

Woody Biomass and Small Log Workshop: From Feedstock to Product

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College of the Siskiyous, Weed, California

Opening Session: Woody Biomass: Is It a Problem or a Solution?

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Biography: John Shelly is a Cooperative Extension Advisor in Biomass and Forest Product Utilization at the University of California at Berkeley, Richmond Field Station. He teaches, presents workshops, and conducts research in a wide variety of forest products manufacturing processes and woody biomass utilization. John's educational background is in Wood Science and Technology (BS-- Penn State, MS and PhD -- University of California at Berkeley). His academic career began in 1978 and includes positions at UC Berkeley and the University of Kentucky. His primary area of interest and expertise is in the physical properties of wood and manufacturing technology with an emphasis on woody biomass, including underutilized urban and timber species. Current efforts are focused on the technology needed to wisely use these underutilized resources to enhance forest health and economic development. Recent projects include research projects focused on the utilization of non-commercial western hardwood species, small diameter trees, diseased and dying trees, sudden oak death diseased wood, and urban tree removals. John has authored over 60 scientific and extension publications and presented papers and talks at over 100 conferences and workshops. John is also a co-chair of the University of California Woody Biomass Utilization Workgroup, a board member of the California Biomass Collaborative, Vice President of the Forest Products Society and he recently served as a member of the Brookings Institution 2006 Large Fire Panel.

Abstract: Woody biomass, a broad, generic category that includes woody materials generated from forest thinning, fuel reduction in wildfire hazard areas, storm damage, catastrophic forest mortality (drought and insect related), debris from orchard and urban tree maintenance, residue from the waste stream of wood manufacturing, construction, demolition, transportation (pallets and shipping containers), and many other wood use activities. On one hand, woody biomass is a problem... a disposal problem in the urban environment and a wildfire hazard, ecosystem health concern or forest productivity hindrance in a forest environment. On the other hand, woody biomass as a form of wood is a renewable resource with many favorable properties that make it a good feedstock for many manufactured products.

Over the past 50 years there has been much effort devoted to developing knowledge, improving technology, and disseminating information on the material properties and utilization opportunities of woody biomass, including:

- Soil additives and amendments (mulch, compost, etc.)
- Firewood and fuel wood
- Combustion fuel for biomass power plants
- Solid wood products (lumber and round wood)



- Non-structural composite products including wood/plastic lumber and wood/cement products
- Structural composite products such as particleboard and oriented-strand board
- Pulp chips for paper products
- Bio-oils, producer gas, and other organic chemicals

When the energy issues become prominent on the national and international stage, as they are now, much attention is devoted to opportunities to convert woody biomass into energy products. In addition, there are many non-wood product benefits of biomass such as ecosystem services and carbon storage that just beginning to be discussed. Yet, in spite of all the positive attributes of woody biomass we are still faced with a major disconnect between woody biomass supplies and beneficial uses. “The devil is in the details.” The physical properties of much of the available forest biomass are often inferior to other woody biomass raw materials that can be used to make these products, the costs of harvesting and transporting the forest biomass are high, and sometimes public concerns hinder the use of wood resources. It remains a major challenge to expand the sustainable and profitable use of woody biomass as a raw material for beneficial uses requiring a range of developments and incentives from technology to public policy to make it work. Woody biomass is unlikely to be the only answer to the global question of how do we address the dwindling supply of fossil fuels and non-renewable resources that drive an industrialized society, but it will certainly be a part of the answer, and perhaps a very large part.

