

Power Play

By following conservation ethics operators can reclaim both energy and waste

When ecology logistics began in the 1970s, during the first wave of environmental consciousness, forward-looking industries recognized that stuff going down the drain, messy though it was, had value. Non-obvious elements like heat energy, off-gases, water (hot, cold, clean and dirty) and a broad spectrum of waterborne solids had commercial value. If you could recover any of this, you'd save money, and it was good for business.

"Well there is likely a lot that can be done," says Toronto-based energy consultant Ken Brown, who provides product and technical support on energy conserving, long life and "green" lubricants. "The food industry tends to use a lot of energy during cooking as well as storing finished products in coolers or freezers," he says, adding that other relevant issues for food processing include mixer efficiency, as well as broad areas dealing with "efficiency of burners and heaters [and their] insulation. Probably not much is done with the waste heat when cooling down product."

Brown also points to energy and resource leaks in areas such as food storage, "plus how traffic in and out of freezer areas is controlled to minimize loss of cold air. In addition, don't forget getting product to the stores and the freezers at stores. [This area] tends to be very bad...building maintenance and process heating can be [compromised] by steam and leaking steam traps...and are notorious wasters of energy."

Better beer, less waste

In sectors based on grains, grinding processes can use between 55 and 60 per cent of the whole energy budget, one reason why Guelph, Ont.-based Sleeman Breweries has become so focused on its energy consumption. Doan Bellman, Sleeman's vice-president of Technology, says the beermaker's enormous expansion in product volume forced the brewery to become more energy conscious, as beer production went "from zero in 1988, to some 850,000 hectolitres a year" today.

The "large micro-brewery" success story revolves around few high-profile miracle technologies, but rather banks on plant-wide upgrading of equipment at every stage of production, from the bottle washers and pasteurizers to efficient use of heat-exchangers. These reclaim hot water and steam from

those stages that need higher temperatures, as the wort, or proto-beer, chills out for cold-temperature stages. Along with this array of thermal engineering developments, Bellman points to a more than 50-per-cent reduction in water consumption, even as actual batch processing times telescoped from 10 weeks to five or six. This, he says, saves time – and time is money in any business – as well as space, an important consideration now that the brewer's inexorable growth has expanded it into a neighbouring property (formerly part of White Westinghouse).

"Greener" waste disposal

Even more ambitious resource-conservation areas are debuting at Thunder Bay, Ont.-based EEC Energy Corp. The company's advanced, high-temperature (50°C to 55°C) ADvantage anaerobic digesters take in agricultural waste-feedstock, from grits and grains, to straw and spent cooking oils. According to vice-president Jeff Stubbings, running such high-temperature, bacteriological processes means faster waste reduction processes, compact footprint and quick, solid return on investment. The digesters use built-in CO₂ as well as H₂S scrubbers, though sulfides are down in the range where users such as a local "grains



Sleeman Breweries upgraded its system to reduce energy use, waste and space.

processor" could burn the output methane without first cleaning up the noxious sulfur compounds.

The energy efficiencies of this design are impressive, as are the environmental specs of this "closed loop" waste processing system. But, notes Stubbings, much of the return on investment revolves around fuel prices. "Energy currently costs around \$7/BTU in the spot market, whereas it was \$12/BTU last year," he says. Still, he finds from grains-intensive plants that the high-efficiency digesters can produce enough methane to allow a plant to remove itself from the power grid. Stubbings adds that operators should also look beyond their cost-per-kilowatt from the local utility and consider often-overlooked extras such as the distribution charge and the line-loss costs normally considered inescapable. Instead, he says, a 10-ft. diameter by 32-ft. digester could feasibly yield approximately nine cubic feet of methane per pound of waste-grain input, as one tank processes about three tons per day.