



Digester Gas Provides Savings

By Thomas Mangione

Digester gas is a source of free energy that can greatly reduce operating costs for wastewater treatment facilities. As the cost of natural gas and other fuel alternatives continues to soar (see **Figure 1**), more facilities are reviewing their strategies for handling digester gas. Simply wasting this sometimes troublesome energy source is no longer an option. In the last year alone, the number of upgrades and retrofits to existing anaerobic digestion equipment and processes has climbed drastically.

For optimal operation, anaerobic digesters require good mixing and constant temperature control. The digesters operate at either 95°F or 131°F – temperatures at which anaerobic microbes perform most efficiently. In maintaining those temperatures, operators must take into account the heated influent sludge entering the digester as well as heat losses from the digester.

Digester sludge heating is one of the most common uses of digester gas. Produced at low

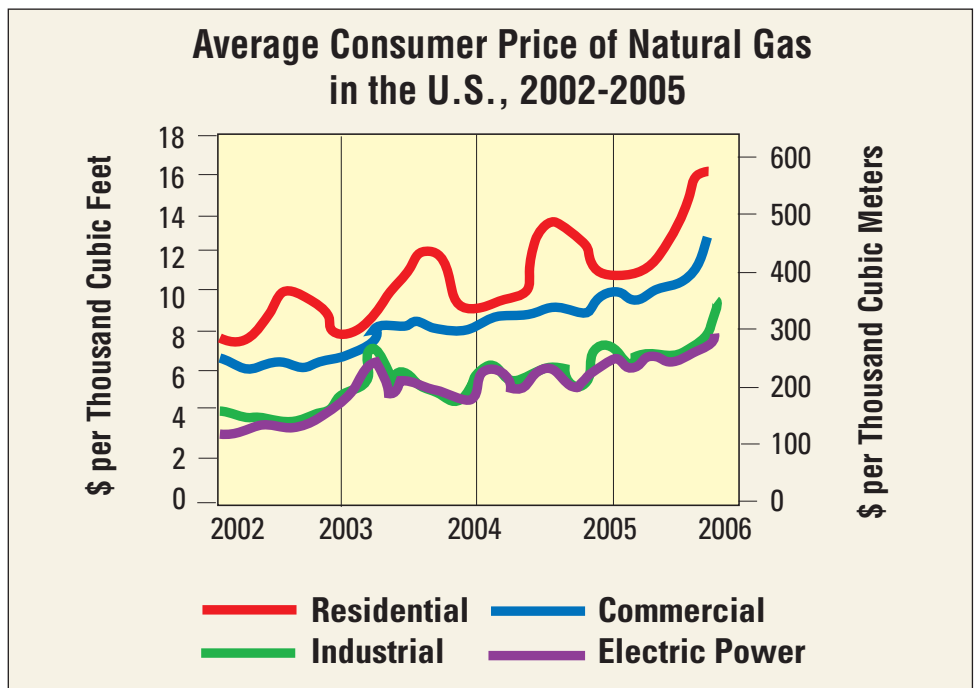


Figure 1: The graph above shows average prices of natural gas since 2002. Source: The Energy Information Administration.

Digester Gas

pressures, this dirty gas can cause maintenance issues with burners and boilers. A gas booster is sometimes needed to increase the pressure before certain burners. Other burners cannot tolerate fouling constituents, and require the gas to be scrubbed. These issues result in more boilers requiring regular maintenance and cleaning.

A decade ago, when natural gas prices were relatively low, some plants tried reducing or eliminating these maintenance issues by shutting off the digester gas to their sludge heaters. But with natural gas prices now four to five times more expensive than 10 years ago^[1], wasting digester gas is a costly approach to operations.

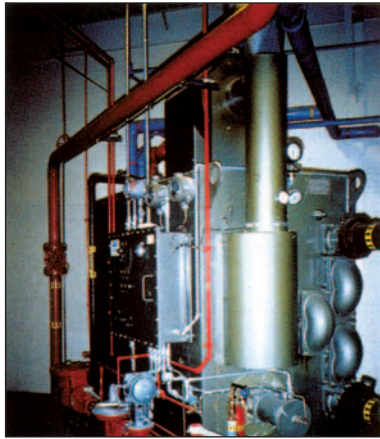


Figure 2: A typical heater heat exchanger.

In an effort to reverse this trend, regular maintenance programs need to be stressed at the plant level. Routine cleaning of the fire tubes should be scheduled and the upgrading of burners and controls seriously considered.

Complete retrofit programs can help with digester maintenance and care. Application engineers determine the scope of

work with a pre-inspection and then tailor their service offering to meet the customer's needs. Such offerings range from supplying OEM parts to a complete turnkey installation, including starting up the rebuilt unit and fine-tuning the burners.

To minimize the issues of burning digester gas in heaters, some heat exchangers allow the heater to operate down to 2 inches w. c., where it automatically blends with natural gas while continuously firing. This unique design safely creates negative pressure in the fire box, eliminating fugitive gas emissions and the need for a gas booster. The water box does not need to be drained in order to access the fire tubes or the inside of the sludge tubes.

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Digester Gas Storage Options

As not all digester gas is used right away, it must be efficiently stored for later use. Storing the gas for peak usage times, for use in other dual fuel motors such as blowers and pumps, and for use in a heater during temperature extremes, can result in extraordinary savings by eliminating



Figure 3: USFilter's anaerobic digestion retrofit program and its Dystor dual membrane gas holder cover (pictured above) are two solutions to digester gas storage.

or reducing the use of natural gas or some other alternate fuel.

The amount of gas storage needed also depends on the facility's usage goals. The owner may want to store as much digester gas as possible, or he may only want enough to let the heater heat exchanger (see Figure 2) run through one uninterrupted cycle.

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Adding a conventional steel cover to an existing plant may pose certain limitations. Existing covers may need to be re-ballasted to account for the weight of the new cover. Sludge variation in the new gas holder will also have some limitations. A good coating application is essential for reliable life.

Odors are another issue with steel covers and anaerobic digesters in general. Even though the amount of sludge exposed to the atmosphere is small, some digesters may release numerous odors, depending on the influent constituents.

As natural gas and other alternate fuel prices skyrocket, wastewater treatment facility operators will continue to seek more cost-effective and energy-efficient operation methods. Anaerobic digesters are a proven, safe and reliable treatment process. To maximize performance and minimize costs, proper efficient use of and proper storage of digester gas are important. (see Figure 3) **PE**

Reference:

1. Interview with Ben Fisher of International Agribusiness Group, Jan. 30, 2006.

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