Biomass and the proposed revisons to the EU's Energy Taxation Directive

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HAWKINS WRIGHT

Introduction

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We offer a wide range of bespoke consulting services for the biomass and bioenergy industries. Our expertise covers the entire biomass supply chain, from forest resources, to logistics, pellet production, contracting and biomass power plant development.

We are entirely independent. We are not involved in the buying, selling, growing, manufacturing or management of timber resources, pulp or paper, wood pellets, lumber, energy or carbon. Our advice is therefore completely objective and untainted by conflicts of interest.

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Executive summary

In this paper we argue that when reforming the Energy Taxation Directive, the EU Commission should aim to harness existing market-based structures of wood fibre supply chains. By focusing on value, as opposed to arbitrary physical criteria such as "whole trees", existing market structures will ensure that wood fibre will continue to flow, sustainably, to the highest and best end-use.

The EU's Green Deal, adopted in December 2019, laid out an ambitious roadmap describing how the EU will reduce its greenhouse gas emissions by at least 50% – subsequently raised to 55% – by 2030[1], and how it will go on to reach net zero emissions by 2050.

The policy is more far-reaching than these numerical targets alone. Its purpose is also to guide a new growth strategy, something that has become more urgent since the onset of COVID 19. The aims of this strategy are, amongst other things, no less than "to transform the EU into a fair and prosperous society", "to protect, conserve and enhance the EU's natural capital", "to protect the health and well-being of citizens from environment-related risks and impacts" and "to decouple economic growth from resource use".

The Green Deal covers all sectors of the economy, notably transport, energy, agriculture, buildings, and industries such as steel, cement, ICT, textiles and chemicals. The deal outlines a major rethink of how the EU will support its transition to a carbon neutral society, while also detailing the major lifestyle changes that will be asked of EU citizens.

Delivering such a transformational policy will require changes to a host of existing EU policies that impinge on the supply of clean energy. Central to this is the way that energy will in future be taxed.

The EU's Energy Taxation Directive (ETD) that was adopted in 2003 established the rules that govern the minimum rates of taxation that member states may apply to energy products, essentially mineral fuels (used for transport and heating) and electricity. The intention was primarily to ensure fair competition between member states.

Given the extent to which energy and climate policies have developed since 2003, energy taxation is acquiring a far greater remit including, for example, an important role in the EU's commitment to meeting the Paris Agreement.

To meet this new remit, the Commission has concluded that the current ETD needs reforms that, *inter alia*: remove measures that incentivise the consumption of fossil fuels; promote GHG emission reductions, energy efficiency and alternative fuels; and provide incentives for investments in clean technologies[2].

The details of a reformed ETD are not yet known beyond a commendable commitment to incentivise renewable energy generation. With regard to biomass and biofuels specifically, the Commission's public consultation on the intended reforms seeks answers to questions concerning the sustainability of biomass resources. This includes a question asking respondents whether they "support the objective to minimise the use of *whole trees* [italics added] and food and feed crops for energy production, whether produced in the EU or imported".

As we explain in this report, the term "whole trees" is one without merit and with no meaning in forestry. Although the term is used in the EU's Biodiversity Strategy, we argue that using a reformed ETD to disincentivise the inclusion of "whole trees" from the biomass supply chain, will contribute to sub-optimal silvicultural practices, with negative implications for both the productivity of the forest and for environmental outcomes.