Feedstocks/Fiber Supply

Moderator: *Bruce Goines, US Forest Service, Region 5, Vallejo, California*

The Challenge of Small Tree Harvesting and Handling

Bruce Hartsough, Biological and Agricultural Engineering, University of California, One Shields Avenue, Davis, CA 95616, 530-752-8331, brhartsough@ucdavis.edu

Biography: Bruce Hartsough began his career in 1976 at Weyerhaeuser Company, evaluating and developing methods for harvesting small trees, in Oklahoma, Oregon and Washington. He then joined the University of California at Davis as a development engineer, studying logging on steep terrain with helicopters and cable yarders. Much of his recent research has focused on methods for harvesting to reduce fuel loading and improve forest health in natural stands, harvesting of short-rotation plantations, and collection of forest biomass for energy. He has B.S. degrees in Forest Engineering and Renewable Natural Resources (UC Davis 1976), an M.S. in Agricultural Engineering (UC Davis 1983) and a doctorate in Agricultural Engineering (Auburn University 1986). He is currently Professor of Biological and Agricultural Engineering and Interim Associate Dean of the College of Engineering at UC Davis. He is a member of ASABE, COFE, FPS and SAF and has served as chair of the Short-Rotation Woody Crops Operations Working Group and the ASABE Forest Engineering Research Committee.

Abstract: Small-tree biomass makes up a substantial fraction of the total that may be removed in fuel-reduction thinnings of forests in the western United States. Studies and practical experience show that it is expensive to remove small trees from naturally regenerated stands, in large part because most equipment used for these operations is very similar in concept to that used for larger trees. It may be possible to reduce harvest costs by developing new equipment that satisfies some basic materials handling principles, including bulk handling, densification and

unitization, as can be demonstrated with examples from other applications. The development challenges are numerous, however, so in the short term the high costs of small trees will be a fact of life. If society believes the benefits of removing small trees outweigh the costs, it should agree on a method to pay. One possibility: remove some higher valued trees as well. As one study demonstrated, relatively small volumes of large trees can offset the net costs of the small trees.

Wood Supply to Industry

Michael Backes, Roseburg Forest Products Company, 98 Mill Street, Weed, CA 96094, 530-938-5733, mikeba@rfpco.com

Biography: I have worked for Roseburg Forest Products for the past 14 years as the California Acquisition Manager and am responsible for buying logs for our California veneer operation. I am also responsible for furnishing hog fuel to our boiler as well as selling excess hog fuel to other biomass plants from Roseburg fee lands that are not geographically close to the Weed veneer plant. I am involved with selling paper chips and chip fines generated by the veneer plant.

I am a member of the California Licensed Foresters Association and am a California Registered Professional Forester and current chairman of the Mount Shasta City Planning Commission. I hold a bachelors degree in forestry from Humboldt State University and an AA degree from College of the Redwoods.

Through the past 25 years I have worked for Sierra Forest Products (the furthest south sawmill in California) and for the Louisiana Pacific Corporation where I initiated a biomass program on the company timber lands at Feather Falls. As with other fellow Foresters I am a true environmentalists, passionate about promoting the most environmental contentious energy and building material available, wood!

Abstract:

Woods Supply Regional:

- Large Industrial timberland owners
- Small Private timberland owners
- Agency: USFS, State, BLM

Mill Residual Supply

- Locally
- Regionally

Wood Supply Nationally

- Fiber Supply problem (real or perceived)
- Competing fiber users

Federal Lands Perspective

Rod Vineyard, USDA FS Lassen National Forest, Eagle Lake Ranger District, 477-050 Eagle Lake Road, Susanville, CA 96130, 530-257-4188, rvineyard@fs.fed.us

Biography: Assistant Fuels Management Officer Eagle Lake Ranger District, 1978 – 1983. Biomass Specialist Eagle Lake Ranger District 1984 to present, helping to pioneer and develop the Biomass program on the Lassen National Forest and in Northeastern California.

B.A. Park Management & Resources, Chico State University, “1976”.

Abstract: Today most of the forested areas on the Eagle Lake Ranger District and throughout the West have far more trees than what historically existed. The more productive mixed conifer sites on the District will have upwards of 1,000 plus trees per acre; whereas 300 trees per acre are common on the drier, eastside pine sites. This in-growth is due mainly to fire suppression, which has led to today’s stands that are characterized by tree densities that are several times higher than historic levels. We treat our overstocked stands with mechanical biomass thinning operations, utilizing a thinning from below cutting prescription. This treatment removes most of the ladder fuels in the stand and decreases the number of trees per acre down towards a stand structure that is more similar to pre-settlement conditions. To summarize we are reducing the fire danger in our National Forest, returning stand structure back toward pre-settlement conditions and improving overall forest health. My presentation will show examples of the above described operations.

