Steam Generator Solutions: Imaginative Heat Management Schemes Cut Processing Costs of Snacks

Energy-efficient steam generators play key roles

Legend has it that the renowned Greek inventor Archimedes (287-212 BCE) — originator of the compound pulley and the hydraulic screw — used the sun's heat as a weapon of war in defending the Sicilian city of Syracuse from a Roman invasion fleet. Using the principle of the parabolic reflector, as seen in a modern solar furnace, he is said to have arranged an array of mirrors on a hillside to focus the sun's rays on the invaders' ships, thus igniting them. Fact or fancy, the story indicates that making heat work harder is a preoccupation of long standing.

Today, spurred by accelerating costs, processors of snacks are turning to equally imaginative methods to boost energy efficiency. One of the common methods is the recovery and recycling of heat generated during processing.

Using Waste Heat to Toast Corn Chips

Among the numerous facilities operated by Frito-Lay, one of the world's best known snack food manufacturers, is a 350.000-square-foot complex in southern Georgia, where vast quantities of corn chips and snack specialties are produced. Here, gas-fired ovens on three parallel processing lines use heat to toast corn chips. Until recently, however, once its mission was accomplished, the heat was simply stack-vented from the plant's roof.

Realizing that the same heat could be recovered, converted to steam and reintroduced into the plant's main steam supply stream, management thoroughly quantified the energy cost reductions that this would realize, and researched available heat recovery technology.

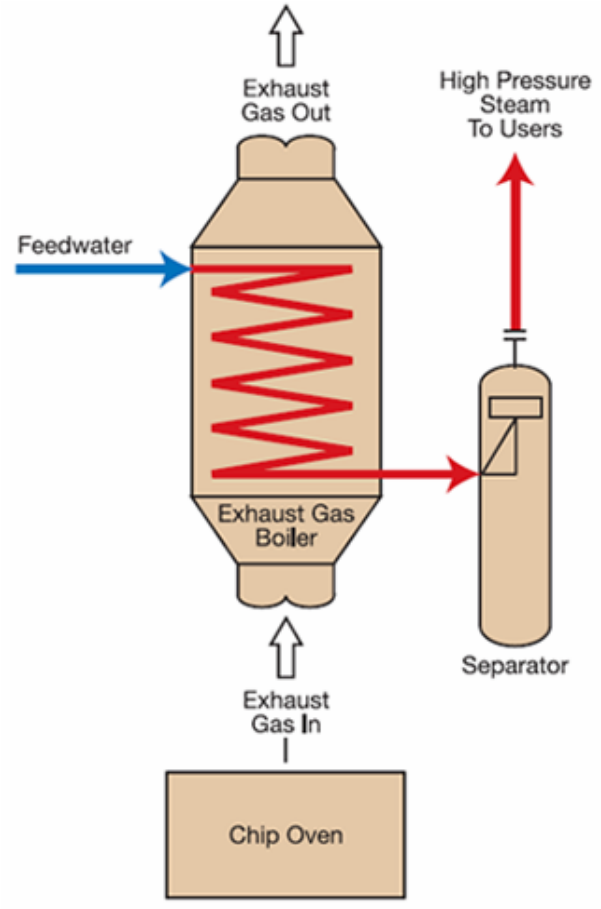
Providing Custom Services

In Georgia, Frito-Lay addressed this challenge by contacting Clayton Industries of City of Industry, Calif., a world leader in the design and manufacture of steam generators and heat recovery systems. Clayton's recommendation: three roof-installed heat recovery boilers (an option less expensive than ground installation), each serving its own toasting oven.

The toaster ovens are situated in long conveyor systems that deliver corn chips formed and cut. Here toasting adds the "crunch" that appeals to snack-lovers, and heat is subsequently channeled to a vertical channel much like an exhaust hood outlet, and introduced into a heat recovery boiler. The heat creates steam in the boiler core. The steam is routed to a remotely located separator, which in turn sends it to the processing supply stream. Processing heat is captured and, like a phoenix, revives to return as processing heat.

Clayton heat recovery boilers were installed at the snack food company in the fall of 2007. The economies enjoyed as a consequence have confirmed the accuracy of its executives' predictions, and the company's capital investment has already been recouped.

Clayton Industries, founded in 1930, markets internationally. The Thermal Products Division manufactures a broad range of direct-fired steam generators and waste heat steam generators used by major industries. The company's Chemicals Division is the source of chemicals used to treat steam generator feed-water.



Doing Double Duty – At a Frito-Lay snack food plant, Clayton heat recovery boilers capture heat from toasting ovens and convert it to steam that is reintroduced into the main steam line. The system paid for itself in 18 months.

Exhaust Gas Captured – Steam generators can be an essential part of a heat recovery system. They capture gases that would be exhausted and employ that heat for a boiler system.