strategy,* London, UK.

5. JNCC is in the process of developing its Position Statement on renewable energy and biodiversity which will include a view on the wider use of biomass.

6. Dufey, A (2006). *Biofuels production, trade and sustainable development: emerging issues*, International Institute for Environment and Development (IIED), London, UK; Dufey, A (2007). *International trade in biofuels: Good for development? And good for environment?*, An IIED Briefing, International Institute for Environment and Development (IIED), London, UK.

7. Often referred to as lignocellulosic matter. This is the biomass component of plants made up by lignin and cellulose – both of which are organic compounds found in cell walls.

8. European Council Conclusions, 8-9 March 2007, 7224/1/07 REV 1.

9. See for example: European Environment Agency (EEA) (2007). *How much bioenergy can Europe produce without harming the environment?*, EEA Report No 7/2007; UNEP/WCMC/UNESCO (2007). The last stand of the orang-utan, state of emergency: *Illegal logging, fire and palm oil in Indonesia's national parks*, Rapid Response Assessment, Norway; Friends of the Earth (2005). *The oil for ape scandal, how palm oil is threatening the orang-utan*, Research Report, London, UK.

10. Full life-cycle analyses take account of land use changes associated with biofuel production, cultivation practices, feedstock type, processing methods, transport of biofuels and their feedstocks, and use in vehicles.

11. Global Canopy Programme (2007). *Forests first in the fight against climate change*, the VivoCarbon Initiative, Oxford, UK; Hooijer, A. *et al* (2006). *PEAT-CO2, Assessment of CO_2 emissions from drained peatlands in SE Asia*, Delft Hydraulics Report Q3943, The Netherlands; see also: Biofuelswatch. (2007). *Biofuels threaten to accelerate global warming, available at www.biofuelwatch.org.uk; Wetlands International (2006). Factsheet: Tropical peatswamp destruction fuels climate change*, The Netherlands. Peatlands cover just over 3% of the world's land area but are the world's largest terrestrial carbon sink. It has been estimated that tropical peatlands in south-east Asia store approximately 42 billion tonnes of carbon. When peatlands are drained, cleared and burned for cultivation, there are two sources of emissions, firstly from peat oxidation and secondly from fire. Recent research estimates that 27% of palm oil plantations in Indonesia are planted on drained tropical peatlands. The drainage, clearing and burning of tropical peatlands in south-east Asia causes the emission of 2 billion tonnes of CO_2 annually, which equates to 8% of global annual greenhouse gas emissions. Currently only approximately 3% of imported palm oil is used for biodiesel production in Europe (the remaining 97% is used in the food and chemical industry). However, this new market has the potential to dramatically increase global demand for palm oil, which will further fuel the destruction of valuable habitats in the countries in which it is produced.

12. Righelato, R and Spracklen, DV (2007). *Carbon mitigation by biofuels or saving and restoring forests?* Science, Vol. 317, 17 August 2007, p. 902.

13. A joint OECD/FAO report predicts that food prices for cereals, sugar, oilseeds and vegetable oils will rise between 20% and 50% by 2016. OECD-FAO (2007). *Agricultural outlook 2007-2016*, Paris, France.

14. The existing EU environmental policy framework also includes: achieving favourable conservation status according to the Habitats Directive, achieving good ecological status according to the Water Framework Directive, and the targets and actions of the Biodiversity Communication and Action Plan.

15. The EU target agreed by EU Heads of State and Governments at the Göteborg European Council (15/16 June 2001) is 'that biodiversity decline should be halted with the aim of reaching this objective by 2010' (see Presidency Conclusions http://ec.europa.eu/governance/impact/docs/key_docs/goteborg_concl_en.pdf). The international target was adopted by governments at the World Summit on Sustainable Development in Johannesburg in 2002, who agreed on 'achievement by 2010 of a significant reduction in the current rate of loss of biological diversity'.

16. For background information on the Ecosystem Approach see: www.cbd.int/programmes/cross-cutting/ecosystem

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