Biomass Power Generation

Gordon Draper, Biomass One, 2350 Avenue “G,” White City, OR, 97503, 541-826-422, ext. 1009, draperg@biomassone.com, www.biomassone.com

Biography: Graduate of University of Missouri, School of Forestry, received a B.S. in Forest Products Marketing. Was with International Paper Co. for 25 years with the last 15 years as Manger of Fiber Procurement Western Region. The last 15 years have been with Biomass One, a 25 megawatt co-generation power plant in White City, Oregon, as Vice President of Fiber Fuel & Transportation. Have been proactive in promoting restoration of forest health as it relates to forest fuel reduction, processing, transport and consumption.

Abstract: Over 100 years of fire suppression, harvest mismanagement, lack of adequate salvage logging, and reforestation efforts have given us forests which in many cases are in very poor health.

Nationally, the government has reported that approximately 42 million acres are at high risk for conflagration fires and that the Biscuit fire could be just the start of what is yet to come. In Oregon 4 million acres have been identified as being in the high risk category needing prompt attention. The governor has called for a 20-year plan treating 200,000 acres per year. The big question is who is going to do it and at what cost paid by whom?

The complexity and scope is overpoweringly large and will require the involvement of all concerned. Biomass One’s biomass power plant in White City, Oregon, is but one small but important piece of the puzzle. Approximately 25% of the plant’s fuel requirements is processed by the company’s three portable Morbark tub grinders and services by 10 of its own chip trucks.

Logging slash is a major fuel source for that equipment. The plant reaches out 75 miles to acquire fuel for those machines.

The problem facing the issue is to a large extent an inadequate infrastructure in all aspects. The fix and solution will require the concerted effort of a multitude of public and private land owners, loggers, processors, truckers, and industrial end users and, yes, the environmental movement as well.

The barriers that now exist have to be torn down. Biomass One is committed to being part of the solution.

Biomass Conversion Technologies— Lumber, Veneer and Composites

Moderator: *Gareth Mayhead, University of California, Berkeley*

UC Richmond Field Station, Building 478, 1301 South 46th Street, Richmond, CA 94804, 510-665-3662, garethmayhead@nature.berkeley.edu

Biography: Gareth is currently Academic Coordinator for Forest Products within the Center for Forestry at the University of California Berkeley. In this role he works under a USDA Forest Service grant coordinating outreach in woody biomass and forest products issues in California, Oregon and Washington. Prior to this appointment 5 years were spent as a project manager at a community forest in the UK. This involved project development and management delivering support and assistance to the timber sector in North West England. Projects focused on utilization of waste wood, development of added value products, streamlining forest certification, biomass for energy, business and financial support programs.

He has a Masters in Forest Industries Technology from the University of Wales, Bangor, UK. After this he worked for 5 years at the BioComposites Centre, at the University of Wales, in a number of roles as Research Scientist and Pulp Lab Manager, carrying out contract research and development relating to utilization of natural fibers. He is an associate member of the Institute for Wood Science and treasurer for the Forest Products Society Pacific Southwest Section.

Lower Capital Investment Biomass and Smaller Log Processing Options

Larry Swan, USDA Forest Service, Fremont-Winema National Forests, 2819 Dahlia Street, Klamath Falls, OR 97601, 541-883-6708, lswan01@fs.fed.us

Biography: Larry Swan is a Forest Products Utilization and Marketing Specialist employed by the USDA Forest Service. He is based in Klamath Falls, Oregon. Larry provides businesses, non-profit organizations, and state, local and federal agencies technical and business assistance designed to improve 1) economic viability of forest products businesses, especially related to use and markets for low-value logs and residues, and 2) focus and success of related public investments. His time lately has been split between Oregon and Southern California, through special intergovernmental agreements with the Oregon Economic and Community Development Dept. (OECD) and CalFire (i.e., California Dept. of Forestry and Fire Protection). He also works annually for the International Forestry branch of the Forest Service on community forestry

projects in Latin America and every summer on fire assignments. Larry is a member of the Society of American Foresters and Forest Products Society. He holds a B.A. (1973, University of Arizona), M.S. (1979, Long Beach State University), and fulfilled his professional forestry education requirements at Cal Poly San Luis Obispo (1990). Larry was chosen in 2004 as one of the top 50 business leaders in Oregon by *Oregon Business Magazine*.

