Cut your carbon footprint

How to optimise the efficiency of your steam system – pages 4 & 5

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Steam demand cut for ExxonMobil

ExxonMobil’s Fawley refinery has cut boiler steam demand from 850tph to 650tph, thanks to the efforts of a combined “Steam Team” comprising Spirax Sarco steam specialists and in-house engineers.

The Steam Team has helped contain rising energy costs by fixing leaks and implementing continuous improvement projects around the steam system.

Spirax Sarco’s Site Operations Engineer, Mr Paul Smith provides day-to-day on site expertise, while Mr Roger Ferryman, Spirax Sarco’s Oil and Petrochemical Manager, helps define the Team’s ongoing strategy.

“In the end, what this really means to us is that the Steam Team gets the results it is planning for,” says Steam Team Leader, Mr Mick Mears.

In one example, pump seal failures have reduced since Spirax Sarco designed a system to remove condensate, control the steam pressure and ensure that steam reaching the seal is dry. The design is now part of ExxonMobil best practice.

Another improvement is in the Slack Wax line, which must be kept warm for the wax to flow. The causes of cold spots on the line have been identified and remedial work successfully undertaken.

Steam traps have been another focus for the team, resulting in significant energy savings.

The site preference is the Spirax Sarco UTD30 thermodynamic trap, which is easy to fit and extremely efficient because it removes condensate virtually as it forms. The traps are fitted with a diffuser to reduce noise levels during discharge and protect people and plant.

Controls help Moy Park keep its chickens juicy

Highly accurate Spirax Sarco steam controls play a vital role in an advanced new oven used to roast chicken at Moy Park’s Grantham factory.

Two pneumatically-actuated Spirax Sarco KE control valves reduce the pressure from the plant’s steam distribution main to 3.0 bar g ± 0.1 bar before it reaches the oven, regardless of changes in the required flow rate.

“We need precise control and the Spirax Sarco valves deliver it,” says a Moy Park spokesman.

The oven, part of a £3 million expansion at the site, cooks ready-to-eat roast chicken, which is bound for the supermarket shelves.

To cater for different recipes, the oven has two main roasting zones and several intermediate chambers. Steam humidifies these chambers to keep the chicken moist.

When selecting its supplier, Moy Park looked for a combination of quality products and the right organisation to back them up.

“We use Spirax Sarco equipment extensively throughout our steam systems,” says the Moy Park spokesman. “A lot of companies will sell you equipment but won’t provide proper back up, but we know we can always rely on Spirax Sarco to attend to our needs if we call.”

The control valves are part of an order for £17,000 of Spirax Sarco equipment that also included Direct In-line Variable Area (DIVA) flowmeters. The meters help to monitor the cost of the roasting process by measuring the steam flow to the oven’s cooking zones. This helps Moy Park to price its products competitively.

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The spokesman continues: “We have a similar oven fitted with Spirax Sarco steam controls in one of our Irish plants. We essentially copied that set up because it’s already working so successfully over there. We’ve had no problems with the Spirax Sarco equipment since we started up the Grantham oven a few months ago.”
Hospital hot water bill drops by 15%

Bradford Royal Infirmary has cut an estimated 15%, which is equivalent to over £5,000 a month, off its energy bill by opting for plate heat exchangers (PHE) from Spirax Sarco. The compact PHEs replace calorifiers that previously supplied heating and domestic hot water to the hospital.

The project began with the supply of two PHEs to replace three domestic hot water calorifiers that were designed to run on waste heat from the hospital’s combined heat and power (CHP) plant.

The gas-powered CHP plant generates electricity for the hospital. The plant is cooled by water, which then acts as a heating medium in the domestic hot water heat exchangers. “The calorifiers weren’t particularly old, but we wanted to be more efficient,” says Mr Paul King, who managed the project for the hospital. “They were also starting to cause a few maintenance issues, and the need to strip them down for insurance inspections was a bit of a nightmare. PHEs avoid that completely.”

The Spirax Sarco units predominantly run on waste heat from the CHP cooling water, which is topped up with steam from the hospital’s boiler when necessary. “The system takes as much heat from the CHP plant as possible, and is only topped up by 8% live steam on average three times a day, when the running load is at its highest,” says Mr King.

