

HM3 Energy Awarded \$90,000 Phase I USDA SBIR Grant

*Technology converts forest waste into clean fuel to
co-fire with coal at coal-fired power plants*

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GRESHAM, ORE. – A project proposed by HM3 Energy has been awarded a \$90,000 grant from the National Institute of Food and Agriculture (NIFA), United States Department of Agriculture. The USDA Small Business Innovation Research (SBIR) award will fund HM3 Energy's project entitled "Forest Waste Contaminant Removal for Conversion into Clean Fuel for Coal-fired Power Plants."

HM3 Energy has developed a proprietary process using torrefaction to convert underutilized biomass with low commercial value—forest waste, agricultural residue and urban waste wood—into dry and dense briquettes suitable as alternative fuel in existing coal-fired power plants. The biomass is torrefied by heating it at high temperatures in the absence of oxygen.

However forest waste – the diseased and insect-damaged timber, smaller trees, tree limbs, branches, and other biomass debris from forest restoration, thinning, logging and other forest activities – typically contains a lot of contamination, including dirt, sand, rocks, and metals.

When co-fired with coal, the contaminants in the torrefied biofuel can contribute to the slagging and fouling of the power plant surface, decreasing its efficiency. Using the USDA SBIR grant, HM3 Energy intends to find a way to efficiently remove almost all of the soil contaminants in forest waste with minimal water usage.

The SBIR process is highly competitive, with only two Oregon organizations receiving Phase I grants this year. Recipients who successfully complete their proposed research may apply for Phase II grants. Phase II awards assist in moving technology from lab to the field, and begin at \$750,000.

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About HM3 Energy -- HM3 Energy, Inc., an Oregon corporation, has developed a proprietary process to turn biomass into clean fuel to replace coal in coal-fired power

plants. Existing power plants designed to burn coal can co-fire biomass with coal, or directly replace all coal with biomass, drastically reducing carbon and other harmful emissions such as mercury, sulfur and nitrous oxides

The process, which uses torrefaction, produces biomass briquettes/pellets very different from traditional wood or biomass pellets. The HM3 Energy process creates dense solid fuel which can be shipped and stored outside, just like coal. These pellets also can be pulverized and fed into a coal-fired boiler without any modifications to the coal-fired plant, saving millions of dollars in retrofitting costs.

HM3 Energy ran a successful test burn of 100% torrefied biomass in a coal-fired boiler at Western Research Institute in February of this year. The biomass performed just as coal during a steady-state combustion of first 50/50 coal/HM3 Energy torrefied biomass, followed by 100% pulverized biomass feed. The torrefied biomass performed just as coal, with the exception that a feed rate of about 20% less biomass feed was needed to maintain the same furnace temperature.

HM3 Energy is an Oregon-based corporation formed in 2008 (first as HM3 Ethanol) to produce cellulosic ethanol from untapped non-food renewable resources as feedstock. The technical team consists of five senior chemists and engineers who have studied conversion of lignocellulosic feedstock for years.

In late 2008 the team realized that torrefying low-value biomass such as forest waste, agricultural residue and urban waste wood would have a much greater impact on reduction on carbon emissions, and thus global warming. In 2009 the company changed its name to HM3 Energy and concentrated on clean solid fuel to replace coal from biomass.

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