WASTE 4 GENERATION

THE SOLUTION FOR FUTURE GENERATIONS

CASE STUDY 3

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A site based on the west coast of Ireland, and utilising biogas to biomethane conversion. The site required a great deal of retro-fitting of equipment after the original suppliers closed.

The site had additional management requirements including rainfall capture, digestate & process.

On initial investigation, it was found that the digesters were highly inhibited across a number of parameters, in particular ammonia. One of the key contracted feedstocks for this site was chicken litter, so on determining there was ammonia inhibition present, as well as high incoming nitrogen, we knew we had to devise a permanent cost-effective solution going forwards to prevent inhibition. High levels of ammonia were present through all stages of the process, on reception of the waste, which was carefully controlled through odour control, through to high levels of ammonia/nitrogen within the digestate, which would determine spreading regimes. In regards to the feedstocks, there were a number of contracted wastes which had to be optimised and managed. We worked with these key feedstocks to create a feed-blend which worked for both the plant and it's clients.

The site had known odour issues, and we investigated how these could be remedied and mediated, including digester leaks and gas leaks which were contributing to the odours.

The operators inherited a number of issues from the site's design and implementation. This included the feeding and recirculation set-up, where fresh feed in could only be added to the system via the recirculation, meaning that the digesters were almost on a continuous loop of recirculation. This meant that key elements were either continuously converted such as nitrogen present in the recirculation was continuously being converted to ammonia/ammonium as well as any nitrogen present in the feed. It also meant chlorides for instance, which are not converted by the AD process, were continuously concentrated up, as the concentration present within the recirc were being supplemented by concentrations within the feed. Similarly for the parameters above, the loading rates for the digesters were being mis-represented by the presence of the recirculation, which we addressed and adjusted to gain a true reflection of the plant's performance and biogas production. In the early days of our time onsite, we checked and inspected the entire process, checked every valve, and seal and found a substantial number of leaks, which helped realise actual gas production once they were sealed.

The site used biogas upgrading to compress and purify the biogas produced and convert it into compressed biomethane, for use with off-site CHP units.

- Initially attended site beginning of March 2019 to view process
- Original production approx. 10% of designed output.
- Conducted a dedicated 6 week period onsite to ramp-up the plant, achieve key targets as well as train operators & key personnel.
- Following 6 week period, over-saw key planned preventative management as well as key repairs.

