

## Capital Project for New Gas-Fired Boiler at the Central Steam Plant

### JOINT FINANCE AND AUDIT COMMITTEE AND BUILDINGS AND GROUNDS COMMITTEE

February 28, 2017

The Central Steam Plant (Plant) includes five operational boilers installed between 1959 and 1996. The boilers, their source of fuel, and their efficiency rate are listed below in a table. A sixth boiler located within the plant was decommissioned in 1997.

The university currently spends over \$9 million to operate the Plant assets. The university evaluates fuel prices, operating costs, and thermal loads to determine which assets to use to meet thermal demands. In the present environment, gas-fired boilers are more economical because of lower operating costs and are utilized first to meet steam service. The gas boilers operate the entire year and provide 60 percent of thermal needs of the university. Coal-fired boilers provide 40 percent of thermal needs with coal providing service and redundancy during the winter months.

State-of-the-art, high efficiency gas-fired boiler technology with 90 percent operating efficiency is now available. These new boilers are 12 percent more efficient than the Plant's existing gas assets and offer significant fuel and operating cost reductions. A new 100,000 pound per hour gas-fired boiler could produce 60 percent of the Plant's steam generation with a \$495,000 lower annual fuel costs than the current gas assets.

The estimated total capital project costs inclusive of design, construction, and equipment to install a new, high efficiency gas-fired boiler is \$6.8 million. Using projected future fuel savings, including fuel escalation rates, these savings can be used to fund this capital project and will generate a positive net present value using the current cost of capital rates within 15 years. By installing a new gas-fired boiler and increasing the total capacity of the Central Plant's assets to meet thermal demands, the Plant could use the older gas-fired boilers in the winter periods in place of the coal-fired boilers. This would result in a \$243,000 annual reduction of operating costs, exclusive of annual fuel costs savings, and costs related to coal-fired boiler air pollution control, maintenance, and disposal costs. The combined impact of fuel savings and these reduced future operating costs should result in a positive net present value after nine years.

#### Central Heat Plant Boiler Assets

<u>Boiler ID No.</u>	<u>Year Built</u>	<u>Fuel Source</u>	<u>Steam Output</u>	<u>Efficiency</u>
Boiler #6	1949	Decommissioned		
Boiler #7	1959	Coal	100,000 lbs/hr	82%
Boiler #8	1968	Gas	80,000 lbs/hr	78%
Boiler #9	1969	Gas	80,000 lbs/hr	78%
Boiler #10	1972	Gas	80,000 lbs/hr	78%
Boiler #11	1996	Coal	100,000 lbs/hr	82%

The university's proposal calls for installing a new 100,000 pound per hour gas-fired boiler in place of the decommissioned boiler. Beyond the long-term financial benefits, a new gas boiler would result in a reduction of carbon dioxide emissions by nearly 50 percent, increase the Plant's overall capacity to meet future campus growth, and act as a replacement for the eventual decommissioning of aging coal-fired Boiler #7. The university would keep Boiler #11, a 100,000 pound per hour coal-fired boiler in the Plant to maintain a source of redundancy and fuel diversity.

The estimated total project costs inclusive of design, construction, and equipment are \$6.8 million. As with all self-supporting projects, the university has developed a financing plan, as described earlier in this report, to provide assurance regarding the financial feasibility of the project. This funding plan calls for the use of fuel and operating savings to pay back an internal loan for the entire cost of the project.

Under the 2006 Management Agreement between the Commonwealth of Virginia and the university, the Board of Visitors has the authority to approve the budget, size, scope, and overall funding of nongeneral fund capital outlay projects. This request is for a \$6.8 million authorization to install a new gas-fired boiler for the Central Steam Plant.

**RESOLUTION ON CAPITAL PROJECT FOR  
NEW GAS-FIRED BOILER**

**WHEREAS**, The Virginia Tech Central Steam Plant supplies steam to the Blacksburg Campus; and,

**WHEREAS**, the existing configuration of the Central Steam Plant's boilers include a combination of coal and gas/oil-fired boilers with operating efficiencies between 78 percent and 82 percent; and,

**WHEREAS**, new gas-fired boiler technology offers operating efficiencies of 90 percent; and,

**WHEREAS**, installing a new 100,000 pound per hour gas-fired boiler would result in an estimated annual savings of \$243,000 compared to current boiler operations; and,

**WHEREAS**, a new gas-fired boiler will maintain the quality and reliability of the Central Steam Plant while operating more efficiently and reducing carbon dioxide emissions; and,

**WHEREAS**, a new gas boiler would increase the Central Steam Plant's capacity to meet present and projected future campus growth; and,

**WHEREAS**, the total project cost is \$6.8 million and the university has developed a 100 percent nongeneral fund resource plan to support the costs; and,

**WHEREAS**, under the 2006 Management Agreement between the Commonwealth of Virginia and Virginia Tech, the Board of Visitors has authority to approve the budget, size, scope, and overall funding of nongeneral funded major capital outlay projects;

**NOW, THEREFORE BE IT RESOLVED**, that the university be authorized to move forward with the installation of a new 100,000 pound per hour gas-fired boiler in the Central Steam Plant at a total project cost not to exceed \$6.8 million.

**RECOMMENDATION:**

That the resolution authorizing Virginia Tech to design and install a new gas-fired boiler for the Central Steam Plant be approved.

April 3, 2017