

The Consortium for Advanced Wood-to-Energy Solutions (CAWES) conducted a survey to rank issues and knowledge gaps that must be addressed to advance markets for torrefied wood. This report provides the top ranked responses across five major areas of interest and need.

*Consortium for
Advanced Wood-to-
Energy Solutions:
Ranking of Issues &
Knowledge Gaps*

October 1, 2014



Consortium for Advanced Wood-to-Energy Solutions: Purpose

The Consortium for Advanced Wood-to-Energy Solutions (CAWES) was initiated by the U.S Endowment for Forestry and Communities, the Georgia Southern University Herty Advanced Materials Development Center, and the USDA Forest Service to serve as an open-platform collaboration of institutions in the public and private sectors representing green energy, forest management, research and development, philanthropy, and private industry. The purpose of CAWES is to advance sustainable, scalable, distributed wood-to-energy solutions that stimulate forest restoration and rural economic development through research, development, and deployment of commercially-viable advanced wood-to-energy solutions.

Issues & Knowledge Gaps: Ranking of Priority Needs

CAWES held its kick-off meeting in Atlanta, GA, August 26 - 27, 2014. As follow-up to that meeting, the Steering Committee committed to conducting surveys and/or requests for information in three areas:

1. Ranking of priority issues and knowledge gaps;
2. Status review of capabilities for research, development, and demonstration capacity and equipment; and,
3. Requests for “expression of interest” from potential public and private institutions who might serve as production partners.

This report provides a summary of the top rankings of issues and knowledge gaps in five different major categories of need (see Table 1). To view the original survey and listing of all potential issues and gaps, see Appendix A.

TABLE 1 – Ranking of Priority Needs in Five Major Categories

CATEGORY OF NEED	PRIORITY		
	1	2	3
<u>Conversion & Densification</u>	Conversion --Technology and equipment selection	Densification -- Need to demonstrate the densification of torrefied wood at scale	Conversion--Product definition: Energy pellets or bricks, biochar, activated carbon, etc.
<u>Feedstock Supply & Logistics</u>	Availability of raw material	Cost of raw material	Sustainability of resource
<u>Markets & Economics</u>	Development of a credible marketing study	Development of a “generic” business plan	Need for offtake agreements with customers
<u>Regulatory & Social</u>	Social-Retaining the social license to remove and utilize woody biomass and hazardous fuels	Social--Development of a credible life cycle inventory and LCA for energy consumption and GHG emissions	Regulatory-Use in Customer facilities and its impact on permitting and other operational issues
<u>Finance</u>	Pro forma business case that includes CAPEX/OPEX per ton of capacity & relevant financial performance measures (ROI/ROCE)	Need for credible marketing studies for targeted products: torrefied wood, biochar, and activated carbon	Access to capital

In addition to ranking the range of issues in each category of need, respondents were provided the opportunity to suggest other issues and knowledge gaps warranting attention. Responses were as follows:

Conversion & Densification

- Product safety in handling and transport

Feedstock Supply & Logistics

- Financial modeling
- Integrated assessment using all listed criteria
- Appropriate sizing of facility or sourcing plans (e.g. rail) to extend reach

Markets and Economics

- Impacts of product safety requirements on manufacturing cost

Regulatory and Social

- Safety regulations for manufacturing, handling, and storage

Finance

- Safety regulations for manufacturing, handling, and storage

Becoming a CAWES Partner

CAWES is focused on bringing the best minds in private development, government, academia, and conservation together to accelerate appropriately-scaled commercialization of wood-to-energy technologies. CAWES members will receive non-exclusive, royalty-free access to all intellectual property developed by the Consortium with opportunities for intellectual property-protected work under special agreements. The challenges and knowledge gaps identified by CAWES partners will form the foundation for funding priorities and benchmarks.

The founding partners seek the participation of any institution – whether public or private – that shares a commitment to addressing the challenges and opportunities torrefaction presents. CAWES partner organizations will make an entity-appropriate annual financial contribution and serve on the CAWES Steering Committee or one of two other CAWES advisory boards. The CAWES consortium will meet quarterly.

For More Information:

The Endowment serves as the Consortium administrative/financial manager. For more information contact:

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Appendix A

Purpose & Directions

The Consortium for Advanced Wood-to-Energy Solutions (CAWES) is developing a 24-month work plan to determine the validity of torrefied wood as a market-based tool to aid in addressing forest health and rural job creation needs in America's more challenged forest-rich areas. At the kick-off workshop in Atlanta on August 27 the participants developed extensive lists of challenges and knowledge gaps that might be necessary to address in order to advance the overall objective.

PLEASE take just 10-12 minutes to complete this brief survey NOW IF AT ALL POSSIBLE. All responses need to be in by NOON EDST, September 15.