W4G
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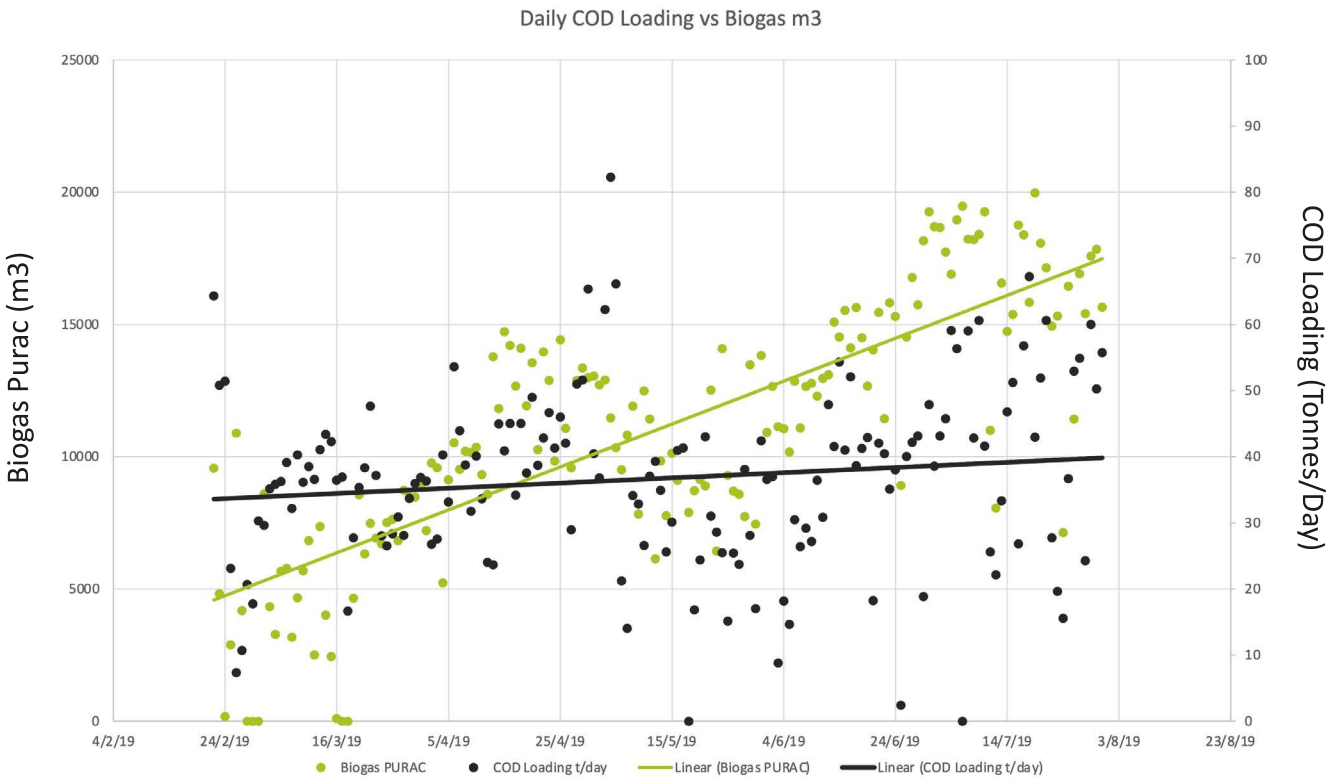
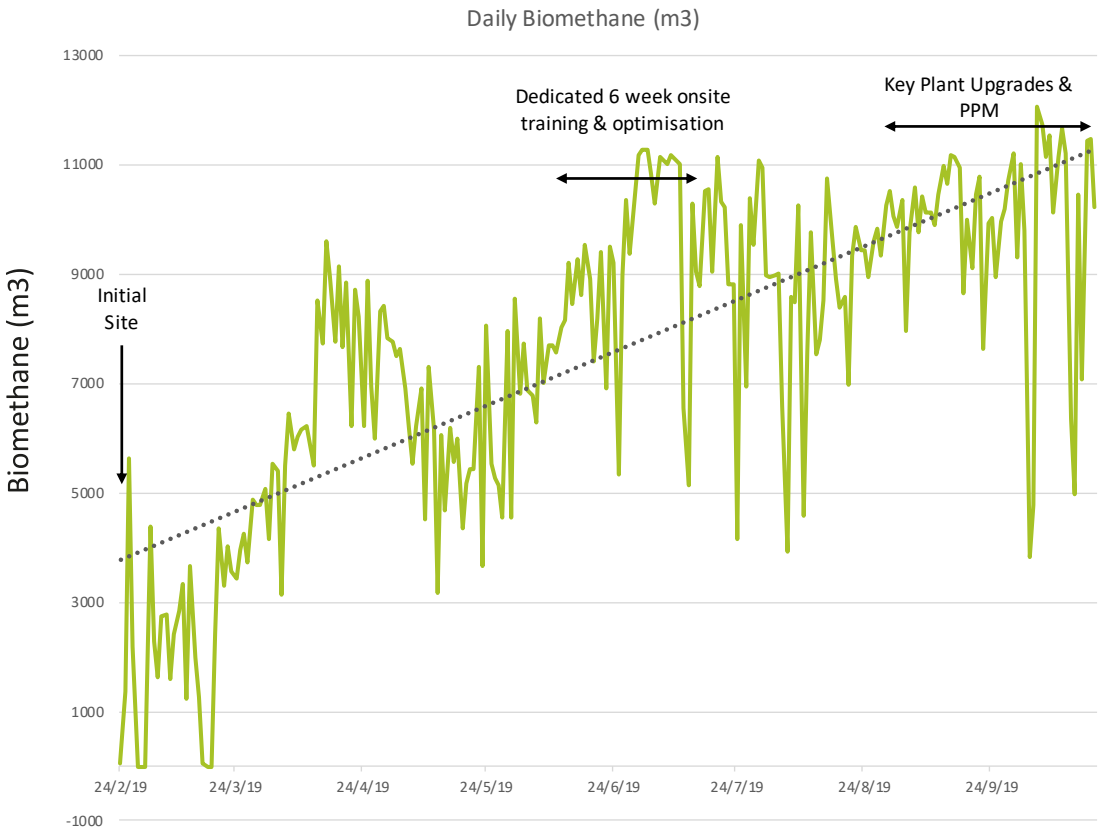


The initial analysis of the site found the digesters to be highly inhibited.

