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## Biomass Feedstock National User Facility

*Solving feedstock challenges today*

**B**iomass is a versatile home-grown resource that can be converted into power, fuel, chemicals and products. Idaho National Laboratory helps strengthen the body of knowledge that enables industry to deploy technologies capable of producing price-competitive products from inedible sources of biomass.

At the Biomass Feedstock National User Facility (BFNUF), our researchers focus on early stage applied research and development (R&D) associated with key technical barriers facing the U.S. bioenergy industry. We investigate advanced feedstock supply and logistics, analysis and sustainability, preprocessing, and characterization. Such R&D

will help create intellectual property for U.S. companies, enabling them to license these technologies worldwide. The User Facility is arguably the most complete feedstock preprocessing R&D facility in the world.

### **Who Do We Help?**

BFNUF has provided customized technical R&D to more than a dozen leading U.S. feedstock, bioenergy and technology companies. Along the way, BFNUF has processed more than 1,150 tons of raw biomass materials, producing a wide variety of products from biomass sources ranging from forest and agriculture feeds to municipal solid waste.

### **Process Development Unit**

The biomass feedstock Process Development Unit (PDU) is the flagship of the BFNUF. The PDU's innovative design—modular and reconfigurable—helps bioenergy companies find the best way to convert feedstock into fuel. The full-scale preprocessing system is located in a 27,000-square-foot high bay at INL's Energy Systems Laboratory.

The PDU can process 2 to 5 tons of biomass per hour using a variety of techniques including hammer mill grinding, rotary drying, pelleting, cubing and multiple packaging options. The PDU is a unique tool to accommodate the varied needs of process design and feedstock supply.

Changing the World's Energy Future



**Supply Chain Development**

At BFNUF, our research team combines supply and logistics experience, feedstock characterization, and modeling to support collaborations in feedstock supply chain development.

The BFNUF Characterization Laboratory analyzes feedstock quality and storage performance to aid development of high-quality products. Researchers evaluate the physical properties of material prior to deciding on pathways for energy conversion. Physical and chemical material evaluations are entered in the Bioenergy Feedstock Library database to provide fundamental data on biomass characteristics for researchers and industry.

BFNUF researchers also conduct feasibility studies, techno-economic assessments, characterization of biomass resources and supply chain design to move the product where it needs to go. Our understanding of cost, quality and risk trade-offs helps the industry establish a successful supply chain.

**Feedstock Development, Scale Up and Integration**

The BFNUF is uniquely suited to help develop feedstock specifications thanks to our integrated preprocessing system, the Process Development Unit (PDU), and our in-house Characterization Laboratory.

Whether preprocessing feedstock to a customer's specifications or collaborating to develop custom specifications, BFNUF provides a complete suite of services: sourcing for common and distinctive feedstocks; process development, testing and



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design; feedstocks processed to specifications; feedstock characterization data sheets; and packaging and shipping for testing. These capabilities allow toll processing to supply industry collaborators with industrial feedstocks for testing and validation of their conversion processes.

INL researchers' experience developing these feedstocks extends to a variety of projects:

**Biofuels Projects**—Our PDU grinding and drying processes produce bulk feedstocks at moisture and particle size specifications for feed handling and conversion testing.

**Biopower Projects**—Our PDU pelleting and cubing systems supply feedstocks for test burns, while our pilot-scale torrefaction systems allow biopower producers an effective means to evaluate this option.

**Waste-to-Energy Projects**—

Our PDU grinding, pelleting and cubing systems process has post-sorted municipal solid waste for gasification testing.

BFNUF's ability to inform feedstock specifications allows customers to develop custom feedstocks that improve feed handling performance, conversion performance and the capabilities of industrial preprocessing equipment.

BFNUF also offers lab- and pilot-scale testing for industrial feedstocks during processing, scale up and integration. For the customer, this means accelerated commercialization and fewer costly delays during commissioning and startup.

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