

Biomass Research and Development Technical Advisory Committee

Bridgepointe Hotel and Marina
101 Howell Rd New Bern, NC 28562
September 17-18, 2019

Quarter 3 Meeting Summary



I. Purpose

On September 17-28, 2019, the Biomass Research and Development (R&D) Technical Advisory Committee (“Committee”) held its third meeting of 2019. The Committee’s 2019 theme is “Year of the Tree.” This meeting focused on woody biomass issues in the southeastern U.S. Representatives from Weyerhaeuser, Edgemere Consulting, Southern Environmental Law Center, the NC State University Department of Forestry & Environmental Resources, and Domtar gave presentations to the Committee. The Committee also received an update from the U.S. Department of Energy’s Bioenergy Technologies Office (BETO). See Appendix A for a list of Committee attendees and Appendix B for the meeting agenda. Appendix C contains a summary of findings from the Committee. Meeting presentations can be viewed on the Biomass R&D Board website.

II. Weyerhaeuser Introduction

Richard Stitch, Environmental Affairs Manager, Weyerhaeuser

Representatives from Weyerhaeuser gave members of the Committee an introduction to the company, including information about its history and activities:

- Timberlands management
- Real estate, energy, and natural resources
- Wood products.

The overview and activities for the first day of the meeting focused on timberlands management.

III. Final Harvest Site

Weyerhaeuser

- Visited site of final processing, where timber is processed by floor contractors
- Plans two rotations per site, which is approximately 50 years.
- Discussed greatest challenges currently facing the industry
 - Trucking, specifically, driver shortages due to heavy insurance costs associated with logging.
 - Private landowners are struggling to find markets
- Discussed the need for local timber markets
 - The largest market for hardwood is printing/writing, which is seeing reduced demand
 - Seeing increasing demand for cardboard
 - Most desirable/profitable product is saw timber
 - Not much market for pulpwood



IV. Two Year Old Pine Plantation

Weyerhaeuser

- Visited site of a pine plantation that was harvested in 2015 and replanted in 2016
- Weyerhaeuser hand plants trees in beds throughout North Carolina
- Will cut the first thinning at 8-12 years of growth; the first thinning is necessary in order to take care of mortality issues and avoid pests
- Discussed sustainability certifications such as Sustainable Forestry Initiative (SFI) and Forest Stewardship Council (FSC) certification, and the role of third-party inspection to meet sustainability objectives and indicators



V. First Thin Pine Plantation

Weyerhaeuser

- Visited a 13 year old stand following its first thinning
- In about one year, this stand will be fertilized
- Will cut when the trees are about 25 years old
- Further discussed sustainability certifications

- Value of the certification is difficult to ascertain, but maintaining certification is important to maintaining market share.
- Converting from forest to plantation is difficult with SFI or FSC certification
- However, able to flip back and forth between planting hardwood and planting pine



VI. New Bern Sawmill Tour

Weyerhaeuser

- Visited Weyerhaeuser's New Bern sawmill
- The mill primarily produces 2x4s, 2x6s, and 4x4s
- In the mill, cut trees are unloaded, debarked, cut into logs, then cut into boards
- Any excess goes into the chipper
- By-products are also a large part of the business





VII. Welcome, Introduction, and Updates

Ian Rowe, Technology Manager, Bioenergy Technologies Office, DOE

- Dr. Rowe welcomed the Committee to the third meeting of 2019
- Provided updates on behalf of DOE's Bioenergy Technologies Office (BETO).
- BETO released a Funding Opportunity Announcement (FOA) last spring
- [The BETO FOA included ten topics:](#)
 - Cultivation Intensification Processes for Algae
 - Biomass Component Variability and Feedstock Conversion Interface
 - Efficient Wood Heaters
 - Systems Research of Advanced Hydrocarbon Biofuel Technologies
 - Optimization of Bio-Derived Jet Fuel Blends
 - Renewable Energy from Urban and Suburban Wastes
 - Advanced Bioprocessing and Agile BioFoundry
 - Plastics in the Circular Carbon Economy
 - Rethinking Anaerobic Digestion
 - Reducing Water, Energy, and Emissions in Bioenergy
- DOE is holding a number of upcoming conferences:
 - BETO Bio-Restore Workshop, September 25-26, 2019 at Argonne National Laboratory in Lemont, IL
 - BETO Leveraging First Generation Bioethanol Production Facilities Workshop, September 25-26, 2019 at Ames National Laboratory in Ames, IA
 - Advanced Research Projects Agency–Energy Carbon-Optimized Bioconversion workshop
- Dr. Rowe also provided an update on Committee operations:
 - BETO is working with USDA on going through the nominations for 2020 members
 - Swearing in of the new 2019 members will take place at the next meeting in Washington, DC.

