

CREATING VALUE FROM RENEWABLE RESOURCES

**Response to 2 year progress report on
strategy for non-food crops and uses**

May 2007

Contents

Section A – Overview	3
Section B - Detailed comments on project board recommendations	8
Section C - Key actions for priority bioenergy and renewable material sectors	17
Section D – Revised non–food crops strategy action plan	19

Section A: Overview

Introduction

1. The Strategy for Non-Food Crops and Uses¹ was published by Defra and DTI in November 2004 to provide a framework for the competitive and sustainable development of the biorenewables sector in England.

2. In November 2006, a 2 year progress report, 'Creating Value from Renewable Materials'² was issued by Defra and DTI. The report had been prepared by the Project Board set up by Government to monitor the implementation of the Strategy. As well as reviewing progress it put forward suggestions for how the Strategy might develop over the next 3 years.

3. This report has come at an opportune time and its findings serve to strengthen the case for increasing the use of renewable materials and bioenergy in the UK. Combating climate change remains an urgent priority- the Stern review underlined the significant economic and environmental impact of failure to address this issue. There is recognition within the EU of the need to build a knowledge based bioeconomy to retain competitiveness, and the Energy Review outlines the need to improve the energy security and mix by developing renewables. There is a growing domestic and international recognition of the WWF concept of 'One Planet Living' and the need to ensure that we respect the environmental limits of the planet. We remain convinced that the sustainable use of renewable plant based materials and bioenergy in the form of biomass for heat and electricity and transport biofuels can play a major role in helping to meet all of these objectives.

The Project Board's report

4. Against this background, it is pleasing to see some important progress in developing markets for bioenergy, renewable materials and associated technologies in the UK over the last 2 years, but we agree with the report's overriding conclusion that more can and must be done if we are to achieve a sustainable, competitive, and thriving biorenewables sector.

5. The Project Board has made a number of useful recommendations for updating and refocusing the Non – Food Crop Strategy over the next 3 years. This statement and the information set out in section B, detail how, over the next 3 years, Defra and DTI will be working with those involved in the UK biorenewable sector and key end users to act on the Project Board's findings, and deliver the next stage of the Strategy's Action Plan.

Future funding and policy framework for biorenewables in UK

6. We must state at the outset, that Government has no pre conceived blue print for the biorenewable sector in the UK. Our role is very much one of facilitation: through providing direct and indirect incentives (such as procurement policies), research and development, information and promotion. It is for all those involved with the industry to determine the precise way forward. However, because of the important way in which biorenewables can help to achieve our sustainability goals, we will continue to provide a policy framework that encourages the culture of innovation and investment from growers, processors, manufacturers and consumers, to build market share and enable the sector to flourish in the UK.

¹ <http://defraweb/farm/crops/industrial/pdf/nfc-strategy.pdf>

² <http://defraweb/farm/crops/industrial/pdf/nfc-progress-0611.pdf>

7. To underline our commitment to this agenda, and in recognition of the need to build quickly on the momentum created so far, core Defra funding for biorenewables work will be increased from 2008/2009. The details will be confirmed in the Comprehensive Spending Review (CSR) later this year.

8. The Project Board suggested that a refocused, overarching Strategy remained the most appropriate framework for taking forward the sustainable and competitive development of the biorenewables sector. We endorse this view and have issued today a UK Biomass Strategy, which sets out our latest ambitions for the sustainable development of biomass used for renewable industrial materials, energy and transport fuels. This new Strategy pulls together many existing objectives and cross Government policies in the area, updating and building on those set out in the original Non-Food Crops Strategy. It will be the key overriding policy framework for the development of biorenewables in the UK up to 2020 and beyond.

9. The programme of work resulting from the 2 year review of the Non-Food Crops Strategy, as set out in the revised Action Plan at section D, will now be integrated with the Biomass Strategy, and implemented and monitored through a single new programme on renewable fuels and materials, set up under the renew Defra initiative. DTI will also work with Defra and other Government Departments, through the Biomass Strategy, Energy White Paper, (also issued today), and its industrial biotechnology work programme to take forward actions on bioenergy, biorefineries and biospecialities.

Revisions to the Non-Food Crops Strategy Action Plan

10. The original Non-Food Crops strategy encompassed 50 wide ranging actions spread across 11 work strands. This was an ambitious and diverse programme and although good progress has been made, we agree that it is now necessary to define and focus on those areas where Government can make most impact in bringing about the change needed to meet our sustainability objectives.

Priority sectors

11. **Bioenergy** has seen most progress over the last two years and, as the Project Board suggested, we must build quickly on these achievements. The Energy White Paper will explain the actions which are needed to decarbonise the energy supply in order to tackle climate change and diversify energy sources and maintain UK economic competitiveness. This will involve a fundamental shift to a low carbon economy. As part of this process we need to make optimum use of plants and other biological resources –and look towards building the pillars of a **'bioeconomy'**, which links bioscience with commercial development, to deliver the outcomes we need for industry, society and the environment.

12. Central to this aim will be the development of biorefineries to provide a sustainable manufacturing base for energy, fuels, biomaterials and chemicals. These technologies may be based on crops, waste materials, biochemical transformation or novel sources such as marine algae. Some of the elements for this programme are in place, through the DTI Technology Programme, Defra supported projects being carried out by the National Non-Food Crops Centre (NNFCC) and the proposals for the Environmental Transformation Fund. In addition, the Bioscience for Business Knowledge Transfer Network (BfB KTN) plan to establish a major new industry-led national programme - IBTI - (Integrated Biorefining Technologies Initiative), to develop the necessary technologies and skills of bio-refining. It will be established as a multi-disciplinary and virtual research centre and be focused on whole chain innovation from discovery to demonstration and deployment.

13. There is scope, subject to resource availability, to take this significantly further with targeted technology development, innovation platforms and other mechanisms for joining scientific advance to industry deployment. The UK Biomass Strategy sets out in greater detail our plans and goals for longer term large scale deployment of biorefineries in the UK.

14. In addition to energy, there is high potential for development of other non-food uses of plant-based materials, and we agree with the Project Board that we should concentrate on building sustainable growth in the following three materials sectors:

Plant based pharmaceuticals, nutraceuticals and bio-actives;

Renewable construction materials; and

Renewable chemicals (including oils, monomers and polymers)

15. Details of the key actions we are pursuing to drive forward developments in each of these priority sectors are set out at section C. However, we agree that in some cases Government needs to define more precisely what levels of progress it expects to see in each of these sectors over the next 3 years. To do this we need first to have a clear picture of where we are now and the direction in which industry itself is planning to move.

