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SUMMARY

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SUSTAINING ECOSYSTEMS THROUGH RESPONSIBLE BUSINESS PRACTICES

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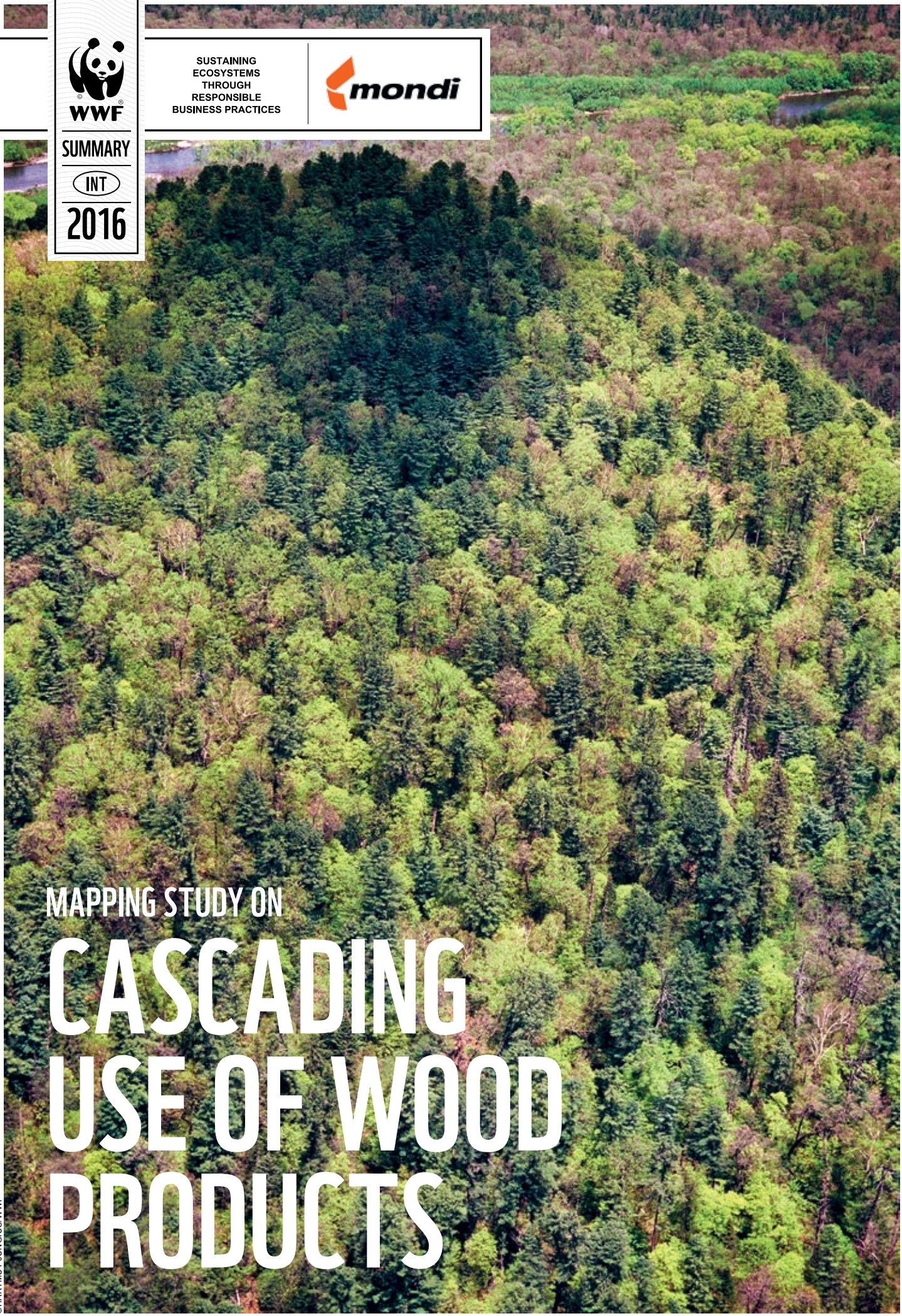

MAPPING STUDY ON CASCADING USE OF WOOD PRODUCTS

EXECUTIVE SUMMARY

Wood is used as a raw material to produce a wide range of products in the pulp and paper industry (paper, cardboard, etc.), the woodworking sector (furniture, panels, fibre boards, etc.) as well as in the new bio-based economy (e.g. wood-plastic-composites, biopolymers). Furthermore, wood, wood products and by-products are used for energy purposes as fuels (e.g. logs, pellets, bioethanol). Recent studies suggest that a growing demand for materials and energy could lead to a supply deficit of wood in the coming decade. The more resource efficient use of wood offers the potential to overcome the supply deficit and increase the availability of wood and a prominent approach is to adopt the 'cascading use' of wood.

