"JRP's technical expertise enabled them to uderstand in detail the client's processes and to produce a really comprehensive report identifying substantial savings."

Case Study

Client: Speciality chemicals and sustainable technologies company
Services provided: Energy audit to comply with the requirements of the Energy Savings Opportunity Scheme, ESOS
Potential Savings Identified: £1.9m

Summary

A speciality chemicals and sustainable technologies company appointed JRP Solutions to carry out an ESOS audit of their UK estate of 23 sites. Of these, 6 accounted for over 90% of energy consumption across the whole of the organisation and were audited. All other sites and transport were excluded as de minimis.

The total consumption for the reference period April 2014 – March 2015 was just under 500,000 MWh, equating to a cost of nearly £20m. Gas consumption was circa 370,000 MWh and electricity consumption circa 127,000 MWh.

The greatest energy savings opportunities were found at a combined heat and power (CHP) plant which comprised:

- Two gas fuelled reciprocating engine generators with a nominal output of 3 MWe each
- Engine exhaust gas steam boiler, nominal capacity. 5,400 kg/hr operating at 5 bar g
- Low temperature heat recovery system and circulation pumps from engine jacket, maximum output approx 1 MW
- Standby low temperature hot water (LTHW) boiler

The key opportunities identified were:

Insulation of all bare measures of pipe work

A thermographic survey of the entire steam distribution system was recommended. This would reduce heat loss by approximately 90% and save approximately 2,000 MWh pa, equating to nearly £60k with an associated simple payback of 2 years.

Hot water heat recovery

It was recommended to pump cold treated make up water to the CHP plant directly from the treatment plant instead of the hotwell and use surplus heat from the LTHW engine jacket heat recovery system to pre-heat the make-up water before it enters the CHP boiler feed tank. This would save approximately 1,300 MWh pa, equating to £36k and have an associated simple payback of 2.1 years.

Installation of decentralised CHP

The existing 6 MWe system could be replaced with a smaller 4 MWe system comprising two 2 MWe CHP units with exhaust gas steam boiler and LTHW system. Reduced steam and LTHW heat output would be a closer match to current and future campus steam and heat requirements.

A separate 2 MWe CHP system could be installed with its heat output used to drive an absorption chiller system to meet the 1.5 MW (thermal) base load of the three chiller systems. The new absorption chiller could be connected to the three systems via plate heat exchangers on each return leg to pre-cool water upstream of each of the existing chillers.

Installing a decentralised CHP plant would save approx. 28,000 MWh of electricity pa and increase gas consumption by 61,500 MWh pa. As natural gas is a much cheaper energy source associated savings of nearly £250k could be expected.

As no capital cost was associated with this project the savings were excluded from the overall summary.

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Opportunities identified at the other sites surveyed included:

- Replace electric heaters with steam and LTHW for coating dryers
- Repair compressed air leaks
- Pump optimisation
- Furnace optimisation
- Replace steam heating systems with gas heating systems
- Heat recovery from factory processes for space heating
- Improved utility metering
- Install VSD drives to LEV fans
- Upgrade lighting
- Compressor replacement upgrades

If all opportunities at all sites were implemented (excluding the complete replacement of the CHP plant) a saving of nearly 14,500 MWh could be expected, equating to just under £1.2m. The cost of implementing these projects is predicted to be £1.5m, and has an average payback of 0.8 years.

JRP are continuing to work with this client to implement a number of key improvement opportunities and to help in the delivery of their 2025 Sustainable Business Plan.