Mr King says the domestic hot water units proved such a success that the hospital then installed a further two Spirax Sarco PHEs to provide hot water for heating.

Bandvulc Tyres saves 8% energy costs in a flash

Bandvulc Tyres has knocked 8% off its energy bill by fitting a Spirax Sarco Engineered System. The new system uses flash steam from the returning condensate to preheat the feed to the boiler.

Before the new system was fitted, Bandvulc was already using some energy from returning condensate to maintain the water in the boiler feed tank at 95°C. However, heating the feed water any further would have caused cavitation problems at the inlet to the feed pump, as well as generating an unsightly plume of flash steam from the boiler feed tank. So the company was forced to cool the condensate before it reached the tank, even though the cooling system wasted some of the available heat energy and also used electricity. Spirax Sarco helped Bandvulc to engineer an effective solution to the problem.

A skid-mounted heat recovery system was introduced between the boiler feed pump and the boiler itself. The heart of this system is a plate heat exchanger that heats the boiler feed using the flash steam generated by uncooled condensate. Positioning the heat exchanger after the feed pump is crucial to the success of the system, because the feed is already under pressure at that point. This effectively prevents the water from evaporating to steam, even though its temperature is now raised from 95°C to 125°C before it enters the boiler.

Several other modifications were also made to the steam system. Modulating controls were introduced so that the system could run constantly, maintaining the pressure in the system and ensuring continuous heat recovery. This in turn requires the control system to keep a close check on the level of water in the boiler, so new level probes were also supplied.

“The system is working pretty much exactly as Spirax Sarco said it would,” says Bandvulc director Mr Richard O’Connell. “It’s saving us around 8%, just as predicted.”
Cut your carbon foot

The UK emits 648 million tonnes of CO\textsubscript{2} a year and many of us are anxious to “do our bit” to cut emissions. Spirax Sarco’s experts can find cost-effective energy saving opportunities in almost any steam system.

1. **Switch to heating on demand**
   Hot water storage results in significant heat losses. Consider replacing storage systems with plate heat exchangers that use steam to provide hot water on demand. They are extremely responsive and their compact size leads to heat losses from their surface that are significantly lower than those of hot water storage vessels performing the same duty.

2. **Recover all condensate**
   Condensate contains up to 20% of the energy in the steam from which it came. Returning water to the boiler feedtank typically recovers about half this energy, while the rest can be recovered by installing a flash steam vessel or pressurised condensate return system. Condensate return schemes also save money on water, treatment chemicals, and effluent charges.

3. **Install automatic boiler blowdown**
   All steam boilers need to be purged by blowdown. The key is to remove only enough water to maintain the Total Dissolved Solids (TDS) content at an acceptable level. Dumping any more is a waste of energy, treated water, and chemicals. An automatic TDS blowdown controller monitors TDS build-up in the boiler and opens the blowdown valve only as required.

4. **Focus on feedtank conditions**
   Less fuel is needed to produce steam from hot feed water. Using returned condensate to raise the feed temperature by 6°C gives a fuel saving of 1%. Ideally, feed water should be maintained at 90°C.

5. **Encourage good practice**
   Monitoring and targeting (M&T) systems enable managers to check the performance of each consumer separately. According to the Carbon Trust, the right M&T scheme can yield savings of 10% on many sites, with 5% considered a conservative average.

6. **Contact Spirax Sarco**
   Our experts can visit your plant and carry out a full steam system audit to identify key areas for carbon emissions reduction and offer advice to maximise plant efficiency. Alternatively, why not sign up for Spirax Sarco’s energy savings training course? The one-day course focuses on providing energy efficient solutions and can help you take control of carbon emissions and energy use. For more information, contact Kim Mansfield, Training Co-ordinator on 01242 535211.
To minimise this carbon footprint. For companies, this means growing pressure from their opportunities in almost any steam system. Here are some key areas to consider:

*St George’s Hospital reaps benefits of steam system upgrades*

St George’s Hospital in Tooting recently upgraded its heating and hot water systems and cut its energy bill by 15%, thanks largely to an overhaul of its boiler controls and the installation of a new automation system. The boiler house is at the heart of St George’s Energy Centre, which includes a 4.5 MW Combined Heat and Power (CHP) plant.

