



Annual Performance and Monitoring review

EPR Permit JP3632ZH

Cogen Plant - Dow Silicones UK Ltd

This report is to fulfil ERP permit JP3632ZH condition 4.2.2

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;

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Summary

The report includes details of our performance during 2022 . SPC charts have been used for all CEMS monitoring we carry out for NOX and CO for the last 6 years. SPC charts have been used for extractive sampling we have carried out since 2008.

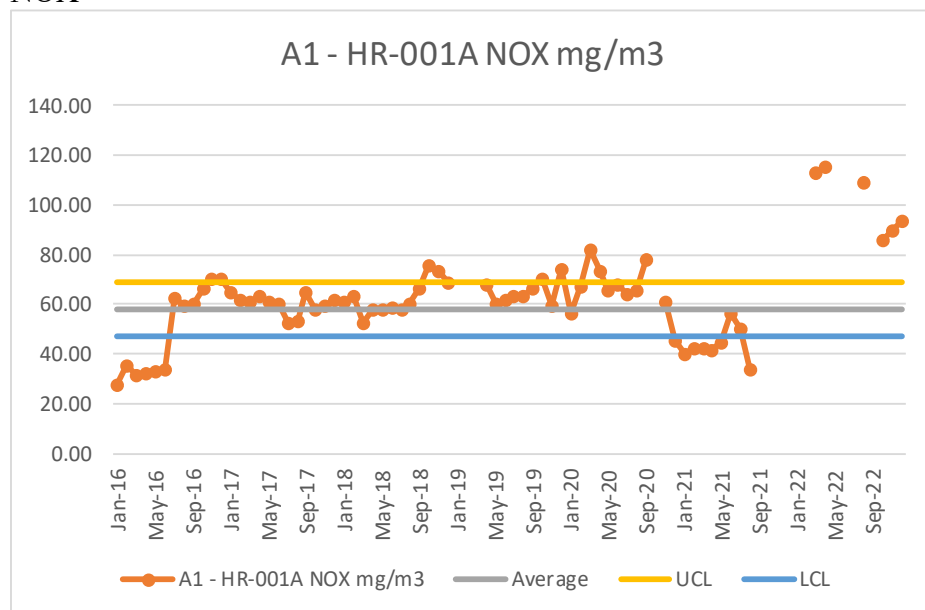
Points of interest for 2022 :

- The Fired Boiler NOx optimisation was carried out in March and was very successful
- Unit A started back up after statutory inspection in March and immediately had operational issues causing high NOx levels. The Unit was shut down again at the start of April awaiting delivery of parts and didn't restart until August.
- The Fired Boiler was non-operational from September as it was taken down for statutory inspection
- Following a full site shutdown Unit A started up and still had higher NOx than expected. The unit was also unable to run at higher rates or with the GT operational due to flame detection problems. The unit operated minimally during Q4 to keep the site running as the Fired Boiler was out of operation for statutory inspection.
- The GT on Unit B was operational during Q1, but not for the remainder of the year due to an internal failure. At the end of the year work began to transfer the operational GT from Unit A to Unit B to enable Unit B to be used with a GT.

