

Savannah River's Biomass Steam Plant Success with Clean and Renewable Energy

Challenge

In order to meet the federal energy and environmental management requirements in Presidential Executive Order 13423, DOE Order 430.2B, and the Transformational Energy Action Management (TEAM) Initiative, DOE Secretary Samuel Bodman encouraged the DOE federal complex to utilize third party financing options like the Energy Savings Performance Contract (ESPC). Specifically, this innovative renewable steam plant meets two of the TEAM initiatives, which strengthens the federal requirements by requiring that DOE sites (1) improve energy efficiency and reduce greenhouse gases and, (2) implement renewable energy generation projects on agency property for agency use. The Savannah River Site (SRS) not only used the ESPC procurement mechanism to achieve both TEAM goals, the SRS project leads the Department in innovative energy management and environmental stewardship.

Technical Solution

SRS utilized an innovative, third party financing plan in the form of an ESPC to fund this biomass project. Under an ESPC, contractor-guaranteed savings in energy and operational costs are used to fund the project under a financed mortgage. The arrangement doesn't increase the SRS budget or annual cost of operating the facilities included in the project scope. When the mortgage is paid off, all savings accrue to the federal government. As mission needs evolved over the years, a number of facilities that the original plant served in A-Area were torn down resulting in an oversized, inefficient boiler plant with low productivity and increased venting of excess steam. The existing boiler plant was operating beyond its useful life, forcing SRS to spend higher maintenance and repair costs. DOE collaborated with Savannah River Nuclear Solutions and Honeywell Building Solutions to install two energy efficient 30,000 lbs/hr steam boilers to replace a 1950s vintage coal-fired steam plant with a wood-burning (biomass) unit - a "renewable energy source" providing an efficient, long-term, reliable source of steam to A-Area that includes the Savannah River National Laboratory and other administrative facilities. Construction of the new steam plant began in August 2007 and was completed on schedule in September 2008. SRS started exporting steam from the new plant in early September 2008.



A-Area Steam Power Plant

"The Savannah River Site has always strived to reduce emissions above and beyond allowable limits and to be a good steward of the environment. This new right sized plant clearly supports those goals and will provide reliable, efficient steam with substantial reductions in greenhouse gases."

- Patrick Burke, DOE Utility Manager

SRS Biomass Cogeneration Plant

Project ID: Task Order No.-KL46299M

Tech Stage: Deployed (Operational)

Energy Savings Performance Contract

The technical solution has been deployed to the A-Area at Savannah River Site.

Impact and Features

- The source of the SRS biomass power comes from residual waste generated by waste wood from the logging industry. Annual environmental benefits of the project includes:
 - Particulate matter reduction of 400 ton
 - SOx reduction of 1,742 tons
 - NOx reduction of 218 tons
 - CO reduction of 10 tons
- Biomass supply requirements are estimated to be about 27,000 tons annually.
- Financials for the SRS A-Area Biomass project
 - Construction and Financing Costs: **\$13.8 million**
 - First Year Operations Savings: **\$1.5 million**
 - ESPC contract terms: **9 years**
- Two 30,000 lbs/hr steam boilers were constructed and replaced the existing coal-fired boilers:
 - One new boiler is wood-fired and provides the majority of the steam required for the area
 - The other boiler is a standby, fuel-oil fired boiler which will operate during maintenance periods for the wood-fired boiler and during peak steam demand times.
- The new boiler system results in less energy consumption lower operating and maintenance costs, and compliance with new Clean Air Act Standards.
- With the success of this biomass project, SRS is proposing another ESPC project to replace the coal-fired power plant in D-Area and oil-fired boilers in K-Area. The new Replacement Project is currently undergoing DOE review. It is a \$167.2 million project, consisting of a large biomass cogeneration plant near F-Area along with two smaller biomass boilers in K-Area and L-Area for building heat only. The start of construction for this project will be early 2009 with the three plants operational in approximately 30 months. Ameresco Federal Solutions is the designer, builder and operator for this project. Biomass fuel for the plants will be procured through commercial vendors with some fuel being supplied from residual waste from SRS logging operations.

Vendor	Honeywell
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Web Link	http://www.srs.gov/general/news/releases/NR2008_SteamPlant.pdf

