



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 2020 . SPC charts have been used for all CEMS monitoring we carry out for NOX and CO for the last 3 years. SPC charts have been used for extractive sampling we have carried out since 2008.

Points of interest for 2020 :

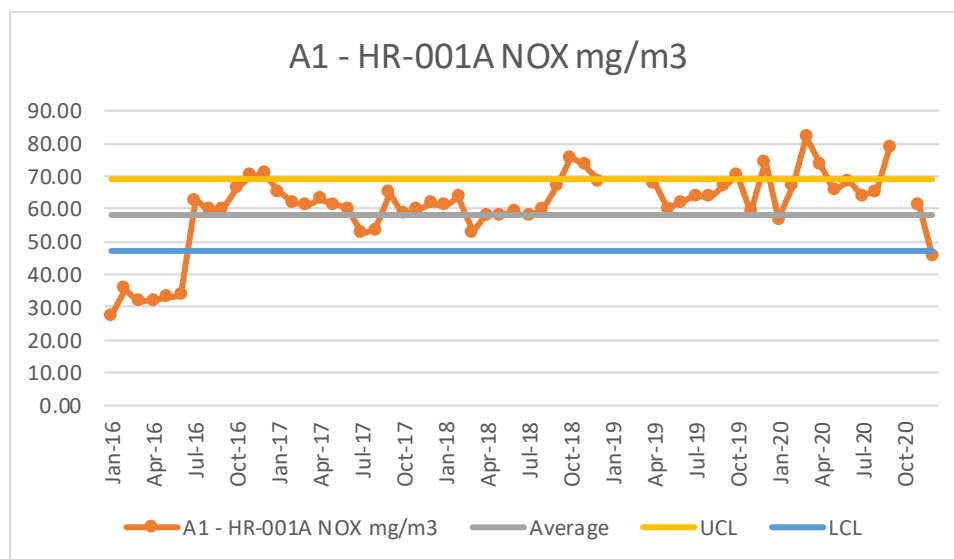
- GTB was upgraded in Q2 to lower NOx emissions
- GTA was upgraded in Q4 to lower NOx emissions
- Fired boiler upgrade is planned during 2021. NOx emissions are above permit limit in the interim period, but the burner will not run more than 1500 hours. Minimising the running time and rates of this unit has increased the CO monthly average a little, but it is still within the permit limit.

Incidents

There was one invalid days report for A1 during March 2020. There didn't seem to be a substantiated reason for the data issues, but we believe the ongoing work to upgrade GTB may have affected the cabling causing the issue, as we also saw a number of spurious DCS alarms during this period. During the same time period there were 4 invalid days for A2 LAND visited not long after the issue with A1 resolved itself and found nothing wrong with the analyser at all.

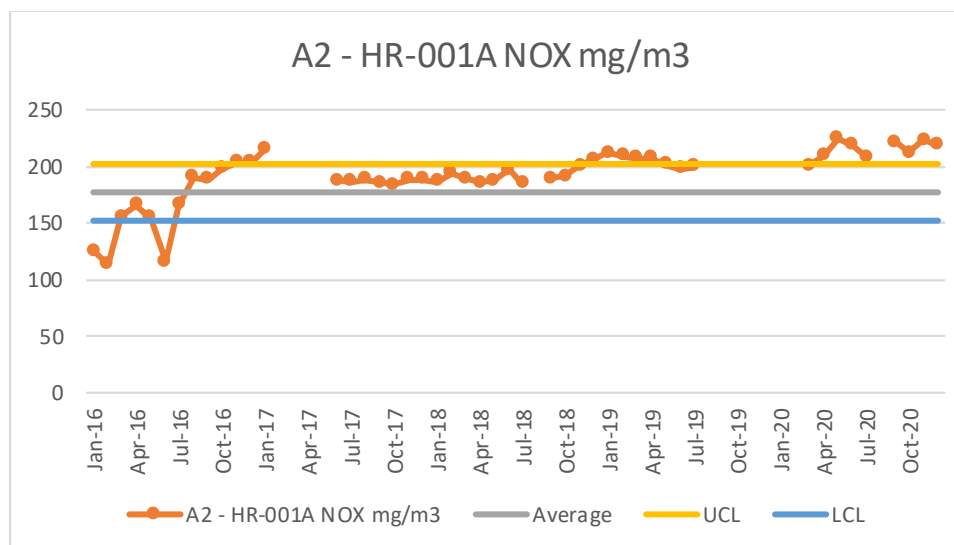
There was also a period during Q3 where the data link between the DCS and Envirosoft was down due to an upgrade on the DCS software blocking the link due to a firewall. This link was restored as soon as the root of the problem was established. Some data was missing and the Q3 reporting data was calculated outside of Envirosoft using DCS and Pi data.