Cascading use is a strategy to use raw materials such as wood, or other biomass, in chronologically sequential steps as long, often and efficiently as possible for materials and only to recover energy from them at the end of the product life cycle. It is the intention that the increased cascading use of wood will contribute to more resource efficiency and consequently reduce pressure on the environment.

"CASCADING USE OF BIOMASS AS WELL AS COMBINED HEAT AND POWER PRODUCTION NEED TO BE INCENTIVISED WHERE APPROPRIATE"
(WWF 2012)

WWF and Mondi are in a partnership to promote resilient landscape and responsible products manufacturing and consumption. As part of their work programme, the partners want to share a common understanding on the most efficient use of wood. WWF has published a position paper, which states that "Cascading use of biomass as well as combined heat and power production need to be incentivised where appropriate" (WWF 2012). Mondi has a similar position, aligned to the one of CEPI, which is to "Place the cascading use principle at the core of its climate and energy policy, with a view to ensure the most efficient use of the available biomass, in particular to contribute to the EU growth and jobs objectives".

Even if cascading use is often referred to in the public and political debate, a common understanding of the term and a consensus on where and how cascading use of wood should be implemented is missing. Furthermore, the integration of cascading use into existing policy frameworks differs to a large extent from country to country. This status leads to confusion and misinterpretations by stakeholders. This is why WWF and Mondi set up a project to provide fact based information on the state of policy relating to cascading use of wood and to raise public awareness of its value.

Nova-Institute and IEEP were asked to undertake a mapping study to understand and interpret concepts of cascading use and investigate the policy framework in different countries. The objective of the study is to identify regulations that either hinder or promote the cascading use of wood. The geographical scope covers five European countries (Finland, Germany, Poland, Spain, United Kingdom) and the US. The policy frameworks of the European countries have been analysed in detail whereas the US has been limited to one policy example, the BioPreferred Program. The research was carried out through desk research and interviews with relevant experts (including industry and NGO representatives and policy makers) in the respective countries from March to September 2015.

The content of the project has been defined to focus exclusively on the analysis of existing policy frameworks favouring the sequential use of wood. Therefore, policy frameworks on other environmental impacts (soil fertility, biodiversity, greenhouse gas emissions), the technical implementation (co-production, carbon sequestration) or other aspects are not covered within this study.

For the purpose of this study, the following concept was used as basis: Cascading use of biomass takes place when biomass is processed into a bio-based final product and this final product is utilised at least once more either for material use or energy. Furthermore, the study differentiates between single stage cascades (when biomass is used once as a final product and then used for energy) and multi-stage cascades (if biomass is subsequently used for several material applications before it is used for energy).

The results of the study reveal that none of the investigated countries have dedicated policies for cascading use of wood. However, a multitude of policies and legislative measures influence cascading use and the wood sector in general, e.g. bioeconomy strategies, forestry management, waste policy, bioenergy policy, building regulations, etc.

These policy fields should all be taken into account when considering how best to promote the cascading use of wood. There is a need for policy harmonisation across these sectors in order to build a consistent framework for the resource efficient management of wood and to support the cascading use of wood. From the analysis it has become clear that each country analysed is in a unique situation concerning wood availability and utilisation. These circumstances need to be taken into consideration in order to find the best solutions to increase resource efficiency. The ideal way would be that the European Commission provide guidance to Member States on how to take the Cascading Use of Wood principle – and in general material applications of biomass – into account when designing their bioenergy support schemes, in particular those related to European Renewable Energy policy and activities related to the Circular Economy package. This guidance also needs to take into consideration that there are different types of wood resources suitable for different kinds of applications and that the nature of this resource will vary between countries and regions.

Generally, the establishment of cascades is decided by economic factors, but economics are influenced both by commercial imperatives as well as policy support (such as incentives). Usually, producers of high value applications can pay a higher price for raw materials, which means that in a standard case, a resource for which there is competition, goes to the higher value-creating application. These are usually bio-based products in material applications, so that in a free market, high-value resources would usually at least enter a single-stage cascade (if the product enters a waste management system at the end of its first life cycle). The ability of different actors to pay for the wood resource, however, is currently influenced by subsidies that are paid to support renewable heat and power generation. At present, certain biomass for energy uses are able to receive this support and as a result may be able to pay higher prices for resources than would have been the case based purely on market forces. This has the potential to distort whether wood, wood products and by-products are used for material uses, cascaded and/or used directly or indirectly for energy production and poses a significant barrier to even single-stage cascades.

