



Photos: Logging in Białowieża Forest, Alan Weiss; Logging site in North Caroline supplying Enviva pellet mill, Dogwood Alliance

Wood pellet and energy companies burning biomass often claim that they rely on wood residues or low-value wood, and there is a widely held conception that this translates into lower impacts on forests and less life-cycle greenhouse gas emissions

Unfortunately, this is based on a misconception of what those definitions mean. This briefing focusses on legal definitions used by the EU, however those concur with the general use of the terms 'residues' and 'low-value wood' by forestry industries, energy companies and governments around the world.¹

The main findings of the briefing are:

- Both the terms 'low-value wood' and 'forestry residues' are being widely used to include wood from whole trees;
- Both of those terms are based on economic considerations only, and take no account of the ecological, climate or cultural value of trees;
- One of the main arguments put forward for restricting forest biomass sourcing to 'low-value wood' and forestry residues is that the extent and intensity of logging is primarily driven by the demand for high-value wood products. Yet the income stream from selling large quantities of 'low-value wood' is the key economic driver behind more intensive logging in Europe and beyond;
- Even the use of sawmill residues for energy does not result in a positive climate balance and, furthermore, there such residues have long been fully utilised (including to provide processing heat for sawmills);
- Large-scale removal of + or slash from forest floors harms the health of soils, biodiversity, future tree growth and causes high emissions of CO₂ from soils.

Thus, limiting subsidies to burning wood from wood processing or forestry residues, let alone so-called 'low-value' wood, cannot protect climate, forests, and biodiversity.

¹ Note that this briefing focusses on solid biomass only, not on bioliquids and biofuels. A small proportion of the latter is derived from wood, mostly from pulp mill residues.

Low-value wood?



Photos: Dogwood Alliance

Drax Plc operates the world's biggest wood-burning power station. NGOs¹ as well as media reporters² have been documenting since 2015 how their largest external wood pellet supplier, Enviva, regularly sources roundwood from the clearcutting of coastal hardwood forest in the Southeastern USA, much of it large-diameter wood. However, in 2019 Drax declared all but 61 tonnes of its wood pellets from the USA as having been made from "sawmill residues", "branches, tops and bark", "thinnings" and "low-grade roundwood".³ On their website, they claim: "*Drax does not take high quality wood from other industries. Sustainable biomass is largely made up of low grade wood and low value residues produced as a bi-product of the production and processing of higher value solid wood products (e.g. saw-timber for construction and furniture)*".

The large quantities of logs from clearcut forests observed to be entering Drax's pellet supply chain must come under Drax's definition of 'low-grade roundwood', since none of the other categories of wood sourcing listed by Drax could apply.

So how can Drax – and indeed much of the forestry and wood biomass industry – define mature, healthy

trees that have been cut down in what was a biodiverse forest ecosystem – as "low value wood"?

The rationale for such claims is purely economic: wood fetches a lower price if it is used to make wood pellets or woodchips for burning instead of being processed to make furniture and other added-value wood products.

Sawmills require just the right amount of wood to meet their customers' demand, and they need logs which are straight, unblemished and neither too small nor – in many cases - too large to fit their specifications. This, therefore, is what **high-value wood means: logs that meet the requirements of sawmills and which therefore attract a higher price.**

Pellet and energy companies, as well as pulp mills on the other hand, require large quantities of wood at the lowest possible cost, as long as that wood meets the technical specifications of the plant where it will be burned (e.g., depending on the different combustion technologies, wood with low bark content, hardwood, or wood from slow-growing trees may be necessary). To those industries, it

does not matter how big or small, blemished or crooked a tree is.²

This prevents or at least limits competition between sawmills and biomass companies for the same wood: the latter will take whatever wood does not go to sawmills. Indeed, sawmills and pellet mills are often co-located, and there are even formal business partnerships between such businesses.⁴

Thus, so long as sawmills pay more for logs than pellet mills or energy companies – as they will almost always do – ***any wood used for biomass energy, or for pulp and paper production, will by definition be "low-value" wood.***

The value of trees to ecosystems, to the climate and to communities is of no relevance to this definition.

² The only exception would be charred wood following wildfires, which can cause damage to wood chippers and is not suitable for pulpmills.

How are wood residues defined in the EU?



Logging residues after a forest clearcut in France, Photo: SOS Forêt France

Unlike the term 'low value wood', the term 'residues' is defined in EU legislation.

The EU Renewable Energy Directive 2018 defines a 'residue' as "*a substance that is not the end product(s) that a production process directly seeks to produce; it is not a primary aim of the production process and the process has not been deliberately modified to produce it*".⁵

Within that overarching definition, it distinguishes between forestry residues on the one hand and wood industry residues on the other hand.

Forestry residues are defined as "*residues that are directly generated by...forestry, and that do not include residues from related industries or*

processing". This means that the 'production process' referred to above would be logging.