16. The UK Biomass Strategy sets out clearly our aspirations and in some cases targets for the sustainable development of biomass for heat and power, transport fuels and for advancing the establishment of biorefineries in the UK over the next 5 –20 years. We accept that at present, the position for the renewable material priority sectors is less well defined. As the Project Board report notes, the dynamic and rapidly changing nature of many of the renewable industrial materials sectors, combined with the early stage of commercial development of some of the industries, has led to difficulties in collecting data to monitor market size, growth and development. To overcome this Defra will, subject to securing necessary funding, seek to supplement existing statistical information with specifically commissioned research projects and economic analyses. DTI through the Bioindustry Association (BIA) and BfB KTN will be carrying out a benchmarking exercise of industrial biotechnology companies, which may also give further insight into the innovation and industrial competitive performance of the biorenewables sector.

17. These various projects will enable us to consider the scope for setting ambitious, yet realistic goals for each renewable materials sector. This exercise will also take into account other Government objectives relating to sustainable production and consumption, including any relevant findings from the Commission on Environmental Markets and Economic Performance, which is due to report in spring 2007.

Cross cutting drivers

18. In the meantime, the report points to a number of useful cross cutting policy drivers and some specific new actions which it suggests will help overcome outstanding barriers to development in all 4 of the priority sectors. In many cases these are extensions of existing Non-Food Crops Strategy commitments.

19. Defra will work with the NNFCC over the next 3 years to implement the overriding **communication strategy on renewable materials** to raise the profile of renewable building materials, pharmaceuticals and chemicals across the public sector and with potential growers, processors, manufacturers and consumers, including most importantly school children. DTI will work with the BIA and BFB KTN to develop a communication strategy for industrial biotechnology which will cover the application of biotechnology for the processing and production of chemicals, materials and energy.

20. Defra will work with the regional organisations, industry and other stakeholders to look at how best to continue to support the establishment of **sustainable supply chains** (through the next Rural Development Programme for England 2007-13) and to **add value to production chains** (by linking to work being instigated by Don Curry under the Sustainable Farming and Food Strategy Forward Look issued in July 2006).

21. We agree with the Project Board that **Government procurement** can be used to increase demand for sustainable renewable materials by helping to develop robust and competitive supply chains and promoting wider confidence in what are at present relatively new and innovative products. On the 5th March 2007 the UK Government Sustainable Procurement Action Plan (SPAP) was published. This incorporates the Government Response to the Sustainable Procurement Task Force and builds on the sustainable operations targets for the Government office estate published in June 2006.

22. The targets include a pledge to go carbon neutral by 2012 and Defra is currently working with other Government Departments to increase the uptake of biomass energy use, especially with the major procuring Departments. This in turn should reduce department's fuel bills, and help them to meet the 2012 carbon neutrality target. We will also increase the use of renewable construction materials produced from biomass in new buildings and major refurbishments on the Government Estate, where they help to reduce their carbon foot prints. We will achieve this, through the development and application of appropriate Government procurement standards ("the Quick-Wins"). We will promote these standards to other organisations. The DTI is leading cross-Government work on how public procurement can more effectively stimulate innovation to deliver better value for money and to drive wealth creation as part of its forward policy programme.

23. The move towards a more bio-based economy, particularly the development of next stage biofuels and biorefineries requires continued substantial investment in **Research and Development**, which needs to proceed in parallel with demonstration and full commercial deployment as new technologies become more developed. The Biomass Strategy sets out our plans for supporting and taking forward with stakeholders, a number of international and domestic R&D programmes on bioenergy and biorefineries, including those offered through the Energy Technologies Institute and the EU's Framework Programme.

24. The DTI's Technology programme will also provide opportunities to support collaborative R&D on bioenergy, as well as demonstration projects through its Innovation Platforms. The proposed Sustainable Consumption and Production platform, focusing on Low Impact Buildings, will provide an opportunity to demonstrate innovative solutions for improving the environmental footprint of buildings, including the use of renewable building materials.

Working with stakeholders across government to deliver the revised Strategy Action Plan.

25. A revised and refocused Strategy Action Plan has been drawn up, taking into account the Project Board's various recommendations.(see section D). This will be implemented by Defra and DTI through the renewable fuels and materials programme,(see paragraph 9 above), and will require close collaboration with policy makers in other Government departments and public sector organisations, the devolved administrations, and a raft of other stakeholders and interested parties. The commitment and skills of our main delivery partners, the NNFCC and the BfB KTN will be key to success.

26. The regional organisation network also has an essential role to play in implementing parts of the revised Action Plan at grass roots level. Government Offices and Regional Development

Agencies are best placed to drive forward and support those parts of the biorenewables agenda most relevant to local priorities. The NNFCC will continue to work closely with these bodies to ensure that renewable fuels and materials are properly recognised in their structures and work programmes. This is likely to involve different arrangements in different regions but we aim for all areas to maintain close links with the NNFCC. There will also be much stronger regional representation in the forum we are establishing to help monitor implementation of this next stage of work. Non-food crops are an important theme in the Sustainable Farming and Food Strategy (SFFS) and SFFS delivery groups are increasingly including renewable fuels and materials in their remit.

Conclusion

27. The need to develop a viable UK bioeconomy, has never been more urgent. To achieve this, it is clear that we need to intensify and refocus our efforts. We need to continue today to take action to optimise the environmental, economic and social benefits we can obtain from the increased, but sustainable, use of biomass for energy and fuels and renewable materials. At the same time we need to ensure that we are building for the future by developing the biorefinery technologies and infrastructure necessary to increase the quantities and types of end products we are able to manufacture from a wider range of renewable feedstocks.

28. The Project Board's report has given a useful outline of how UK might achieve these goals. Defra and DTI have shown in this statement, that they are committed to providing the necessary framework, in terms of policy steer and resources. UK industry is becoming increasingly well placed to respond to the challenge. Ultimately this is an area which affects society as a whole, and where individuals can, through sustainable consumer choices, play their part in driving markets: be it through investing in carbon saving biomass boilers or natural sheep's wool insulation in buildings, using biofuels to power cars made in a part from natural fibre composites, or by benefiting from the ever increasing array of plant based medicines and vaccines which are helping to treat serious diseases.

Section B – Detailed comments on project board recommendations

Building the pillars of UK bioeconomy

Biorefinery concept and support for emerging Technologies

1. More work needs to be done to develop advanced technology needed for biorefineries both in terms of research and commercial development. However, successful technologies require the integration of the most appropriate chemical, thermal and biochemical processes available, and this should remain a key focus of the Strategy and of the work of the NNFCC and KTN. It is vital that those parts of government, industry and academia involved with biorenewables in the UK are aware of these opportunities and encouraged to participate in the development of new technology (paragraph 3.5).