Abstract: Substantial investment and infrastructure are usually required to economically harvest and transport biomass and smaller logs. However, if there is already some type of harvest or fiber removal occurring, there may potentially be lower cost capital investment processing options suitable for certain locations and markets.

Small Log Utilization: Veneer and Plywood

Scott Janni, Management Solutions and Services, Inc., 2243 Cedar Lane, Whitefish, MT, 59937, 406-249-1432, scottjanni@centrurytel.net

Biography: B.S. Economics, Natural Resource Option, 1976-1981, Montana State University; Graduate study in pursuit of M.S., Economics, 1982. Business Consultant for Management Solutions and Services, Inc. Started company in June, 2004. Client list includes Roseburg Forest Products (Oregon, California, Arbortech Inc. (Virginia), East Fraser Fiber (BC, Canada), Pyramid Mountain Lumber (Montana), Stimson (Oregon, Montana); North End Timber (for 1st Security Bank, Montana); Vaagen Brothers Lumber (Washington). Was Plant Manager, Plum Creek Timber Company from 1992 – 2004.

Work history includes a Plant Manager position with management of high speed, small log sawmill and planer operations in addition to management of a re-manufacturing plant producing finger-jointed structural lumber. Familiar with high technology: curve sawing technology, machine vision systems, optimization. Have traveled in North America, Scandinavia, and Japan to gain a better understanding of wood products processing technology, markets, and raw material resource issues. Have experience serving export lumber markets in Japan (1990- 1998); operated VMI (vendor managed inventory) programs to provide high grade lumber products and service for large retailers; developed relationships with key domestic distribution customers to achieve maximum sales value from products produced. Implemented a Continuous Improvement Program to enhance financial results from operations and train staff in the area of Process Improvement. Additional professional activities include: Member, Board of Directors, Montana Manufacturing Extension Center, Montana State University; Member, Flathead Forestry Exposition Committee; Presenter, Inland Logging Conference

Abstract: Historically, veneer has not been considered as a conversion alternative for small logs. The technology available in the past for peeling blocks into veneer required that a “core” be left in the middle of the block. The core is necessary because the lathe chucks must have something solid to hold onto as they rotate the block against the knife and produce a ribbon of veneer. With the progression of technology, the minimum diameter core required for efficient operation has been reduced over time and depending on market conditions, the possibility exists that veneer can be a conversion alternative for smaller wood. In this abstract, the following areas of interest will be covered:

- 1) The math and physics of peeling small logs
- 2) Secondary processing of veneer and it’s impact on financial outcome .
- 3) Market conditions and demand for veneer products .

Summary – In the summary section of the presentation the current economics of small log conversion to veneer will be reviewed, and a look to the future will also be presented.

Small Log Utilization: Lumber

Chris Skinner, Sierra Pacific Industries, P.O. Box 2677, Burney, CA 96013, 530-335-3681, cskinnner@spi-ind.com

Biography: I am the Burney Division Manager for Sierra Pacific Industries of the Burney small log sawmill and cogeneration plant. I began my career in the wood products industry eleven years ago. I graduated from Montana State University with a BS in Manufacturing Engineering with a minor in Business. I spent the first few years of my career as a capital project engineer with Plum Creek Timber, the majority of it in Louisiana and Southern Arkansas. Since then, I have stepped over to the production side of the industry working with Southern Yellow Pine and 10 different Hardwood species with Roy O. Martin Lumber Co.; White Fir, Doug Fir, Ponderosa Pine, and Sugar Pine in the northwest with Sierra Pacific Industries.