VIII. Forest Supply Chains (PowerPoint)

Pete Madden, Edgemere Consulting

- The U.S. has more than 750M acres of forest land
- On average, we grow 50% more forest than we cut
- Reviewed U.S. Forest Service Forest Inventory and Analysis—a robust data set that people use when they want to understand the state of U.S. forests
- Reviewed different available forest resources, such as loblolly pine, and the demands for different forest resources and products
- Pulp and paper mills are shutting down, so not able to do the first thinning
- Looking at areas of oversupply to see where to put pellet mills
- The wood bioenergy industry lacks the financial incentives present in Europe
- Europe has realized that wood pellets are a source of renewable power and subsidized it
 - Because it is subsidized, companies need to report on their carbon footprint and have an understanding of their entire carbon footprint.

IX. Burning Wood for Electricity is Not a Climate Solution (PowerPoint)

Heather Hillaker, Associate Attorney, [Southern Environmental Law Center](#)

- SELC is a non-profit organization that uses the law to protect the environment and natural resources of the southeast
- Discussed climate and environmental impacts of using biomass for electricity
- The wood pellets industry exploded in recent years. The market is Europe, especially the UK.
- The forestry carbon accounting rules used do not account for the emissions produced by biomass; the policies treat burning biomass as carbon neutral, but there is a carbon payback period
- Burning wood pellets emits more CO₂ than coal
- Sourcing practices contribute to the degradation of natural resources
- Initially, the industry was supposed to use wood residues and wastes, but this was insufficient; they now use whole trees
- Sustainable sourcing is still problematic
 - Pellets increase atmospheric carbon, even when harvested from sustainably managed sources
 - UK only counts emissions from transport
 - Losing acres of natural sources; more trees is a result of more pine plantations, not natural forests
 - Carbon storage is less in pine plantations than natural forest and there is also a lack of biodiversity
- This also impacts local communities through air pollution (process emits volatile organic compounds and hazardous materials); additionally mills are often located in areas that are already suffering

X. State of Forest Resources in the U.S. South (PowerPoint)

Rajan Parajuli, North Carolina State University, Dept. of Forestry & Environmental Resources

- The U.S. south has a total of 245.5 million acres of forest lands
- Total timberland acreage is stable, but some ebb and flow among different types
- Most lands owned by private non-corporate land owners (58%)
- The annual harvest is less than the annual growth

XI. Public Comment

Richard Stitch, Weyerhaeuser

Weyerhaeuser was honored to host yesterday's tour of the Technical Advisory Committee reviewing working forest operations, and touring the New Bern, NC sawmill. We appreciated the questions and interactions, which broadened our perspectives on biomass and bioenergy.

"Wood is Good," "Forests for the Future," "The Year of the Tree." These are all great themes focusing on the importance of managing our forests for the far-reaching products, functions and values we all receive from wood, trees and forests. The forestry sector understands and respects our duty to manage our forests for the present without jeopardizing the ability of future generations to meet their own needs. Certification programs, like the Sustainable Forestry Initiative, Forest Stewardship Council, and American Tree Farm System, are credible schemes that ensure that forestry operations meet stringent measures to conserve wildlife, water quality, special sites and enhance long term forest productivity, not only on program participant's lands, but also at the locations where certified companies procure their wood.

Eighty-six percent of the forests in the southeast are privately owned. Working forests are critical for supplying the wood and fiber needed by local lumber and pulp mills. Recently, wood has taken on greater importance in providing fuel for energy. Due to markets, expertise, and productive sites, the southeastern US is uniquely positioned to supply these growing markets. Private forest landowners manage their forests for a variety of objectives, but regardless of the goal, markets are necessary for moving wood and fiber from the forest to the mill. Without markets, landowners lose the incentive to manage their woodlots and forests will become overstocked, stagnate, and, like we have seen in the other regions of the US, either be converted to other uses, or transformed to stands that are susceptible to insects, fire and disease.

Well-managed forests are key to supporting rural economies in the southeastern US. Professional foresters, mill managers, loggers, road builders, tree planters, and manufacturing jobs are all directly tied to forests. According to North Carolina State Extension Service, in 2017, the forest sector in North Carolina directly contributed \$20 billion in industry output, just over 2% of the state-wide economic output. The forest sector employed over 71,600 people with a payroll of \$4 billion and a value added (gross state product) of \$5.6 billion.