2. Defra and DTI have commissioned a scoping study to look at the possibilities for producing and developing 2nd stage biofuels in UK. We endorse this work and suggest that, depending on the results, further road mapping work be carried out to consider the potential for establishing larger scale whole crop biorefineries in the UK. (paragraph 3.6)

The Energy White Paper, published on 23 May 2007, underlines the need for action to decarbonise the energy supply in order to tackle climate change, diversify energy sources and maintain competitiveness of UK industry. This will involve a fundamental shift to a low carbon economy. As part of this process we need to make optimum use of plants and other biological resources and move towards a UK 'bioeconomy' which will link bioscience with commercial development to deliver the outcomes we need for industry, society and the environment. This will involve:

- Large scale substitution of bio-based products for those based on petrochemicals, and other non renewable sources, across a wide range of industrial products;
- Integration of fuel and energy production with other bio-based materials in biorefineries – co streams to add value;
- New generation technologies for biofuels and other products of biorefineries fully operational in the UK

The UK Biomass Strategy, also published on 23 May provides an overarching framework for a long term programme of work to respond to this challenge. We expect that biorefineries and new generation biofuels will be deployed within the next 5 years, with scaling up and wide market penetration moving on through the 2010-2020 decade. This will require significant investment in R&D, proceeding in parallel with demonstration, as technologies are developed. In particular technology development will be needed to solve the following key issues:

- Optimising energy use, through efficient processes and full use of generated heat
- Optimising biomass value through extraction and use of high value components
- Widening the range of feedstocks which can be used for fuel and product manufacture, especially with lignocellulosic biofuel and biomass-to-liquid technologies
- Optimising anaerobic digestion

- Widening the range of bio-based fuel types, with viable substitutes for gas, oil, petrol, diesel and kerosene in all applications
- Addressing limitations of engine technology
- The effects of biofuel development on other sectors – requiring solutions such as new markets for by-products (eg as new industrial products or as a feedstock for anaerobic digestion) to avoid disruption of established markets.
- Biocatalysis for co-product stream design.

The National Non-Food Crops Centre (NNFCC) is engaged in highly targeted work with industry on potential technology deployment including new generation biofuels and this role is expected to expand. The Bioscience for Business (BfB) Knowledge Transfer Network (KTN), in which NNFCC is a partner, is pressing ahead with stakeholders to develop integrated science and deployment programmes, including plans for UK biorefinery development, in the context of the high level of international interest and activity in this area.

In particular the KTN plan to establish a major new industry-led programme - IBTI (Integrated Biorefining Technologies Initiative) – to develop the technologies and businesses needed to advance the successful transition of the UK to a bio-based economy. IBTI is envisaged as a 10 year product development partnership between leading UK industries and government. It will be established as a multi disciplinary and virtual research centre and be focused on whole chain innovation from discovery to demonstration and deployment.

Priorities for next 3 years

Efforts to focus on bioenergy and 3 renewable material sectors

3. To maximise the contribution to the various economic, environmental and social objectives discussed earlier in this report, efforts in the short to medium term should continue to focus on developing the following industry sectors which have demonstrated real potential for further growth:

- **Bioenergy (biomass and biofuels);**
- **Plant based Pharmaceuticals, nutraceuticals and bio-actives;**
- **Renewable Construction materials; and**
- **Renewable Chemicals (including monomers, polymers, oils).**

(paragraph 3.7)

Further details of how Defra and DTI will be working with stakeholders to drive forward the sustainable and competitive development of these 4 priority sectors over the next 3 years and beyond, are set out in the remainder of this document. Section C summarises some of the specific key actions we will be taking in the individual sectors.

Cross cutting themes

(a) Communication

4 (i) We need to continue to raise awareness of the non-food crops Strategy and potentials of sustainable renewable materials in Government, industry and with the public. Because the renewable materials agenda does not recognise Departmental or inter-disciplinary boundaries, work should focus initially on increasing awareness across

the public sector so that synergies in policies, and opportunities to make use of any additional delivery channels and networks can be exploited. (paragraph 3.9)

Communication and dissemination of knowledge and information on non food crops to all involved in the renewable materials and bioenergy supply chains- from growers to manufacturers and consumers, will continue to form the core of NNFCC's remit. DTI will work with the BioIndustry Association (BIA) and BfB KTN to develop a communication strategy for industrial biotechnology which will cover the application of biotechnology for the processing and production of chemicals, materials and energy.

4. (ii) The overriding communications strategy developed by this Project Board should be implemented by Government and stakeholders over the next 3 years (paragraph 3.10)

Defra will take forward as a priority during 2007/08, outstanding work on implementing the overriding non-food crops communications strategy. Defra will conduct a series of seminars with other Government Departments to discuss the potentials of biorenewables and consider the scope for further collaboration. High level seminars or workshops with representatives from industries included in the 4 priority sectors outlined above will be held to explain Government policy on biorenewables.

4. (iii) Business Links could provide a useful tool for those involved with renewable materials and it will be important to ensure that the service is properly promoted and updated with information relevant to the renewable sector. (paragraph 3.11)

Defra will work with Regional Development Agencies, through the Local Business Link offices at DTI to review, and if necessary update, the information on biorenewables available via Business Links. Defra will also look at the scope to improve web based information on bioenergy and renewable materials issued by Government through the Transformational Government Website Rationalisation Programme.

4. (iv) Outstanding work on developing educational material for schools should be taken forward as a priority, and be expanded to look at incorporating renewable materials and energy modules into higher education and possibly vocational training courses. (paragraph 3.12)

NNFCC are liaising with Department of Education and Skills (DfES) and the Farming and Countryside Education (FACE) to consider the scope for including renewable materials in the national curriculum. Work on examining the possibility of incorporating modules on biorenewable modules into higher educational and vocational training courses will be taken forward during 2007/08.

(b) Building supply chains

5. Regional organisations should also have an increasing role to play in supporting supply chain development at a local level. (paragraph 3.14)

Responsibility for funding socio-economic projects under the England Rural Development Programme (ERDP) transferred to Regional Development Agencies on 1 October 2006. Substantial work is continuing to determine the precise shape of future investment under the 2007-2013 ERDP and this will look at how best to support the establishment of sustainable local supply chains for biorenewables.

It is our intention to continue to support energy crop planting under the 2007-2013 ERDP and we expect to be in a position to accept applications under the new programme in summer 2007.

