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FORESTS AND ENERGY

Summary

This note has been prepared for the plenary session of the European Forest Week on “Forests and Energy” taking place on Wednesday 22 October 2008¹. Its objective is to stimulate a lively and well informed discussion by providing the reader with background information and proposing questions which participants in the session may wish to address during the discussion. The note presents tradeoffs between energy and other functions, notably biodiversity and the forest industries, discusses related climate change and sustainability issues, and asks whether a new equilibrium can be found.

Participants are invited to share their views on forests and energy, addressing if they wish the questions set out in this paper. The Chair will prepare a summary of the discussions, on her own responsibility, which will be tabled at the end of the week.

I. Introduction

1. Renewable energy is an essential component of a national sustainable energy policy. As countries increase investments in renewable energies, tradeoffs become apparent, including costs but also potential environmental impacts.

¹ This document was mandated by the Timber Committee at its 65th session. The report of this session is on the Committee website in English only (<http://www.unece.org/trade/timber/tc-docs.htm>).

2. It is anticipated that wood energy – still the most important form of renewable energy - will further increase its significance in the total primary energy picture throughout Europe. Influenced by new processing technologies, wood fuels are changing. Besides the success of wood pellets and briquettes, it is expected that cellulose-based ethanol and biomass to liquid processes will become economically viable in the near future, further boosting the demand for wood fibre.
3. For an updated overview of this issue from a global perspective, refer to FAO Forestry Paper 154, *Forests and Energy: Key Issues*. This 50-page publication was prepared for the High Level Conference on Food Security: The Challenges of Climate Change and Bioenergy, held in Rome in June 2008².
4. This secretariat note presents the main issues and questions. It is based on a longer background paper, which is being circulated widely, in English only.

II. Sustainable wood energy in Europe

5. The Joint Wood Energy Enquiry³ was a comprehensive survey on wood energy in the EU 27 countries, using 2005 as the base year. According to the enquiry, 332 million m³ of wood was used for energy in Europe in 2005, including wood from forests and trees outside forests (45 percent); residues from industry (49 percent) as well as recovered wood (6 percent). This corresponds to 42 percent of total wood use according to the European Wood Resource Balance⁴. Nine percent of the final energy consumption in the EU 27 was generated from renewable sources in 2006. Wood played the most significant role in the renewable mix with 58 percent. Wood therefore accounted for just over 5 percent of total primary energy supply, a significant part, but much less than fossil energy sources or nuclear.
6. For 2020 the European Union has set targets calling for 20 percent renewable energy of the overall energy consumption. Assuming that the renewable mix would be as in 2005, an additional 353 million cubic meter wood equivalent wood be required. If wood declined in relative importance within the renewable mix by 25 percent (a plausible assumption), still 198 million additional cubic meters of wood will be needed. Biomass Action Plans are currently being developed in most countries of the EU, which will set the scene for the future contribution of wood to energy supply.
7. It is clear that wood cannot by itself supply the continent's energy needs, even if all wood were devoted to energy. If it were assumed that the entire increment of Europe's forest was efficiently used for energy generation⁵ (including everything that is currently used in the wood processing industry), this would still only cover 9.5 percent of the total primary energy supply.

² url: <http://www.fao.org/docrep/010/i0139e/i0139e00.htm>

³ Steierer F, Fischer-Ankern A, Francoeur M, Wall J, Prins K. (2007): Wood energy in Europe and North America: A new estimate of volumes and flows. Joint Wood Energy Enquiry. url: <http://www.unece.org/trade/timber/docs/stats-sessions/stats-29/english/report-conclusions-2007-03.pdf>.

⁴ Mantau, U., Steierer F., Hetsch S., Prins Ch. (2008): Wood resources availability and demands – Part I National and regional wood resource balances 2005. url: http://www.unece.org/trade/timber/workshops/2008/wood-balance/docs/wood%20availability_part1_final.pdf.

⁵ Assuming a net annual increment of 767 million cubic meter in forests available for wood supply (source: State of Europe's Forest 2007) and 80 percent efficiency in energy generation

Utilizing the entire growing stock in the EU 27 for energy generation, the region's energy needs would be met for just 2.4 years⁶ before exhausting all the wood.

Potential sustainable wood supply

8. A central question is “how much wood could be provided for energy and forest products on a sustainable basis, and on what conditions?” To answer this question information is needed about prices, alternative energy sources, forest owners' behaviour, policy requirements for biodiversity and many other factors.