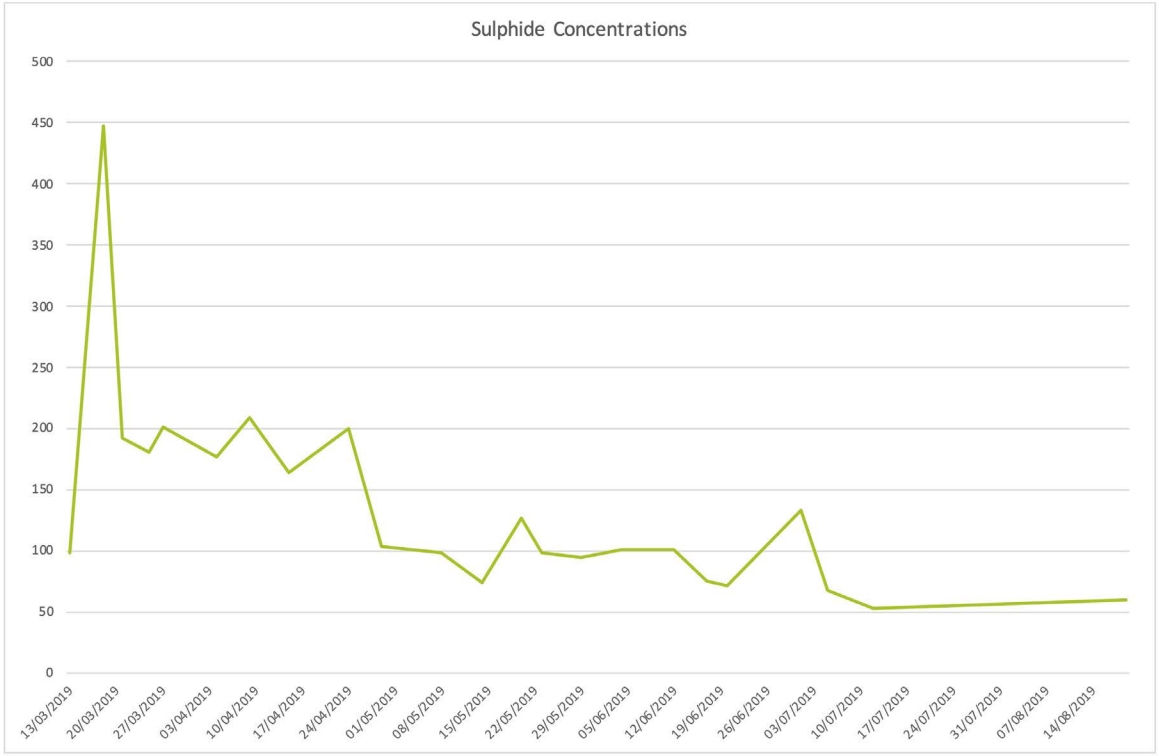
As you can see from the graph, over the time we worked onsite, we only increased the loading onto site slowly, they were already feeding high COD onto the system, however they were not seeing the expected production from that COD.

By reducing the inhibition within the system, we were able to realise the true gas potential of the COD being fed.



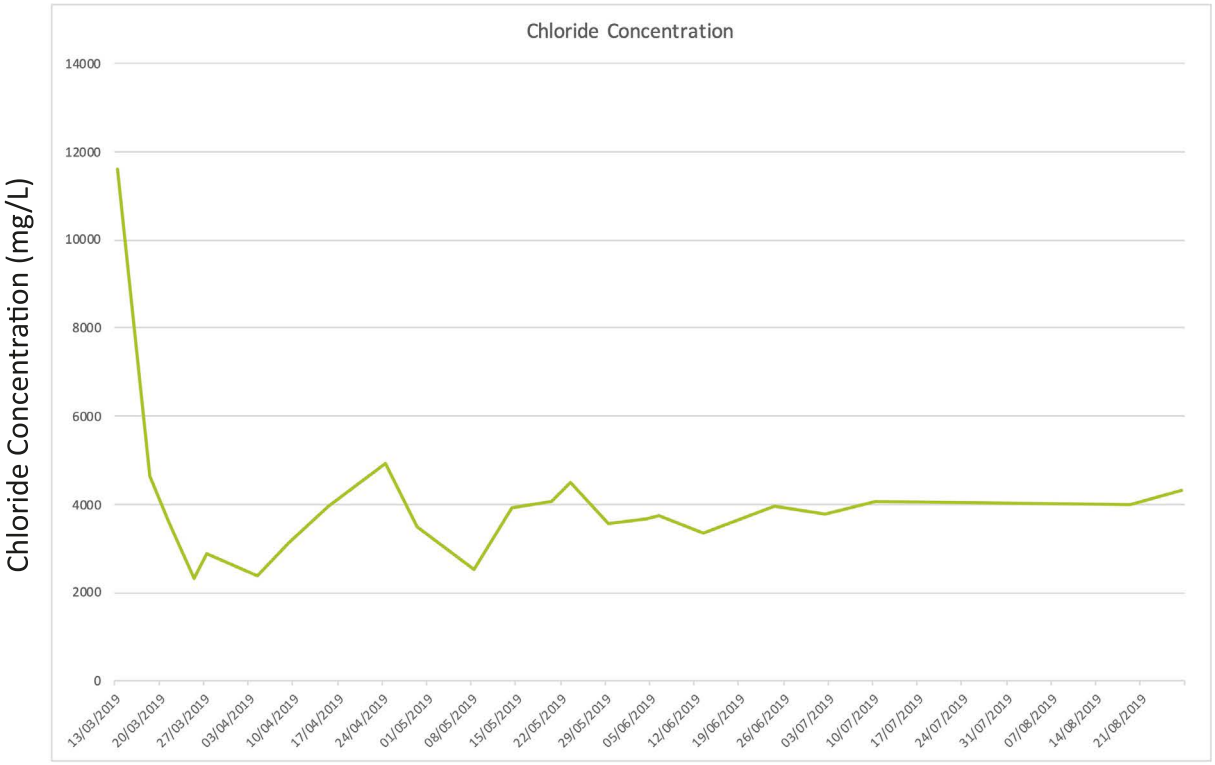
During our time on site, we were able to both significantly increase production but also steer the plant through key works on site, including works to the PURAC unit which directly affect the potential production capacity the site had.