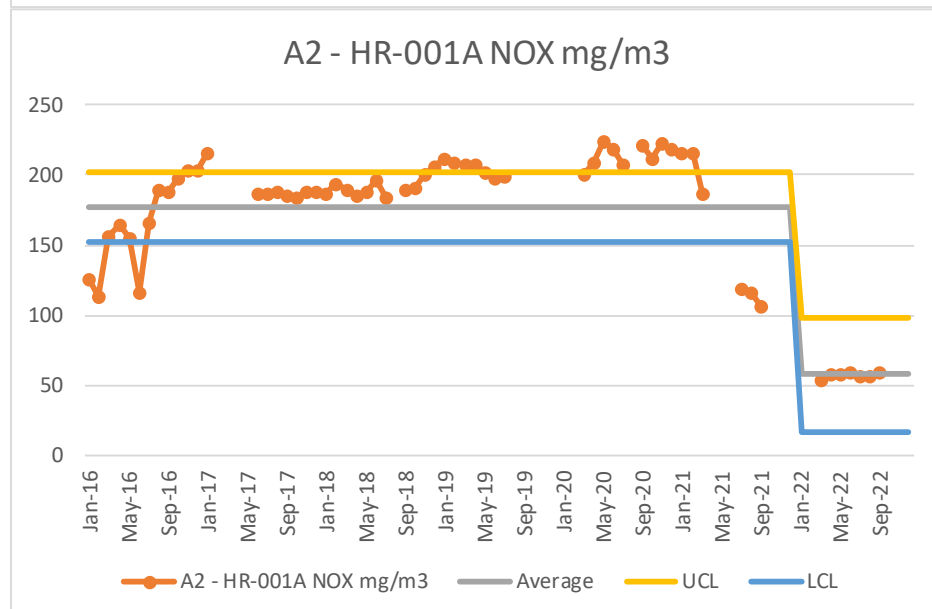
Incidents

A schedule 5 was submitted for Unit A running with higher NOx levels in Q1 and Q4, the reasons for these have yet to be determined, likely to be the same cause.

