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## **New Biocoal Technology May Bring Relief from Smokey Skies**

*Gresham, Ore.* The air quality resulting from forest slash pile burns in much of the western United States at this time of year may significantly improve in the future as a result of innovative technology getting a boost from a U.S. Forest Service Wood Innovations Grant. The recipient, HM3 Energy, is a clean tech company that wants to turn those piles of forest slash resulting from restoration operations into biocoal that can replace coal in Japanese coal-fired power plants.

Northern Arizona University's Ecological Restoration Institute and Coconino County are collaborating with HM3 Energy on the grant titled "Converting Forest Residues to Profitable Torrefied Briquettes for Export Markets." The purpose of the project is to obtain all key information needed for construction and operation of a 50,000 tons-per-year commercial torrefied briquette (biocoal) plant in northern Arizona that would export biocoal to Japan. The plant will be designed so that capacity can be doubled in the future.

Torrefaction (roasting at high temperature in the absence of oxygen) changes the properties of woody biomass. HM3's torrefied briquettes are water resistant, grind like coal and have similar energy content to coal (and 30% more than raw wood pellets). However, compared to coal, harmful emissions such as nitrous oxides are reduced by more than 50%, and very little sulfur and no mercury whatsoever is produced when the biocoal is combusted.

Using proprietary technology proven over the course of two years in HM3 Energy's Oregon demonstration plant, the commercial plant in Arizona would utilize woody biomass residues (limbs, branches, and small-diameter whole trees) resulting from forest restoration treatments in high-density ponderosa pines and junipers from the Coconino and Kaibab National Forests near Flagstaff. These restoration treatments improve forest health, reducing the risk of uncharacteristic catastrophic wildfires and post-wildfire flooding.

Forest restoration efforts have been impeded due to the lack of a viable market in many locations for the slash resulting from thinning operations. It is too bulky to transport long distances and is therefore disposed of in pile burns during cooler weather that negatively impact air quality. The market HM3 Energy provides for the slash will complement and enhance efforts of other markets that must remove residuals after accessing small-diameter wood and woody biomass residues.

Coconino County is assisting in site identification for the commercial biocoal production plant, and NAU's Ecological Institute is accessing biomass and detailed rail logistics for delivery of the torrefied briquettes to Japan via rail and ship. Japan, which is actively seeking to reduce the use of coal in power generation, has strong economic incentives in place to promote alternative sources of power. Biocoal imports would allow Japanese coal plants to reduce dependence on coal without making expensive

modifications costing hundreds of millions of dollars, as is the case with converting coal plants to raw wood pellets.

The volume of biomass available in the Coconino and Kaibab National Forests alone can effectively support numerous biomass torrefaction plants, each using 160,000 bone dry tons slash annually over the next twenty years and more. However, the success of this project has much wider implications beyond Arizona. A successful commercial plant would be just the first of many in the western U.S. and Canada that could accelerate the pace of implementation of forestland and rangeland restoration treatments by utilizing biomass residues that are to be disposed.

### **About HM3 Energy**

HM3 Energy, an Oregon biotechnology company founded in 2009 to research conversion of forest waste into biocoal, completed its research and demonstration phase at the end of 2018. It is now licensing its torrefaction and densification technology to produce biocoal from biomass, including forest residues and sawmill residues. More information about HM3 Energy's technology, including a short video on how it turns forest slash into biocoal can be found at: <https://HM3Biocoal.com>

The US Forest Service Innovations Award announcement can be found at: <https://www.fs.fed.us/news/releases/forest-service-announces-2019-wood-innovation-grant-awards-reducing-wildfire-risk-and>



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