

Maximising the value of existing plant has reduced fuel oil consumption

We reviewed the heating requirements at a large sewage treatment works. Our Process Energy approach facilitated the detection of poor heat transfer between the combined heat and power (CHP) unit and the sludge treatment process.

The Challenge

We were tasked with auditing the heat generation and use at a large sewage treatment works. The site contained an Enhanced Enzymic Hydrolysis (EEH) plant, which provided thermal input for the digesters.

Thermal energy was created primarily by a CHP unit running on biogas and supported by hot water boilers fired with fuel oil or biogas.

“There is huge potential to increase the thermal efficiency of the process by matching the heat generation and use”

Ray Wellham, Director, Projective

Benefits

- ▶ Net annual savings of **£100,000**
- ▶ Carbon dioxide savings of **400 tonnes** per annum
- ▶ Capital payback of less than **6 months**

Our Approach

We created a mass and energy balance of the system and compared the thermal demand at each stage of the process with the fuel oil and biogas consumption. This revealed that the fuel oil consumption was excessive. We conducted site investigations and discovered the CHP unit was not transferring sufficient thermal energy to the process. Extensive analysis of the heat transfer revealed a low overall thermal efficiency of approximately 25%.

Intelligent Solution

We specified the necessary work to remediate the heat exchanger back to design conditions. We identified the root cause of the poor performance and provided a designed solution to maintain optimum performance. We also identified areas for further energy reduction.

The EEH plant is a batch process with discrete thermal requirements. However, heat is produced continuously by the CHP, which is required to run at all times. The two are not well matched, resulting in the CHP rejecting heat to atmosphere when process heating is not required.

The Process Energy approach allowed us to identify how the continuous heat generation could be matched to the batch process of the EEH plant.

The Result

We worked with operations to remedy the poor heat transfer across the CHP heat exchanger. The increase in thermal transfer will realise savings of £100,000 in fuel oil with minimal capital spend.



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