Air monitoring CEMS data NOX

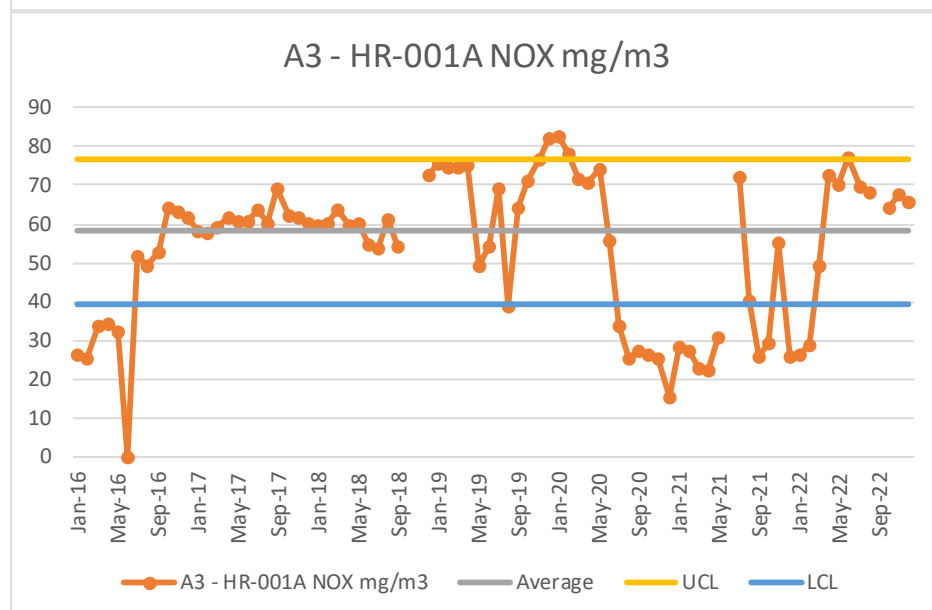


Permit limit:
Monthly ave 75mg/m3
Annual ave 55 mg/m3
*O2 ref 15%



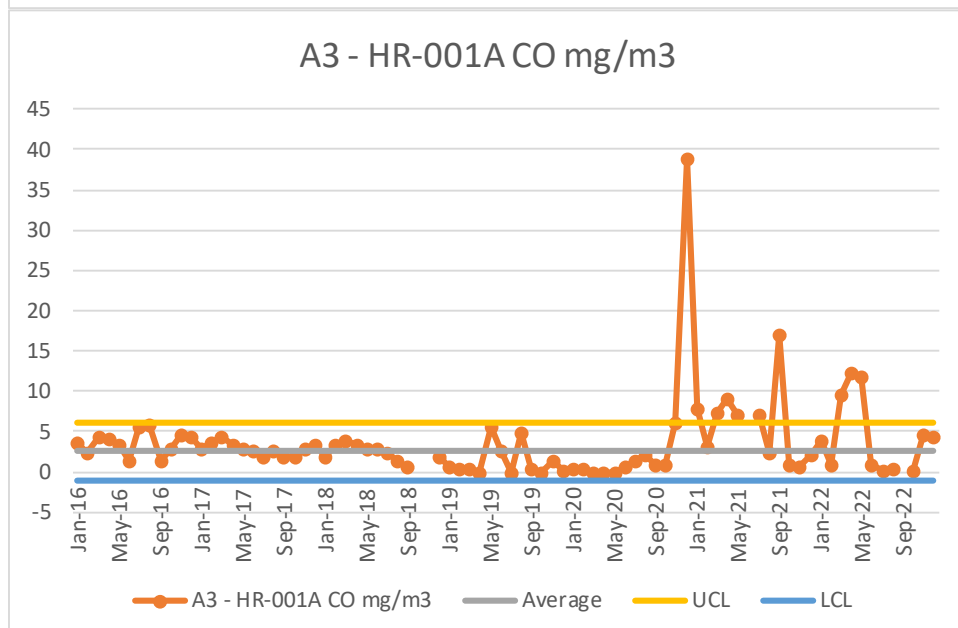
