



## Biomass power and CHP

a sustainable part of the UK energy mix

### Biomass: A low carbon technology

The Government is committed to an ambitious set of targets for 2020 and beyond, aimed at reducing the UK's carbon emissions. Biomass is a sustainable, proven, low carbon energy source that can help deliver carbon savings cost effectively and help the UK deliver on its climate change and renewable energy targets.

### **Biomass is low carbon**

- Burning fossil fuels releases carbon that has been removed from the atmosphere millions of years ago, while biomass returns carbon to the atmosphere that has only recently been absorbed. This is why, at the point of combustion, carbon emissions from biomass generated energy are significantly lower than those created by burning from fossil fuels.
- Unlike fossil fuels, sustainable biomass provides for new organic material to be grown which reabsorbs the carbon released in the generation process as part of the natural carbon cycle.
- Even taking into account the energy used to grow, transport and process the fuel, biomass generated electricity can still produce up to 85%<sup>1</sup> less emissions than that produced using fossil fuels, with the new **Government Sustainability Criteria** requiring generators to demonstrate at least a 60% reduction in **Green House Gases (GHG)** in order to receive financial support.
- Using biomass to generate electricity therefore 'displaces' or saves carbon that would otherwise be released through the burning of fossil fuels.
- Energy experts such as the **IEA** and the International Panel on Climate Change (**IPCC**) agree, and have demonstrated that properly managed forest biomass resources are therefore 'low carbon.'
- As the only low carbon and renewable **baseload** energy source (by which we mean biomass can run all the time if desired, and is not subject to external environmental factors such as wind or sun), biomass has a unique role to play in helping to deliver the UK's carbon savings and renewable energy targets.

### **A mature biomass industry can help maintain the natural carbon cycle**

- Supporting the growth of the biomass industry will pay economic and environmental dividends.
- Placing an economic value on wood will encourage more biomass product to be planted.
- More sustainable feedstock supplies (biomass fuel) in the UK and abroad will in turn help to support natural carbon processes within a balanced environment.

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<sup>1</sup> Biomass Energy Centre: Carbon emissions of different fuels  
[http://www.biomassenergycentre.org.uk/portal/page?\\_pageid=75,163182&\\_dad=portal&\\_schema=PORTAL](http://www.biomassenergycentre.org.uk/portal/page?_pageid=75,163182&_dad=portal&_schema=PORTAL)

- According to DECC<sup>2</sup> and as verified by the IEA, sustainably managed forests “can both provide a stable rate of CO<sub>2</sub> removal from the atmosphere and supply renewable materials and woodfuel.” Ensuring that biomass feedstock is sustainable (in other words, what is used is simultaneously replanted and regrown), means that biomass can “substitute for fossil fuels” to deliver **GHG** savings.<sup>3</sup>

### Long term potential to decarbonise industry and the energy mix

- If combined with Carbon Capture and Storage technology, biomass generation has the unique future potential to actually *remove* carbon from the atmosphere.<sup>4</sup>
- Using highly efficient biomass Combined Heat and Power (**CHP**) can produce carbon savings for both renewable electricity and renewable heat.<sup>5</sup> This could provide a viable solution to decarbonising some core industrial sectors without jeopardising Britain’s competitiveness.
- Biomass can be converted into forms which are even more efficiently consumed and produce even lower carbon emissions, for example liquid fuels through “gasification”<sup>6</sup>
- By-products such as residual wood waste, straw, oat husks, grape flour, cocoa shells and olive cake, and non-food crops such as cork fines, can also be used as biomass for energy production. In 2009-2010, 14% of solid biomass was from bedding waste and 8% from animal by-products<sup>7</sup>.
- New build and **co-firing** of biomass with coal, and ultimately full conversion of existing plants to biomass, can play an important part in decarbonising the energy mix.

“Renewables will be absolutely crucial to securing our energy supplies and reducing our carbon emissions in the decades ahead. We are reforming the electricity market to help bring forward a surge of investment in renewables... Beyond 2020 the importance of developing renewables further will remain and the investment we secure now will drive down the cost of doing this.” - *Chris Huhne, Renewable Energy Review, 12 May 2011*

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<sup>2</sup> Evidence base including the READ Report, IEA Task 38 Work, DECC & EU Research.

<sup>3</sup> International Energy Agency (IEA): Bioenergy Project Development and Biomass Supply  
<http://www.iea.org/textbase/nppdf/free/2007/biomass.pdf>

<sup>4</sup> Bellona: “How to go Carbon Negative”  
[http://www.bellona.org/ccs/ccs\\_blog/1240912877.0](http://www.bellona.org/ccs/ccs_blog/1240912877.0)

<sup>5</sup> In the IPCC’s recent special report[1] on renewable energy sources and climate change mitigation, they state: “Bioenergy has a significant greenhouse gas (GHG) mitigation potential, provided that the resources are developed sustainably and that efficient bioenergy systems are used. Certain current systems and key future options including perennial cropping systems, use of biomass residues and wastes and advanced conversion systems are able to deliver 80 to 90% emission reductions compared to the fossil energy baseline.”

<sup>6</sup> DECC: UK Renewable Energy Roadmap, p87

<http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/renewable-energy/2167-uk-renewable-energy-roadmap.pdf>

<sup>7</sup> REA Analysis of Sustainability reporting under Renewables Obligation



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Policy and regulatory certainty, including levels of support, need to be set now for the long term so biomass industry can mobilise to deliver low carbon MW quickly and affordably in the timescales required, to meet out binding targets and mitigate gaps in supply.

We must seek to ensure that the UK does not continue to cumulatively lock in carbon emissions. Therefore as well as incentivising the building of new low carbon plants, this structure must also support conversion of existing plants.

### Key Terms:

**Baseload Generation:** Baseload is the minimum amount of power needed to satisfy continuing, steady user demand. Baseload power plants (including nuclear, coal and biomass) generate this energy at a stable, constant rate and are not intended to switch on and off regularly.

**Co-Firing:** Co-Firing power stations are able to produce power using two different types of fuels at the same time, for example coal and biomass. Increasing the proportion of non-fossil fuel material combusted is a cost-effective way to generate cleaner energy without building new plants from scratch. Another way would be to fully convert existing fossil fuel plants to using biomass instead.

**Green House Gases (GHG):** Green House Gases are gases within the atmosphere that absorb and emit radiation, contributing directly to the “Green House Effect” where thermal radiation from the earth’s surface is reabsorbed through the atmosphere (rather than being lost) leading to rising temperature.

**International Energy Agency (IEA):** The IEA is a globally recognised independent intergovernmental organisation that seeks to promote the use of reliable, affordable and clean energy. The Agency has 28 members, including the UK and the United States and also works extensively with non-members such as China and India.

**The Intergovernmental Panel on Climate Change (IPCC):** The IPCC is an intergovernmental body, established by the United Nations in 1988 with the task of monitoring and assessing all current research into climate change.

**Renewable Obligation Banding:** The **RO Banding** system entitles different renewable technologies to varying levels and values of ROCS. The aim is to send a signal to the market to attract extra investment into emerging technologies (such as biomass) enabling them eventually to scale up and bring down costs long-term. RO Banding Reviews are regularly conducted by Government to decide and fix levels of support until the next review.

**Sustainability Criteria:** Introduced as part of the Renewables Obligation (RO), the sustainability



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criteria ensures that biomass electricity generators deliver a minimum greenhouse gas emissions saving of 60%, compared against that produced by fossil fuels. The criteria also imposes limitations on the sources of biomass feedstock, protecting ecologically important areas such as primary forests, peatlands, and wetlands.