Abstract:

- LOG PROCUREMENT
 - Company owned lands
 - Forest Service
 - Private Land owners
- SMALL LOG MANUFACTURING
 - Debarking
 - Primary Breakdown
 - Secondary Breakdown
 - Sorting
 - Stacking
 - Drying
 - Planing
 - Grading
 - Packaging
- COGENERATION
 - Definition of
 - Where the fuel comes from
 - Manufacturing Operations
 - Woods Fuel
 - 100% utilization of the tree
- Workforce
 - Skill levels

Woody Biomass Utilization in Oregon

Scott Leavengood, Oregon State Univeristy, 119 Richardson Hall, Corvallis, OR, 97331, 541-737-4212, Scott.Leavonwood@oregonstate.edu, <http://owic.oregonstate.edu>

Biography: Scott Leavengood is director of the Oregon Wood Innovation Center at Oregon State University – a joint initiative of OSU’s College of Forestry and the OSU Extension Service.

Scott has worked for OSU since 1994 as a Wood Products Extension Agent, first in south-central Oregon, then in the Portland metro area. His role with the Wood Innovation Center involves coordinating the outreach of the department of Wood Science & Engineering at OSU, providing technical assistance to existing Oregon wood products firms, and assisting entrepreneurs. Scott has a B.S. in Wood Science & Technology from Colorado State University, M.S. in Forest Products from Oregon State University, and is currently a Ph.D. candidate in Engineering Management at Portland State University.

Abstract: Scott will define and describe the various categories of woody biomass (merchantable and non-merchantable logs, mill residues, logging slash, and urban wood waste) and the current uses for these materials. The presentation will include summary data from a 2006 U.S. Forest Service publication describing the total timber harvest in Oregon, volume use by the state's forest products industry, and volume flows between firms.

Biomass Conversion Technologies

Biomass to Energy—Heat, Electricity, Liquid Fuels

Moderator: *John Shelly, University of California, Berkeley*

Energy for Public Buildings and Other Small Scale Applications

Rob Williams, California Biomass Collaborative Forum, University of California, One Shields Avenue, Davis, CA 95616, 530-752-6623, rbwilliams@ucdavis.edu <http://biomass.ucdavis.edu/>

Biography: Rob is a Research Engineer in the Department of Biological and Agricultural Engineering at the University of California, Davis and is a technical staff member for the California Biomass Collaborative. He has been a research engineer at the University since 1996.

For the Biomass Collaborative, Rob conducts biomass and MSW conversion technology and system evaluations, biomass resource assessments and other related analysis.

Rob's research interests are in renewable and sustainable energy systems, primarily related to biomass for heat, power and transportation fuels.

He holds a Bachelor of Science degree in Mechanical Engineering (1984) and a Master of Science degree in Biological & Agricultural Engineering (1992), both from UC Davis and is a Registered Professional Engineer in the state of California.

Abstract: Bioenergy systems for heat, power, and/or combined heat and power (CHP) will be discussed, including some examples of recently installed or proposed systems. The presentation will describe some of the technologies, their energy and environmental performance and costs.

Biomass Power Plants and Other Energy Applications

Tad Mason, TSS Consultants, 2724 Kilgore Road, Rancho Cordova, CA, 95670, 916-638-8811, ext. 112, tmason@sbcglobal.net

Biography: Tad joined TSS Consultants in 2000 and since that time has conducted biomass market and utilization feasibility assessments, supported biomass project development, designed forest fuels management projects, and conducted applied research for a variety of clients.

Clients served range from public sector agencies, to private sector businesses, Tribal enterprises, public utilities, investment banks and non-profit organizations.

As a principal at TSS, he has managed projects throughout North America focused on wildland fuels reduction, forest management, biomass utilization and bioenergy project development. Prior to joining TSS, he served as Manager of Wood Fuel Supply for Pacific Energy/Pacific Wood Fuels Company where he coordinated biomass fuel procurement activities in support of four biomass-fired power plants in Northern California. As a Registered Professional Forester (RPF), he has prepared plans for timber harvests, timber management, fuels treatment, and fire restoration.