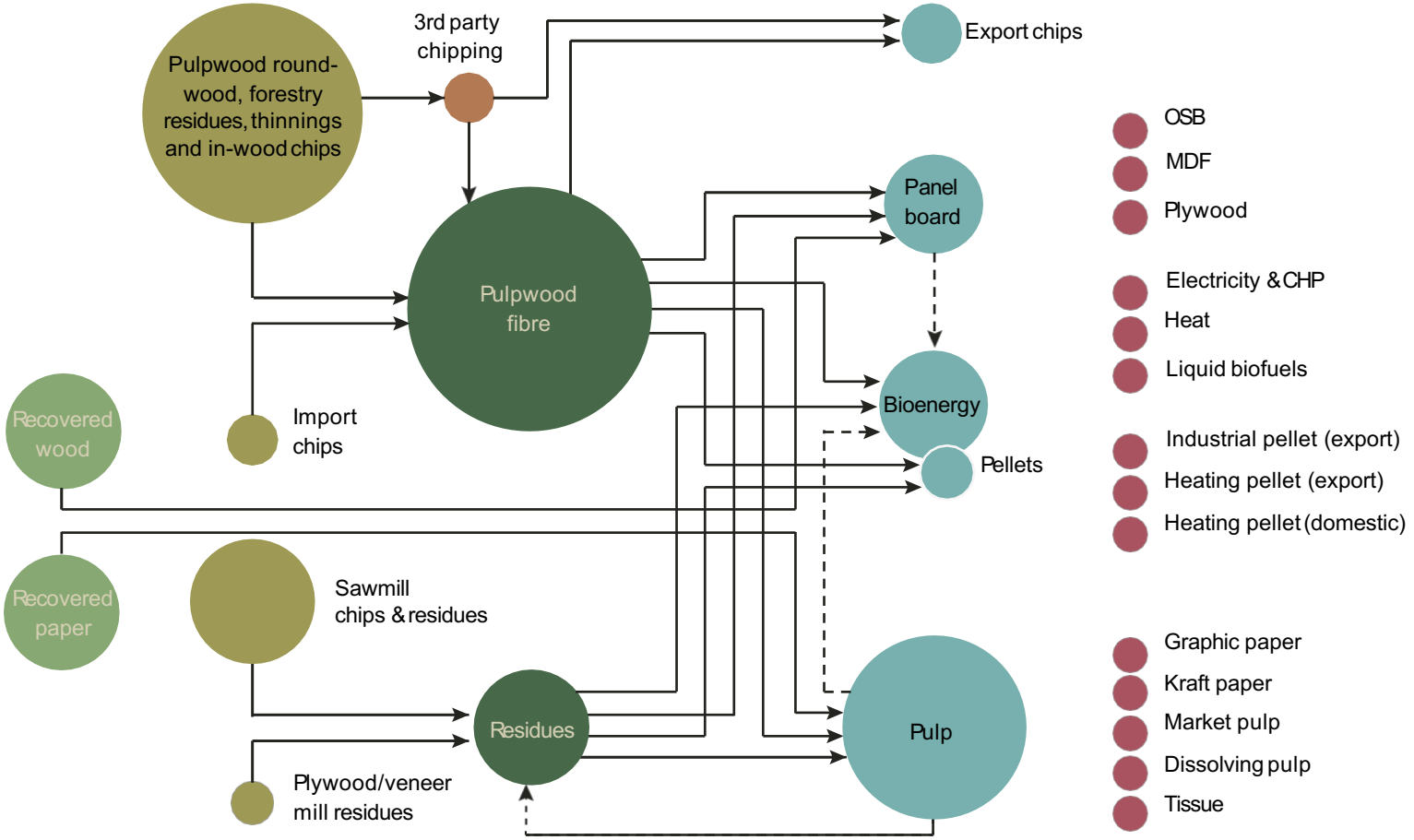
1. These reductions are relative to GHG emissions in 1990.

2. The current ETD does not guarantee any special treatment for low carbon fuel, including biomass. Nor does it differentiate between the environmental performance of biofuels, though it does grant member states an option to exempt "products produced from biomass".

Wood fibre raw material flows

In all forest economies, wood fibre flows through complex and dynamic supply chains from multiple sources to numerous end-uses. Every forest basin is different to some extent, but interactions between supply sources (pulpwood, residues and recovered wood) and end uses (pulp, panel board and bioenergy) are broadly the same. The important point to note from this diagram is the interconnected nature of the material flows. All sectors are connected, so that changes that affect one sector will be felt in others too.