Air monitoring
CEMS data
NOX



Permit limit changed
1/7/2020 from 125mg/m3
to 75mg/m3 *O2 ref 15%

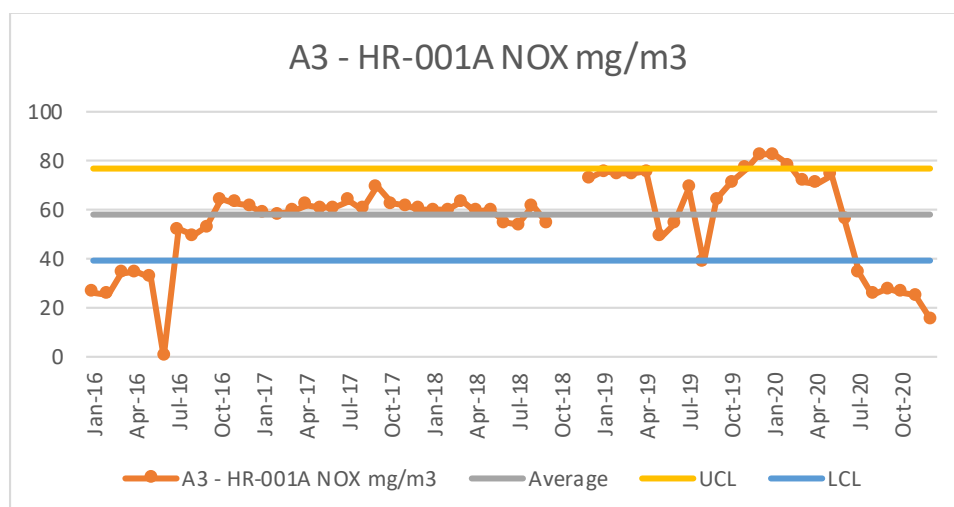
No results Oct 20 due to
full shutdown for GT
upgrade



Permit limit changed
1/7/2020 from 250mg/m3
to 100 mg/m3
*O2 ref 3%

Burner upgrade to reduce
NOx – due during 2021.

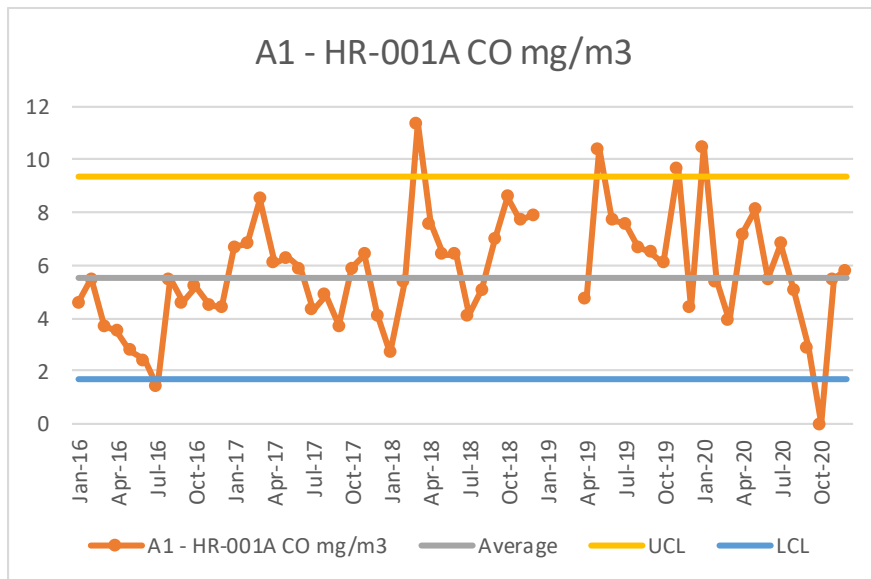
No results Jan, Feb and
August as unit not
running above threshold
or shutdown.



