



# Durable, Water Resistant Wood-Based Energy Pellets

## Water-resistant and durable pellets from biomass derived binders

Combining torrefied wood with biomass-based binders creates water-resistant and durable high-energy-density pellets or briquettes with improved fuel composition. This new method extracts a mixture of fatty acids from either cranberry pomace or birch bark to use as a binder in new torrefied woods. The binders, produced from abundant biomass waste, have a neutral pH and therefore produce no corrosive gases during combustion. The binders are also very environmentally friendly, as no chemical cross-linking agents, such as formaldehyde, are required. This technology was developed to meet renewable energy needs.

## Binders coat and protect small torrefied wood particles

While torrefied wood chips can easily be formed into high-energy, high-density pellets, doing so burns off most of the natural binders, resulting in pellets with poor water repellency. Furthermore, such pellets can turn into a black “mud” upon exposure to water. Another problem with torrefied wood pellets is low durability. The pellets can create dust that not only results in product loss, but high concentration of dust fines that clump together. The consequent clinkering reduces boiler efficiency, poses inhalation hazards and increases the potential for dust explosions. This new method creates water-resistant and durable high-energy-density torrefied wood pellets or briquettes with biomass-based binders. By adding binders that melt and flow under the extruder conditions, this process coats and protects the smaller particles of torrefied wood.

## Phase of Development

- Prototypes developed and tested

## Benefits

- Moisture resistant and durable
- No corrosive gases produced during combustion
- Environmentally friendly; no chemical agents used in binder
- Improved fuel composition

## Features

- Derived from low-cost and abundant biomass waste
- Water-resistant and durable high-energy-density pellets/briquettes
- Biomass-based (cranberry pomace or birch bark) binders
- Neutral pH

## Applications

## Technology ID

20180221-20180239

## Category

Engineering &amp; Physical Sciences/Chemicals

Engineering &amp; Physical Sciences/Materials

Engineering &amp; Physical

Sciences/Sustainable Technology

## Learn more



- Binder for producing torrefied wood pellets or briquettes
- Renewable energy
- Fuels
- Torrefied biomass
- Wood pellets
- Reuse cranberry pomace waste

#### **Researchers**

Oksana Kolomitsyna

*Research Fellow, Natural Resources Research Institute*

[External Link](http://www.nrri.umn.edu) (www.nrri.umn.edu)

Tim Hagen

*Researcher, Natural Resources Research Institute*

[External Link](http://www.nrri.umn.edu) (www.nrri.umn.edu)

#### **Interested in Licensing?**

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact us to share your business needs and licensing and technical interests in this technology.