Defra has worked with the Environment Agency and other stakeholders to produce 'opportunity maps' for energy crops which will help regions to assess the most appropriate areas in which to target biomass support.

(c) adding value to production chains

6. To increase commitment from those already growing renewable feed stocks, and ensure security of supplies in UK, Government and stakeholders should explore ways of adding value to non-food crop production chains.

We suggest that investigations be carried out to identify suitable markets in the non-food crops sector and consider how best to provide the education and infrastructure needed to encourage growers to maximise the benefits they receive from growing crops to supply the UK renewable industries. (paragraph 3.16)

The Sustainable Farming and Food Strategy Forward Look, issued in July 2006, highlighted the need for farmers and growers, to adopt a more business focused approach, based on greater awareness of market opportunities. For diversified enterprises (including those growing renewable feedstocks), the report recognised the benefits of greater collaboration and cooperation and the need to develop new skills needed to engage more fully with supply chains. The trend towards a more sustainable pattern of production and consumption in society as a whole, which is already beginning to take shape, will bring opportunities to add value to the feedstocks and materials produced by UK farmers and industry alike. It will be for industry to take the lead in finding ways to maximise the value of the products they make.

Skills and training play a vital role in enhancing productivity and in helping farmers to diversify into new business opportunities, both of which are vital to future economic success. Industry are best placed to determine how to increase skill levels across the sector, and stakeholders, such as the National Farmers' Union (NFU), can help facilitate and lead this debate, working collaboratively with LANTRA and other key players

(d) Procurement

7. More can be done to use sustainable public procurement to push up demand for biorenewables and the Government should set out how this can be achieved in its response to the report of The Sustainable Procurement Task Force. (paragraph 3.17)

Government recognises the importance of public procurement in driving forward the sustainable and competitive development of renewable materials and bioenergy, which can provide innovative solutions for meeting our environmental and sustainability objectives.

The Sustainable Procurement Action Plan (SPAP), published on 5 March 2007 as part of the response to the Sustainable Procurement Task Force report, sets out a robust framework for driving up sustainable procurement across central Government. It includes a number of measures aimed at making more effective use of Government procurement power as an enabler to transform the market for innovative and sustainable solutions, to make them more widely available and affordable to citizens and corporate buyers. In particular the wider OGC/HMT drive for greater collaboration to reduce supply costs will make it easier for Departments to meet the commitment to operate buildings with equipment and products which comply with the standards defined in the updated minimum environmental product standards list, (also known as the Quick Wins 2007), published alongside the SPAP.

The SPAP builds on the sustainable operations targets for the Government office estate published in June 2006. These include a pledge to go carbon neutral by 2012 and Defra is currently working with other Government Departments to increase the uptake of biomass use, especially with the major procuring Departments which should, in turn, reduce departments fuel bills, and help them to meet the 2012 carbon neutrality target. Government will also actively consider using renewable construction materials produced from biomass in the building of new developments on the Government Estate, as a means of reducing their carbon and overall environmental footprints. The DTI is leading cross-Government work on how public procurement can more effectively stimulate innovation to deliver better value for money and to drive wealth creation as part of its forward policy programme.

8. The London 2012 Olympic Games and Paralympic Games present important opportunities for procuring and showcasing of sustainable renewable building materials and other commercial products. Government should work closely with the Olympic family on these issues. (paragraph 3.18)

Defra and DTI are fully engaged with the Olympic Delivery Authority (ODA) and the Government Olympic Executive (DCMS) and have pressed the benefits of bioenergy and renewable materials to the Olympic family. The Government is fully engaged across the piece on these issues and believes that the ODA's sustainable development strategy and procurement strategy will help to take forward these technologies. The ODA Strategic Plan sets a target of 20% for meeting energy demands from on site renewable energy and, although currently out to tender, we would expect that the use of biomass heat will contribute to this. The Strategic Plan and associated ODA sustainable development and procurement strategies recognise the potential of renewable materials and products, including renewable construction materials, biocomposites for use in stadium seating, and biopackaging for catering and merchandise.

(e) More R&D, innovation and demonstration

9. R&D and demonstration work should continue to be targeted at bioenergy and renewable material projects which show most potential to translate into the production of marketable sustainable products and technologies. Government has played an important role in facilitating and supporting collaborative research but should also now seek to work in a more joined up way so that synergies can be exploited across the public sector. (paragraph 3.19)

The move towards a more bio-based economy, particularly the development of next stage biofuels and biorefineries requires substantial investment in **Research and Development**, which needs to proceed in parallel with demonstration and full commercial deployment as technologies become sufficiently developed. The Biomass Strategy sets out our plans implementing and supporting with stakeholders, a number of international and domestic measures and programmes on bioenergy and biorefineries such as the BfB KTN's Integrated Biorefineries technology Initiative (IBTI), the Energy Technologies Institute, and other research programmes.

For renewable materials Defra will continue to support targeted R&D and demonstration projects aimed at bringing to market innovative sustainable products. An evaluation of the research outputs of Defra's Renewable Materials Supply Chain Development and Assessment Programme will be carried out during 2007 to help identify future R&D requirements. Again a collaborative approach will be adopted through continuation of the successful Defra/BBSRC Renewable Materials Link programme. The DTI's Technology Programme will also provide opportunities to support collaborative R&D on renewable energy, with 2 calls for projects

expected later in 2007. In addition, the Programme's proposed Sustainable Consumption and Production Innovation platform, focusing on Low Impact buildings, will provide an opportunity to demonstrate innovative solutions for improving the environmental footprint of buildings, including the use of renewable building materials.

10. Maintaining and indeed enhancing, bioscience capacity, knowledge, and skills within the UK is vital to the future development of a competitive biorenewables industry. (paragraph 3.20)

DTI's Bioscience Unit is responsible for developing a strategy to ensure that the UK has a vibrant industrial bioscience sector and that the UK's world class science base in plant and microbial bioscience is translated into innovation, jobs and prosperity for the UK. It is working closely with the BfB KTN and the BIA (through its Industrial Biotechnology Working Group) to develop and implement policy. DTI is contributing £3m over 3 years to the BfB KTN, (launched March 2006), to facilitate the application of the global knowledge-base research expertise, resources and commercial know-how in the biosciences and technologies of micro-organisms, land plants and organisms from the marine and freshwater habitats. This will provide a focus for the biorenewables sector.

(f) Safeguarding the environment

11. In particular, aligning expansion of the renewables industry with the complex mix of environmental objectives is an ongoing task which must be pursued and co-ordinated with wider Government policies (paragraph 3.21).

