

FINAL TECHNICAL PROGRAM

International Workshop

***Sustainable Production Systems for Bioenergy:
Impacts on Forest Resources and Utilization of Wood
for Energy***



Flagstaff, Arizona, USA

5-10 October 2003

and optional

Post-Workshop Tour, Arizona

11-15 October 2003

SPONSORS, ORGANIZERS, HOSTS

Sponsored by:

IEA Bioenergy Task 31 Conventional Forestry Systems
for Sustainable Production of Bioenergy - Jim Richardson, Task Leader
USDA Forest Service Research & Development - Bryce Stokes and Dan Neary

Organizers:

USDA Forest Service, Rocky Mountain Research Station
Greater Flagstaff Forests Partnership

Hosted by:

USDA Forest Service, Rocky Mountain Research Station
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BACKGROUND

This is the third annual workshop held by IEA Bioenergy Task 31 on 'Conventional Forestry Systems for Sustainable Production of Bioenergy'. The Task is developing systems and guidelines for environmentally sustainable and economic production of biomass for energy from conventional forestry systems; and promoting their acceptance and use in relation to silviculture, forest management, harvesting and transportation. It is envisaged that integrated assessments of forest management practices, environmental conditions and socio-economic factors will not only improve productivity and forest health, but also result in the most efficient use of forest resources, including biomass for energy, from both natural forests and plantations in the world's major forest biomes.

WORKSHOP OBJECTIVES

This workshop continues the Task's approach of developing sustainable systems for producing biomass for energy from naturally regenerated forests and plantations that integrate forest management, environmental conditions and socio-economic factors. The objective of the workshop is to provide an opportunity and venue for resource managers, power industry representatives, bioenergy systems equipment manufacturers, energy production professionals, energy users, program managers, educators, scientists, and researchers to exchange information and discuss sustainable management, production, and use of bioenergy as an integral part of resource management and community development. The workshop will review state-of-the-art knowledge in two main topic areas related to this objective:

- Bioenergy and wildfire risk reduction
- Bioenergy production systems

For both of these main topic areas, more specific consideration will be given to how sustainable biomass production for energy depends on and integrates questions of:

- Operations and economics of feedstock production
- Social and political considerations of using wood for energy
- Site productivity and improvements in forest management
- Environmental quality in bioenergy production
- Integrating bioenergy and forest fuels management
- Enhancing bioenergy production systems

PROGRAM OUTLINE

Arrival

Sunday 5 October

Arrive at Phoenix Sky Harbor Airport, Arizona. See the Arrival/Departure section below for information on traveling to the Embassy Suites Hotel, 1515 N. 44th Street, Phoenix where there will be a social hour at 1800 and a welcome dinner at 1930, as well as an introduction to Arizona and Southwestern ecosystems.

Field Study Tour

Mon 6 & Wed 8 October

A field tour by coach on two separate days (Monday and Wednesday), starting from the hotel in Phoenix at 0800 on 6 October and traveling to Flagstaff for the workshop. The Monday trip to Flagstaff will include energy in Arizona, native American history in the Southwest, and past forest management. Arrival in Flagstaff will be approximately 1700. The focus of the Wednesday field trip (0800 departure from the Radisson Woodlands) in the Flagstaff vicinity will be small diameter fuels buildup, increased fire risks, approaches for dealing with the forest fuels situation, and opportunities for bioenergy production systems in over-stocked ponderosa pine forests in the Southwest. It will include the Flagstaff Wildland-Urban Interface Fuels Reduction Project, wildfire risks and ecosystem impacts, the burning interval study, ponderosa pine restoration studies by the Ecological Restoration Institute, silvicultural approaches for reducing ponderosa pine fuels, the Fort Valley Experimental Forest, the Southwest Fire and Fire-Surrogate study, the impacts of the current bark beetle epidemic, and ponderosa pine ecosystem restoration approaches and studies on Northern Arizona University's Centennial Forest. The Wednesday field tour will conclude at 1700 at the Radisson Woodlands. Box lunches will be provided both days.