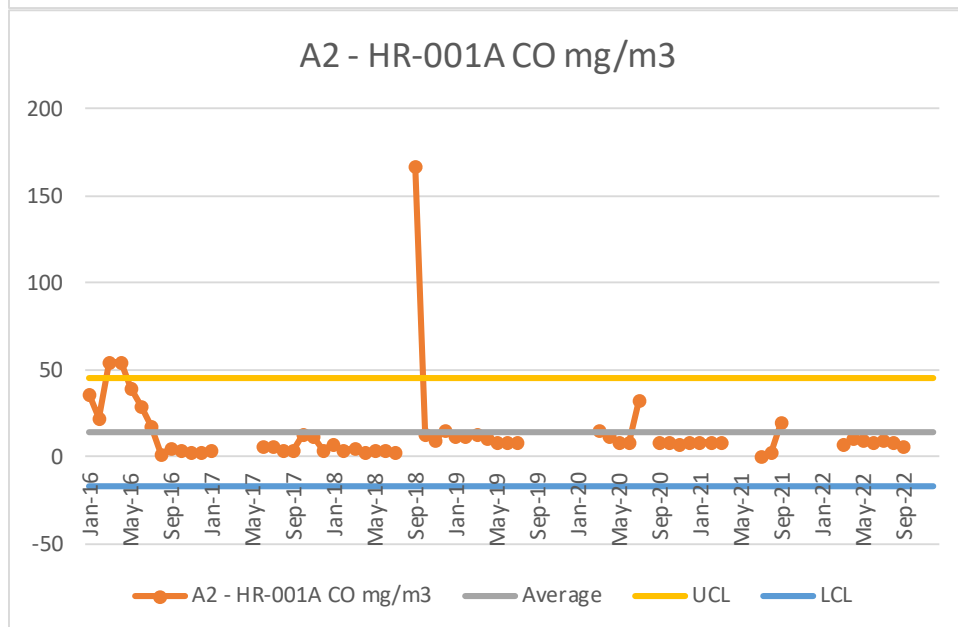
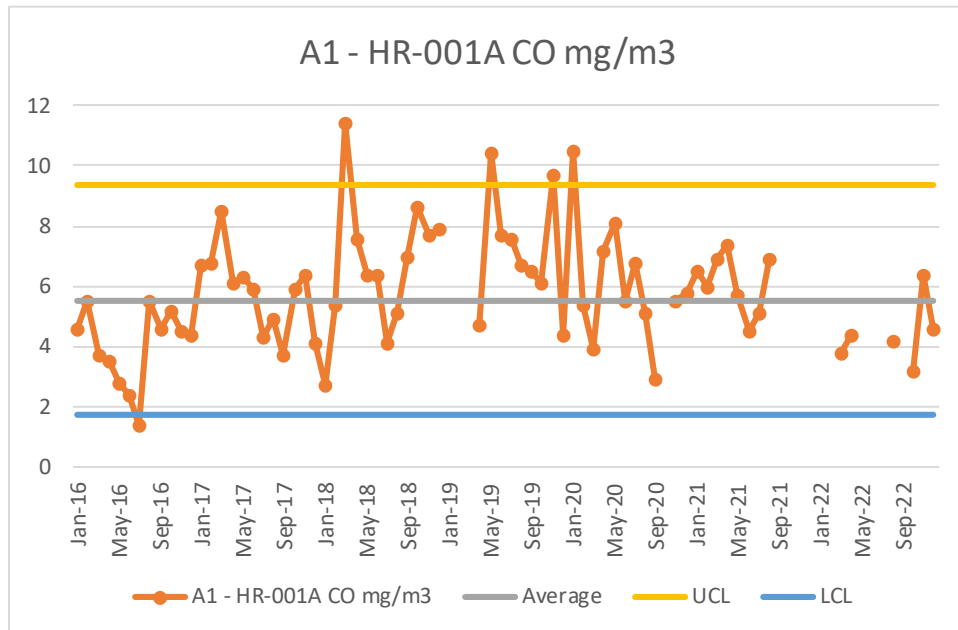
Permit limit:
Monthly ave 100 mg/m3
Annual ave 100 mg/m3
*O2 ref 3%