Tad Mason received his B.S. degree in Forestry from the University of California at Berkeley in 1979. He is an active member of the Northern California Society of American Foresters and the California Licensed Foresters Association. Tad currently serves on the Western Governors Association Biomass Task Force and the Oregon Forest Biomass Work Group.

Abstract: Commercial scale biomass power technologies have evolved over time to take advantage of a variety of economical feedstocks and to meet ever more stringent emissions and performance criteria. This presentation will address the range of current biomass combustion technologies utilized in North America and review performance criteria utilized to effectively select the optimum technology matched to specific variables. The range of costs to develop, construct, own and operate a commercial scale project will be reviewed.

Liquid and Gaseous Fuels

Bryan Jenkins, Biological and Agricultural Engineering, University of California, One Shields Avenue, Davis, CA 95616, 530-752-1422, bmjenkins@ucdavis.edu

Biography: Bryan Jenkins is Professor of Biological and Agricultural Engineering at the University of California, Davis. He teaches and conducts research in the areas of energy and power, with emphasis on biomass and other renewable resources. Dr. Jenkins has more than 30 years experience working in the area of biomass thermochemical conversion including combustion, gasification, and pyrolysis. His research also includes analysis and optimization of bioenergy systems. His teaching includes both graduate and undergraduate courses on energy systems, heat and mass transfer, solar energy, and power and energy conversion, including renewable energy and fuels, economic analysis, environmental impacts, fuel cells, engines, electric machines, fluid power, cogeneration, and other technologies. Prof. Jenkins is a recipient of an Outstanding Achievement Award from the US Department of Energy for exceptional contributions to the development of bioenergy. Prof. Jenkins is Executive Director of the California Biomass Collaborative, a joint industry, government, environmental, and academic coordinating organization for biomass technology and policy in California, co-chair of the UC Davis Bioenergy Research Group, and Interim Director of the UC Davis Energy Institute. He is also a member of the UC executive committee on the low carbon fuel standard for California.

Abstract: Biomass is a chemically complex resource suitable as feedstock for many types of energy conversion systems. Recent attention has focused on the use of biomass for biofuels, especially those substituting for petroleum in transportation, although biomass enjoys a long history of development for both liquid and gaseous fuels in addition to heat production, steam raising, and electricity generation. Nationwide, biomass resources may be sufficient to displace up to about a third of current liquid transportation fuels. Improvements have been made in both

biochemical and thermochemical processes for producing a diversity of biofuels, and large scale biorefinery demonstration projects have now been funded in the US to test different design concepts. Renewable and low carbon fuel standards provide incentives for increasing biofuel production. These programs complement others around the world where reducing greenhouse gas emissions and mitigating climate change are major drivers of development, although ensuring sustainable practices will be key to expanding local, national, and international markets for biofuels.

Environmental Considerations

Moderator: *Bill Stewart, University of California, Berkeley*

The Value of Carbon in Forests

Bill Stewart, University of California, Center for Forestry, 137 Mulford Hall, 211, Berkeley, CA 94720-3114, 510-643-3130, stewart@nature.berkeley.edu

Biography: Bill Stewart recently joined UC Cooperative Extension Forestry Specialist after a decade with the California Department of Forestry and Fire Protection where he was the Assistant Deputy Director for the Fire and Resource Assessment Program (FRAP). While with the State, he led the 2003 Forest and Range Assessment for California, worked with the Board of Forestry on state forest management plans and the 2007 Forest Policy Statement, and worked on numerous forest management and fire management projects involving both state and federal agencies.

Mr. Stewart's areas of interest for both extension and research are in improving the positive financial linkages between urban residents and the working forests and rangelands of California. As we all know, there is an ever increasing social demand for services and risk avoidance such as better water quality, better fish and wildlife habitats, reduced wildfire, more open space, and climate impact benefits but few straightforward price signals and markets for landowners.

Before his decade in Sacramento, Mr. Stewart worked on forest and resource economics for the Sierra Nevada Ecosystem Project and on the Sierra Nevada Wealth Index. Mr. Stewart received his BS from Stanford University and his MS and PhD degrees from the University of California at Berkeley in environmental sciences and forest economics & policy.