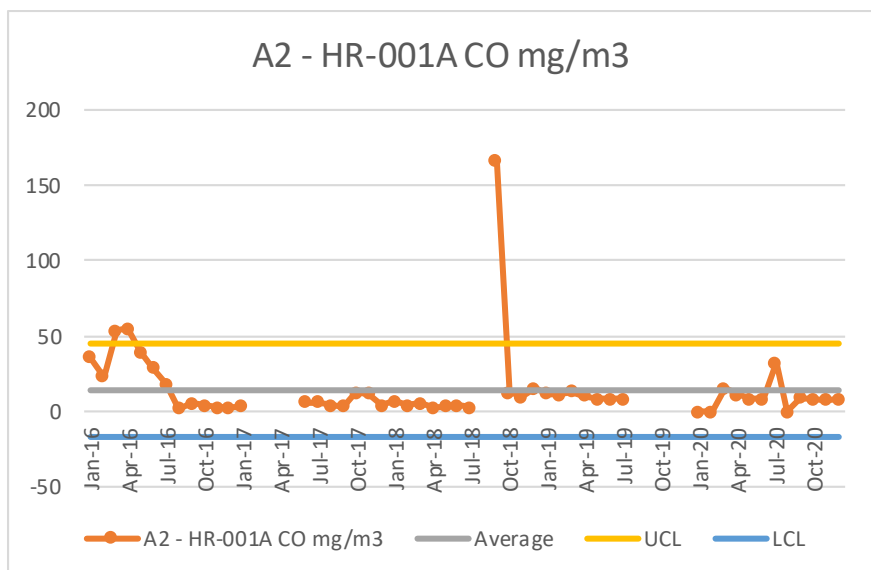
Permit limit changed
1/7/2020 from 125mg/m3
to 75mg/m3 *O2 ref 15%