Burner was upgraded to reduce NOx during 2022. Optimisation was carried out in March 2022 and proved very successful as can be seen from the SPC chart (and updated limits).

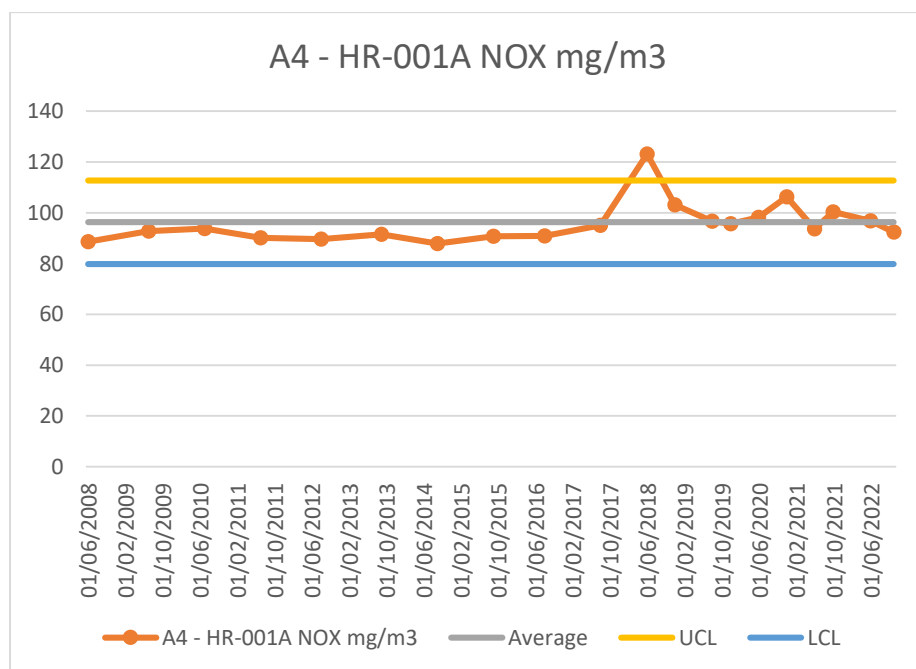


Permit limit:
Monthly ave 75mg/m3
Annual ave 55 mg/m3
*O2 ref 15%

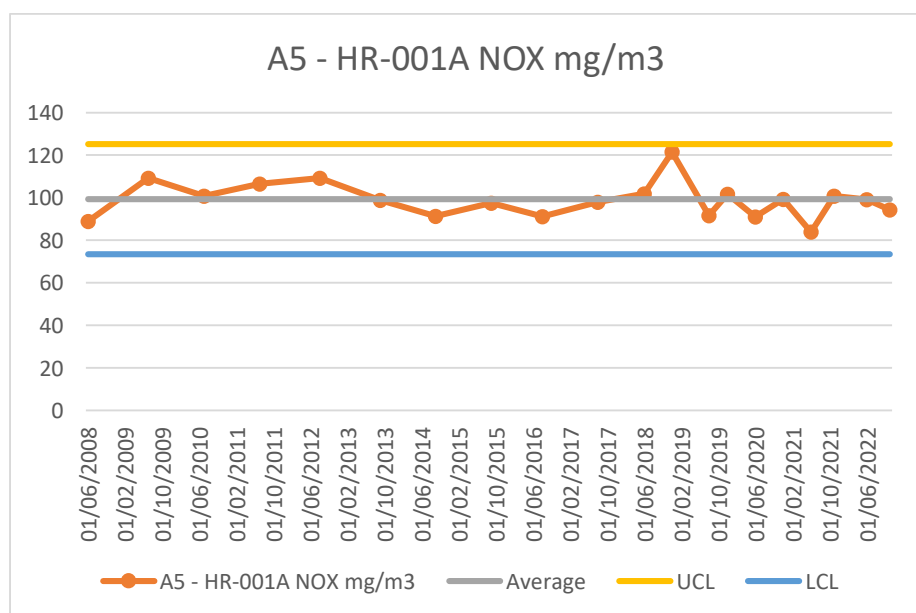
CO



Periodic extractive sampling NOX

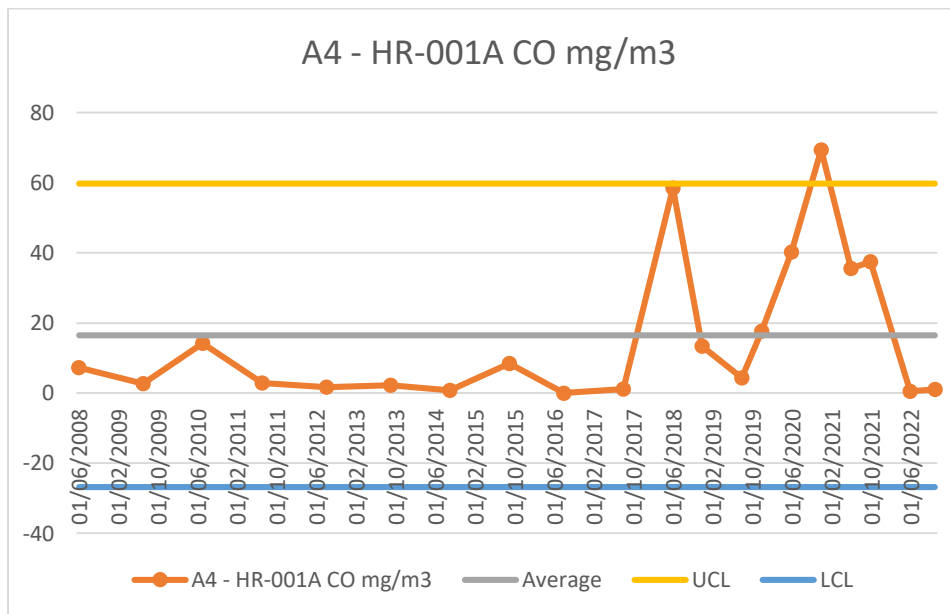


Permit limit:
6 monthly extractive
sample 110 mg/m3
*O2 ref 3%



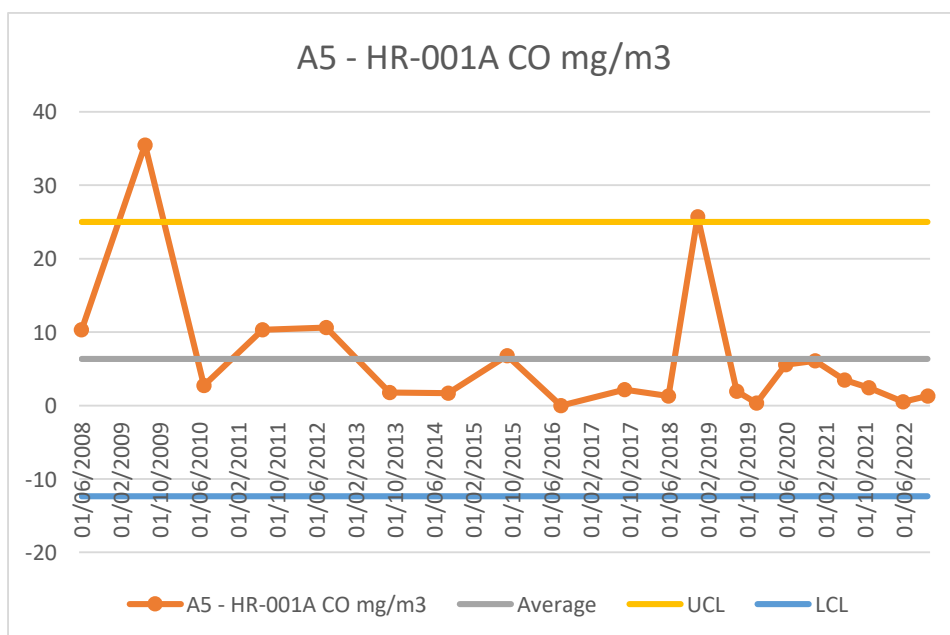
Permit limit:
6 monthly extractive
sample 110 mg/m3
*O2 ref 3%