9. UNECE and FAO are preparing an estimate of potential sustainable wood supply, which will be the starting point for a process involving national contact points and sector specialists to provide a more precise quantified answer to this key question. This first estimate, based on internationally available data, will be presented at a policy dialogue during the European Forest Week.

III. Forests and Energy – increasing demands on a limited resource

10. In the general context of increased demand for wood energy, tensions and even conflicts are probable. The plenary session is invited to consider “what should be the broad lines of policy for forests and energy, and how should conflicts be resolved?”

11. Increasingly the concept of balance between economic, environmental and social dimensions of sustainability has been accepted. Sets of criteria and indicators have been drawn up to measure sustainability of forest management at the national level and certification systems inform consumers that the forest supplying the wood they consume is managed sustainably. The report to the ministerial conference in 2007 on the state of Europe's forest⁷ found that, with some exceptions, Europe's forests are being managed sustainably.

12. However, the rising demand for wood energy could lead to adjustments in both policy and management practice. In particular, higher targets for renewable energy implies increased wood harvests, perhaps bringing into production hitherto neglected forests, extraction of residues from the forest, more intensive silviculture, and establishing plantations on non-forest land. This trend is already becoming apparent, even with the existing imperfect statistical systems: Europe's removals, excluding Russia, have risen between 2004 and 2007 by 73 million m³, with particularly steep increases in Germany, whose removals rose 50 percent between 2003 and 2007.

13. More intensive forest management sometimes conflicts with targets for biodiversity or habitat protection; currently 17 percent of the forests in Europe (excluding Russia⁸) are classified as not available for wood supply, mostly due to some kind of protection status. In addition,

⁶ Growing stock of 19'660 million cubic meter in the EU 27 (source: State of Europe's Forest 2007) and 80 percent efficiency in energy generation

⁷ MCPFE/UNECE/FAO (2007): State of Europe's Forest 2007. The MCPFE Report on Sustainable Forest Management in Europe. MCPFE Liaison Unit Warsaw.

⁸ If Russia is included, the share rises to 52 percent, as so many Russian forests are very remote and therefore not “available for wood supply” (source: State of Europe's Forests 2007)

ecological standards might decrease wood supply, e.g. deadwood / habitat trees in the forest, limiting clear-cuts, distance requirements for harvesting near streams, or not utilizing genetically improved tree species. EFI recently published a study⁹ (co-funded by the European Paper Industry - CEPI) concluding that 68 million cubic meter of wood would not be felled in Europe (EU 27) due to protection of biodiversity and landscape diversity.

IV. What role should wood energy play in climate change mitigation?

14. In Europe's forests 5.6 million tonnes of carbon are stored¹⁰, roughly four times the annual green house gas emission of Europe¹¹. Forest and plant growth is a major process to sequester atmospheric carbon. In the EU 27 on average the biomass in the forests has increased by 236 million tonnes per year over the last 15 years¹². This is equivalent to 8.4 percent of Europe's annual greenhouse gas emissions.

15. However, forests are not only carbon storage, but also deliver wood, which can be used as a substitute for fossil fuels and non-renewable construction materials like steel or concrete. Utilizing wood instead of these materials (or fossil fuels) reduces overall GHG emissions, since carbon released when burning wood has already been recovered from the atmosphere while the tree was growing. In addition, the carbon stored in harvested wood products is bound for a certain amount of time, as it is not released immediately to the atmosphere once the tree is cut and harvested. Thus the use of wood energy from sustainable sources is one way for the forest sector to mitigate climate change, alongside carbon sequestration in the forest, replacing non-renewable materials and storing carbon in harvested wood products.

16. From the point of view of carbon balance, a strategy for maximizing the contribution of wood to climate change mitigation would be a "cascading" pattern of forest growth and use of wood:

- (a) Maximise biological growth (biomass) in the forest;
- (b) Harvest and utilize as much as possible of the increment for wood products;
- (c) Recycle the wood products and at the end of their service life burn them for energy generation;
- (d) Utilize the biomass increment that cannot be used for wood products for energy generation directly;
- (e) Throughout, avoid carbon loss to the atmosphere, notably through reducing conversion of forests to other land uses and avoiding silvicultural practices which release carbon from forest soil.

⁹ Verkerk et al (2008): Impacts of Biological and Landscape Diversity Protection on the Wood Supply in Europe. EFI Technical Report 27, 2008.

