

FACT SHEET: BIOMASS AND SUSTAINABILITY

Generating electricity and heat from biomass, a renewable and low carbon fuel source, is an increasingly important tool in the fight against climate change. Sustainably sourced biomass leads to substantial greenhouse gas savings across the supply chain when compared to fossil fuels. It also has a beneficial impact on forest management and biodiversity around the world.

Why biomass is a good alternative to fossil fuels

Sustainably sourced biomass is part of a natural carbon cycle leading to greater carbon storage and lower emissions

Burning wood or plant material (biomass) releases carbon which was absorbed as it was growing. This carbon is then reabsorbed by growing biomass in a 'closed carbon cycle': more material planted than harvested results in a carbon store, or carbon credit. The overall effect is a **net decrease** in atmospheric carbon. In contrast, burning fossil fuels (which of course cannot be replanted) releases carbon that has been outside the carbon cycle for millions of years and would otherwise have stayed locked underground. This leads to a **net increase** in greenhouse gases in the atmosphere, contributing to climate change.

The UK biomass industry is at the forefront of developing world leading 'Sustainability Criteria' which recognise and streamline existing environmental best practice in the biomass supply chain, and which are already helping to drive up standards of sustainable forestry around the world.

Other benefits of biomass

If biomass procurement is linked with strong sustainability standards, this incentivises:

- Less forest land converted for commercial development by landowners seeking more profitable uses
- Less neglect of forests, which leads to wildfires, disease and infestation – all of which impair carbon absorption and can even lead to increased net emissions
- Greater carbon absorption rates among the forest stands, as trees are given optimal access to light and nutrients they need to grow
- Continued carbon absorption – mature trees that no longer provide a net 'carbon sink' are harvested allowing younger trees (which absorb at a greater rate) to flourish
- Countries without forests and natural habitat protection regimes (such as the UK's 'sustainability criteria') to adopt high ethical and environmental standards to comply with UK procurement policies. Developed countries like Canada and the USA already have rigorous forestry management and certification schemes to protect communities, sensitive ecosystems and food chains
- Additional markets for forestry products when traditional uses (e.g. newsprint) are in decline
- More active forestry management and therefore greater biodiversity

COMMON MYTHS AND MISUNDERSTANDINGS ABOUT BIOMASS SUSTAINABILITY

#1: Even if all harvested trees are replanted, there will still be a delay before all the carbon is reabsorbed

TRUTH: Levels of stored carbon in a well-managed forest should remain balanced or even increase over time

This myth is based on the theoretical notion of harvesting a single tree, which then takes several years to regrow. However, standard forestry practice simply doesn't operate by cutting down individual trees one at a time. Similarly, scaling this theory up to forest level suggests a forest being entirely harvested and then entirely regrown. For obvious economic, as well as ecological, reasons this is not how forestry management works. In reality, landowners manage their forests as a whole landscape, by harvesting and regrowing different sections ('stands' or 'plots') at different stages. One stand may just have new saplings growing while another comprises mature trees about to be harvested.

This sustainable management technique makes financial sense for foresters (because it ensures stable income), while maximising growth rates and ensuring carbon is absorbed faster. Clearing forest floors of deadwood and employing anti-wildfire measures are also standard management techniques used to encourage rapid, healthy growth and optimal carbon absorption.

Measuring carbon levels across a whole forest (in line with the landscape approach to forestry described above) might look something like this: if 100,000 trees grow by 2% a year (the forest's equivalent of 2,000 trees), then even harvesting 1,500 trees annually will mean 0.5% forest growth every year. This growth rate is only possible if good forestry practice is employed. Managing forests sustainably only makes sense if the forest is economically viable, and *this* is underpinned by demand from the biomass industry.

The notion of 'carbon debt' is therefore a myth – it does not apply to the reality of well-managed forests. It also doesn't apply to fast growing crops such as miscanthus, which are specifically planted for biomass fuel.

#2: Biomass processing and transportation leads to higher carbon emissions than is shown in official figures

TRUTH: To qualify for Government support, UK biomass heat and power generation must prove greenhouse gas savings of at least 60% across the supply chain when compared to fossil fuels

Some people claim that the reported carbon footprint of the biomass supply chain is skewed by excluding added carbon from importing wood. In fact, the Government's 'Sustainability Criteria' requires an independently verified 60% greenhouse gas saving (compared to the EU fossil fuel grid average) across the whole supply chain – including harvesting, processing, storing, transporting and replanting. If the Criteria aren't met, biomass generators will not receive the Government support required to make their businesses economically viable. Suppliers around the world who wish to sell to UK developers are therefore being incentivised to reforest at a rate which ensures these significant carbon savings take place.

