

## Energy Survey of Leixlip Sewage Treatment Works

### Summary

PowerTherm was contracted to undertake an Energy Survey of the sewage treatment works in Leixlip. The objectives of the survey were to evaluate tariff-related opportunities, assess the operation and control of plant at site and identify energy saving measures. Particular emphasis was placed on evaluating the operation of the boilers and Combined Heat and Power plants (CHPs) on biogas. The survey resulted in a change in gas tariff, identified a number of practical energy saving measures relating to the operation of pumps and odour removal fans, and recommended a complete change in the control strategies for the boilers and CHPs.

### Site Description

Leixlip sewage treatment facility processes sewage from Leixlip and Intel in separate streams. The process runs continuously and electricity is consumed driving pumps, mixers and aerators. Biogas is generated in the digesters, stored in an inflatable bell and then burned either in the boilers or the CHPs to produce heat for the process and electricity.

Annual electricity spend exceeds €350,000 per annum.

Natural gas use is limited, as sufficient biogas is generally available at site to meet biogas use.



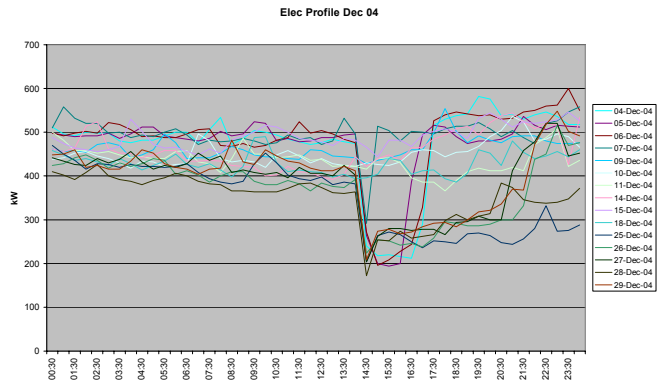
### Data Collection

A 2-monthly Cost-Consumption report, provided by ESB Customer Supply, provided an overview of electricity usage patterns over the previous 3 years. A review of half-hourly electricity profiles was undertaken to develop an understanding of patterns of use and establish if participation in the Winter Demand Reduction Incentive scheme was delivering savings.

Time was taken to develop an understanding of the process, including a review of the site control system (SCADA). This involved extensive customer consultation.

Power generated by the CHPs over a week was monitored using PowerTherm's power analyzer. A clamp-on ammeter was used to collect instantaneous current readings on a number of loads.

Historical records on plant operation and a number onsite instruments provided data on biogas production and an indication of combustion rates.



### Analysis

Data collected was analysed to establish savings from changing gas tariff. Savings from a number of measures were quantified in cost and energy terms.

An hourly model was constructed to evaluate performance under different CHP/boiler control modes. This considered the rate of generation of biogas, storage volume and rates of combustion by the CHP and boiler under full and part load conditions. As part of this analysis it was necessary to derive the specific heat capacity of the biogas from a number of site parameters. A further analysis evaluated the cost-benefit of operating on natural gas either when biogas is not available or during the WDRI scheme.

### Recommendations

The report concluded that in addition to changing gas tariff and implementing alternative controls of some plant, the most significant savings would arise from re-configuring the SCADA and CHP controls to make the best possible use of available biogas. It was calculated that the value of electricity generated by the CHP could be increased by up to 83% simply by changes to controls. The CHP vendor was contacted and a modest price obtained for implementing this recommendation.