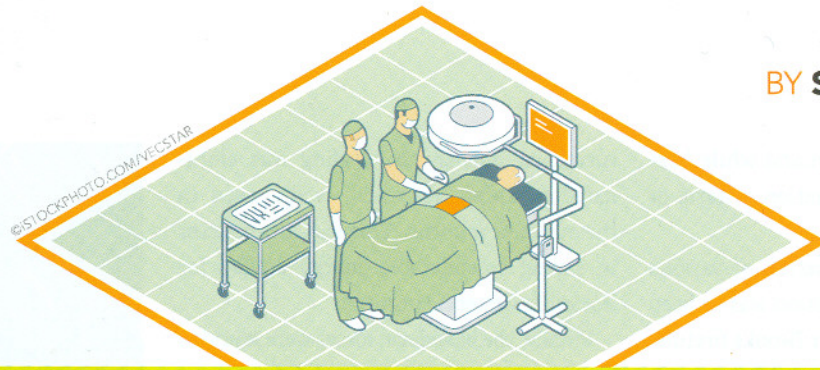


BY STEVE CONNOR



PROPER DIAGNOSIS =

# POSITIVE PROGNOSIS

AT THIS CONNECTICUT HOSPITAL, COMBINING THE OLD WITH THE NEW EXPANDED PERFORMANCE WHILE SHRINKING CARBON FOOTPRINT AND CAPITAL INVESTMENT.

**T**he present recession is blind when it comes to all sectors of the economy. Everyone is affected to some degree, and the health care industry is no exception. An aging population, advancing technologies, rising costs, and ever increasing consolidations leading to stiffer competition are plaguing this industry. It is constantly looking for ways to reduce its costs while providing the best quality care for its patients. Energy consumption is a major cost area, and boilers are a major consumer of this energy.

Rockville General Hospital (Rockville, CT), an affiliate of Eastern Connecticut Health Network (ECHN), is a 233,000-sq-ft facility and an excellent example of a health care provider who had gone through a consolidation and was being asked to improve its competitive position without adversely affecting its patients, by improving its level of service.

When several hospitals in the Connecticut area combined and formed ECHN, the laundry and sterilization processes traditionally done in-house in these facilities were transferred off-site to a central location, decreasing their steam load, leading to over-sized boilers

for the present conditions. This caused frequent burner cycling and wasteful energy losses from these units, making the boiler room an obvious target for substantial energy improvement.

John Lombardi, engineering director for Rockville General Hospital, and Scott Roman, the hospital's HVAC engineer, were committed to a long-term sustainable and energy efficient solution for their steam generation needs while minimizing capital expenditures as much as possible.

They knew that whatever boilers they chose for replacement of their existing steam plant would have to meet their stringent criteria for high in-service efficiency, criteria which looks at the total operating profile of a boiler system including radiation/convection losses, and other losses associated with turndown, blowdown, pre/post purging, cold startup, and stack gas effluent.

## IT BEGINS WITH UNDERSTANDING

The solution started with an intimate knowledge of the load within the facility and what type of boiler or combination of same

would best satisfy the demand while best accommodating the evaluation criteria of in-service efficiency.

After considerable evaluation of various boiler designs, their conclusion was to keep one of their existing Cleaver Brooks firetube boilers that, although almost 40 years old, were in excellent shape and could be used for standby if required. This saved considerable capital investment.

### WEIGHING THE IN-SERVICE EFFICIENCY CRITERIA

They then supplemented this boiler with a new optimized Cleaver Brooks firetube boiler, properly sized to meet the varying loads with its high turndown modulating burner, including a PLC-based electronic control and parallel positioning actuators for precise air and fuel metering.

This boiler also included an advanced stack economizer with a primary section for heating deaerated feedwater before entering the boiler and a second (condensing) stage for preheating the cold makeup water before entering the deaerator tank. This secondary stage captures the latent energy in the flue gas, putting additional Btuh into the makeup water, reducing the stack losses and delivering up to 90% fuel to steam efficiency.

Properly matching the boiler type and size to meet the hospital's load, the firetube boiler selection also met the other in-service efficiency criteria by operating the majority of time at mid to high fire, substantially reducing the radiation and convection losses while at the same time operating at the boiler's highest efficiency point(s). This also mitigated cold startup loads becoming a non-factor.

Also, because the boiler was properly sized to load and included a 10:1 advanced

turndown burner, the cycling was eliminated meaning no on-off cycles, even in the summer months. This was a key factor in saving considerable energy dollars for Rockville General Hospital.

Finally, the blowdown losses were found to be very small with this boiler design because of its liberal heating surface, and the implementation of a basic but conscientiously enforced chemical treatment program.

### THE FINAL ANALYSIS

After installation and several months of running time, John Lombardi and Scott Roman's assumptions proved correct. The new optimized boiler package is attaining up to 90% overall efficiency with an added bonus of delivering less than 9 ppm (parts per million) nitrogen oxide (NO<sub>x</sub>) emissions. To date, the hospital has saved 15% in fuel savings which includes a 600,000 lb reduction in CO<sub>2</sub> (greenhouse gas) emissions. This, in addition to the substantial reduction in NO<sub>x</sub>, is a major contributor to smog formation, thereby further supporting Rockville General Hospital's mission statement of "Improving the Health of our Communities with Competence and Compassion."

### SUMMARY

Saving boiler fuel energy is not only a major way of reducing operating costs, but it is also an excellent way of reducing the carbon footprint, assisting the environment at the same time.

Looking at a boiler's in-service efficiency potential (and coupling it with basic engineering know-how and knowledge of a given steam demand and/or load profile) will lead to the best solution for any process or heating application. It's a matter of putting the right shoe on the right foot — or in Rockville's case, putting the right boiler type,



ROCKVILLE GENERAL HOSPITAL INSTALLED A NEW CLEAVER BROOKS FIRETUBE BOILER AND SAVED 15% IN FUEL COSTS AND REALIZED A 600,000 LB REDUCTION IN GREENHOUSE GASES.

properly sized and configured, in the proper place to do the job. **TB**



*Steve Connor is the director of marketing services for Cleaver Brooks Company, the world's largest producer of steam and hot water boilers. His background includes over 40 years of experience in the steam generating field spanning a broad scope of disciplines including engineering, service training, and field application sales. A frequent speaker and publisher of several articles concerning boiler design, efficiency, application and safe operation, Mr. Connor offers a vast experience level and down to earth delivery style, provoking new insights and a much better understanding of the dynamics of heat transfer and the many ways to enhance fuel conservation and boiler safety.*