It is essential that any development of the biorenewables sector is carried out sustainably. We do not, for example want to contribute to climate change mitigation at the expense of creating other environmental problems, such as loss of biodiversity. The UK Biomass Strategy provides a coherent framework for the development of biomass for use as energy, biofuels and industrial materials, to achieve optimum benefits for climate change whilst addressing environmental risks.

12. The changing conditions climate change is bringing may have implications for the types and yields of crops and plants which can be grown in the UK, and this will need to be considered in longer term policy making on land use and farming issues in general, as well as informing specific thinking on renewables. (paragraph 3.21)

Climate change will require adaptation to evolving pressures, such as water shortages and new pests and diseases. Individual agricultural businesses and industry need to be ready to seize opportunities for new crops and markets that emerge as a result of climate change.

As part of it's ongoing work in developing the UK Biomass Strategy, Defra is assessing the land use implications of an increasing the amount of energy and renewable materials obtained from renewable sources, including biomass. This will consider in particular the impact of climate change on the availability and suitability of land for biomass for all purposes, likely competition from other land uses, such as food production, and the impact of wider policies such as planning and housing requirements.

Delivery bodies

13. It will be important for NNFCC to build on the good progress it has made in delivering Strategy actions. A strong focus also needs to be maintained on regional delivery. Although we have begun to embed renewables, particularly energy, into the plans and

policies of some regions, more needs to be done to consolidate this work and increase coverage across the regional network. (paragraph 3.22)

Successful delivery of the refocused Strategy Action Plan is reliant on the commitment and skills of our main delivery partners, (the National Non-Food Crops Centre and the BfB KTN), together with a raft of other stakeholders, and interested parties throughout the renewable supply chain, within the public and private sectors. Defra funding for NNFC to deliver biorenewables work will be increased from 2008/2009. The details will be confirmed in the Comprehensive Spending Review (CSR) later this year.

We agree that the regional organisation has an essential role in delivering the refocused Strategy. Government Offices and Regional Development Agencies are best placed to drive forward and support those parts of the biorenewables agenda most relevant to local priorities and circumstances. NNFC have been engaging with regions and are working with RDAs to ensure that renewable fuels and materials are properly recognised in their structures and work programmes. This is likely to involve different arrangements in different regions but we aim for all of them to maintain close links with NNFC.

Monitoring and evaluating success of strategy

14. As this report shows, it is easier to measure processes than outcomes at such an early stage in a long-term work programme. The collation of data to support the high-level performance indicators we have devised is continuing and should help to measure changes on the ground. These changes are what will help steer the future direction of the Strategy and Government should continue to invest in the collection of necessary statistical and economic evidence. (paragraph 3.24)

The importance of obtaining relevant data to support indicators and to provide evidence to measure the progress and effectiveness of the Strategy is fully accepted. A framework of indicators is under development to aid this process and will now be incorporated into the performance monitoring arrangements under the renewable fuels and materials work programme.

Ideally, established data sources based on published figures that meet the criteria for the National Statistics quality mark would be used for indicators. However, such data sources are not always readily available. This is particularly the case with the Non-Food Crops Strategy which is wide ranging and where a number of sectors are at a relatively early stage of commercial development. In other areas, some of the issues eg biodiversity, are still under research and the implications of the growth in the non-food sector are not yet clear or are complex and not necessarily amenable to straightforward measurement via a simple indicator.

Under such circumstances it can be more appropriate and cost effective to obtain data/information via specifically commissioned research and analysis into selected sectors or issues. Whilst incorporating an element of subjectivity, this is a valid approach to assessing progress and performance, for example to assess the rate of growth for a sector or changes in its market share. Subject to any resource constraints, this approach will be pursued for certain items, focusing initially on the 3 renewable material market sectors, renewable building materials, renewable chemicals and plant based pharmaceuticals.

These assessments, combined with data supporting other indicators will provide an annual indication of progress with the Strategy and will be published in due course, subject to any data confidentiality issues. A full assessment of the effectiveness of the Strategy is achieved

through formal policy evaluation which is typically carried out later in the life of a policy programme, when sufficient time has elapsed to have had an impact.

Setting of goals and priorities by government to steer growth

15. We do, however, consider that given the wide ranging nature of the Strategy and its action plan, it would be useful for Government to consider introducing some further aspirational goals or objectives to focus efforts over the next 3 years. It should make clear where it wishes to see most progress by 2009. (Paragraph 3.25)

We have identified bioenergy, plant based pharmaceuticals, renewable chemicals and construction materials as the sectors we consider offering most potential for sustainable and competitive growth in the UK. We have also outlined number of common actions which should help to bring about progress. Government should now examine more precisely the extent of economic growth which is feasible in the areas we have flagged, and where possible, set realistic milestones and goals to encourage this growth. (paragraph 3.25)

To define more precisely levels of progress Government expects to see in each of these priority sectors over the next 3 years we need first to have a clear picture of where we are now and the direction in which industry itself is planning to move. The UK Biomass Strategy sets out our aspirations for the sustainable development of biomass for heat and power, transport fuels and for advancing the establishment of biorefineries in the UK. However, the position for renewable materials is less well defined. We are dealing with a dynamic and rapidly developing sector, made up of a wide range of industries, many at an early stage of commercial development and this has led to difficulties in collecting data to set baselines and then monitor market size, growth and development. As explained in response to point 13 above, to overcome this, Defra will, subject to securing necessary funding, supplement existing statistical information with specifically commissioned research projects and economic analyses.

These projects will help form the basis for considering the scope to set ambitious yet realistic goals for each renewable materials sector. This exercise will also take into account other Government objectives relating to sustainable production and consumption, including any relevant findings from the Commission on environmental markets and economic performance, which is due to report in Spring 2007, on ways in which Government and business can stimulate growth and employment in the UK's environmental goods and services sectors.

Benchmarking & learning lessons from international best practice

16. In assessing the performance and overall success of the Strategy it may be useful to benchmark UK performance against achievements and practices in other countries. This will obviously need to take into account the different political priorities and circumstances of other nations but should provide opportunities to learn from best practices at an international level. (paragraph 3.26)

Defra, DTI, NNFCC and the BfB KTN will continue to engage with other key players in international fields such as US, Scandinavia, and Germany to learn from experiences and best practices overseas.

The Bioindustry Association (BIA) and BfB KTN will be carrying out a benchmarking exercise for the UK industrial biotechnology sector. However, until we have firmer information and data on the state of other biorenewables sectors, it will be difficult to accurately benchmark UK progress in these areas with achievements in other countries. As explained under recommendation 15, we are planning to carry out additional research and economic analyses of the priority

renewable materials sectors to increase our knowledge of these sectors. We will review the scope to benchmark in the light of these findings.