GT was upgraded during
Q2

CO

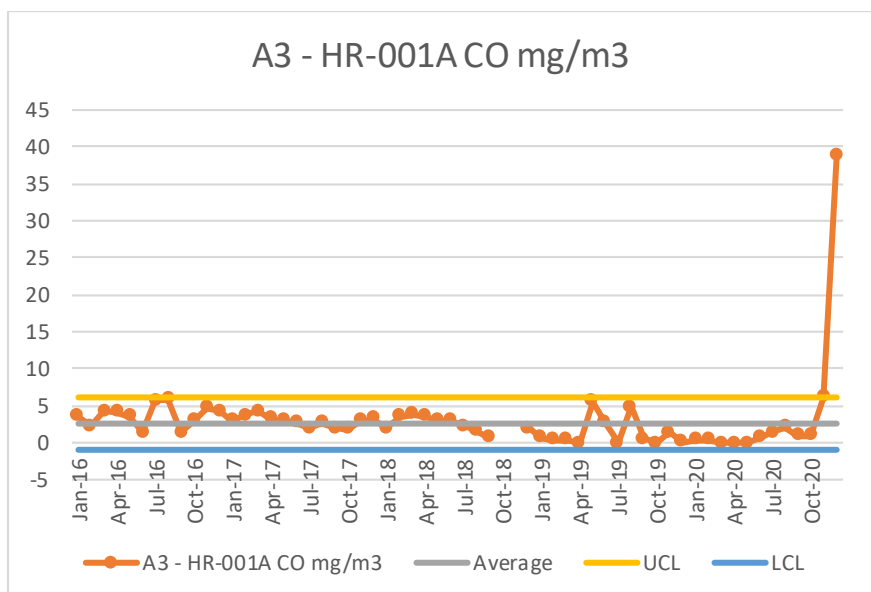


Results within permit limit (80mg/m3).
*O2 ref 15%



Results permit limit (110mg/m3).
*O2 ref 3%

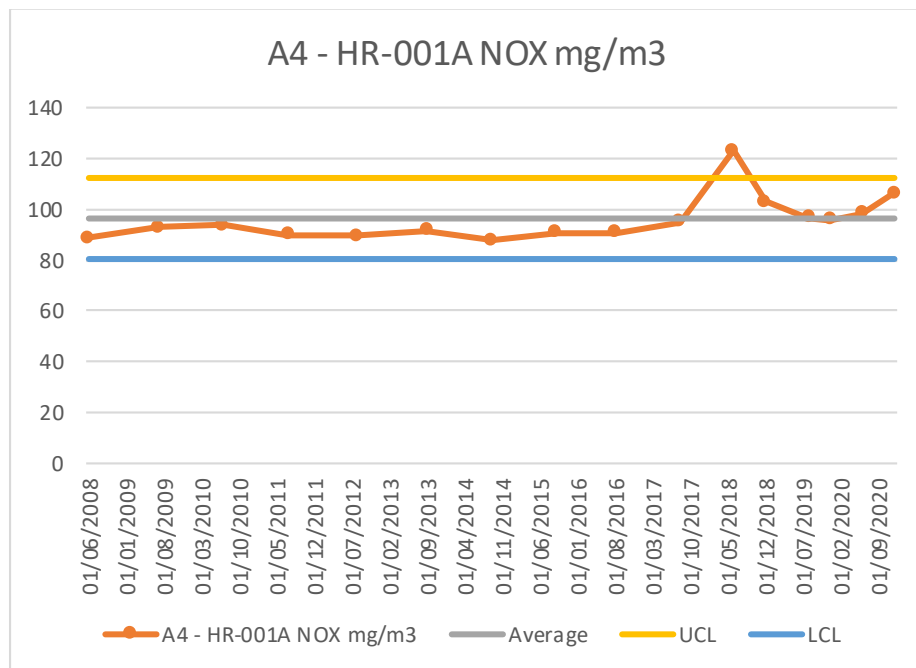
No results Jan, Feb and August as unit not running above threshold or shutdown.



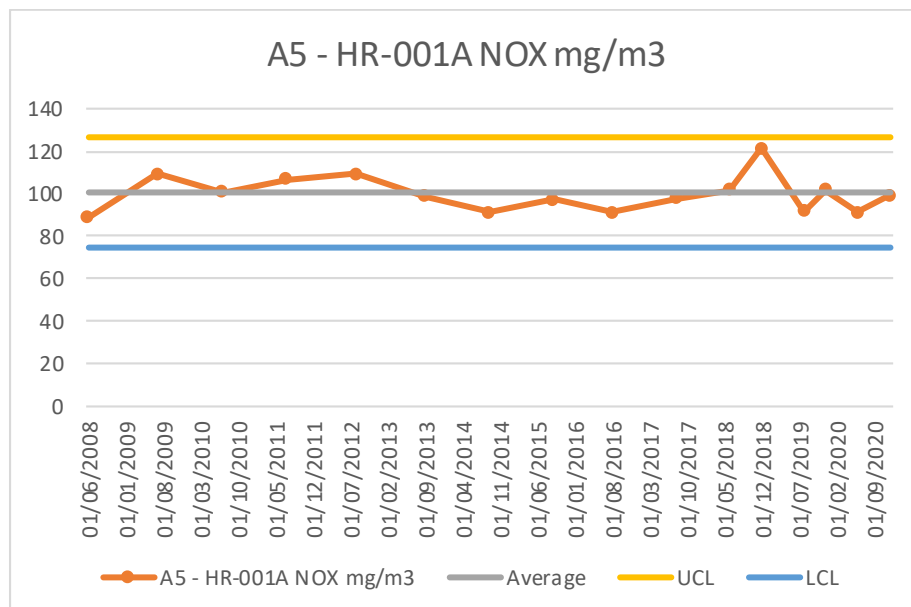
Results within permit limit (80mg/m3). *O2 ref 15%