¹⁰ Referring to EU 27 (source: State of Europe's Forest 2007)

¹¹ Referring to EU 27: Green house gas emissions in EU27 were equivalent to 5'143 tones CO₂ equivalent (= 1'403 tones carbon) (EEA 2008: Annual European Community greenhouse gas inventory 1990–2006 and inventory report 2008, EEA Technical report No 6/2008)

¹² source: State of Europe's Forest 2007

17. Signals generated by current policies are conflicting and not coordinated. For instance, under the Kyoto Protocol, the only incentive is for carbon sequestration in forests, and not in harvested wood products; there are few incentives to use renewable raw materials, including wood, rather than non-renewable ones; nor is there any incentive to achieve the right sequence of uses (raw material, then energy).

Policy suggestions

- (a) Promote more intensive silviculture to support carbon sequestration in forests (alongside payments for carbon storage).
- (b) Promote wood mobilization and recycling.
- (c) Promote the use of wood for energy through measures to reduce harvesting cost or consumer prices for wood energy buyers, or by stimulating installation of wood burning boilers.
- (d) Incorporate replacement costs for non-renewable materials into their market price to improve wood products' competitiveness.
- (e) Ideal policy measures would not distort markets and would be graduated in their effect, possibly with correcting factors to prevent unintended results, and without excessive administrative costs and constraints which may hamper creative solutions.

18. One measure which satisfies most of these requirements is a carbon tax designed to provide the right price signals for all actors, by penalizing the end user for using materials or fuels emitting GHG. However, in many countries the introduction of a comprehensive carbon tax (and a partial carbon tax is by definition a distortion) has proved politically very difficult as it creates numerous short term "losers" and the gains are diffuse and long term.

19. It should also be noted that none of the measures discussed above takes explicitly into account the biodiversity or socio-cultural aspects.

V. Will wood energy harm the forest-based industries in Europe?

20. For several decades, forest-based industries in the region have been managing the flow of their co-products for both raw material and energy uses, to reduce costs, and make the best use of the available material. Until recently, the raw material pathway dominated, technically and economically, with energy use getting lesser priority.

21. Increased energy prices have changed this balance, creating new markets and encouraging convergence between pulpwood and wood energy prices. In current conditions it is likely that prices for low quality wood assortments will adjust and correlate strongly to the market value of its energy content.

22. European forest-based industries have become an important generator of wood energy for their own purposes and for external customers, and are among the beneficiaries of renewable energy support schemes. However, there are new actors: energy firms (including oil companies) expanding into bioenergy, who have different skills than the forest based industries and often have access to considerable capital.

23. Forest-based industries, notably those which rely on low priced wood for their raw material, have had to adjust to a double impact: supply scarcity and higher prices for raw material, as increasing volumes of wood (roundwood, chips and co-products) go to energy uses. Some industries, including the composite panel industries, have expressed concern about their long term viability in conditions of high energy prices, and mills have closed in Europe and North America. Other industries, notably the sawmilling industry, have benefited from the higher prices and new markets for their co-products.

24. Industry representatives have called for a “level playing field,” claiming that energy uses are subsidised, whereas raw material uses are not (although forest management also receives significant financial support¹³). Forest-based industries are entering another period of structural adjustment, triggered by the change in the relative prices of wood energy and wood raw material.

25. Market actors will have to develop strategies which keep their enterprises competitive in the changing economic landscape. Possible ways forward for the forest-based industries include partnerships with forest owners or energy companies, product innovation and improved material efficiency, improving integration or sourcing raw material from new sources, or combinations of approaches.

26. One feature of the present situation is volatility, as policy instruments are changing rapidly. This makes it harder for market actors, whether forest owners, forest based industries or energy suppliers to develop and invest. Public policy makers should develop policies for wood energy adapted to the present situation and acceptable to most of the stakeholders, and then maintain them with minimal changes. These policies should be firmly linked both to national energy strategies (especially national biomass action plans) and national forest programmes.

VI. Conclusions: Towards a new equilibrium?

27. The changed situation for renewable energy is causing structural shifts, posing new challenges to the forest sector and creating opportunities to make a significant contribution to sustainable energy supply. Adjusting to the rapidly changing situation while maintaining a focus on sustainability will not be easy. A prerequisite is a realistic and well-informed public policy dialogue. The plenary session of the European Forest Week is intended to contribute to such a discussion.

28. Delegates are invited to consider:

- (a) Forest biodiversity and wood energy production – how to manage tradeoffs?
- (b) What role should wood energy play in climate change mitigation?
- (c) Will wood energy harm the forest-based industries in Europe?
- (d) How can policy makers help the forest sector to find a new equilibrium?
- (e) What is the role for international organizations?

¹³ EFFE: Evaluating financing of forestry in Europe (2003) Project under the Programme “Quality of Life and Management of Living Resources” of the European Commission, DG Research