



Sustainable Energy
Systems 2050
NORDIC ENERGY RESEARCH PROGRAMME



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ENERWOODS

- Woodbased Energy Systems from Nordic
Forests

Project presentation at kick-off meeting

Helsinki

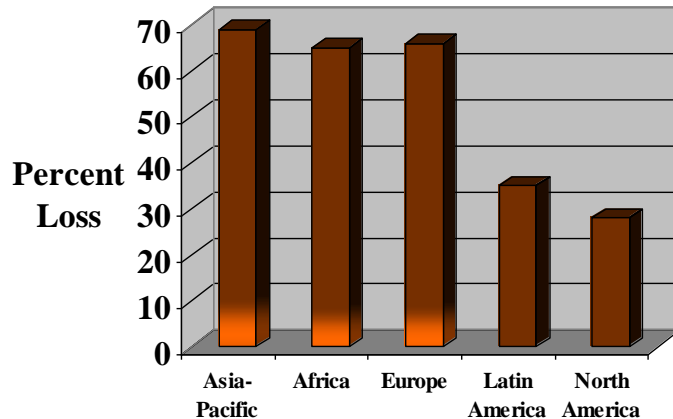
12. October 2011

Palle Madsen, *Forest & Landscape*, University of
Copenhagen

Forests – state of the art

- half of the global forest cover has been cleared
- on a global scale, forest clearance is currently responsible for 17-20% of the annual atmospheric CO₂-increase
- fossil fuel reserves are not endless
- climate change
- novel pest- and disease-scenarios
- ambitious goals for a fossil-independent future
- increased focus biomass
- EU farming has got a new platform for attracting subsidies
- biomass is already an unsubsidized key product for forestry
- in "the South" most people and the governments have forgotten that forestry is productive
- farming will never be capable of producing the biomass we need – especially not in the Nordic countries

Loss of Original Forest Cover



Wood now – and wood in the future

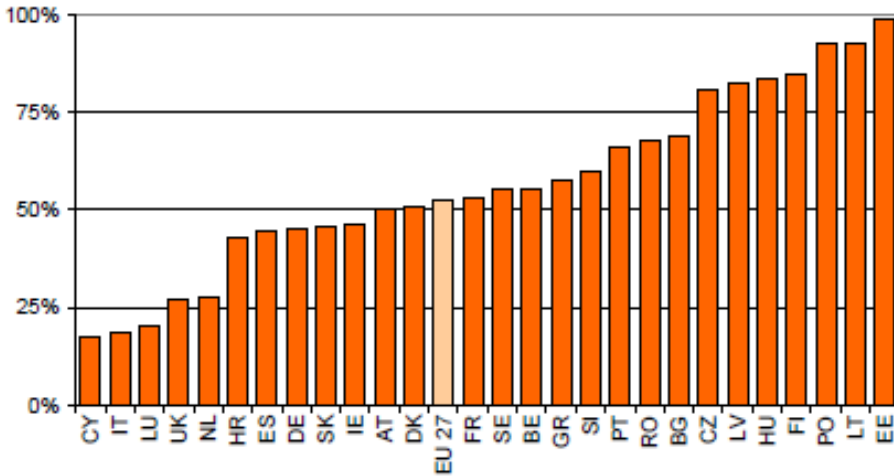


Figure 3-1: Share of wood energy in total renewable energy (EU 27)

Source: Data Eurostat, illustration EUwood

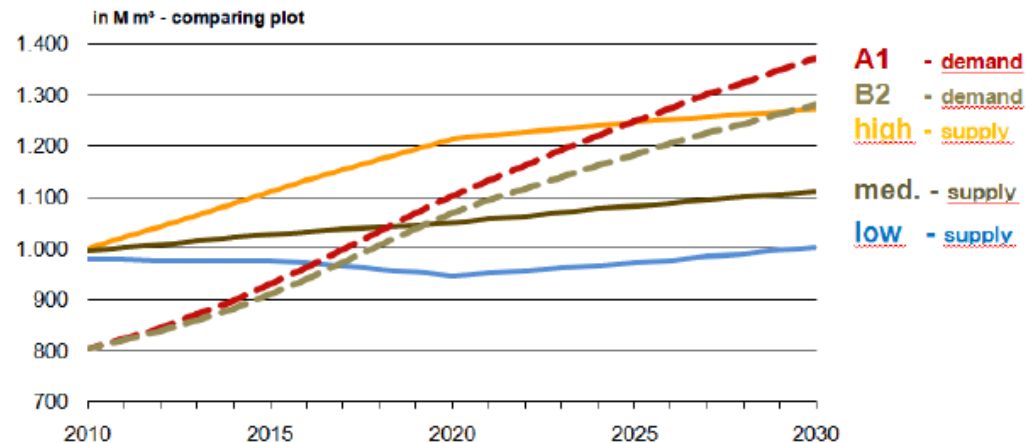


Figure 1-4: Development woody biomass potential demand and potential supply

Source: EUwood 2010

Objectives and challenges...



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Project objectives

The **prime objective** of this project is to **strengthen the role of Nordic forestry** as a significant contributor to the development of competitive, efficient and renewable energy systems. Woody biomass must contribute more to meet fossil energy independence by 2050 as well as the EU 2020 renewable energy goals, while at the same time securing sustainability and the provision of ecosystem services now and in the future. The complete energy chains

Five main challenges are linked to meeting the project objectives:

1. A considerable increase in forest productivity by e.g. selection of proper forest management models, species, provenances and clones without compromising ecosystem sustainability and stability.
2. Transportation across long distances and large scale storage of woody biomass in optimized systems linking forestry and end-users.
3. Balancing trade-offs between forest carbon sequestration and fossil fuel displacement by cost- and bioenergy-efficient strategies from a land-use perspective.
4. Balancing integration versus separation of forest functions at appropriate scales in a multifunctional and sustainable forest management context.
5. Efficient implementation of the research findings in the management of forests and the woody biomass energy system.



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Hypotheses and participants.....

Three main **hypotheses**:

- Woody biomass energy systems can be developed and designed to efficiently support both the 2020 and 2050 energy and climate policy goals without compromising sustainability and environmental benefits of forests.
- Depending on site, Nordic forest productivity can be increased by up to 80% relative to standard production levels without jeopardizing sustainability.
- Cost and greenhouse gas mitigation efficiency as well as the degree of utilization of the harvesting and transport fleet can be markedly improved by adapting and matching harvesting systems to resources and feedstocks for final consumer.

Participants:

The Forestry Research Institute of Sweden (Skogforsk)

The Finnish Forest Research Institute (Metla)

Linnaeus University (LNU)

Swedish University of Agricultural Sciences (SLU)

University of Eastern Finland (UEF)

Finnish Environment Institute (SYKE)

The Norwegian Forest and Landscape Institute (NFLI)



Novel forest ecosystems.....



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Forest growth and productivity regains importance.....

- healthy, vigorous forests are essential to maintain current forest functions and to contribute to CC mitigation....

- to a large and increasing extent we have to accept and work with novel forest ecosystems....

(Mixed N. spruce and Douglas fir in Denmark)



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... involving end-users



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A strong Advisory Board

- needs real influence on project work to create ownership for the project and its results
- is essential for dissemination and implementation of research findings
- is a source of inspiration and information from practise



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