CO



Results within permit limit, but higher than usual. Will continue to monitor.

Permit limit:
6 monthly extractive sample 100 mg/m3
*O2 ref 3%



Results within permit limit.

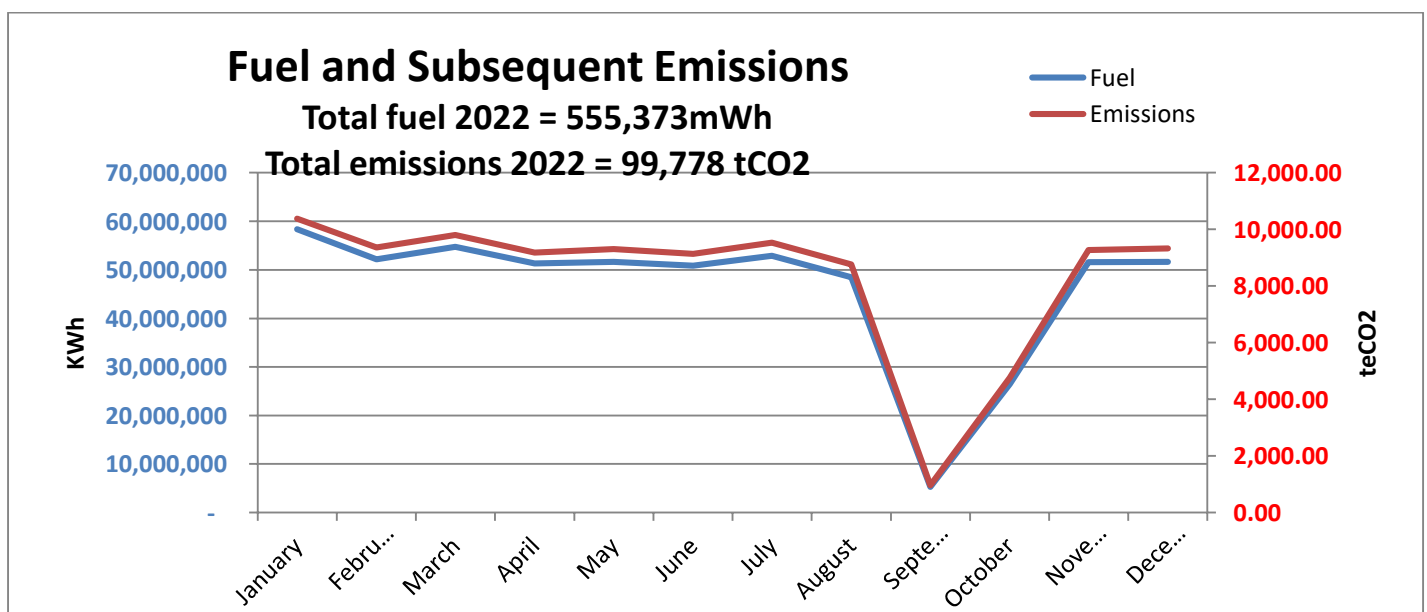
Permit limit:
6 monthly extractive sample 100 mg/m3
*O2 ref 3%

Fuel and Subsequent Emissions

Fuel and emissions were lower again during 2022 due to heat demand being lower due to not operating W714 and W718. Also there was no electricity exported during 2022, so less gas was used to create export electricity.

Average fuel consumption for the year was 46,281 MWh per month compared to 58,492 MWh per month for 2021.

