Working towards improving sustainability in pharmaceutical manufacturing

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First for Steam Solutions

Foreword

From vitamins to vaccines, the pharmaceutical industry continues to enhance the world's health with its advances towards cutting-edge, innovative solutions. It is here that we often find steam playing a vital part in the manufacturing process.

There is ever increasing focus on reducing the carbon impact of manufacturing and plant owners are striving to identify areas to reduce energy consumption and wastage.

Taking this into account, Angelo Giambrone, business development manager at Spirax Sarco UK explains the steps pharmaceutical managers can take to improve steam system efficiency, maximise process and final product quality whilst optimising overall productivity.

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Heating, ventilation and air conditioning (HVAC) has always been an integral part of of pharmaceutical manufacturing, with organisations such as AstraZeneca and GlaxoSmithKline estimating that HVAC demands accounted for 60-70% of their UK operations' total energy consumption[1].

In fact, operating costs of industrial HVAC in cleanrooms tend to be between 20 and 100 times larger per square foot than those employed in typical buildings. With such large numbers in mind, it is understandable that reducing overall consumption and improving efficiency is an area of importance for plant managers and operators.

Due to the considerable focus on demand reduction, steam systems are a key area where efficiencies could be identified and implemented.

The work carried out by Spirax Sarco in surveying and auditing HVAC systems has helped to identify energy savings and has overcome technical challenges that can manifest themselves when making changes to airflows and temperatures.

[1] Real-time feedback for smart energy usage, Cleanroom Technology,https://www.cleanroomtechnology.com/news/article_page/Real-time_feedback_for_smart_energy_usage/153641

Improving steam efficiency

From the boilerhouse through to the distribution system and into the plant room, there are many areas pharmaceutical plant managers and operators can consider when looking to improve system efficiency. Some of these steps can be very simple – for example, ensuring that lagging is of a good standard is crucial in maximising system efficiency.

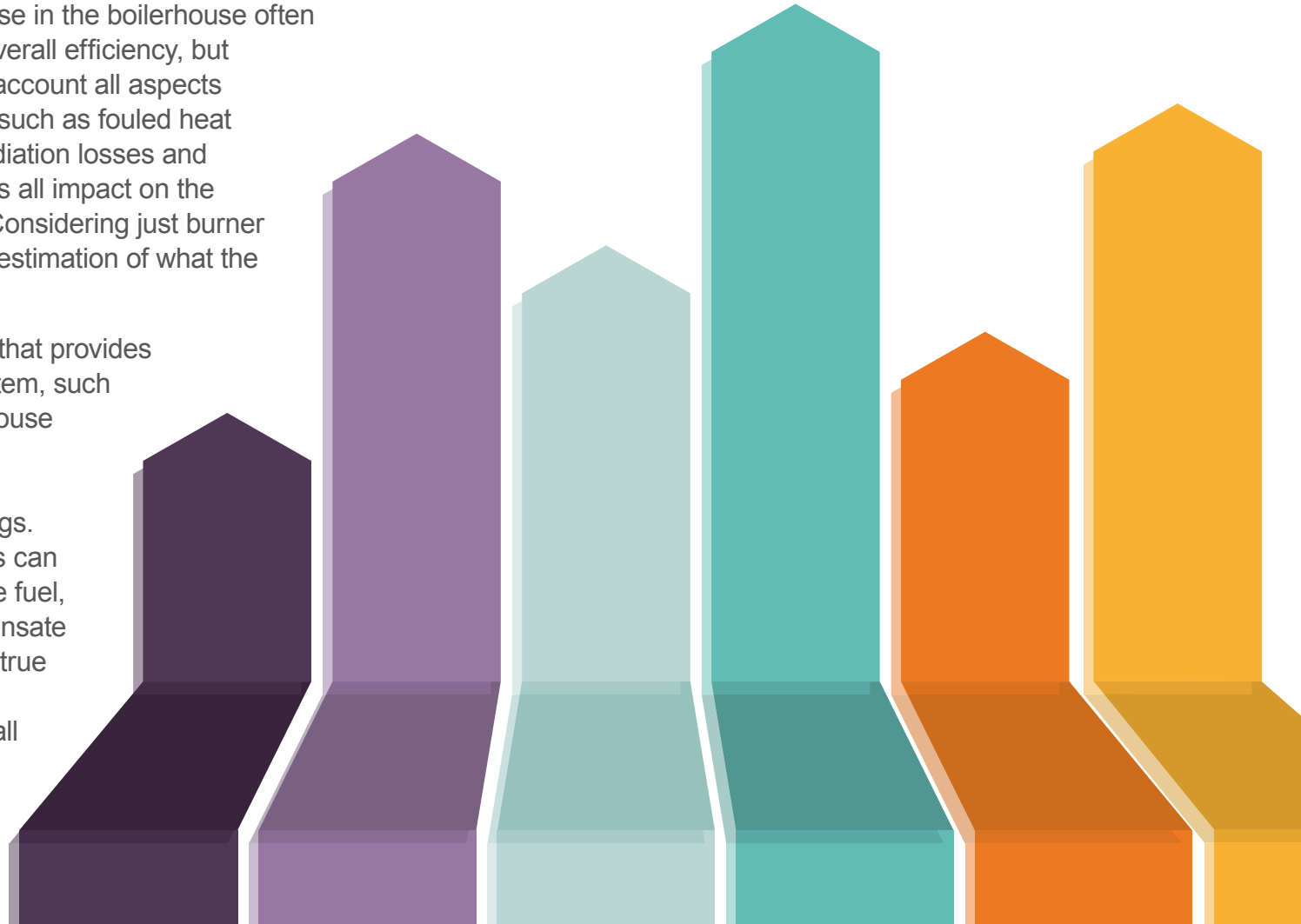
The boilerhouse can present a number of opportunities to reduce fuel consumption. Controlling boiler TDS (Total Dissolved Solids) and using an associated heat recovery system is one such example. Another is to capture thermal energy in the boiler flue gases using an economiser, which is typically used to pre-heat feedwater going into the boiler. Fuel savings from each can typically be between 3% and 5%, lowering emissions while improving efficiency.

