

Executive Summary

The following report contains a proposed redesign to the mechanical system for University Ridge at East Stroudsburg University from a conventional duct furnace system to a more environmentally friendly cogeneration system. University Ridge is a 140,000 ft² apartment complex which consists of ten buildings for student housing.

The following thesis will illustrate the effects of reducing the complex's dependency on the electrical grid. A combined heating, cooling, and power system is implemented in order to take care of the buildings thermal loads and reduce the amount of power purchased. This system is able to do this by harnessing otherwise waste exhaust heat from the production of electricity. Absorption cooling also harvests the waste heat which it uses as a "free" source of energy. Also, a chilled water storage tank is used in order to balance the buildings ever changing load thus resulting in a more efficient chiller operation. Additional equipment which will accompany the system are pumps, cooling towers, and piping which will be sized.

The new turbines will be located outside of the pump house where the absorption chiller will be located. The use of these efficient turbines will reduce the amount of pollutants released to the atmosphere as a result of using a clean burning fuel and the flattening of the loads on the prime mover. The additional first cost of this cogeneration system will be analyzed and a payback period will be identified and the systems feasibility will be justified from this.