December value well within permit limit, but atypically high. The coinciding months data for NOx was very low

Periodic extractive sampling NOX

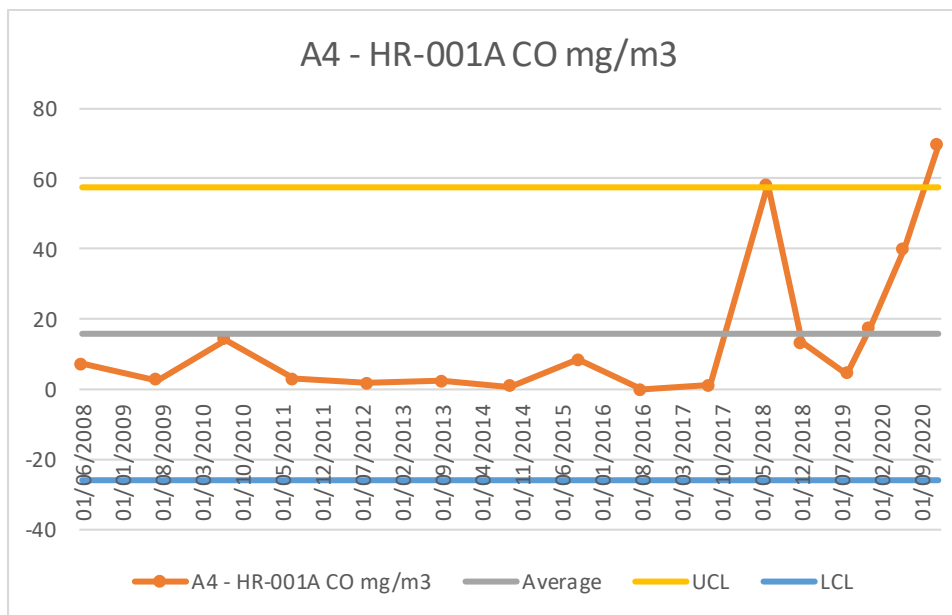


Permit limit changed
1/7/2020 from 135mg/m3
to 110 mg/m3
*O2 ref 3%



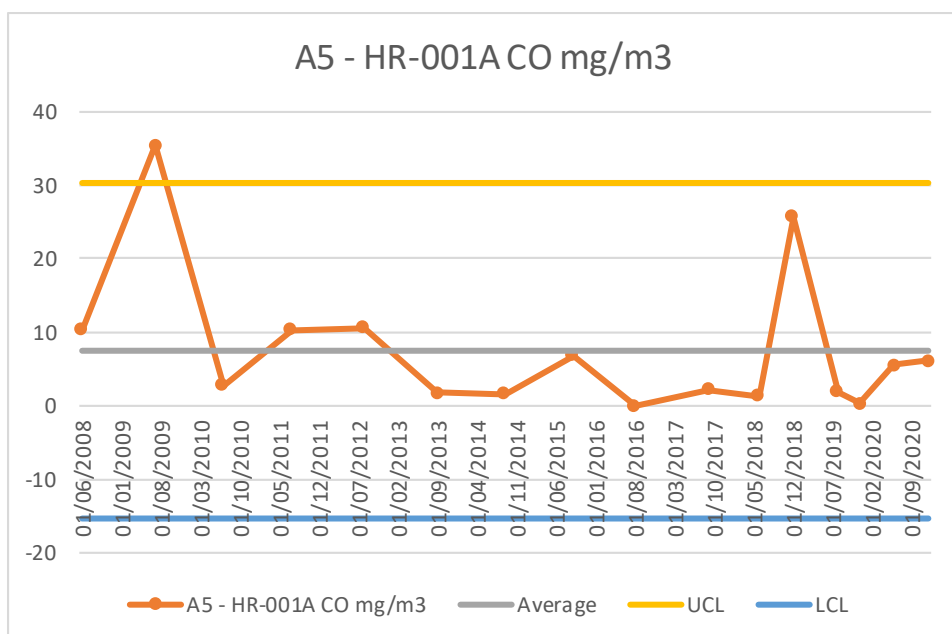
Permit limit changed
1/7/2020 from 135mg/m3
to 110 mg/m3
*O2 ref 3%