Key to the goals of this TAC, is that trees are one of the greatest carbon sequestration mechanisms in the world. Forests don't just take in and sequester carbon, the fuels derived from trees and mill residuals replaces fossil-fuel CO₂. This carbon is renewable, recyclable, and, while the forests are growing, provide extensive benefits such as wildlife habitat, water purification, flood control, soil

protection, recreation, aesthetics...I could go on and on. No wonder there is yet another forest theme claiming, "Trees are the Answer!"

Weyerhaeuser urges the TAC, in their discussions and guidance regarding forests, biomass and mill residuals, to encourage and possibly even incentivize forest management and utilization, and minimize regulatory hurdles that block the way to the energy-delivering and carbon-capturing potential of forests. Policy, laws and rules affecting biomass must be clear, simple, and fair for all forest landowners.

Thank you for this opportunity to comment.

Daniel Parkhurst, Policy Manager, Clean Air Carolina

- North Carolina has a wood pellet issue
- Wood pellet production has grown
- Health issues are made worse by having wood pellet plants located close by
- The UK does not have their own pellet plants

Jennifer Skvarla, Board of Directors, North Carolina Wildlife Federation

- We must consider a range of environmental issues affected by wood pellet production
- The heaviest logging in NC takes place in the flood plains
- Markets encouraging a switch from natural forest to pine plantation, reducing species diversity.
- EPA: biomass doesn't reduce CO2 emissions considering the source.
- The Committee's assessments should consider the impact of the industry on species.
- Ms. Skvarla lives near Weyerhaeuser; appreciates need for jobs, but feels we are slowly choking ourselves on earth. She believes the Committee has the responsibility to consider this for future generations.
- We need to consider climate change and preserve the earth for future generations.

Larry Baldwin, Crystal Coast Water Keeper

- The issue of bioenergy is complex
- Mr. Baldwin is concerned about us using our resources so that someone else doesn't need to use theirs.
- Bioenergy is having an impact on the amount of woods we have available to us.
 - We cannot keep taking and not giving back.
 - There is a need some type of control: if you're going to sell wood, you should put it back/replant
- Mr. Baldwin works to monitor the concentrated animal feeding industry in his profession. This industry generates huge amount of waste.
 - Poultry waste (dry waste) is mixed with wood and burned. This will release contaminants.
 - Processes are being looked at to create energy from this waste, but they are not looking at effect.
- Mr. Baldwin requests that the Committee look at all of the considerations with bioenergy. Her believes that we cannot continue going down this road.

Harry Seamans, BioRenewable Deployment Consortium

- Forests, managed properly, provide a good economy and environment
- Markets for forest products provide sustainability.
 - The only place where there is a growth of trees is in North America and Europe because there is value for trees.
- Biorenewable processes are technically proven and ready to go. Examples include:
 - Crude
 - Sugars extracted for fuels and chemicals
 - Lignin-producing fuels and chemicals
 - Need to be proven economically. Forest products industry provides synergy for this to happen. If the industry doesn't evolve, it may go away.
- Mr. Seamans encourages the Committee to support efforts to guide policies to make a difference with forest.

XII. Biomass Feedstock Opportunities from a Kraft Pulp Mill (PowerPoint)

Annabeth Rieter, Corporate Manager, Environmental Regulation, Domtar

- Domtar is North America's largest producer of printing and writing papers
- 13 major pulp and paper mills in North America
- Focused primarily on biomaterials program, which is a new area at which Domtar is looking

XIII. Subcommittee Breakouts

- There are three standing subcommittees: Conversion, Sustainable Feedstocks Production and Logistics, Products, Markets, and Systems Group
- For this meeting, the members randomly assigned to one of three subcommittee groups. Each group worked to summarize the findings of the site visit and brainstorm topics to potentially cover next year.

XIV. Closing comments

- Specific recommendations will be made during the Q4 meeting.
- The Co-Chairs wrote a summary of the events and findings from the Q3 meeting.
- Plans for the Q4 meeting, to take place in the Washington, DC area were discussed
- Potential topics for 2020 were discussed

Appendix A: Committee Member Attendance—September 17-18, 2019

Co-Chairs	Affiliation	Attended
Kelly Tiller	Genera Energy Inc.	Yes
Doug Faulkner	Leatherstocking, LLC	Yes