Technical Sessions

Tue 7, Thur 9, & Fri 10 October

The 3-day workshop, Tuesday, Thursday, and Friday, will be held at the Radisson Woodlands Hotel, Flagstaff, Arizona. Invited and volunteer papers will be presented on topics related to the workshop objectives. On Friday afternoon after the conclusion of the technical sessions, participants can either depart from Flagstaff for Phoenix or other destinations, or stay overnight and depart Saturday morning. Alternatively, participants can choose either of the optional 2- or 5-day post-workshop tours which will start in Flagstaff and conclude in Phoenix, including the hotel night on 10/10.

Optional Post-Workshop Tours **(Option 2 includes Option 1)**

Option 1: Sat 11 – Mon 13 October

Option 2: Sat 11 -Wed 15 October

Two optional post-workshop tours are being offered, both starting in Flagstaff and concluding in Phoenix:

Option 1: (2-day tour) involves a visit by coach/train to the Grand Canyon (11 October) followed by a return to Flagstaff. On the second day there will be a full-day rafting trip down the Glen Canyon section of the Colorado River followed by a return to Flagstaff. On Monday 13 October there will be a bus or shuttle to Phoenix for national and international departures on Monday.

Option 2: (5-day tour) includes the Grand Canyon visit and Glen canyon rafting trip in Option 1. It continues on 13 October with an 0800 departure from the Radisson Woodlands, and visits to bioenergy facilities in the White Mountains, as well as stops illustrating forest management, fuels and environmental issues in the Apache-Sitgreaves National Forest, the White Mountain – Apache Nation, and the 2002 Rodeo-Chediski wildfire. Tour participants will overnight on Monday and Tuesday at the Hon-Dah Resort and Casino on White Mountain Apache Tribal lands. Option 2 ends in Phoenix on Wednesday evening with a farewell dinner and overnight accommodations in that city prior to national and international departures on Thursday.

TECHNICAL SESSION DETAILS

Workshop Technical Sessions

Tue 7, Thu 9, Fri 10 October

TUESDAY, OCTOBER 7

Session 1. Social and Political Considerations of Using Wood for Energy.

Invited and volunteer papers and discussion

- 1.1 *Pentti Hakkila, VTT, Finland* – The drivers behind the development of forest energy in Finland
- 1.2 *Rolf Björheden, Växjö University, Sweden* – Establishing forest energy in Sweden – rules of the ‘sustainability game’ in retrospect
- 1.3 *Jianbang Gan and C.T. Smith, Texas A&M University, USA* – A comparative analysis of woody biomass and coal for electricity generation under various CO₂ emissions reductions and taxes
- 1.4 *Tara Bhattarai, Tribhuvan University, Nepal* - Traditional biomass fuel in Asian developing countries: the issue of production and sustainable utilization
- 1.5 *Kenneth Iversen and Richard Van Demark, Prescott Area Wildland/Urban Interface Commission, USA* – Integrating sustainable fuel reduction management with bioenergy and wood products economic development
- 1.6 *Helen M. McKay, Forestry Commission, UK* – Environmental, economic, social and political drivers for increasing use of woodfuel as a renewable resource in Britain
- 1.7 *Steve Smith, Forestry Commission, UK* – Quantifying the potential woodfuel resource in Britain and distributing the results via an interactive web site
- 1.8 *H. Michael Rauscher and William G. Hubbard, USDA Forest Service* - The encyclopedia of southern forest science: scientific knowledge management in practice
- 1.9 *Dennis R. Becker, USDA Forest Service, USA* – The social realities of bioenergy in northern Arizona

Session 2. Integrating Bioenergy and Forest Fuels Management. Part A.

Invited and volunteer papers and discussion

- 2.1 *Bryce Stokes and Wayne Shepperd, USDA Forest Service, USA* – A strategic assessment of biomass and fuel reduction treatments in Western States
- 2.2 *Kelkar M. Vasant, Brian Geils, Dennis Becker, Steve Overby and Dan Neary, USDA Forest Service, USA* – How to recover more value from small trees: essential oils, resins, and other products

THURSDAY, OCTOBER 9

Session 2. Integrating Bioenergy and Forest Fuels Management. Part B.