“The results have been spectacular”, says Mr Shane King, Principal Engineer at the hospital: “The work has achieved between 12.5% and 15% energy savings, despite an increase in demand caused by adding several large buildings onto the site.”

The energy savings have delivered significant reductions in carbon emissions. “The work carried out is having a very positive effect on our carbon emissions,” says Mr King. “Also we can achieve greater financial benefit from the exemption from the Climate Change Levy (CCL) for CHP schemes. Improving the Energy Centre’s thermal performance increases the ratio of electrical output to total output which increases the level of CCL exemption. This is worth at least £20,000 per month when we achieve an electrical efficiency of 20% or above and gain 100% exemption.”

*Carbon emissions gains a higher profile*

Manufacturers could soon be feeling greater consumer pressure to reduce the carbon footprint of their products. A new carbon emissions label scheme has been introduced by the Carbon Trust. The organisation reckons that two-thirds of us want to know more about the environmental impact of the products we use (www.carbon-label.co.uk). The Trust’s new scheme helps companies measure the carbon emitted per product helping consumers choose environmentally-friendly products. One of the first products on the shelves is Walkers Cheese and Onion crisps. It’s a sign of things to come.

Carrot and stick
Carbon labels are the latest in a range of measures designed to give companies an incentive to save energy. The Climate Change Levy provides an effective “stick”, which is offset by the “carrot” of Enhanced Capital Allowances, where energy-saving investments attract accelerated tax relief. A wide range of Spirax Sarco equipment is included on the Energy Technology List. The list is a directory of equipment that qualifies for the ECA scheme.

See the Energy Technology List at: www.eca.gov.uk.etl

Find out more: visit www.SpiraxSarco.com/uk and click Connexions
Heating and hot water in an instant

*Spirax Sarco EasiHeat™ Engineered Systems provide a low maintenance, space saving solution for instant heating and domestic hot water. Great for building services applications such as hospitals, schools and hotels, as well as for use in industrial applications, EasiHeat offers many advantages over traditional methods of heating and hot water. Here we review three satisfied customers.*

**EasiHeat advantages at a glance**

- **Energy efficiency** – Plate heat exchangers are highly efficient because they extract more energy from steam than shell and tube units.

- **Low maintenance** – Plate heat exchangers do not require strip downs for insurance inspections like shell and tube heat exchangers. If they must be dismantled it takes just six bolts, making maintenance easier.

- **Space savings** – The compact plate heat exchangers and optimised layout makes EasiHeat an ideal solution when space is tight.

- **Time savings** – Supplied fully tested and skid-mounted, EasiHeat systems save time during specification, installation and commissioning.

- **Reliability** – Users need never run out of hot water again.

**Fast installation for contractor**

Opting for EasiHeat Engineered Systems has saved plant room space and reduced installation time during a major refurbishment project by contractor, Hiltons of Nottingham. Compared with the shell and tube heat exchangers originally specified, the two EasiHeat systems occupy just 25% of the space and were fitted in around half the time.

The EasiHeat systems save space partly because the steam-to-hot water plate heat exchangers at the heart of the systems are so compact and partly because peripheral items are arranged in the most space-efficient way. Each system occupies just 1.2m³.

Engineered systems also saved time for the contractor, because commissioning work was carried out before they arrived on site.

**Sweet benefits for food processor**

Tate & Lyle’s EasiHeat system has eliminated the company’s reliance on stored hot water. This saved energy and improved production flexibility.

As well as eliminating the heat loss during storage, the EasiHeat steam-to-hot water system enables Tate & Lyle to cope with peaks in production that it could not meet before. The company previously relied on filling a 60-tonne storage tank with hot water overnight, ready to supply the next day’s production. There was no extra hot water, which prevented any extra production taking place.

The EasiHeat system supplies up to five tonnes of instantaneous hot water per hour, eliminating the need to run the boiler to heat water overnight and enabling the site to expand production to meet demand.

**Lower maintenance for brewery**

As well as helping Wadworth Brewery use 8.2% less energy to heat its hot water, two EasiHeat Engineered Systems have cut maintenance at the Wiltshire-based brewery, which suffers rapid equipment scaling from the local hard water.

The new systems replace calorifiers that had to be stripped down and descaled twice a year, taking two men three days each time. The Spirax Sarco EasiHeats only need descaling every eight weeks and the whole procedure is much easier, taking one man less than half a day.