Abstract: Forest carbon is much more than simply carbon sequestration. Although the international discussion about forest carbon is often phrased in units such as metric tons, hectares, and euros, the central issue is what foresters and forest businesses have dealt with for decades. Forest carbon benefits include the in-forest, in-product, and in-renewable energy components. Each component currently has a different market and many of the components are currently undervalued in US markets – especially compared to European markets where CO2 reductions are mandatory and where carbon prices work across products and sectors. An understanding of the current values placed on different aspects of forest carbon and where those prices could go in the future with efficient policies and markets is essential for forward looking forest managers and forest product purchasers in California and Oregon.

Air, Water and Land Use Permitting Considerations for Biomass Energy Facilities in Oregon and California

Frederick Tornatore, , TSS Consultants, 2724 Kilgore Road, Rancho Cordova, CA, 95670, 916-638-8811, ext. 104, fatoxic@tssconsultants.com

Biography: Frederick Tornatore has over 30 years of professional experience in renewable energy development for both the private and public sectors. Much of this experience has been in evaluating existing and emerging renewable technologies along with assessing environmental effects of the development and utilization of renewable energy resources, including biomass, geothermal, solar, and small hydro. Currently he is responsible for technical and environmental evaluations of a wide number of existing and emerging technologies that use many different forms of biomass (e.g., agricultural, forest, urban wood, municipal solid and animal wastes, and biosolids from wastewater treatment plants). He is also currently involved in the permitting/environmental process for several biomass utilization projects in California and Oregon.

Mr. Tornatore also has a long history of renewable energy legislative, regulatory, and policy analyses. While with the California Energy Commission, Mr. Tornatore implemented legislative mandates for renewable energy research and development. At TSS, he tracks and evaluates the myriad of legislative mandates, regulatory requirements, policy developments, and executive orders that provide current and emerging incentives to biomass-to-energy development, such as renewable portfolio standards, renewable energy credits, emission reduction credits, and greenhouse gas reduction.

Mr. Tornatore graduated from the University of California at Berkeley, and he has been California Registered Environmental Assessor for over 15 years. He was the 2004 and 2005 Chairman of the Sacramento Environmental Commission.

Abstract: Although biomass power production is seen as a renewable and ‘green’ energy source and is being embraced in general by the public for its’ myriad of societal and environmental benefits, it nonetheless requires considerable permitting attention. Local, state, and federal environmental agencies that deal with land use, air, and water issues on biomass power projects have regulations and laws that many times cannot take into account the societal and environmental benefits. Framing the positive aspects of the biomass power project and development of good rapport with the agencies is necessary. Understanding of the agencies constraints as well as flexibilities is paramount. This presentation will examine some of the critical biomass power permitting aspects in the states of California and Oregon.

The Pathway Forward

Moderator: *Gareth Mayhead, University of California, Berkeley*

Forest Service Resources

Bruce Goines, USDA Forest Service, 1323 Club Drive, Vallejo, CA 95492, 707-562-8910, bgoines@fs.fed.us

Biography: Registered Professional Forester California with 33 years field experience with the Forest Service in Timber/Fire/Silviculture and State & Private Forestry Programs. Currently serving as a Special Assistant to the Regional Forester working on Forest Health, Fuel Hazard

Reduction and Biomass Utilization issues in California. Most recent emphasis is working with the State of California on issues related to Carbon Sequestration, Climate Change and public lands Forestry

Bachelor of Science Degree from University of California Berkeley in Forest Resource Management, 1974

Wine maker producing Cabernet Sauvignon, Syrah and Zinfandel wines!

Abstract: Overview of the Forest Service Woody Biomass Utilization \$5 million annual grant program: purpose, timelines and evaluation criteria. Also brief overview of a Forest Service/California Resource Conservation and Development Association project that could provide professional engineering services to evaluate potential bioenergy projects in your local area.