As the Project Board report points out, any decisions to benchmark progress in future will also need to take into account the relevant policies in place in other countries. In our experience, other nations have tended to focus resources on development of specific sectors of the biorenewables industry to meet very specific aims. – ie the use biomass for heat and power has developed rapidly in Sweden for energy security reasons. In the drive towards a bio-based economy in the UK, the Biomass Strategy will take a more holistic approach to developing the biorenewables sector, to meet climate change and other sustainability objectives.

Future arrangements for overseeing implementation

17. We understand that Government is considering detailed plans for overseeing implementation of the Strategy work programme up to 2009 and will announce the new arrangements in its detailed response to this report. (paragraph 3.27)

To get a firmer idea of what is and isn't working, Government needs to engage more closely with those operating on the ground. There will therefore be a much stronger regional focus on the way in which we monitor the implementation of the refocused Non-Food Crops Strategy Action Plan.

The national Project Board will be replaced by a new forum which will involve setting up local area networks, through the regional GO offices, to co-ordinate non-food crop issues locally and report back regularly on progress and implementation. This will be backed up by workshops drawing together regional representatives and national stakeholders to tackle specific issues at a national level. We will also continue to work with existing networks used to deliver the Strategy for Sustainable Farming and Food (SFFS). Non-food crops are an important theme in the SFFS and SFFS delivery groups are increasingly including renewable fuels and materials in their remit.

This work will aligned with the overall monitoring arrangements for the UK Biomass Strategy, which will be largely implemented through the Defra renewable fuels and materials work programme.

Section C – Key actions for priority bioenergy and renewable material sectors

A. Move towards a UK bio-based economy – Development of the biorefinery concept.

Bioscience for Business KTN to establish a steering Group for IBTI (Integrated Biorefining Technologies Initiative) and draw up proposal for consideration by DTI by summer 2007.

Government to analyse NNFCC scoping study on possibilities for developing and producing 2nd stage biofuels and its position paper on suggestions for development of whole crop biorefineries in UK.

DTI to respond to German Presidency paper on transition to a bio-based economy (due to be issued in May 2007) and to participate in the EC's KBBE-Net (Knowledge-based bioeconomy Network).

B. Bioenergy

(i) Biofuels

Introduce Renewable Transport Fuels Obligation (RTFO) from 2008 and develop sustainability assurance scheme.

Consider possibility of RTFO targets beyond 2010

(ii) Biomass power and heat

Complete implementation of Biomass Task Force Action Plan

Review of Renewable Obligation to consider introduction of banding and to amend co-firing rules (to take energy crops from cap).

Consider support for biomass heat in light of findings of Ernst and Young Report

Finalise arrangements for continuation of the energy crops scheme and biomass support under new ERDP

Plant Based Pharmaceuticals

Defra/DTI and NNFCC plant derived pharmaceutical Thematic Working Group to consider the findings of November 2006 'roadmap study' on UK plant-derived pharmaceutical sector and devise and implement a plan for the competitive and sustainable development of the sector.

Renewable Materials for Construction

Publicise results of lifecycle work completed on range of renewable construction materials and ensure relevant products are included in the BRE Green Guide to Building specifications which is linked to Code for Sustainable Homes by end 2007.

Liaise with other Government Departments, including CLG and the Olympic family to maximise potential to demonstrate use of renewable construction materials in specific R&D demonstration programmes such those that might be offered by SCP innovation platform, and real projects such as 2012 London Olympics, Thames Gateway etc.

Carry out a study to examine scope to set a target for use of renewable building materials in construction in England, working with other Government Departments, (i.e. through DTI construction strategy) and industry as appropriate.

Renewable Chemicals

Continue to support uptake of biolubricants through NNFCC Thematic Working Group. In particular during 2007/08 issue publicity material and support ERRMA bid under EU Commissions Framework Programme for Competitiveness and Innovation for market introduction programme for biolubricants.

Analyse and follow up results of 2006/07 project on facilitating markets for biosolvents

Ensure the sustainable development of the use of renewable polymers by participating in British standards work on standards for degradable packaging to ensure various materials are accurately presented.

Take forward findings of 2006/07 projects to derive life cycle assessments for carrier bags made from range of renewable and other materials .

N.B. The establishment of IBTI by BFB KTN and other work relating to the development of biorefineries to produce renewable fuels and chemicals is also relevant to this sector (see actions above).

Section D – Revised Non–Food Crops Strategy action plan

Communication, Dissemination, Education and Training		
Action	Delivery Lead	Progress To Date
1. Implement Defra communications strategy for renewable materials and fuels to (a) provide information to the consumer to influence behaviour and support environmentally beneficial choices (b) to inform industry of new commercial opportunities.	Defra	A long term communications strategy was formulated in summer 2006 and this targets all players in the renewable materials supply chain from farmers and growers, to regulators, policy makers, innovators, industrialists and consumers. The strategy has been developed alongside, and links into, publicity work related to wider policies on climate change and sustainable consumption and production.
2. (a) Continue to develop education materials on the potential of non-food crops to substitute for fossil materials for school children and examine scope for including renewable materials in national curriculum.	Defra, NNFCC	NNFCC have supported a number of educational events to communicate and evaluate mechanisms for engaging teachers and students. These include science fairs and teachers' workshops focusing on sustainability. NNFCC have published a series of posters under the banner 'Did You Know?' aimed at informing school children at Key Stage 2 (ages 7-11) about the different uses of non – food crops and renewable materials. Teacher packs on the history and uses of hemp as an oil and fibre crop have been prepared and trialled. NNFCC have developed links to key organisations including the National Science Learning Centre, FACE and the Association for Science Education.
(b) Examine scope for incorporating renewable materials and bio energy modules into higher education and vocational training courses.	Defra, NNFCC	
3. NNFCC to work with Regional Development Agencies, Government Offices, local authorities, regional assemblies and advisory bodies to develop programmes for advice and dissemination of information.	NNFCC	Meetings have been held to allow all Regional Development Agencies and Government Offices to share best practice and disseminate developments in non food crop technology. Following on from this, NNFCC has formed alliances with a range of organisations through regional network. For 2006/07, NNFCC has appointed a regional coordinator to help the regions to deliver the non food crops strategy according to their own strengths. Because of the different structures, priorities and working practices of each regional body, it is necessary to tailor specific approaches. NNFCC is examining with DTI the possibility of inputting into existing DTI/RDA networks of relevance to the renewable materials agenda.
4. Expand the range of case studies on the NNFCC website to cover supply chains as well as emerging products.	NNFCC	Work will continue to develop case studies in supply chains (including phytopharmaceuticals, biolubricants, biorefineries, biofuels and construction materials. Fact sheets and web content are also being drawn up to publicise the results of projects. There are a variety of reports on NNFCC website covering use of key product groups. A list of about 30 case studies has been compiled which indicates progress to date with emergent market successes involving renewable materials. These case studies are being written up by NNFCC for use in publications and on the web.
5. (a) Expand bio-renewable information available to industry via 'Business Links' service.	Defra	To be started
(b) Work with stakeholders to increase coverage of renewable materials and bio energy information and links on relevant external websites.	Defra	To be started

