Biomass to Energy and Climate Solutions in Montana

WHAT: This $30,000,000 project responds to a US Department of Energy/Recovery Act grant by offering a Demonstration of Integrated Biorefinery Operations. A dynamic team of experts propose to refine and implement smokeless biomass pyrolysis for the production of biochar, biofuels and electricity in partnership with Phoenix Renewable Energies, LLC in Helena, Montana.

WHY: Excess carbon dioxide (CO_2) and other greenhouse gasses (GHG) in the atmosphere are impacting our local environment and the global climate. The impacts from climate change are increasing forest damage and the accumulation of biomass. Currently this biomass is treated as waste and has the potential to become a significant fire hazard. When used in biomass-to-energy systems, this smokeless technology can reduce GHG, efficiently produce energy and produce valuable carbon sequestering biochar by-products for soil enhancement. Pyrolysis technology is scalable, replicable and adaptable to a wide range of applications and geographic locations without adverse social and environmental impacts.

WHO: Project grant partners include:

- Danny Day, *Eprida Power and Life Sciences Company; Athens, Georgia*
- Dr. James Lee, Dr. Joe Katz, *Whiting School of Engineering, Johns Hopkins University; Chicago, Illinois*
- Benson Lee, *Technology Management, Inc.; Cleveland, Ohio*
- Dr. Johannes Lehmann, Dr. Kelli Roberts; *Cornell University, Ithaca, New York*
- Chris Racicot, Daniel Conrady, *Phoenix Renewable Energies, LLC; Helena, Montana*

WHERE: Initial testing of various elements of the project will be conducted by Johns Hopkins faculty and Technology Management, Inc (TMI) with equipment supplied by Eprida and TMI. After lab-bench tests, commercialization development will be lead by Phoenix Renewable Energies, LLC of Helena, Montana. Process guidance and product quality assurance will be provided by Cornell University.

HOW: Proof of concept followed by the design, construction, and operation of an integrated biorefinery/combined heat and power unit using a smokeless, scalable biomass pyrolysis process in conjunction with a solid oxide fuel cell system to efficiently and cleanly produce electricity, biochar and biofuels. This decentralized technology extends the potential deployment of this system to millions of end users globally, creating thousands of community-based jobs. This will also facilitate the use of local biomass which is difficult or uneconomic to transport.

Biochar, placed in soil, can sequester 50% of the carbon from the feedstock for hundreds to thousands of years, thus its production and use is carbon negative. If one were to convert just 5.5% of the total available biomass globally to biochar, and sequester that biochar in soils, that would offset global fossil-fuel CO_2 emissions by 38%. The project will include a full life-cycle analysis (LCA) on the technology's effects on energy production, global carbon sequestration, air quality, water quality and environmental health. The attached Project Narrative provides in depth descriptions of the science and objectives.

The net impact is in one year. The proposed commercial plant in Helena, Montana will process one ton of biomass per hour, supply 1MW of electricity to over 750 homes and by substituting fossil fuel use, eliminate GHG emissions equal to 1.6 million barrels of crude oil. In addition, the sequestration capacity of 2,000 tons of biochar products will result in a net reduction of 6,000 tons of carbon dioxide equivalents from the atmosphere per year. *(http://enduse.lbl.gov/info/CA Presentation/sid011.htm)

Contact Chris Racicot, Phoenix Renewable Energies, LLC at 406-465-7599 for more information.