1. Background

Introduction to bioenergy

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Summary

As a consequence of gro-political instability during the 1970, the oil prices suffered a drastic increase in price resulting in a global energy crisis that developed along the following years. As a results, many countries established new energy policies oriented towards the diversification of energy sources. Among those, the use of biomass for energy became a target, especially in Finland and Sweden, countries with large forest resources, giving birth to modern bioenergy in the area. Nowadays, both countries are leaders in bioenergy development and implementation. This session aims at reviewing the development of modern bioenergy, linking to previous courses, including some of the main factors contributing to its successful implementation.

Materials

The modern concept of bioenergy [video]. Bioenergy is the utilization of biomass resources for the production of energy. As such, it is perhaps the oldest technology ever used for energy. *What is new then? What are the differences between using wood for energy in the past and nowadays?* This video presents my views on bioenergy, and why it is more than the mere utilization of wood to produce energy.

Energy from the Forest - Benefits for the Local Economy [video] This is a video summary of this theme of the course, and shows the different steps to produce biomass from the forests till the power plant. The video is shot in a small municipality in Finland, that has established a district heating plant to produce bioenergy. In Finland local bioenergy operators have combined forces in the harvesting and utilization of energy wood. Eno Energy Cooperative manages the entire production chain from harvesting to wood chipping, transportation, and heating plant operations which has resulted in many benefits for the local economy. Source: Wenet, The Wenet Centre Project is coordinated by Joensuu Regional Development Company JOSEK Ltd, the Kajaani University Consortium, and the universities of applied sciences of North Karelia, Savonia and Mikkeli. The EU Regional Development Fund co-finances the project with regional councils and development companies in Eastern Finland as well as Wenet's member companies.

Complementary Materials

For those not familiarized with the main concepts related to biomass production for energy, feel free to use these materials to expand your background:

> Röser, D., Asikainen, A., Raulund-Rasmussen, K. and Stupak, I. eds. (2008) *Sustainable use of forest biomass for energy a synthesis with focus on the Baltic and Nordic region*. Vol. 12. Springer Science & Business Media [e-brary link]
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> Richardson, J., Björheden, R., Hakkila, P., Lowe, A. T., & Smith, C. T. (Eds.). (2006). *Bioenergy from sustainable forestry: guiding principles and practice* (Vol. 71). Springer Science & Business Media. [e-library link]
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> Schubert R et al (2010) *Future bioenergy and sustainable land use*, 365 pp. Earthscale [e-brary link]
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> Machines in biomass procurement operations [YouTube] ForestEnergy Portal
>
> Harvesting of fast growing plantations [Youtube] at *Salixodlarna*

Welcome to the Forest Capital of Europe [video] The video introduces Finland and the city of Joensuu, located in North Karelia, hosting the European Forest Institute, the University of Eastern Finland, the former Finnish Forest Research Institute (METLA, now LUKE), the North-Karelian University of Applied Sciences, among others. Industrially, there is the main factory of John Deere of forest machinery, one of the largests in Europe. Source: Wenet,Wenet: The Wenet Centre Project is coordinated by Joensuu Regional Development Company JOSEK Ltd, the Kajaani University Consortium, and the universities of applied sciences of North Karelia, Savonia and Mikkeli. The EU Regional Development Fund co-finances the project with regional councils and development companies in Eastern Finland as well as Wenet's member companies.

Tasks

From the video, *Energy from the forest- Benefits for the local economy* identify the main sources of biomass for energy currently used in Finland.

Reflections

What were the main triggers associated to the emerging bioenergy sector?

What were the effects of cartels and nationalizations on the energy markets in the 1960-1970?

[These questions may help the students to focus and reflect on the topic contents. They do not require to be submitted as an assignment and are not to be evaluated.]

Objectives

This introductory session focuses on:

- To get familiar with the course information (structure, assignments, evaluation...)
- To get familiar with the wiki course environment and the general possibilities of wiki pages
- To reflect on your previous knowledge and experiences, as well as to share some information about your interests, experiences and course expectations
- To get familiar with the main concepts on bioenergy production

The contents of the background session deal with:

- Rationale and pre-conditions for modern bioenergy development.
- Examples of modern use of wood for energy
- Overview of biomass markets and origins

Woodfuel piled to be distributed, ca 1930. Source: Helsinki city museum