Members	Affiliation	Attended
Charles Abbas	IBiocat	Yes
Rob Anex	University of Wisconsin, Madison	Yes
Brent Bean	United Sorghum Checkoff Program	Yes
Jacques Beaudry-Losique	Algenol Biotech LLC	Yes
Esteban Chornet	Enerkem	Yes
Katrina Cornish	Ohio State University	No
William Frey	Georgia-Pacific	Yes
Jerry Gargulak	Borregaard-Lingotech	No
Aviva Glaser	National Wildlife Federation	Yes
Beth Hood	Arkansas State University	Yes
Raymond Huhnke	Oklahoma State University	No
Randy Jennings	Tennessee Department of Agriculture	No
Madhu Kanna	University of Illinois at Urbana-Champaign	No
Alan Keller	POET	Yes
Michael Lidisch	Purdue University	No
Pete Madden	Drax Biomass	Yes
Michael McAdams	Advanced Biofuels Association	Yes
Shelie Miller	University of Michigan	No
Manuel Garcia Pérez	Washington State University	No
Tim Rials	University of Tennessee-Knoxville	Yes
Matthew Rudolf	SCS Global Services	Yes
Susan Rupp	Enviroscapes Ecological Consulting, LLC	Yes
Basudeb Saha	University of Delaware	No
Patricia Scanlan	Scanlan Environmental LLC	No
Steve Searcy	Texas A&M University	Yes
David Shonnard	Michigan Technical University	Yes
Larry Sullivan	The Citadel	Yes
Valerie Thomas	Georgia Tech	Yes
Michael Wolcott	Washington State University	No

Total – 20 of 31 Members present

Appendix B: Agenda—September 17-18, 2019

Agenda
Public Meeting of the Biomass Research and Development
Technical Advisory Committee
September 17-18, 2019

DAY 1	Technical Advisory Committee Meeting	September 17, 2019
8:00 – 8:45 am	Weyerhaeuser Introduction and Safety Bridge Pointe Hotel and Marina	
8:45 – 9:00	Transit	
9:00 – 9:30	Final Harvest Site (35.17524, -77.45325)	
9:30 – 10:15	2 Year Old Pine Plantation (35.188030, -77.432584)	
10:15 – 11:00	1 st Thin Pine Plantation (35.176607, -77.455419)	
11:00 – 11:45	Transit	
12:00 – 1:00 pm	Lunch	
1:00 – 2:00	New Bern Sawmill Tour 1785B Weyerhaeuser Road Vanceboro, NC	
2:00 – 2:30	Transit	
2:30 – 3:00	Debrief Bridge Pointe Hotel and Marina	<i>Full Committee</i>
DAY 2	Technical Advisory Committee Meeting	September 18, 2019
8:00 – 8:30 am	Welcome and Continental Breakfast	

8:30 – 8:45	Introduction and Updates	<i>Ian Rowe, DOE, BETO</i>
8:45 – 9:30	Forest Supply Chains	<i>Pete Madden, Edgemere Consulting</i>
9:30 – 10:30	Burning Wood for Electricity is Not a Climate Solution	<i>Heather Hillaker, Southern Environmental Law Center</i>
10:30 – 10:45	Coffee Break	
10:45 – 11:45	State of forest Resources in the U.S. South	<i>Rajan Parajuli, NC State University, Dept. of Forestry & Environmental Resources</i>
11:45 – 12:00	Public Comment	<i>Full Committee</i>
12:00 – 1:00	Lunch	<i>Annabeth Reiter, Domtar Stewart Marcoux, Domtar</i>
1:00 – 2:30	TAC Subcommittees	
2:30 – 4:00	Full Committee Discussion	<i>Subcommittees</i>
4:00 – 4:30	Summary and Adjournment	<i>Full Committee</i>

Appendix C: Q2 Committee Summary

Source: Biomass R&D Technical Advisory Committee

Advisory To: Biomass R&D Board

Report Date: 9/18/2019 (Q3 2019)



Issue: *Findings of the Committee on Opportunities for Woody Bioenergy from Southeastern U.S. Forestlands*

The Committee travelled to New Bern and surrounding forest areas in North Carolina in mid-September for an immersive introduction to the forest products industry, forest management, and bioenergy and bioproducts opportunities in southeastern U.S. forestlands. This tour followed the Committee's visit to Missoula, Montana two months prior to learn firsthand about similar issues in the nation's other dominant forest basket.

The Committee toured a major corporation's holdings to learn about the full life cycle of a southern pine forest. The Committee saw working forests at various stages along the management life cycle of a sustainable southern pine plantation, ranging from seedlings and early growth stands to first thinnings to mature stands and active final harvest operations and preparing harvested sites for replanting. The Committee also visited a sawmill to better understand that critical link in the forest products chain. The Committee explored in depth the recent emergence and growth of the wood pellet market in the southeast, looking at regional economic and resource impacts as well as community and carbon cycle perspectives.