CO



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

Permit limit changed 1/7/2020 from 200mg/m3 to 100 mg/m3
*O2 ref 3%



Results within permit limit. Will continue to monitor this.

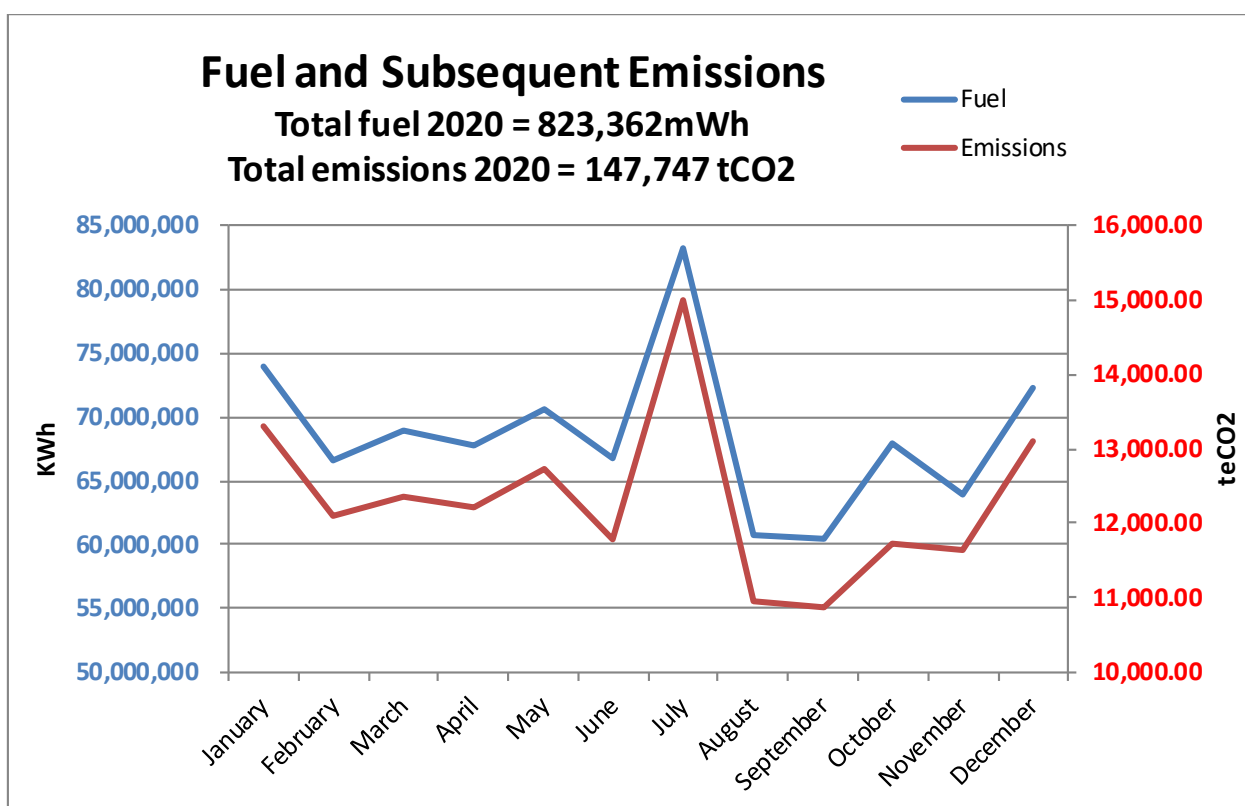
Permit limit changed 1/7/2020 from 200mg/m3 to 100 mg/m3
*O2 ref 3%

