Work-study visit to Denmark/Sweden
May 8 – 18, 2002

Small Wood Utilization And Bioenergy

Skov & Landskab

Danish Centre for
Forest, Landscape
and Planning

University of Idaho

Woodland Restoration, Inc

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Background

During the summer of 2001 Dr. Niels Koch, Director of Skov & Landskab, Danish Center for Forest, Landscape and Planning invited Forest Service officials to conduct a work-study visit to Denmark. He had been traveling in the U.S. Pacific and Interior Northwest, and had seen many forests in need of thinning go untouched for lack of market value or other incentives to offset cost of the operation. Dr. Koch believed that mechanized harvesting systems, automated small log mills, and tax and market structures existing in Denmark would be of much interest to Forest Service visitors. This tour was implemented in response to that invitation.

Purpose

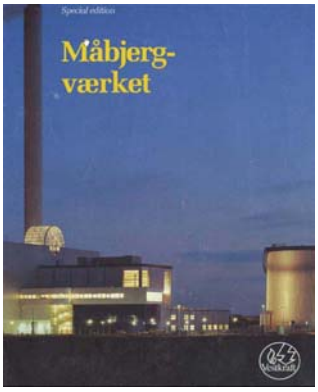
To expand our knowledge of equipment, systems, and markets for harvesting and utilization of small-diameter, low-value wood materials as well as to see a broader array of possibilities that might have application in the US. Of particular interest are applications, technologies and markets that could enhance public forestland management, forest health restoration and hazardous fuels reduction on US federal forestlands.

Participants

- **U.S. Forest Service:**
  - **Washington Office R&D**: John Sebelius, Resource Valuation and Use Research
  - **Field R&D**: Eini Lowell, Social and Economic Values Research, Portland, OR;
  - **Washington Office NFS**: Dan Len, Forest Management, Ft. Collins, CO;
  - **Field S&PF:** Lew McCreery, State & Private Forestry, Morgantown, WV;
- **Industry:** Matt Arno, Woodland Restoration Inc., Missoula, MT
- **Academia:** Han-Sup Han, Assistant Professor, Forest Engineering, University of Idaho, Moscow, ID

Summary of Locations Visited

In-woods whole tree chipping operation on a young Norway spruce plantation near Vorbasse, Jutland. A chipper produces 60,000 m^3/year of chips.



Maabjergvaerket, a wood chip fired district heating and electric generation plant in Holstebro, Jutland. This plant generates 20 megawatts of electricity that supports 55,000 people nearby.

Energy Denmark imports wood from the Baltics for use in bio-energy.

Chipping on dock of imported wood for use in area district heating plants.

Tirstrup district heating plant, wood chip fired, Arhus, Jutland. This plant is 1.4 megawatts & heats (via hot water) 130 homes of the nearby community.

Rold Forest Sawmill, processing 350 m^3/day or 55,000 m^3/year of tree length logs, Arhus. This is one of 10-15 softwood sawmills being operated in Denmark.

Urban forest aforestation project in several locations outside of Arhus

Skov & Teknik forestry equipment show is organized every 4th year by Skov and Landskab.

KFK Bioenergy, wood pellet manufacturing plant, Vildbjerg

Cut-to-length thinning operation on a 50 year-old Norway spruce plantation in Sweden at $15.00/m^3.

Silvatec, company manufacturing chippers and harvesters, Farso. It takes 3 weeks to manufacture a complete harvester.

Knareds Sagen, AB – automated small log sawmill in southern Sweden

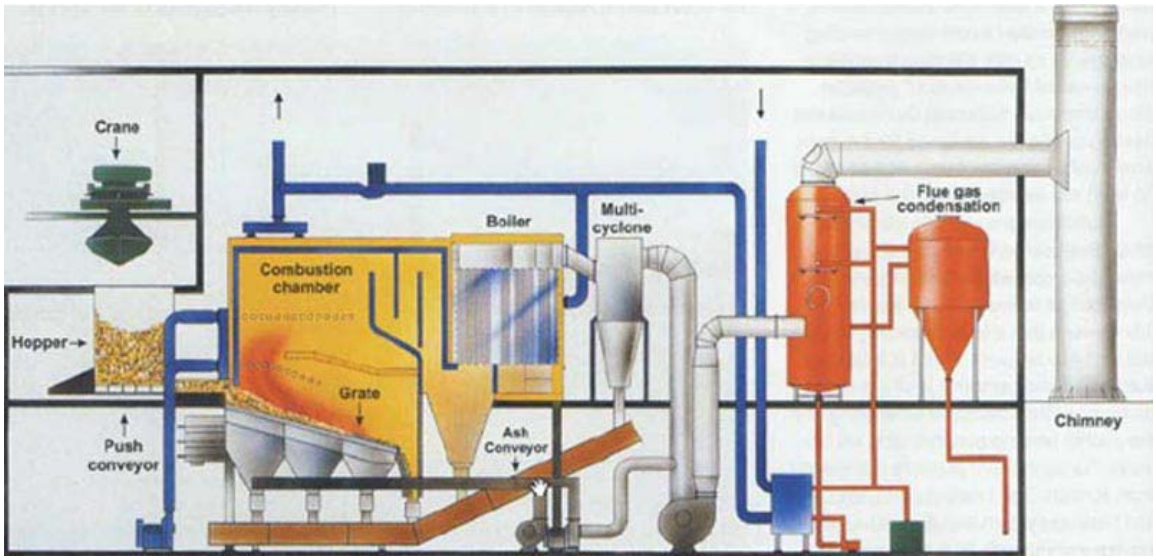
Stora Enso newsprint mill, Hyltebruk, Sweden.

Various wood construction projects and a building products supply center in southern Sweden

Summary of Findings

Denmark levies special taxes (energy tax, CO_2 tax, and Sulphur tax) on fossil fuels to generate funds that subsidize capital investments in renewable energy ventures. This tax is not imposed on energy generated by biomass or any other type of non-fossil fuel.

Wood and straw fired district heat plants under the current tax structure save homeowners considerably (one example given suggested up to 2/3) when compared to natural gas district heating; Wood pellets made from residues are used in such heating plants.



Wood Fired District Heating Plant

Denmark is approximately 10% forested; the country is planning to increase that to 20% in about 100 yrs.

Denmark's lumber industry serves niche markets such as long log lengths while its neighboring countries process cut-to-length materials.

Summary of Conclusions

In Denmark and Sweden there appears to be a commitment to renewable energy given the large number of wind generators and biomass heating plants we saw. They are even importing some wood for heating chips instead of fossil fuels. The forestry operations we saw were carried out with much care and precision.

In the United States some people think the reason we don't use more small wood is a lack of technology or uses for small material, but as the Danes and Swedes have shown it is actually a lack of investment in technology. To get that investment there either needs to be a lot of material available at the right price to entice private investment or the public needs to make the investment.

Government tax policy can be effective in stimulating demand for renewable energy use and associated industrial activities. This makes it more feasible to practice forest health restoration and fuel reduction treatments on the US public forestlands and helps to stabilize local energy supply and economic stability.

Recommendations

As participants in the study tour we spend a lot of time thinking about small wood utilization in the United States. These are some ideas that came up in our discussions.

- Put chip burners in government owned buildings near fire prone forests in need of fuels reduction work. A National Forest Ranger Station or an elementary school would be appropriate examples. Many of these buildings are already heated by hot water heat, so a chip boiler could be installed in place of the fossil fuel burner.

- Use a small portion of National Fire Plan funding for appropriate biomass removal projects.

- Subsidize capital investment in renewables through a tax on fossil fuels. This approach seems to have worked very well in Denmark and Sweden.