Developing and Integrating Supply Chains to Help Overcome Barriers

Action	Delivery Lead	Progress To Date
1. Continue to develop close co-operation between seed producers, farmers and industrial users through NNFCC instigated networks. In particular :	NNFCC	
(a) Establish net working arrangements for all parties involved in development of biorefineries and renewable materials for construction	NNFCC	NNFCC is considering how best to establish effective networking arrangements for all parties involved in the development of biorefineries and for the supply chain for renewable materials in construction. The proposed Integrated Biorefining Technologies Initiative (IBTI) , to be set up by the Bioscience for Business KTN is envisaged as a 10 year product development partnership between leading UK industries and government. It will be established as a multi disciplinary and virtual research centre and be focused on whole chain innovation from discovery to demonstration and deployment.
(b) Build on success of existing 3 Thematic Working Groups which have been established to bring together all elements of supply chains for bio lubricants, renewable polymers and plant derived pharmaceuticals.	NNFCC	NNFCC has established and continues to facilitate 3 Thematic Working Groups to network all elements of the supply chains for biolubricants, renewable polymers and plant derived pharmaceuticals.
2. Work with agriculture industry and other stakeholders to consider how best to add value to non-food crop production chains (i.e. through development of on farm production facilities, establishment of large scale cooperatives etc)	Defra	
3. Complete implementation of Biomass Implementation Action Plan (BIAG) arising from 2006 Government response to Biomass task Force report.	Defra, DTI ,	One year on ' progress report due to be issued summer 2007
4. Carry out a study to examine scope to set a target for use of renewable building materials in construction in England, working with other Government Departments, (i.e. through DTI construction strategy) and industry as appropriate	Defra, DTI	
5. Consider the findings of November 2006 'roadmap study' on UK plant- derived pharmaceutical sector and devise and implement a plan for the competitive and sustainable development of the sector.	Defra, DTI, NNFCC	

Sustainable Procurement

Action	Delivery Lead	Progress To Date
1. Defra to consult on the potential to add additional non-food crops derived materials to the Market Transformation Programme/Quick Wins list which sets out current and future minimum standards for government buyers.	Defra	
2. Following issue of government response to Sustainable Procurement Task Force, engage with newly established Defra sustainable products unit to provide evidence of life cycle impacts for renewable materials.	Defra,NNFCC	Government Response to sustainable procurement task force and accompanying Action Plan issued 5th March 2007.
3. Defra to work with OGC and other departments to ensure that commitments to actively consider the use of biomass heating and renewable construction materials on Govt estate are effectively implemented	Defra	
4. Work with Olympic Family to ensure renewable materials and bio energy are incorporated into sustainable development plans and where appropriate procurement specifications.	Defra,NNFCC	ODAs strategic plan sets a target of 20% for meeting energy demands from on site renewable energy. The strategic Plan and associated ODA sustainable development and procurement strategies recognise the potential of a wide range of renewable materials and products including renewable construction materials, biocomposites and bio packaging.

Research and Development, Innovation and Demonstration

Action	Delivery Lead	Progress To Date
1. Defra to continue non-food crops research programme	Defra	2007/2008 funding to be decided. Funding for 2008/2009 - 2010/2011 depends on CSR07
2. Renewable raw materials LINK-style non-food crops programme to operate to 2010.	Defra	By autumn 2006, 3 projects had been approved for LINK funding. These will be taken forward over the next 5 years. Various innovative projects are in the pipeline.
3. Outputs of programme on supply chain development and assessment to be assessed by early 2007.	Defra	Underway
4. Work with DTI, CLG and Defra coordinating division to ensure that where possible, the technology strategy boards, Sustainable Consumption and Production Innovation Platform provides opportunities for R&D and demonstration projects for renewable materials and bio energy.	Defra	TSB approved the concept proposal for platform in February 2007. Further scoping work underway.
5. Develop, at the European level if possible, a central life cycle inventory database to support the sustainable development of the sector.	Defra, NNFCC	This is a longer term action which needs to be taken forward in tandem with work being carried out by the EU Commission to develop lifecycle inventory data bases for materials on a European scale. There is scope for the UK to play a lead role in the development of LCA information for renewable materials and an expert in this field from Imperial College is helping the NNFCC to develop LCA's in this area. Following on from this NNFCC are developing lifecycle inventory and assessment information for several materials and /or products of most relevance to UK. These include packaging and construction materials and will take into account latest EU standards on methodologies etc. A number of projects relating to the use of biomass for energy and fuel have also been completed and work to align this with European standards is being taken forward as part of the Government's response to the Biomass Task Force report. Work on developing the European level LCA data base is expected to continue up to 2009.
6. BBSRC to develop a strategy for research on non-food uses of crops.	BBSRC	BBSRC focused initially on energy and a bioenergy review issued in March 2006

Encouraging Sustainability and Innovation Through EU Environmental Legislation and International Collaboration