These visits to northwest and southeast forestlands provided both some common themes and some stark contrasts for the Committee, especially about managing different types of forest lands and addressing growing fire risk threats. The lessons drawn from these two trips will give the Committee a broad national perspective for our fourth quarterly meeting of 2019 when we will develop our final recommendations to the federal government for improving research, policies and regulations for growing woody bioenergy capacity and markets, while also improving forest health.



A Building Blocks Are In Place

- In contrast to northwest forestlands, those in the southeast are characterized by well-developed infrastructure and supply chains: roads are built and maintained, equipment is available and accessible, skilled and trained labor are locally available. Forests support an existing, but fluid, industrial ecosystem.

- In another contrast to the northwest, southeastern forests are overwhelmingly privately held and managed (86%), and more than two-thirds of all privately held forests are owned and managed by individuals (noncorporate). This privately-owned and largely-unregulated landscape allows forestland management to respond to market signals and promotes sustainable management practices.
- There are good examples of corporately-held and managed forests in the southeast that serve as models for well-run and sustainable forest resources.
- A spike in trees planted 30 years ago is fueling oversupply and inventory accumulation in southern forests, leading to annual “growth to drain” rates greater than 1.5 for the foreseeable future, meaning southern forests are adding biomass at a rate that is 50% greater than forest removals.
- Sustainable forest management—ecologically and economically—is culturally ingrained among southern forest landowners.
- All of these advantages position the southeast to take a leadership role in launching advanced bioenergy industries.

B

Healthy Markets Drive Healthy & Sustainable Forests

- Southeastern markets for woody biomass are dynamic. Despite continuing contraction in the pulp and paper industry (with steep increases in mill closure rates), demand for pulpwood and chips has actually trended upward with growing demand for wood products like oriented strand board (OSB) and sharp increases in wood pellet demand, particularly for export markets.
- New and growing markets for lower value pulpwood, mill residues (like chips, sawdust, and shavings), and forest harvesting thinnings and residues all promote sustainable forest management practices. This allows the cost of healthy forest management practices to be spread across a portfolio of uses, ranging from high value sawlogs to high volume pulpwood as well as lower value but economically important forest and mill residues; those uses could also include new industrial growth in woody biofuels and biobased products.
- Forest landowners have the option to defer or accelerate certain forest management activities like precommercial thinnings or final harvest (to a limited extent) to better align with market economics. Promoting best management practices in a forest stand and maintaining optimum timing of management activities requires reliable and stable markets for all components of forest biomass.
- As traditional pulp and paper jobs and demand have declined, pellet manufacturing has stepped in to stabilize local economies and help preserve forest management infrastructure and supply chains.

C

Region-Specific & General Challenges

- While basic infrastructure and dynamic and responsive markets are in place, southern forests are threatened by macro trends:
 - Trucking is a growing bottleneck in southeastern forest communities and the outlook is challenging. New trucking regulations are making it more challenging and more expensive to meet insurance requirements and attract drivers. As truck drivers age, the trucking industry struggles to attract younger replacements, let alone fill projected growth in demand.

- Continued downward pressure on pulp and paper markets threatens the delicate economic balance of forest markets in the southeast. The scale of the woody biomass supply chain serving an existing pulp mill is large, averaging thousands of tons a day per mill, amplifying the ripple effects of any single mill closure.
- Public involvement and support for new forest management practices are critical for success. There are public perception concerns around managing sensitive lands as forest resources for biomass use (e.g., pellets), and plantation life cycle management of forestlands.
- While opportunities to better utilize all parts of the vast forest ecosystem have been identified and technically proven, financing and policy hurdles are limiting—or even preventing—large scale capital investments. The root of the problem is addressing the multiple dimensions of risk, which is particularly problematic around opportunities to increase the value of residual woody biomass by extending the range of commercial products or enhancing the value of residuals with further processing.



Common Themes

- The scale of available forest biomass resources is massive in both the northwest and the southeast.
- Both regions have sizable quantities of secondary, residual resources left on the forest floor, and both would benefit from having long-term, stable solutions for residue removal.
- Infrastructure is critical. Where infrastructure is healthy, it makes it much easier for changes to happen quickly. Where there is a lack of infrastructure, options that would otherwise appear very attractive are not even considered due to the high hurdle of developing the infrastructure.
- Financing and government policy are hurdles to larger scale new capital investments, like woody biofuels. The root of the problem is dealing with the multiple dimensions of risk, which is particularly problematic for new uses of residual woody biomass.
- Public involvement and support for new forest management practices in both regions are critical for success. Active engagement with public sensitivities about greater use of forest materials for energy purposes should be anchored in sustainability and economic growth.
- An economically healthy and environmentally sound forest management strategy must integrate markets for every component of forest biomass. Carbon accounting should be incorporated into commercial decisions as a matter of course.