For multi-stage cascades, the challenges and interactions that determine whether cascading occurs and the balance between material and energy use become more complex. First of all, local heat generation from post-consumer wood (in private households) or by-products (in commercial facilities) is a traditional source of energy in many countries, and might make a lot of sense in terms of local and economic energy production. But this material is lost for cascading use. Secondly, an effective establishment of multi-stage cascades requires a comprehensive system of waste collection, preparation and recycling. These structures need time to build. Moreover, an abundance of wood resources in countries such as Poland makes recycling less attractive, since using fresh resources is more economically feasible than setting up a whole recycling system. Finland is in a similar situation in terms of wood availability. While Finland has a strong paper recycling policy, policy for the recycling of other wood materials is not yet strongly established.

The following key messages can be extracted from the analysis:

- There is a strong need for a commonly agreed and accepted concept of "cascading use" among policy makers, researchers and industry.

- Cascades are only established if they make sense economically, but economics are influenced both by commercial factors and by public support (such as through policy incentives). The ability to establish cascading in Europe is impacted by two economic trends: that fresh wood is not necessarily more expensive than the use of recycled wood; that subsidies received for the production of bioenergy mean that energy users can potentially pay higher prices for woody material than would otherwise be the case. There is a strong impression that as long as bioenergy is heavily subsidized, it is highly unlikely that more effective cascades will be established or improved throughout Europe.

- When considering cascading use, it is extremely important to look at a very wide sweep of policies that historically have been developed in isolation. Interlinkages between waste collection and management policies, sequestration measures, management strategies in the forest, resource efficiency strategies and energy policies are intricate and influence each other. Therefore, the implementation of cascading use of wood is not a one-dimensional debate but a whole set of wider complex policy interactions and nuances that dictate the most effective outcomes of the whole resource system.

- Policy harmonisation still needs to allow room for each unique country situation in terms of wood availability and utilisation. It is recommended that the European Commission provide guidance to Member States on how to take the Cascading Use of Wood principle – and in general material applications of biomass – into account when designing their bioenergy support schemes, in particular those related to European Renewable Energy policy and activities related to the Circular Economy package. Such guidance would also need to take into consideration that there are different types of wood resources suitable for different applications.

- Biomass, including wood and wood products, has been chosen as one of the primary means to deliver Member State renewable energy targets. This poses a potential barrier to the evolution and further establishment of cascades for woody biomass, as the first use (material or energy) determines the final material flows.

- The effective national implementation of the European waste hierarchy is crucial for the establishment of multi-stage cascades. Reliable classification and sorting systems of post-consumer wood are extremely important for functional recycling systems. However, even they cannot be a guarantee for a cascade to take place, if the resources are not used as material in their first application.

- Positive examples of established cascading and recycling systems show that public awareness and acceptance is key. This should be supported throughout Europe.

Six selected countries were analysed in more detail in order to highlight especially relevant legislation and their impacts on the cascading use of wood. The main results of the case studies are as follows:

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NUMBER OF COUNTRIES ANALYSED FOR THIS STUDY

THESE ARE: FINLAND, GERMANY, POLAND, SPAIN, UK AND THE US

Finland – A rich tradition in efficient wood use

Finland is rich in wood resources and has a very strong forest industry that accounts for 18% of the national industrial output. A total of 59Mm^3 of wood are used annually by the domestic industry. Estimations about potential future increases in consumptions differ, however. The availability of raw material and an established wood processing industry are strong enabling factors for the cascading use of wood, since the production of bio-based products is a prerequisite for cascading use. However, Finland relies heavily on wood as a solid biofuel for renewable energy generation. The support systems in place for bioenergy create market distortions that constitute strong barriers for an effective cascading system, since a lot of wood is directly allocated to energy and never enters a cascading stream.

In general it needs to be stressed that Finland has a rich history of wood utilisation and has developed systems apart from cascading use to optimise resource efficiency, e.g. through streamlined processes and utilisation of co-products. The interviews with experts from the forestry and wood products sectors showed a general hesitancy towards a binding cascading regulation, since the free utilisation of wood resources is regarded as a major factor for economic growth and prosperity. Awareness of the importance of the cascading issue is growing, though.

Germany – Best practice for post-consumer wood collection and sorting

Wood is a very important resource in Germany in terms of value creation and employment. However, the provision of wood resources is close to the maximum capacity.

In Germany recycling of wood and paper has been established for more than two decades and is widely accepted in the society. EU regulations on waste management are transposed into national law and find strong institutions to ensure collection and recovery of wood, which also means that public awareness of wood recycling is quite high. Strengths are a comprehensive regulatory framework, which organises collection, separation and use of waste wood. They furthermore secure the separation in different qualities of waste wood in combination with specific recovery options. Weaknesses are the practical implementation of the separation process of waste wood (which is still quite elaborated in the European comparison) and a strong competition with energetic use caused by the national implementation of the renewable energy targets.