Action	Delivery Lead	Progress To Date
<p>1. Continue to work collaboratively with other Member States to develop non-food crops policies and support through, for example, research and development at the European level.</p>	<p>Defra, NNFCC, DTI</p>	<p>The DTI is involved in three initiatives with EU colleagues:</p> <p>(1) The UK (through DTI) has signed up to the Organisation for Economic Co-operation and Development (OECD) Task Force on Biotechnology for Sustainable Industrial Development. The current focus of its work is the effectiveness of measures being taken to assist a positive transition to a bio-based economy between now and 2030.</p> <p>(2) 'EC document' Industrial or white biotechnology; A driver of sustainable growth in Europe - published June 2005. Contributing to the development of a sustainable bio-based economy.</p> <p>(3) The UK has signed up to the new, EU approved, ERA-Net in Industrial Biotechnology (a network of funding agencies in 16 countries and a sub-group of the Sustainable Chemistry Technology Platform), which was formed in December 2005. The UK is tasked with gathering data from Member States on their ability to provide and use bio products, began in June 2006. This will be followed with gathering data from non-European countries, with an emphasis on Japan, China and USA.</p>
<p>2. Consult industry on future of flax and help processing aid within the context of CAP reform, including proposals for CMO to be agreed during 2007.</p>	<p>Defra</p>	<p>The planned 2005/06 reform of the hemp and flax sector has been postponed until 2008. This decision follows an EU Commission report on the future of fibre processing aid which recommended a two year roll over of the existing regime. The two year roll over was recommended in order to get a better picture of how the sector is operating under current CAP arrangements. The commission report also recommended a few technical adjustments which make hemp and flax cultivated for industrial uses other than fibre eligible for the single payment scheme, as well as hemp for fibre. These adjustments were accepted by the Council and came into force in July 2006.</p> <p>Defra is continuing to monitor the sector and represent UK interests at natural fibres committee discussions in Brussels. The industry will be fully consulted on all CAP reform proposals when the regime is reformed in 2008.</p>
<p>3. The NNFCC will continue to identify emerging opportunities and markets and supporting technology development from other countries.</p>	<p>NNFCC</p>	<p>Over the past 2 years NNFCC have developed working relationships with countries from all over the world including USA and Canada. The Bioscience for Business Knowledge Transfer Network carried out missions to China and Japan in 2006 and UK Trade and Investment carried out a visit to Canada to visit companies involved in renewable materials in July 2006. NNFCC has been using DTI's Global Watch service to monitor international developments in the non-food crops sector and lead a recent Global Watch mission to Germany, Finland and the Netherlands on second generation biofuels. NNFCC will continue to monitor, disseminate and where relevant learn from international developments in the renewable materials and bio energy sectors.</p>
<p>4. Develop key strategic partnerships at European level to help the EU to compete in a global non-food crops products market</p>	<p>Defra, NNFCC, DTI</p>	<p>Over the past 2 years NNFCC have played an active part in the European Renewable Raw Materials Association (ERRMA) which represents the national activities of member states in industrial crops. They have also engaged with the Renewable Raw Materials Working Group of the EU Commission's DG Enterprise. They have also been involved in work to connect the relevant programmes of Commission services responsible for enterprise, environment and research.</p> <p>Defra and other Government Department have been engaged in the development of the EU's Biomass and Biofuels strategies. NNFCC will continue to build its links to EU institutions and develop partnerships at an EU level. It will actively consider participation in relevant projects involving bids for EU research funds.</p>

Safeguarding The Environment

Action	Delivery Lead	Progress To Date
<p>1. In order to support uptake, prepare publicity material to show that biosolvents are technically robust, deliver environmental gains and are affordable. Reinforce through demonstration work as appropriate</p>	<p>NNFCC</p>	<p>Arrangements for demonstration projects for biosolvents will be considered in light of further information gleaned from NNFCC studies on barriers to uptake in UK, including fact finding missions. The development of NNFCC work programmes for fuels and biorefineries will also inform this work.</p>
<p>2 (a) NNFCC to continue to liaise closely with Defra Waste Division, the Environment Agency, and the Waste and Resources Action Programme to ensure synergies are exploited and consistent messages about the most proper disposal of renewable biodegradable products such as bio plastics are properly disseminated.</p>	<p>Defra, NNFCC</p>	<p>NNFCC have been working through WRAP and WIP to ensure that any changes in the types or amount of biodegradable renewable materials arising in the UK are taken into account in wider WRAP and WIP publicity and initiatives relating to waste recovery and /or sustainable disposal.</p> <p>NNFCC & Defra are also feeding into a number of wider policy reviews and initiatives relating to waste disposal to ensure that where possible these take into account the need to develop sustainable disposal methods for biodegradable products and minimise any unnecessary regulatory burdens which could restrict development of the renewables sector, in particular the development of biomass energy and renewable polymers.</p>
<p>2 (b) Following publication of the UK Waste Strategy 2007, consider what further work is required to assess and demonstrate the potential for mechanical separation systems, such as those using near infra red technology, to ensure proper disposal of biodegradable waste.</p>	<p>Defra, NNFCC</p>	<p>UK waste Strategy 2007 due to be published during first part of 2007</p>
<p>3. Increase coverage of best practice guidance to help farmers maximise profits from non-food crops whilst delivering biodiversity benefits.</p>	<p>Defra, NNFCC</p>	<p>NNFCC and CSL have produced four fact sheets covering borage, hemp, crambe and miscanthus. These are intended to be practical information sheets for farmers and cover basic market information, agronomy (sowing, harvest, inputs, storage, yields, etc), environmental impact, financial support available, eligible land, potential for adding value and useful contacts.</p> <p>NNFCC will build on the portfolio of fact sheets by adding market information sheets and FAQ sheets. These will be disseminated widely at events and developed with additional information as required.</p>
<p>4. Develop a case study on maximising crop yields while minimising impacts by using low input systems and managing field margins and other non productive areas sensitively to protect and enhance biodiversity.</p>	<p>Defra</p>	<p>Ongoing. A field trial of the suitability of switchgrass, and reed canary grass as biofuel crops under UK conditions finished last year, led by Rothamsted Research and funded by Defra and Dti. The trials were at ten sites in the UK with collaboration with ADAS Consulting, Dutchy College and SCRI. In general the yield of reed canary grass was greater than switchgrass, which in turn was greater than miscanthus.</p> <p>A research project for developing SRC poplar led by Southampton University was completed last year. The project has identified the most heritable traits related to SRC yield in poplar and using this information, has developed an ideotype for high yield. The objective was to provide the underpinning science for future developments in molecular breeding and improvement.</p>
<p>5. Introduce Renewable Transport Fuels Obligation (RTFO) from 2008 and develop sustainability assurance scheme. Consider possibility of RTFO targets beyond 2008.</p>	<p>Defra, DfT</p>	<p>See Biomass Strategy for further details on how this is being implemented.</p>

Building a New UK Bio-Based Economy - The Bio refinery Concept (including next generation biofuels)

Action	Delivery Lead	Progress To Date
1. Bioscience for Business KTN to establish a steering Group for IBTI and draw up proposal for consideration by DTI by June 2007	Bioscience for business KTN, DTI	Just started
2. Government to analyse NNFCC scoping study on possibilities for developing and producing 2nd stage biofuels and its position paper on suggestions for development of whole crop biorefineries in the UK.	Defra, DTI	Underway
3. DTI to respond to Cologne Paper on transition to a bio- based economy and participate in the EC's KBBE - Net (knowledge- based bioeconomy network) 2007/08	DTI	Underway