Those must meet the EU's – very weak -⁶ sustainability and greenhouse gas standards.

Wood industry residues are generally sawdust, bark and offcuts from sawmills. They do not need to meet the EU's sustainability standards, and only the fossil-fuel emissions associated with processing and transporting them after they leave the sawmill need to be accounted for.

The Renewable Energy Directive treats forestry (as opposed to wood industry) residues in the same way as any other forest wood.

Is biomass from wood processing residues sustainable and low carbon?

As a 2014 study commissioned by the UK government shows in detail, the two scenarios in which burning sawmill residues for energy reduces greenhouse gas emissions in the short term would be ones where

those residues would otherwise be incinerated without any energy being captured, or where they would be put into landfill.⁷ However, at least across the EU, sawmill residues are fully utilised - not disposed of in

landfill or burned without energy recovery.⁸ They are utilised by the panelboard industry and pulp mills, and a large share is also burned to provide energy for the wood processing industries themselves – something that already happened before any biomass subsidies were introduced because it made economic sense.

As early as 2013, a report published by the European Commission found that “in 2011 the capacity utilisation rate of the pellet plants in three of Europe’s largest producers Sweden, Germany and Austria were 59%, 70% and 75% respectively. Currently the availability of raw materials for pellet production is limited. The feedstock base of sawmilling by-products is almost fully utilised.”⁹ In other words, already by the time the first Renewable Energy Directive came

into force, there were no spare ‘residues’ available for pellet production in some of the main users of forest biomass at that time. Therefore, subsidising the burning of wood processing residues will inevitably lead to displacement effects, i.e. to greater use of roundwood by those industries that would otherwise have utilised such residues.

Furthermore, a peer-reviewed study from 2018 found that even if residues would otherwise be landfilled, burning them in power stations would nonetheless still have a net negative impact on the climate after more than one decade, even when methane emissions from landfill are accounted. Therefore, not even this optimistic scenario would be compatible with the goal of the Paris Agreement to limit global warming to 1.5 degrees.¹⁰

What exactly are forestry residues, and would it help to restrict subsidies to burning such residues in addition to residues from sawmills?



Clearcutting with brush removal in Slovakia, April 2020, Photo: Environment Matters, Martin Jamieson

Logging residues, i.e. branches, tree tops, leaves, even stumps qualify as ‘forestry residues’. The EU definition, set out in the 2018 Renewable Energy Directive, leaves open the potential for most of the trees in a forest area or plantation to be defined as “residue”. This would be on the basis that the ‘primary aim’ of

logging a forest or tree plantation was to procure ‘high value’ wood for sawmills, even if a large proportion or even the majority of the wood ends up burned for energy.

On the other hand, **removing genuine logging residues – or brush/slash - (i.e. branches,**

leaves, tree tops) from forest floors is highly problematic for the climate, for maintaining healthy soils, and for biodiversity.

which becomes dry, as a consequence of which forest organisms die, and trees grow more slowly".³

A 2015 meta-analysis of 238 peer-reviewed publications concluded that removal of such residues for bioenergy – classed as 'intensive harvests', leads to soil organic carbon losses across all layers of forest soils.¹¹ It concluded that this could transform between 142 and 497 million tonnes of soil carbon into 521 million to 1.82 billion tonnes of CO₂ over the next 30 years.

A review of 279 scientific papers, published in 2018 looked at the impacts of large-scale logging residue removal on biodiversity and ecosystem functions.¹² It concluded that *"logging residue extraction can have significant negative effects on biodiversity, especially for species naturally adapted to sun-exposed conditions and the large amounts of dead wood that are created by large-scaled forest disturbance. Slash extraction may also pose risks for future biomass production itself, due to the associated loss of nutrients"*.

Of particular concern is the removal of deadwood and dying trees from forests, including on Natura 2000 sites, which new legislation in Poland is promoting to increase supplies of biomass energy.

Polish scientists have denounced this plan, stating in an Open Letter *"Dead and damaged trees left in forests provide shelter to many species, maintain a suitable microclimate and encourage a new generation of trees to regrow in such places. On the other hand, removing them aggravates the effects of storms or bark beetle infestation: It creates open ground exposed to the sun,*

³ <https://naukadlaprzyrody.pl/2020/07/28/list-naukowcow-w-sprawie-drewna-energetycznego/>

Isn't the scale and intensity of logging mainly driven by the demand for high-value wood products?