Invited and volunteer papers and discussion

- 2.3 *Phillip C. Badger and Peter Fransham, Renewable Oil International™ LLC, USA* - Use of mobile fast pyrolysis plants to densify biomass and reduce biomass handling costs
- 2.4 *Daniel Len, USDA Forest Service, USA* – Smallwood utilization and Bioenergy in the U.S. Forest Service
- 2.5 *Bill Carlson, Wheelabrator Technologies, USA* – How will we ever get these forests thinned before we lose them?

- 2.6 *William G. Hubbard, and H. Michael Rauscher, USDA Forest Service* - Understanding and overcoming barriers to effective bioenergy research technology transfer

Session 3. Operations and Economics of Feedstock Production.

Invited and volunteer papers and discussion

- 3.1 *Jean-François Van Belle, CRA, Belgium* - Model to estimate bioenergy recoverable in Norway spruce clearcuts in southern Belgium
- 3.2 *Dominik Röser, Karri Pasanen and Antti Asikainen, Finnish Forest Research Institute* - Decision-support model analyzing benefits and limitations of different forest fuel recovery options
- 3.3 *Antti Asikainen, Finnish Forest Research Institute* – Simulation modelling of truck arrivals and crushing of forest fuels at plants
- 3.4 *Arto Timperi, Timberjack Oy, Finland* - Novel forest biomass production systems for the world's biggest biofuel plants
- 3.5 *Jerry Johansson, Jan-Erik Liss, Tomas Gullberg and Rolf Björheden, Dalarna University & Växjö University, Sweden* – Transport and handling of forest energy bundles – advantages and problems
- 3.6 *J. B. Hudson, R.J. Hudson, and M. Sendros, Forestry Contracting Limited, U.K.* - Storage of forest residues in compressed fiberlogs
- 3.7 *Takuyuki Yoshioka, Kazuhiro Aruga, Toshio Nitami, Hideo Sakai and Hiroshi Kobayashi, University of Tokyo, Japan* - A Harvesting and Transporting System for Residual Forest Biomass in Japan.
- 3.8 *Veli-Matti Saarinen, Finnish Forest Research Institute* – The effects of slash and stump removal on productivity and technology of forest regeneration operations
- 3.9 *Rob Davis, Forest Energy Corporation, USA* –Harvesting and production of densified fuels from small diameter forest biomass
- 3.10 *William F. Watson, Georgia-Pacific Corporation, USA* – Energy issues facing a US forestry firm.

FRIDAY, OCTOBER 10

Session 4. Site Productivity and Environmental Quality in Bioenergy Production.

Invited and volunteer papers and discussion

- 4.1 *Don J. Mead, Golden Bay, New Zealand* - Evaluating increased plantation productivity from site amelioration using energy analysis.
- 4.2 *T. Mahendrappa, C.M. Pitt, D.G.O. Kingston and, T.L. Morehouse, Canadian Forest Service* - Impacts of harvesting white spruce in Prince Edward Island
- 4.3 *Thomas M. Williams and Charles A Gresham, Clemson University, USA* - Crown dimensions and biomass accumulations in rapidly growing loblolly pine and sweetgum.
- 4.4 *E.A. Carter, USDA Forest Service* - The impact of intensive management practices on erosional characteristics of a loblolly pine plantation in the Piedmont Region of Alabama, USA
- 4.5 *James P. Shepard, National Council for Air and Stream Improvement, USA* - Environmental quality issues for intensive wood production systems.
- 4.6 *Simon Skov, Danish Forest and Landscape Research Institute* – Handle with care! Health hazards of wood chip moulds from forest to combustion

- 4.7 *M.D. Danesh Miah and Syed Ashrafal Alam, Institute of Forestry and Environmental Sciences, Bangladesh* - Deforestation and greenhouse gas emission due to the consumption of wood fuel by the brickfields in Chittagong region, Bangladesh
- 4.8 *Aregai Teclé and Daniel G. Neary, Northern Arizona University and USDA Forest Service, Flagstaff, AZ* – Modelling impacts of different levels of forest fuels management on potential soil erosion and flood flows.

IEA BIOENERGY AND CONFERENCE CONTACT INFORMATION

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IEA BIOENERGY TASK 31 ANNUAL WORKSHOP
FLAGSTAFF, ARIZONA
5-15 OCTOBER 2003

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