

## ***Energy Conservation & Implementation of Heat-Recovery System for a Hospital***

### **The Project.**

The facility in question is a hospital with an 800-patient capacity, which also contains numerous laboratories and outpatient clinics. The hospital has significant energy demands, and had typically relied upon conventional fuels to meet these needs in order to carry out the work of caring for patients at the hospital. Conversion Technology, Inc. (CTI) undertook the responsibility to assist the hospital in developing an energy conservation plan. Through their investigation, CTI's engineers designed a system to use the solid wastes generated by the facility for energy generation. Rather than directly disposing of these wastes, CTI created a closed-loop cycle for the facility in which these wastes could take the place of conventional fuels, thereby significantly cutting energy costs at the hospital.

### **The Analysis.**

CTI performed a thorough analysis of the energy demands and usage at the hospital, in order to determine the exact energy requirements of the facility and to consider potential energy alternatives. The analysis found:

- The primary energy source for the hospital was No. 6 fuel, with an annual consumption of 1,222 tons.
- The fuel was used to generate steam to supply the hospital's energy needs; the steam demand at the hospital was found to be 14,325 tons/year.
- 556 tons of solid waste were produced each year by the hospital, which was directly disposed of in proper fashion.

### **The Solution.**

Upon completion of the energy analysis at the facility, CTI's engineers saw the potential for energy production in the hospital's waste streams. CTI developed a plan of action that would create a closed-loop cycle, using the facility wastes for power generation:

- CTI designed a heat-recovery boiler for handling the hospital's solid wastes (see Figure 1 below).
- This boiler incinerated the facility waste to generate steam that helped to meet the hospital's energy demands, thereby reducing the hospital's reliance upon conventional fuels for energy production and reducing energy expenditures.

### **The Results.**

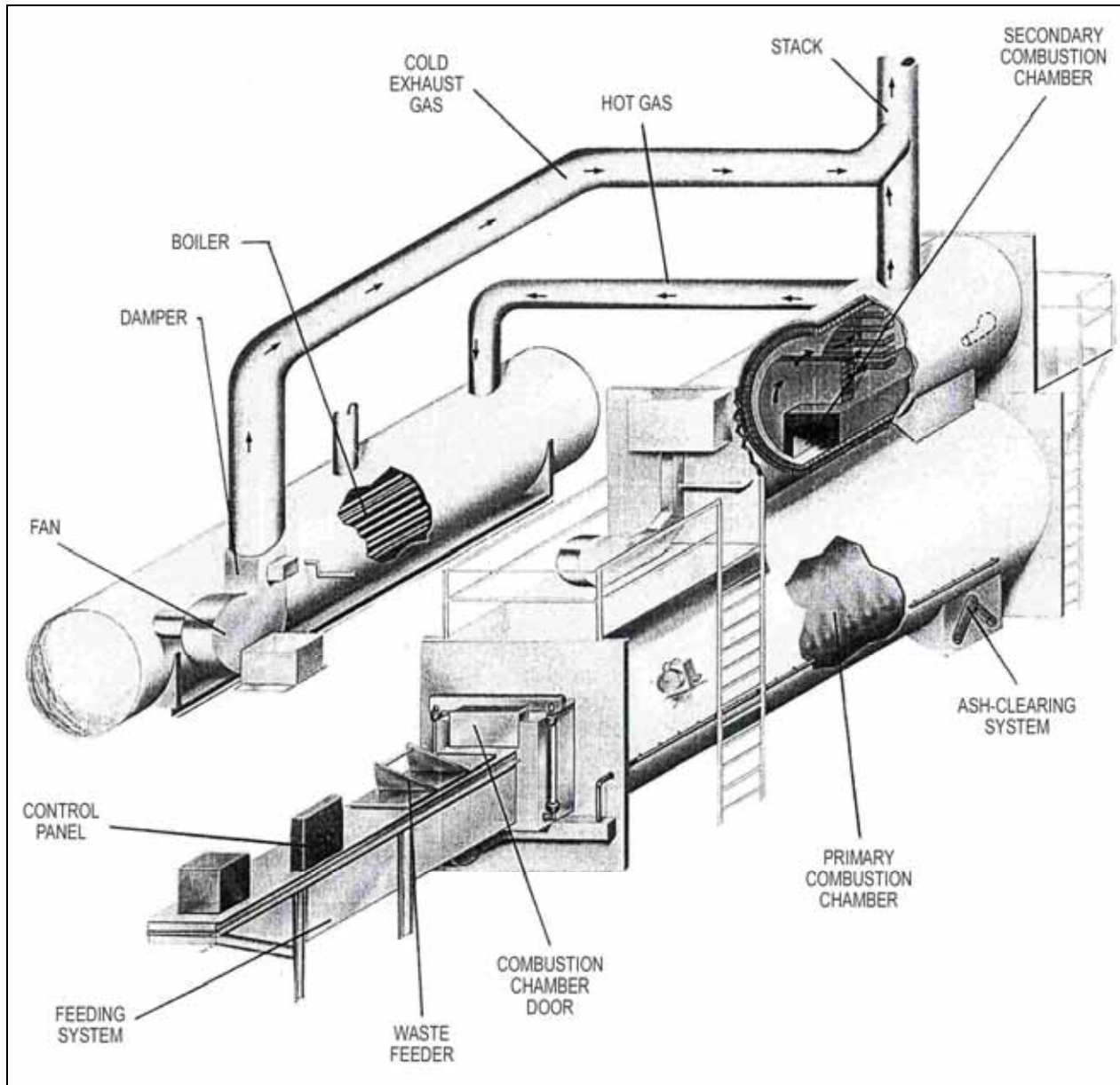
The implementation of the waste heat-recovery boiler at the hospital led to significant improvements in waste disposal, energy production, and energy costs at the facility:

- The boiler designed by CTI generated steam at a pressure of 150 psi, with a thermal efficiency of 66%.
- The new system generated 3,021 tons of steam per year, meeting 21% of the facility's annual energy demand.
- 258 tons of No. 6 fuel were conserved each year as a result of the new energy production design, leading to cost savings of nearly \$80,000/year.
- The investment in the system paid for itself within 7 years through energy savings.

## CASE STUDY

### The Final Word.

The closed-loop system developed for the hospital shows the significant benefits that sustainable design can have for any number of facilities. Dependence on conventional fuels is reduced, waste disposal is made more efficient, and significant energy cost savings are attained. CTI is experienced in aiding facilities in their energy conservation goals, providing economic relief while minimizing environmental impact and providing alternatives to the use of valuable resources.



**Figure 1:** Schematic of hospital waste heat-recovery incinerator, designed to use facility waste to meet energy demands.