Forest biomass advocates frequently argue that logging is driven by the demand for high-value wood, i.e. by those companies and industries which pay the highest price for wood. This usually means sawmills. However, there is no evidence to back up the claim that logging intensity and scale in Europe (or for that matter in North America) is primarily driven by demand for sawlogs rather than for so-called 'low-value wood'. A recent study published in *Nature* showed that across Europe, there was a 69% increase in forest biomass loss and a 34% increase in the average size of clearcuts in 2016-2018 compared to 2011-2015. The authors observed: "*This striking rise in harvested forest area is particularly marked in countries that have relevant forestry-related economic activities (for example, the bioenergy sector, paper industries)*", and highlighted the impacts of the EU Renewable

Conclusions:

When energy and wood pellet companies claim that they rely on 'low-value wood' and 'forestry residues', many people imagine that they are referring merely to brush of slash, i.e. branches, leaves and other small pieces of wood left behind after logging. This, however, is not the case. Both also include whole logs, and in many cases the majority of trees cut down during clearcutting operations.

Policy efforts to restrict forest biomass sources to low-value wood and residues are based on two assumptions: 1) the assumption that the extent and intensity of logging are primarily driven by demand for

Energy Directive.¹³ In other words, the recent increase in logging intensity in Europe appears to have been driven by demand for large amounts of "low value wood", which is the opposite of what energy and wood pellet companies often claim.

This is not surprising: forestry companies, like other businesses, are looking to maximise their profits and to ensure a high return on their capital investments in logging machinery, other equipment and on salaries. This means selling as much wood as possible from each logging operation, which depends on having a market for so-called 'low-value wood', too. It explains why forest campaigners in North Carolina as well as Estonia are hearing reports of small private forest owners getting more frequent calls from logging firms 'offering' to cut their forest since the wood pellet industry started to grow.

high-value wood products, i.e. demand generated by sawmills and their customers, and 2) the assumption that forest degradation from biomass energy can be prevented by making sure that this sector does not compete with sawmills for the same wood.

Neither of those assumptions is borne out by evidence. Across and likely beyond Europe, more intensive logging and forest degradation are very much driven by the demand for large quantities of 'low-value' wood for biomass or pulp and paper. And given that there is little scope for wood pellet or biomass plants competing for timber with sawmills,

policies aimed to prevent such competition are based on the wrong premise.

Wood processing residues, such as sawdust from sawmills, were already fully utilised many years ago. And the removal of logging residues from forest floors is linked to severe soil carbon losses as well as reduced

future tree growth and damage to soils and biodiversity.

Thus, limiting subsidies to burning wood from wood processing or forestry residues, let alone so-called 'low-value' wood, cannot protect climate, forests and biodiversity.



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¹ dogwoodalliance.org/2019/06/caught-in-the-act

² washingtonpost.com/gdpr-consent/?destination=%2fnational%2fhealth-science%2fhow-europes-climate-policies-have-led-to-more-trees-cut-down-in-the-us%2f2015%2f06%2f01%2fab1a2d9e-060e-11e5-bc72-f3e16bf50bb6_story.html%3f; climatecentral.org/news/pulp-fiction-the-series-19592; imdb.com/title/tt8288424/; nyheder.tv2.dk/samfund/2019-09-09-tv-2-afsloerer-fejl-i-klimakontrol-helt-sort-siger-ekspert

³ drax.com/wp-content/uploads/2019/03/Drax-Annual-report-accounts-2018.pdf, page 25

⁴ E.g. tolko.com/tolkocpt_news/pinnacle-tolko-new-facility-northern-alberta/

⁵ All definitions are found in Article 2 of the 2018 Renewable Energy Directive.

⁶ See eubiomasscase.org/wp-content/uploads/2020/07/RED-II-biomass-Paper-Tiger-July-6-2020.pdf

⁷ Life Cycle Impacts of Biomass Electricity in 2020, Scenarios for Assessing the Greenhouse Gas Impacts and Energy Input Requirements of Using North American Woody Biomass for Electricity Generation in the UK, Anna L Stephenson and David J C MacKay, Department for Energy and Climate Change, July 2014, assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf

⁸ Biomass production, supply, uses and flows in the European Union, Joint Research Centre (European Commission), 21st February 2018, op.europa.eu/en/publication-detail/-/publication/358c6d4b-1783-11e8-9253-01aa75ed71a1/language-en

⁹ European Commission, Enterprise and Industry Directorate General, Study on the Wood Raw Material Supply and Demand for the EU Wood-processing Industries, Final Report, December 4, 2013

¹⁰ Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, Mary S Booth, Environmental Research Letters, 21st February 2018, iopscience.iop.org/article/10.1088/1748-9326/aaac88

¹¹ Forest soil carbon is threatened by intensive biomass harvesting, David L. Achat et.al., Scientific Reports, November 2015, nature.com/articles/srep15991

¹² The effects of logging residue extraction for energy on ecosystem services and biodiversity: A synthesis, Thomas Ranius et.al., Journal of Environmental Management, 1 March 2018, sciencedirect.com/science/article/pii/S030147971731228

¹³ Abrupt increase in harvested forest area over Europe after 2015, Guido Ceccherin et.al., Nature, 1st July 2020, nature.com/articles/s41586-020-2438-y