This is made possible both on a local and global scale, because there are two models of delivering biomass:

- Biomass can be grown locally in the UK, often very near the point of use, significantly reducing transport emissions, whilst also stimulating local supply chains and rural economies;

- Shipping, the main transportation method for biomass, is very carbon-efficient. For example, transporting a large shipment of biomass from North America has a similar carbon footprint to transporting a similar load 200 miles by road in the 1,600 lorries that would be required.

#3: Taking up wood supplies forces wood-dependent industries (for example construction) to use other, less sustainable materials such as concrete or plastic

TRUTH: Biomass cannot afford to compete with buyers of high-quality wood. Instead, the industry uses low grade materials and by-products of other industries

To see why this claim is false, it is important to understand where biomass comes from.

Good quality wood needed for construction and joinery is expensive. The biomass industry cannot afford these prices. Instead, biomass is sourced from woody materials with much lower market value, such as forest thinnings (smaller trees which are removed to allow other trees to grow); residues (e.g. bark, twigs and sawdust); and less commercially desirable (e.g. very low grade) wood which would otherwise have no market. Biomass therefore goes hand-in-hand with other wood uses – it doesn't compete with them. In fact, demand for these by-products makes it more economically efficient for landowners to manage their forests sustainably rather than leaving it fallow or in worst cases selling it for development.

This 'mixed use' approach is the industry standard because it meets environmental requirements and is economically efficient. This is acknowledged in research conducted on behalf of the UK's Department of Energy and Climate Change.

To find out more, please see p.31 of the UK's Bioenergy Strategy (available at http://www.decc.gov.uk/en/content/cms/meeting_energy/bioenergy/strategy/strategy.aspx) or DECC's supplementary note on the strategy (published November 2012 and also available using the previous link).

#3: Biomass uses 'whole trees' and this has been shown to have emissions even greater than coal, therefore biomass should not be used.

TRUTH: This claim misunderstands the findings of a report and misrepresents industry standards. It is simply wrong.

Landowners aim to grow wood that attracts the greatest profits. This means timber for construction and joinery, which requires high-quality, straight, long logs. To achieve this, they plant saplings very close together, which encourages trees to grow straight. However, this means they compete for light and nutrients and some will not grow tall. Having served their purpose, they are removed to allow the larger trees to grow to maturity – a process known as 'forest thinning'. These thinnings have few uses as they are not large or high quality enough for joinery or construction uses. Pulping for paper is one use, but this is a declining market as newsprint dwindles. An alternative market for this low-grade wood is biomass. This means using a 'whole tree', but it is small roundwood – not large sawlogs.

Forest landowners must view their forests at a landscape level. They select wood materials based on the quality and type, and send them to appropriate markets to achieve the best prices. For example, the best quality sawlogs go to construction and joinery for the highest prices. Poorer quality wood might go to make pallets and particleboard. The

biomass industry is at the bottom of the list, taking the cheapest materials that can find little other market. This includes residues (e.g. bark and sawdust), forest thinnings and very low-grade sawlogs. In this way, the different uses of the harvested materials are separated efficiently to achieve maximum economic value for the forest. Biomass suppliers do not compete with construction to buy high-quality wood because it would not be financially viable.

The Department of Energy and Climate Change commissioned a study on the carbon emissions of different types of forestry model. Most forests send wood to a combination of end uses, including biomass, pallets, particleboard and timber, but in different proportions. The study (by North Energy Associates and Forest Research) found that a combination of uses always leads to significantly increased carbon storage in forests, compared to if the forest was left unharvested. This is because it leads to investment in good forestry practices. It also found that if biomass fuel is the only use for woody materials from a forest, then it will lead to net carbon emissions, which could be worse than that of coal. However, the same study pointed out that this does not reflect normal forestry practice because it is economically unsustainable. Therefore the 'all wood from all trees' model is discredited as a basis on which to assess biomass.

The 'whole trees' claim about biomass being worse than coal misinterprets this study by assuming the practice that leads to net carbon emissions is the practice of using the whole of a tree for biomass. In fact, it relates to using 'all wood from all trees in the forest'. As explained above, this is almost never the case. This is another example of the need to view the forest as a whole, rather than assessing the situation based on individual trees.

FURTHER READING

Understanding the Carbon Cycle: <http://www.dovetailinc.org/files/DovetailCarbon101Jan2012.pdf>

Understanding Biomass: <http://www.envivabiomass.com/wp-content/uploads/inherent-sustainability-carbon-benefits-20121005.pdf>

UK Bioenergy Strategy: <http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/bio-energy/5142-bioenergy-strategy-.pdf>