Complex market-based raw material flows ensure that wood fibre is directed to the highest and best end-use



Note: This is a simplified and hypothetical flow diagram that does not represent flows within a particular region. The size of the "bubbles" are illustrative and not to scale.
Source: Hawkins Wright

Thinnings and maintenance in a sustainable forest management cycle

Forest management involves more than simply planting trees and waiting for them to grow into prime sawlogs. Depending on geography, the management of a commercial forest is a continual cycle of site preparation, planting, thinning, maintenance and final harvest. In a softwood stand in the US South, this is typically a 20-30 year cycle, but it may be longer elsewhere.

With planted forests, thinning and maintenance regimes are vital elements that ensure a healthy forest. This includes removing weaker, twisted, and damaged trees. The additional light, water and space after the thinning, improves the growing conditions of the most viable trees, increasing their growth rate and improving the characteristics of the trunks and their suitability as sawlogs. Maintenance regimes may also include "sanitary" cutting to eliminate storm, fungal, animal and insect damage. These thinning and maintenance treatments have two effects: they maximise the yield of valuable sawlogs as well as maximising carbon sequestration during sequential forest management cycles (i.e. when account is taken of the carbon sequestered in the long-lived wood products manufactured from the sawlogs).

However, for thinning and maintenance to be commercially viable, there needs to be a market for the low-quality wood that is extracted. Absent such a market, and the income that it generates, it is more difficult for forest owners to justify the cost of the treatments. If thinning and maintenance are therefore reduced, growth rates will suffer, sawlog quality will decline and the health of the forest will be impaired. A forest will then sequester less carbon during sequential forestry cycles than it otherwise would.

Historically, the pulp industry has been the principal market for small diameter and damaged wood extracted from forests during thinning and maintenance. It still is, but pulp production has declined in many regions and pulp mills have closed. Across Europe and North America, pulp mills' annual consumption of wood has dropped by an estimated ~25-30Mt over the past nine years. Pellet mills have been established partly to fill the vacuum, providing a market for low-grade wood and an income for forest owners. In so doing, they are helping to keep forestlands forested and productive.

The thinning of a coniferous forest

Whole trees – why are they used?

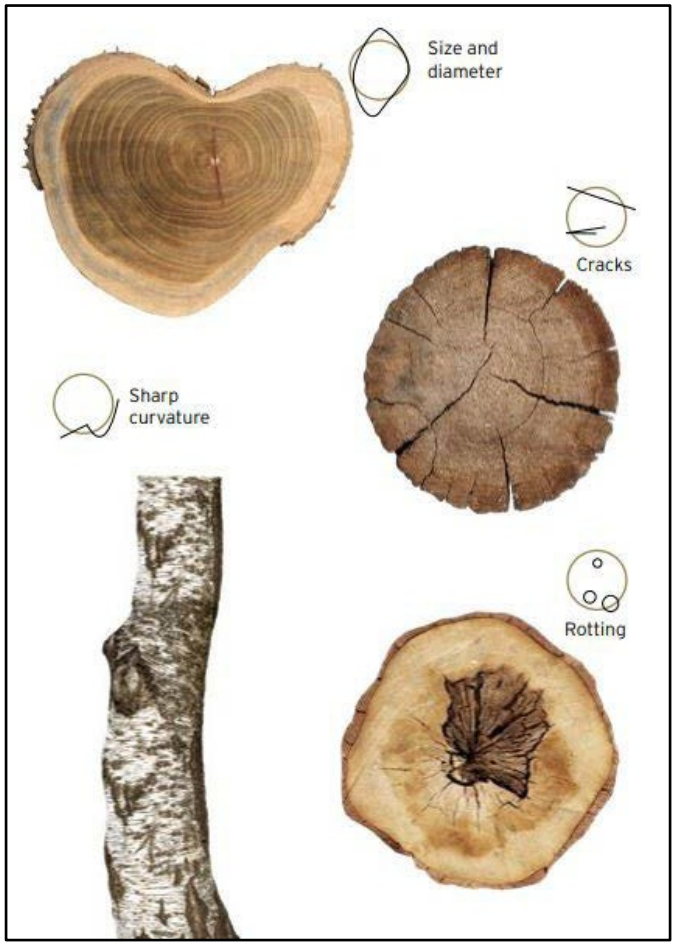
The term "whole tree" is not one that has any meaning in forestry. It defies definition since, biologically, it can be used just as accurately to describe a tiny seedling as a mighty mature tree.