We ask that you review the lists and identify in order of priority importance what you believe are the most important (#1 is highest priority) issues to be addressed in each of the five categories listed. Please rank ALL choices on each page.

*NOTE: On each page, the dropdown boxes next to the priority options will be initially blank. When you input your first ranking, the survey will then automatically populate the rest of the rankings boxes on that page. THESE RANKINGS WILL LIKELY NOT BE IN THE ORDER THAT YOU WANT. You may still edit the ranking in any box after the survey populates the boxes. The survey will adjust in real time to any rankings you input by shuffling the order of priorities on the page. Please make sure that before you move on from a particular page all priorities are ranked in the order that you want.

Feedstock Supply & Logistics

 

Resource--Availability of raw material

 

Resource--Consistency (guarantee) of raw material supply

 

Resource--Cost of raw material

 

Resource--Feedstock type and variability and impacts on downstream processing and product quality

 

Resource--Use of low-value biomass from forest and rangeland (e.g. juniper) restoration operations

 

Resource--Sustainability of resource

 

Logistics--Choice of business model, specifically choice of distributed vs centralized production model and facility size

 

Logistics--Timber harvesting

 

Logistics--Hauling infrastructure and the distance from resource supply to the facility

Any other priorities related to this topic area:

Conversion & Densification

Conversion--Product definition: Energy pellets or bricks, biochar, activated carbon, etc.

Conversion--Technology and equipment selection

Conversion--Raw material quality, such as type, species and blends, moisture content, ash content, etc.

Conversion--Torrefied wood bulk and energy densities

Densification--Need to demonstrate the densification of torrefied wood at scale

Densification--Product qualifications, such as Life Cycle Analysis, Environmental Product Declarations, ISO or other standards of uniformity/consistency of quality

Densification--Special shipping/transit needs for torrefied products

Conversion & Densification--Online, realtime monitoring of process and product quality

Conversion & Densification--Pilot scale demonstration facility availability for producers and users that can be used as a test bed for both product and process validation

Conversion & Densification--Identification of worker safety issues, such as exposure to dust and dust handling

Conversion & Densification--Development of facility engineering studies to determine mass and energy balances

Any other priorities related to this topic area:

Markets & Economics

Markets & Economics--Development of a "generic" business plan

Markets & Economics--Development of a credible marketing study

Markets & Economics--Need for offtake agreements with customers

Markets & Economics--Competition from alternative woody biomass uses, such as wood chips, pellets and CHP

Markets & Economics--Product standards and acceptance in place

Markets & Economics--Understanding storage requirements and impact on product performance

Markets & Economics--Need for test runs in electric utility and CHP facilities

Any other priorities related to this topic area:

Regulatory & Social

Social--Retaining the social license to remove and utilize woody biomass and hazardous fuels

Social--Development of a credible life cycle inventory and LCA for energy consumption and GHG emissions

Regulatory--Production facility compliance with regulatory agencies (OSHA, EPA)

Regulatory--Use in Customer facilities and its impact on permitting and other operational issues

Regulatory--Understanding and addressing ENGO and public concerns such as carbon neutrality, sourcing from public lands, impact of residual material removals on soil quality

Regulatory--Quantifying the impact of biochar amendments on soil quality

Regulatory--Determining and addressing certification needs and product standards

Regulatory--Determining and addressing special maritime regulations on transport of torrefied products

Regulatory--Need to address unlevel playing field specifically subsidies in place for competing products

Regulatory--Need for an Executive Order to test product in federal power generating facilities

Any other priorities related to this topic area:

Finance

Planning--Development of a clear pro forma business case that includes CAPEX/OPEX per ton of annual installed capacity as well as relevant financial performance measures (ROI/ROCE)

Planning--Access to capital

Planning--Need for credible marketing studies for targeted products: torrefied wood, biochar, and activated carbon

Planning--Targeted site selection criteria to optimize federal, state, local incentives

Planning--Clear and consistent communication/product plan

Planning--Need to compare/contrast with coal/natural gas, etc., and make sure the examples are regionally specific and tied to specific fuel type (e.g. lignite vs. anthracite)

Planning--Clear assessment of economies of scale

Funding--Clear assessment of sources of equity finance

Funding--Clear assessment of sources of debt finance (e.g. government loan guarantees)

Funding--Understanding mechanisms for developing joint ventures with end user

Funding--Understanding how to engage TIMOs/REITs as investors to create new market outlet for low value wood

Regulation--Expanding liquid fuels incentives to cover solid fuels

Regulation--Relaxing regulations on investment of personal retirement savings in controlled businesses

Any other priorities related to this topic area:

