



U.S. EPA Environmental Technology Verification Program Environmental and Sustainable Technology Evaluations (ESTE): Verification of Fuel Characteristics and Emissions from Biomass-fired Boilers

Impact Statement

The co-firing of biomass in coal-fired boilers offers the opportunity of reducing the emissions of criteria pollutants and greenhouse gases while also reducing the use of finite fossil fuel resources. This verification will measure the reductions of these emissions from biomass co-fired boilers in the 100 to 1000 million BTU per hour (MMBtu/h) size range.

Background

The U.S. Environmental Protection Agency's Office of Research and Development (EPA-ORD) operates the Environmental and Sustainable Technology Evaluations (ESTE) program to facilitate the deployment of innovative technologies through performance verification and information dissemination. In part, ESTE is intended to increase the relevance of Environmental Technology Verification (ETV) Program projects to the U.S. EPA program and regional offices. EPA has partnered with Southern Research Institute (SRI) since 1997 to operate the Greenhouse Gas Technology Center for the ETV Program and has now contracted with SRI to evaluate biomass co-firing in coal-fired boilers for ESTE.

With increasing concern about climate change and fossil fuel energy supplies, there continues to be an interest in biomass as a renewable and sustainable energy source. Many studies and research projects regarding the efficacy and environmental impacts of biomass co-firing have been conducted on large, coal-fired utility boilers, but little data is available regarding biomass co-firing in industrial size boilers. EPA's Office of Air Quality Planning and Standards has expressed an interest in biomass co-firing in industrial-commercial-institutional (ICI) boilers in the 100 to 1000 MMBtu/h range. The reason for this emphasis is to provide support for development of a new Area-Source MACT standard. There is also interest in development of a Guidance Memo relating to PM 2.5 emissions reductions.

Objectives

The focus for this project will be to evaluate performance and emission reductions for larger ICI boilers as a result of biomass co-firing. The primary objectives of this project are to:

- Evaluate changes in boiler emissions due to biomass co-firing;
- Evaluate boiler efficiency with biomass co-firing;

- Determine if the value of ash for beneficial uses is reduced due to added carbon and metals content;
- Evaluate sustainability indicators including sourcing of biomass and disposal of ash.

Status

The Test Quality Assurance Plan has been completed and approved. Initially, testing will be conducted on two industrial boilers that are capable of co-firing woody biomass: Minnesota Power's Rapids Energy Center Boiler 5 (MP-5) which currently co-fires bark with coal, and the University of Iowa Main Power Plant's Boiler 10 (UI-10) which will be co-firing wood derived pelletized fuel with coal. Testing at the University of Iowa is currently scheduled for December, 2006 and at Minnesota Power in January, 2007. The final report is scheduled for completion in April, 2007.

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