When the term is used, it is usually as shorthand to describe trees of high value. This is based on a common misconception that high-value trees are, by definition, whole trees and vice versa. From this misconception comes the suggestion that to ensure that only low value wood is used for bioenergy, the use of whole trees should be prohibited.

As we set out on the previous page, a sawlog is not defined by its size, but by the absence of defects in the log. The same applies to whole trees. A tree is not more valuable because it is whole from its stump to its highest branch. It is the quality of the tree that matters and the absence of defects such as those illustrated here.

It is also sometimes suggested that the thinning of forests should be discouraged and that this too should be effected by prohibiting the use of whole trees. Proponents of the idea suggest that leaving all trees to grow to maturity and then harvesting selectively will maximise the growing stock of the forest. This too is a misconception; the thinning and ongoing maintenance of planted forests are essential elements of forest management.

As we wrote earlier, without thinning and maintenance, growth rates will suffer, sawlog quality will decline and the health of the forest will be impaired. A forest will then sequester less carbon during sequential forestry cycles than otherwise would be the case.



What is a sawlog? Quality requirements for harvested wood

Sawlogs are not defined by their diameter, but by the absence of defects. True, sawmills will often be designed to process logs within a range of diameters: below a minimum diameter the yield of sawn timber is too low to be economic; above a maximum the sawmill will run up against the physical constraints of its machinery.

More important, however, is the quality of the log. As shown in the table below, sawlogs must not display rot and must not be scarred, torn or twisted. Logs with defects unacceptable at a sawmill, may be acceptable to users of pulpwood, mainly pulp mills and panel board mills. A certain amount of rot can be tolerated, as can tears and twists unless these complicate debarking.

Pellet mills using roundwood to make industrial grade pellets tolerate even greater numbers of defects, including those described for firewood in the table. Low quality roundwood (firewood) will sometimes be supplemented by sawmill residues (sawdust, chips and shavings). As the table shows, there is no higher and better use for this low quality roundwood (firewood), a fact that is unrelated to the diameter of the log.

Quality requirements for softwood

	Sawlogs	Pulpwood	Firewood
Diameter (cm)	11-60	6-60	3-75
Forest rot	●	<30% of diameter	<50% of diameter
Storage rot	●	●	<40% of diameter
A steep warp, swelling	●	● if it complicates debarking	●
Mixed species in one shipment	●	●	●
Fresh wood	●	●	○
Scars	●	●	●
Tears	●	● if it complicates debarking	●

● Required
● Permitted
● Not permitted
○ Not required

Source: Graanul Invest Sustainability Report 2019. Graanul reports that 54% of its pellet feedstock in 2019 was "firewood quality" round-wood. The balance of 46% was sawmill residues.

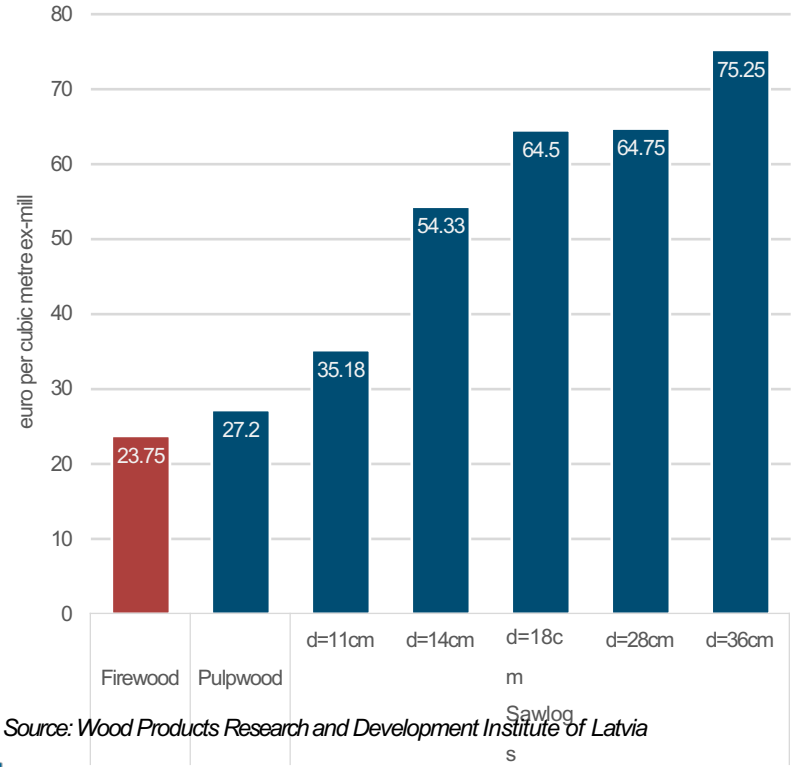
The value of timber reliably reflects the highest and best use of the wood