By effectively planning and managing such down-time events, we were able to optimise our outputs where possible, as well as resources such as consumables and feedstocks.

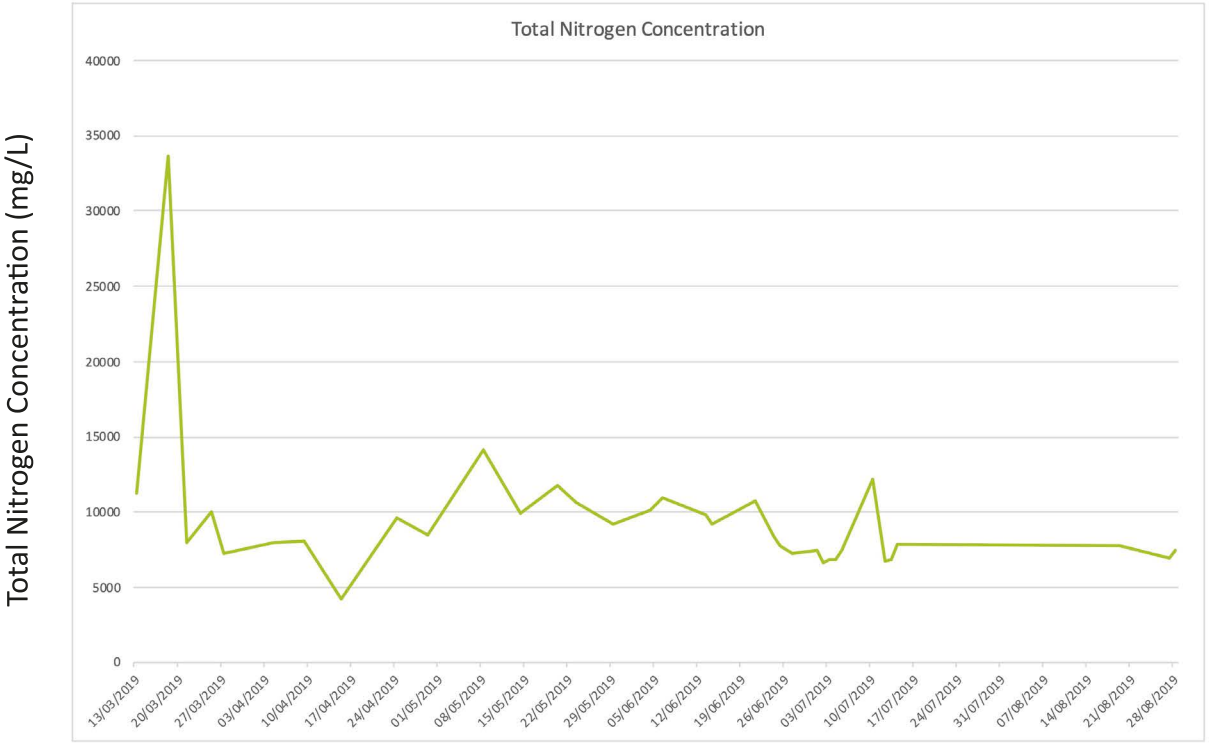


Key inhibitors were identified in the preliminary sampling, as part of the initial visit:

High sulphide concentrations identified within the digesters, due to incoming feedstocks with high sulphate, poor mixing and also limited H_2S control including the management of iron hydroxide dosing.



High chloride concentrations within digestate, which had accumulated, accumulated through settlement and mixing issues as well a high concentrations in incoming feedstocks.



Combined ammonia found to be at excessively high levels, contributed to by the feedstock as well as recirculation. Immediate process changes implemented saw the levels drop, and W4G management saw levels hold at a reduced level.