Fuel and Subsequent Emissions

Fuel and emissions were back up to more normal levels in 2020. Both GT's were upgraded during the year to reduce NOx emissions. The improvement on GTB seems to be better than on GTA, investigation and trials are ongoing to

Average fuel consumption for the years was 68,613 MWh per month compared to 60,220 MWh per month for 2019.

Average CO2 emissions for the year were 12,312 tCO2 per month compared to 10,929 tCO2 per month for 2019



Running Hours

Year:	2020	A1 (hours)	A2 (hours)	A3 (hours)	A4 (hours)	A5 (hours)
Annual Operating Hours		5941.1	2350	4920.9	851	1243.5

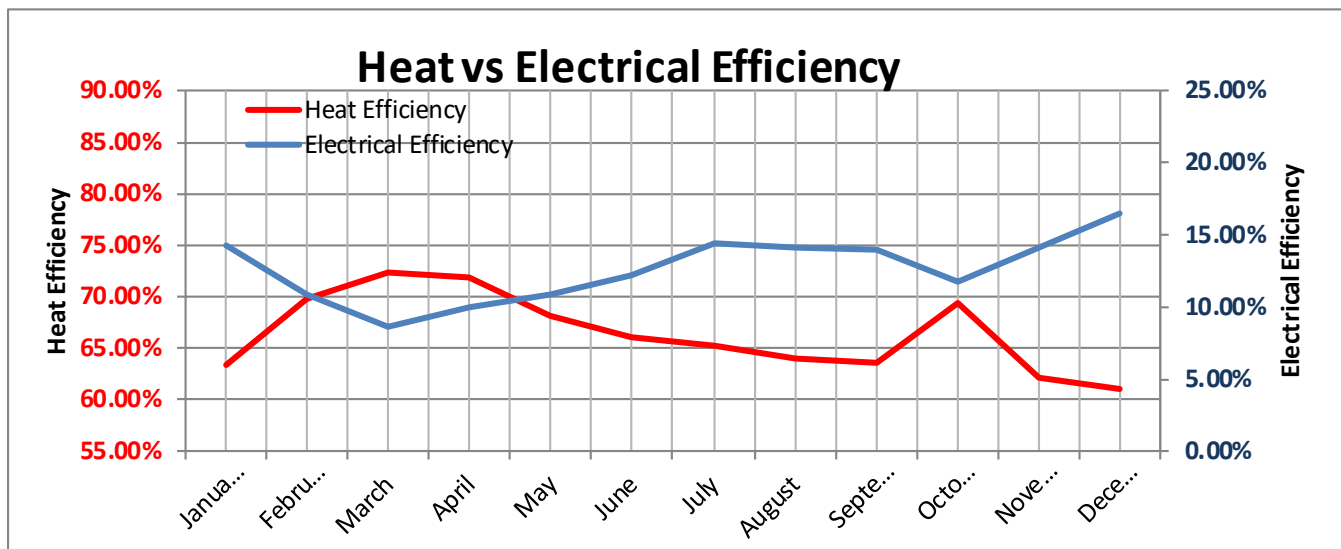
From the annualised hours, it can be seen that they reflect a general running philosophy that the gas turbines and heat recovery units are used as base generating units for both electricity and steam, with the fired boiler taking up the rest of the plant demand.

The MP boilers are kept ready to go at all times 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.

We are looking at these measures which were inherited when Dow started running the CHP. We want to ensure that we are aligned with normal industry measurements for these factors.



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.

We are looking at these measures which were inherited when Dow started running the CHP. We want to ensure that we are aligned with normal industry measurements for these factors.