Timber markets are reliable and efficient mechanisms for allocating wood to the highest and best use that the quality of the log will allow. The charts below depict the prices of assortments of pine roundwood in Latvia and in the US South in the Second Quarter of 2020, showing (in red) the prices of the lowest quality firewood, pulpwood and in-wood chips on the left, rising to the highest quality sawlogs and poles on the right.

This hierarchy of values – which has been seen consistently over the years – ensures that high-quality logs go to high-value end uses, often long-lived construction timber and furniture, while the lowest quality biomass is used for bioenergy. It is a mechanism that works well.

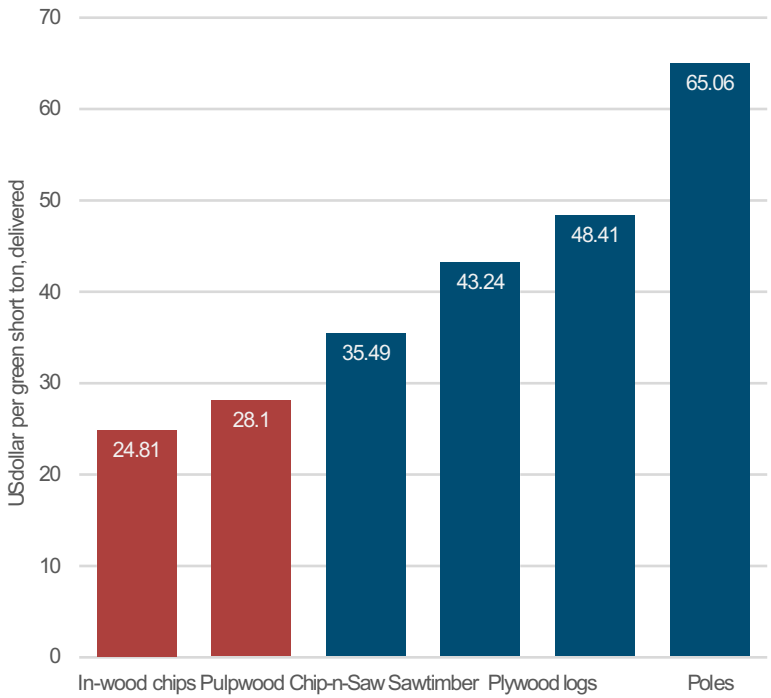
The intervention of authorities in the market could upset this established hierarchy. Placing an arbitrary maximum diameter on pulpwood and firewood, for example, will deny a profitable end-use for larger logs that are otherwise unmerchantable. Likewise prohibiting the use of thinnings ("whole trees") will perversely incentivise sub-optimal silvicultural practices, with negative implications for the productivity of the forest. This will raise costs for forest owners, for downstream producers and consumers of forest products, and for consumers of biomass heat and power too.

Prices of pine roundwood assortments in Latvia, June 2020



Source: Wood Products Research and Development Institute of Latvia

Prices of pine roundwood assortments in US South, Q2 2020



Source: TimberMart South, University of Georgia, USA

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