**find out more:**

visit [www.SpiraxSarco.com/uk](http://www.SpiraxSarco.com/uk) and click Connexions.
Offsite construction delivers time efficient, low risk, high quality results

Offsite construction involves the factory assembly of new equipment into modules that can be quality checked and tested before arriving on site. Once there they can be quickly and easily connected and commissioned. It’s a great approach for new boiler houses or “energy centres”, saving both time and money.

How much time can I save?
Offsite construction can reduce the typical 16 to 20 week schedule of a major energy centre build project by four to six weeks overall.

Procurement time can be slashed by a quarter, because the project manager doesn’t have to deal with as many suppliers and because there are fewer items to order. The bill of materials can also be reduced by up to 10%, because more items are bundled together, reducing administrative and delivery costs.

The time taken to produce preliminary designs is reduced by about 40%, because contractors can use a standard approach. The right design software will also allow any changes to be communicated quickly between the client and contractor, in order to reduce any associated delays.

With the vast majority of the construction phase taking place in a factory offsite, installation time should be cut by 60%. In addition, a new energy centre is often part of a wider construction project, with multiple contractors and suppliers having to access the build site. This can lead to restricted access and complex scheduling, so moving some jobs offsite can have a beneficial knock-on effect on the schedule for the wider project.

The energy centre systems in an offsite manufacturing project are assembled by specialist fitters and thoroughly checked before they arrive on site. This typically halves the commissioning time and can even reduce it to a single day.

Are there risks associated with the offsite approach?
In terms of risk, the right contractual arrangements will pass any risk of overspend and overrun to the offsite manufacturer. This nurtures the sort of “right first time” mentality required to get the job done.

In addition, with the majority of the work taking place in a controlled environment instead of on a building site, health and safety risks are also minimised. This leads to savings in the risk assessment and planning phase, as well as implementation.

For example, on site welding and other hot works can be reduced by as much as 80%, depending on the job. Similarly, a reduction in the number of site deliveries minimises manual handling, while the time spent working at height can also be cut by 80%.

Can offsite manufacturing improve long-term performance?
In the longer term, the better build quality of factory built installations delivers an overall reduction in life cycle costs. Studies carried out by one leading consulting firm indicate that lifetime savings can reach 35% when the hidden costs associated with long-term issues of quality and durability are considered.

Spirax Sarco has extensive experience of delivering turnkey projects using offsite construction techniques.

find out more:
visit www.SpiraxSarco.com/uk and click Connexions
Tell us your views and you can WIN a PlayStation 3

We need your help. We are always keen to improve our newsletters and make them more relevant to you, but we can’t do this without your help.

Please take five minutes to complete a quick survey about our Connexions newsletter. In return, you could win a PlayStation 3 games console, one of the newest, most desirable games consoles on the market.

To help us make Connexions even better and to be in with a chance of winning, all you have to do is fill in the questions on the back of your address slip and then either fax it to 01242 535277, or post it to

Connexions Reader Survey, Spirax Sarco, Charlton House, Cheltenham, Gloucestershire, GL53 8ER. Don’t forget to fill in your name, email address and telephone number so we can contact you if you are the lucky winner.

If you would like to give us your feedback but would rather not enter the free prize draw, then please tick the box to opt out at the bottom of the address slip.

Alternatively, you can complete the survey online at:

www.uk-mktg.com/connexionssurvey

Thanks for your help and good luck.

Extensive guide to steam systems

The most comprehensive practical guide to steam systems in recent times has arrived with the publication of The Steam and Condensate Loop from Spirax Sarco.

The Steam and Condensate Loop explains the principles underpinning steam engineering and heat transfer. It covers all aspects of steam and condensate systems, from the boiler house, through the steam distribution system to the point of use, and recovering and returning condensate back to the boiler.

The manual runs to 1,464 pages, yet its modular approach enables engineers to tackle all aspects of a steam and condensate system in manageable chapters that can be completed in just 30 minutes. The book is easy to use for experienced engineers looking to brush up on best practice, as well as for anyone new to working with steam.

For more information or to order a copy, visit www.SpiraxSarco.com/uk

Training Courses

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Exhibitions

| October | 16th-17th Healthcare Estates Conference (Stand B59) |

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