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Aera Energy tests biomass steam system

By Kris Bevill

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Global Greensteam LLC, a subsidiary of Global Green Solutions Inc., has completed construction of its first demonstration-scale biomass-fired steam combustion system. The patent-pending Greensteam system is being tested at Aera Energy LLC's Belridge oil field near Bakersfield, Calif., where it will be utilized to generate renewable steam for use in enhanced oil recovery operations at the oil field.

Craig Harting, chief operating officer of Global Green Solutions and president of Global Greensteam, describes the system simply as "combustion-based technology for biomass." The demonstration-scale facility will use a mixture of agricultural residue and woody biomass, but the system is able to utilize any number of biomass feedstocks, from woody biomass to urban wood waste or horse muck. The only biomass-based feedstocks that are currently not able to be used in the system, according to Harting, are waste woods that have been polluted with heavy metals and municipal solid waste. "We haven't really done any experimentation yet with municipal solid waste, but at some point we will probably do some experimentation," he added.

For soon-to-be regulated stationary sources of GHG emissions, Harting said Global

Greensteam's system offers significant emissions reductions compared to older biomass-based combustion technologies. Research conducted by Global Green Solutions has shown that the Greensteam technology could further reduce emissions by 75-90 percent when compared to older biomass systems. The demonstration project is undergoing a testing phase through the end of this year to prove the Global Green's ultra-low emissions prediction and will also be subject to Aera's performance testing requirements and California air emissions testing.

Upon receiving successful test results, Global Greensteam will immediately begin constructing a commercial-scale facility at Aera. Harting said the full-scale permit application is currently being completed, and the analysis used for the application estimates that the commercial-scale system could displace more than 300,000 tons of CO₂ annually that would otherwise be produced from fossil fuel-fired systems. "It's a pretty big opportunity for these projects to displace fossil-based greenhouse gas emissions," he said. "I personally think biomass is one of the larger opportunities in the sense that you can directly displace steam and electrical power with the same level of reliability that is produced from fossil fuels and in the same configuration. Repowering an industrial facility or, as we're doing for Aera, replacing their natural gas-fired steam generators with biomass-fired steam generators, from a packaging perspective it's relatively the same thing. We're able to put it in the same area, to connect to the water and electrical supplies the same way that they would if they were doing something with their fossil fuel-fired units. I think that's an advantage for a biomass-based technology like this."

Aera is installing the system for two reasons, according to Harting: to hedge against volatile natural gas prices and availability and to comply with future emissions regulations. The U.S. EPA's forthcoming best available control technology (BACT) guidelines could qualify biomass-based systems such as Global Greensteam's as a method to meet the EPA's requirements, which would be a boon for Global Greensteam, but could also benefit industrial compliers due to the ease of the system's installation.

Global Greensteam is in the process of planning its strategic marketing plan for the system, but Harting said there will be few limitations as to the types of facilities that can employ the process. "We're not going to be targeting extremely small applications, not because the technology wouldn't work, but because we believe there's a cut-off point at which it's not very economical," he said. "It's a good thing to do from an environmental perspective, but it's not particularly effective economically at a very small scale." Harting is confident that feedstock can be adequately sourced for facilities approximately 10 megawatts in size and while proximity to feedstock is a potential downfall for the system, there are instances where it might not be a factor. "Many plants in the area of California near Aera are currently using biomass that comes from L.A. County (more than 150 miles away), but it's still cost effective because there's no place for it to go," he said, adding that high tipping fees in L.A. County make it attractive for feedstock suppliers to truck the waste to industrial facilities instead.

Ideal applications for Global Greensteam's system include paper mills and electrical

power generation facilities. The company has engineered a design for retrofitting bark boilers at paper mills and has projects under development at power plants, according to Harting. The system can be installed to repower a facility that has traditionally used fossil fuels such as coal by substituting biomass for the coal input.

Combined-heat-and-power systems, while quite popular in Europe, have yet to be embraced by the industrial community in the U.S. Harting is looking for that to change soon and said his company's technology is also ideal for that type of system. "CHP applications are a really good fit because they are much more efficient at utilizing more of the energy that comes out of the biomass in the first place," he said. "So, if you're making both electrical power and heat that you either use for an industrial purpose or for residential or commercial building-type heating, those are excellent applications."

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The graphic features a green background with a dark green header. At the top right, there are four circular icons: a factory with smokestacks, a green circle with 'CO2', a green circle with a dollar sign, and a green circle with a leaf. The text is in white and black, with a prominent 'SUBMIT ABSTRACTS HERE' button at the bottom.