Energy monitoring systems

Another way to improve sustainability is through implementing energy monitoring systems. This technology is invaluable in identifying where services are being used and how much is being consumed, so key stakeholders know where and when they should take action.

Those responsible for energy use in the boilerhouse often use burner efficiency to track overall efficiency, but this method does not take into account all aspects of the boiler operation. Factors such as fouled heat transfer surfaces, carryover, radiation losses and excessive boiler blowdown rates all impact on the overall boilerhouse efficiency. Considering just burner efficiency could lead to an overestimation of what the actual boilerhouse efficiency is.

Through the use of technology that provides a complete overview of the system, such as Spirax Sarco's B850 boilerhouse energy monitor, it is possible to measure overall boilerhouse efficiency and then target savings. Cost-conscious boiler operators can utilise measured inputs from the fuel, feedwater, steam output, condensate return and blowdown to build a true picture, helping to yield energy reductions and increasing overall efficiency.



The importance of audits

Although site engineers may be making progress with the steps detailed above, there will almost certainly be times when they need to engage with specialists outside of their organisation. Knowledge partners such as Spirax Sarco can provide expert consultancy and extensive resources to keep steam systems operating at peak performance.

Using the correct quality of either conventional plant steam or clean process steam, will help to ensure you reach the required exacting standards of the final product. Productivity can be affected by poor quality steam, hence it is important to periodically review the steam installation.

A key aspect of this service is the provision of steam system audits, which are a vital tool in identifying energy savings, carbon reduction and achieving best practice in system operation. These audits, which involve an on-site visit from an engineering team, can range from a check-up for a single plant room to benchmarking an entire steam system, from the water treatment plant right through to process applications and condensate return. Whilst dealing with the challenges of COVID-19 and social-distancing, it has also been possible to conduct remote survey work with the use of video and images, to identify areas for improvement.

Training for best practice

Whether considering steam system design principles or the regulations that govern the operating of a boilerhouse, training can assist towards a more sustainable operation. Seeking out training centres that provide accredited courses, such as Spirax Sarco's UK Steam Technology Centre, not only ensures safe working in line with BG01 (Guidance on Safe Operation of Steam Boilers) but also equips operators with the skills and knowledge required to maximise the efficiency and performance of the steam system. Again, as we adapt to a changing work environment, remote training and webinars are an increasingly effective way of ensuring that personal improvement can continue.

To conclude, as pharmaceutical manufacturers continue to pursue efforts to reduce their carbon footprint, the need for energy saving solutions is now greater than ever. With a particular focus on steam systems critical to manufacturing processes, steam users in this sector should be reassured that there are several steps that can be taken to lower emissions whilst improving efficiency.

For more information on improving steam system efficiency, go to

sxscom.uk/sustainablesolutions

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