Average CO2 emissions for the year were 8,315 tCO2 per month compared to 10,576 tCO2 per month for 2021



Running Hours

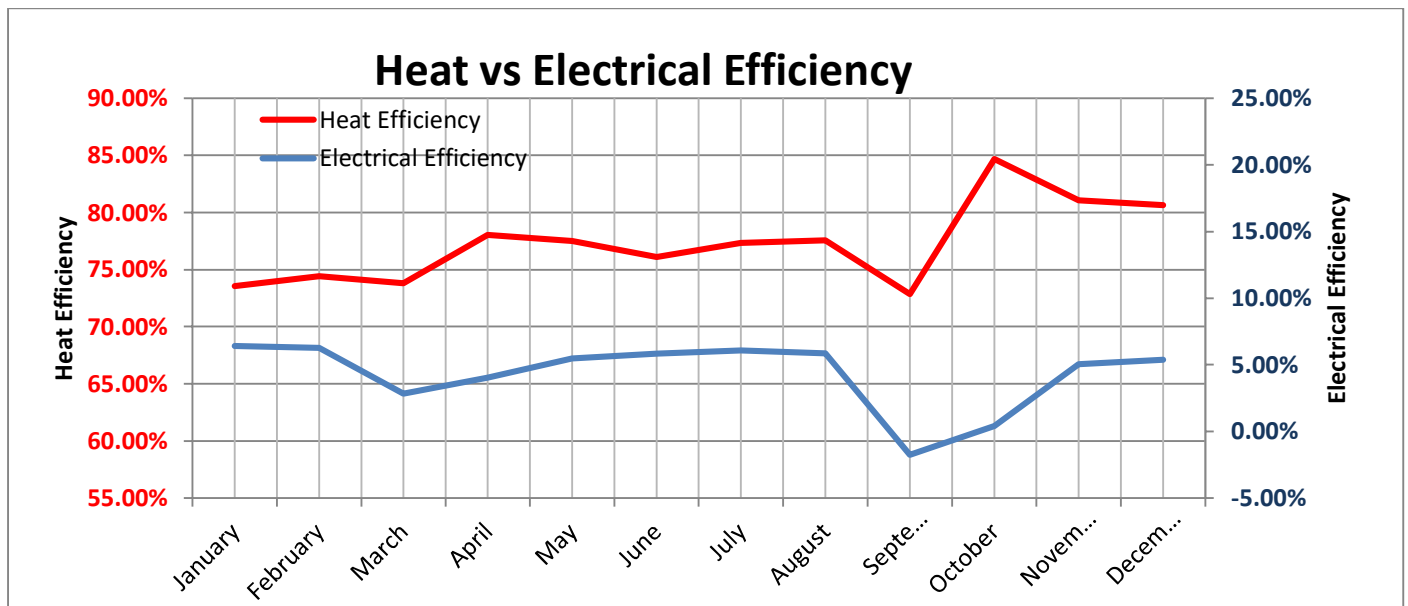
	Year:	A1 (hours)	A2 (hours)	A3 (hours)	A4 (hours)	A5 (hours)
Annual Operating Hours	2022	1139.977	2967	7126.879	906.5	1608

The annualised hours reflect a general running philosophy that the gas turbines and heat recovery units are used as base generating units for both electricity and steam, with the fired boiler/MP boilers taking up the rest of the plant demand. However during 2022 A1 (HRSG / GT A) was out of operation from April to August due to operational issues. The Fired Boiler (A2) was taken down form statutory inspection from October.

The MP boilers are kept ready to go, should they be needed, so the hours here have been calculated based on hours that each MP boiler is running above 20%.

Heat vs Electrical Efficiency

The heat efficiency was higher during periods of the year where the GT's were not running. The electrical efficiency was higher during periods of the year where the GT's were running.



CHP efficiency

CHP efficiency was variable during the year. This efficiency is calculated as a sum of the electrical efficiency and the heat efficiency. The efficiency measured in this way shows as higher at periods when there is higher heat efficiency.

Since not running W714 and W718, the demand for steam has been lower and at times we have struggled to run the steam turbine. This has affected our electrical efficiency during 2022.