Policy Direction

Doug Wickizer, California Department of Forestry and Fire Protection, 34 Paddle Court, Sacramento, CA 95833, 916-653-5602, doug.wickizer@fire.ca.gov

Biography: Mr. Wickizer was granted a bachelor's degree in Forest Land Management from Northern Arizona University in 1970 at Flagstaff, Arizona. He subsequently worked a short period with the USFS in Region III and then took a job with the California Department of Forestry and Fire Protection in 1973 and has been in their employ since that time. His experience since then includes, Forest Practice Inspector, Forest Practice Review Team Chair, Service Forester, Forest Practice Litigation Coordinator, Environmental Protection Officer for the Department, Regulations Coordinator for the Board and Department of Forestry and Fire Protection, Committee Consultant for the Board, Chief of Department Forest Management Program, Administrative Chief for the Departments South Region, and is currently the Department Chief for Environmental Protection, Regulation, and Forest Product Utilization. The Departments interests and efforts in biomass utilization and Global Climate Change are a portion of his program efforts. He is currently a member of the Society of American Foresters' and has served in a variety of capacities, including Nor-Cal Section Treasurer, Section Chair for Land use, and Chapter Chair as well as Chapter Treasurer. Mr. Wickizer contributed to the successful conclusion of numerous projects including; major revisions of the Forest Practice Rules during late 80s and early 90s, completion of the initial Soil Erosion Study, establishment of the original Board Monitoring Study Group in 1989, Design and preparation of the 1996 California Fire Plan, as a contributor to the 2004 FRAP report and writing the current Forestry Protocols for the California Climate Action Registry. Most recently Mr. Wickizer has been appointed to the Board of Directors for the California Biomass Collaborative and a member of the California Bio-Energy Interagency Working Group. He continues to represent both the Department and the Board of Forestry and Fire Protection in Climate Change activities and initiatives.

Abstract: This session will be an update on a number of the policy items that are or will be impacting the opportunities to increase the use of biomass in the near term. AB 32 implementation provides a basis to increase substitution of biomass for fossil fuels in energy production. AB 1020 begins to address the question of disincentives for the diversion of biomass from land fills. The national Farm Bill is still under discussion and provides some incentives for biomass development. The States Bio Energy Action Plan continues to move forward and has

some implications for the future of biomass. The development of the Low Carbon Fuel Standard has the potential to provide additional opportunities for biomass utilization. Future use of biomass will require evaluation consideration of sustainability standards that are in the process of development. Updates on these and other developing policy initiatives will be presented.

Research Direction and Funding

Bryan Jenkins, Biological and Agricultural Engineering, University of California, One Shields Avenue, Davis, CA 95616, 530-752-1422, bmjenkins@ucdavis.edu

Biography: Bryan Jenkins is Professor of Biological and Agricultural Engineering at the University of California, Davis. He teaches and conducts research in the areas of energy and power, with emphasis on biomass and other renewable resources. Dr. Jenkins has more than 30 years experience working in the area of biomass thermochemical conversion including combustion, gasification, and pyrolysis. His research also includes analysis and optimization of bioenergy systems. His teaching includes both graduate and undergraduate courses on energy systems, heat and mass transfer, solar energy, and power and energy conversion, including renewable energy and fuels, economic analysis, environmental impacts, fuel cells, engines, electric machines, fluid power, cogeneration, and other technologies. Prof. Jenkins is a recipient of an Outstanding Achievement Award from the US Department of Energy for exceptional contributions to the development of bioenergy. Prof. Jenkins is Executive Director of the California Biomass Collaborative, a joint industry, government, environmental, and academic coordinating organization for biomass technology and policy in California, co-chair of the UC Davis Bioenergy Research Group, and Interim Director of the UC Davis Energy Institute. He is also a member of the UC executive committee on the low carbon fuel standard for California.

Abstract: Supplying a large fraction of global fuel demand from biomass will require massive development efforts backed by coordinated policies to attract necessary financing and clear standards for sustainable production, handling, and use. The resource potential in biomass has stimulated a number of major new research programs into new technologies, plant sciences, resource management, policy, environmental impacts, and many other areas of sustainable design. Both federal and state roadmaps have been prepared to guide future research and development efforts.