Germany has formulated many political strategies, action plans and programmes addressing biomass utilisation, bioeconomy and recycling. However, cascades currently only work in those areas that already have a long tradition in recycling, e.g. paper and particle boards.

POLAND IS RICH IN FOREST RESOURCES

THE MAJORITY OF THE FOREST AREA IS ECONOMICALLY EXPLOITED

Poland – Abundance of resources counteracts cascading use

Poland is rich in forest resources, with the majority of the forest area being economically exploited. In 2009, the volume of timber removals amounted to approximately 34 million m^3 with an additional 1.93 million m^3 slash being removed. This makes Poland attractive as a location for wood-based industries, but gives little incentive for a repeated use of the resource, i.e. through increasing the cascading use. Furthermore, Poland relies heavily on co-firing of wood resources in coal plants for reaching its renewable energy targets, creating a strong market distortion allocating wood to the energy sector. This means that even the first stage of a cascade is never reached for a significant amount of wood materials. It should be noted that high-grade wood is excluded from the co-firing (under criminal liability) except for small-scale installations, which is positive in terms of cascading use. The verification of the grade of wood resources proves quite difficult in Poland, though.

In terms of recycling, the data basis is quite weak. Vague estimations for a recycling quota of wood products range between zero and 10%. However, the transposition of the EU Waste Framework Directive has only recently taken place, establishing a collection system for solid wastes only in 2013. Attitude and perception towards recycling is slowly changing as a result, and research is done by different actors. This might constitute a promoting factor for increased cascading use of wood, but effects need to be seen and there seems to be a lack of political will to establish cascades.

Spain – Advanced policy measures but poor integration

Spain is a country of relatively low wood resources and is at a relatively early stage in the development of cascading use of wood. Some opportunities are provided by the waste management legislation, which establishes the basis to further recycle waste wood in potential multi-stage cascades. There is also evidence of proactive action at the regional level that is significantly improving the collection and hence availability of waste woods. From a longer-term perspective, the discussion on a 2030 bioeconomy strategy and the research agendas looking at research and development

(R&D) may enable further developments with regard to cascading use of wood.

Challenges to cascading use in Spain are identified in the national policies promoting the use of wood for energy production. Although increased demand of wood for energy purposes may stimulate larger mobilisation of wood resources, in principle it limits the availability of wood to be further cascaded.

The objectives and needs from the wood and forestry sector are not sufficiently integrated within Spanish policy. It is not clear how policies that are quite advanced e.g. for separate collection of wood, landfill taxes and the promotion of recycling/ reuse interact with the wider priorities of the bioeconomy, renewable energy use and broader climate goals such as sequestration. All these factors could be brought together to develop sustainable outcomes that deliver cascading material uses, energy and effective forest management; however, as yet such coordination is not being undertaken.

UK – Transitioning from wood incineration to a waste based bioeconomy?

The recognition of the potential inherent in the utilisation of waste resources has stimulated policy interest in the UK. The ambition to realise a long-term plan, such as a road map or guiding strategy document, has been hampered initially through uncertainty in the government's future at the time the report was being compiled[1]. However, this is due to be revisited. The precise ambition for waste wood within this agenda is not so clear. On the one hand the role of wood waste is particularly important in the UK given the relatively small area of domestic wood production. However, wood waste represents only a relatively small share (4%) of overall waste resources.

What the review of waste resources and use in the UK has highlighted, are the range of sectors and actions needed in order to transform the view of wastes from something that needs to be disposed of, to something that is considered as a valuable resource and input feedstock for a whole range of existing and emerging sectors. These range from funding initiatives; development of coherent policies across various thematic areas; improved coordination activities; planning developments; education and outreach activities; etc.

US – Strengthening innovative wood products through the BioPreferred Program

The US is the biggest producer and exporter of wood and forest products in the world. According to experts in the field, however, the term "cascading use" is not very well established or known by industry players and policy makers in the US and Canada. The topic is slowly gaining some prominence, but is not very high on the agenda. The BioPreferred Program has potential to strengthen the market uptake of wood-based products, therefore enabling cascading use to take place. Unfortunately, the inclusion of wood products in the program has taken place so recently that there is no reliable data on market impacts up to today.

[1] In the run up to the UK General election in 2015.

Cascading use of wood

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Number of countries analysed for this study. These are: Finland, Germany, Poland, Spain, UK and the US.

2050

The amount of wood we take from forests and plantations each year may need to triple by 2050.

2014

The year that the WWF-Mondi Global Partnership was launched.

10%

Today, 10 per cent of the world's population consumes over 50 per cent of the paper.

50%

In Germany, 50% of the total wood resources was used for energetic purpose in the year 2010.

WWF

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To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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