

Distribution Gas Entry – CV Management

Background

This document has been put together to summarise work done during early 2021 via the ENA Entry Customer Forum (ENCF) to review processes associated with Calorific Value (CV) target setting and monitoring for Gas Distribution Network (GDN) connected biomethane sites. This document was drafted in response to industry questions and requests to provide transparency into the CV target setting process and is not a GDN policy document

The review was instigated by the following request raised by John Baldwin, Alison Cartwright and Kiara Zennaro on behalf of biomethane producers:

- During plant start up, until the biomethane/propane blend is within CV specification (which can take up to 15 minutes), biomethane is automatically sent to flare or back to the AD through the use of the diverter valve. This leads to significant flaring over the year and is primarily related to propane. It is not safety related.
- **There needs to be more flexibility to allow start up excursions of CV:** for example, rules should be developed to only send the gas to flare if the CV is out of spec for more than 15 minutes. The GDNs believe that if 10 m³ of biomethane (equal to around 100 kWh) goes into the connection pipeline at a CV of say 38.3 MJ/M³ then the entire gas sold in that LDZ for that day is at 38.3 MJ/M³, *[if the sites' average across the day does not meet the 1MJ threshold]* even though in practice it was all at say 39.9 MJ/M³. There is no customer issue here, the financial and GHG impact of flaring far outweighs any actual consequence from the short-term reduction in CV in the connection pipeline leaving site.
- Similarly, there have been cases where a broken upstream biomethane flow meter that is used for propane addition have resulted in the gas being flared for days. Again, more flexibility is needed here e.g. a workaround to add a bit too much propane for a few days until the broken meter is replaced/repaired.

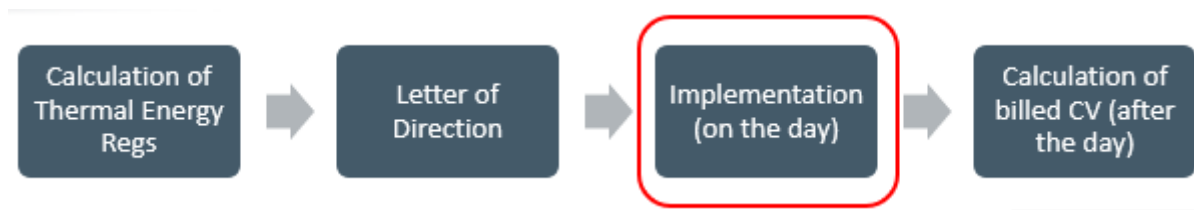
Disclaimer: If you have any questions about this document please contact EnCF@energynetworks.org. This document was published in August 2021 and will be reviewed on an annual basis.

Approach

The following approach was taken to investigate the issues and seek solutions.

Review of GDN processes

CV target processes are put in place to avoid LDZ CV Capping procedures which result in considerable financial amounts of unbilled energy filtering through to National Grid CV Shrinkage costs which ultimately are paid by gas Shippers. The LDZ CV Capping procedures result from the application of the Calculation of Thermal Energy (CoTE) regulations. Site specific Letters of Direction determine the sites which are considered in those regulations (all biomethane sites on GDN networks currently are Directed sites). The way in which CV target processes are implemented have a significant impact on after the day processes including for the calculation of billing CVs. The relationship between these areas is shown in the flow chart below.



It was agreed that we would initially focus on finding solutions based on changes to the Implementation (on the day) part of the processes as highlighted, which it was deemed would be simpler than seeking changes to other areas.

In response to the proposal that was raised, the initial action was for GDNs to review the way in which actual CVs are compared with target CVs for the purposes of determining when gas is out of specification and must stop being injected into the GDN network. This action is termed 'Review of CV real time monitoring' in the rest of this document.

A second piece of work was then undertaken by GDNs to review the way in which those initial target CVs are set to see whether further improvements could be made through shared learning and adopting best practice. This is termed 'CV target setting' in the rest of this document.

This work cannot address issue that can arise when target CVs are particularly high because of NTS gas CVs. This issue is being considered elsewhere.

Engagement / challenge and review

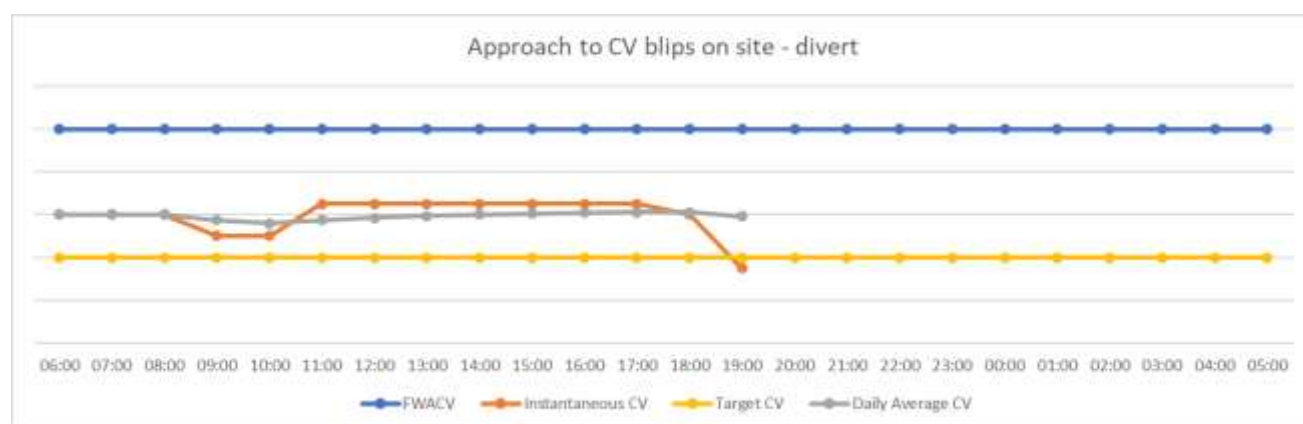
As this work has progressed we have continued engagement with biomethane producers and other stakeholders including OFGEM via the ENCF and specific bilateral meetings. Discussions at those sessions have been useful in determining priorities, solutions and appetite for change.

Outcomes

Review of CV real time monitoring:

Following a review of approaches across the GDNs it was recognised that a key driver in the issue of CV blips was that in most cases site divert valves currently operate as a result of changes to instantaneous CV readings.

A revised process which takes account of average (flow weighted) CV to time, which is more representative of the CV which would feed into capping processes and remains above the tolerance for longer, was recognised as having the potential to greatly reduce the occurrences of this issue. This is shown in the graph below where the current process considers the orange line and a revised process would consider the grey line.



The next steps are that Biomethane Producers will propose new processes including new data point calculation for use in this process. These processes will be reviewed by GDNs so that a mutually agreed solution can be developed for implementation.

CV target setting:

The review of CV real time monitoring highlighted differences in the terminology and processes used by GDNs in setting initial target CVs. This led to some confusion during discussions

between GDNs and more widely. On that basis the decision was taken to undertake a review of CV target setting process across GDNs to identify any opportunities for shared learning.

The result of this review concluded that the differences in current approaches are based on the different dynamics across the UK gas network and that standardisation would lead to overall reductions in efficiencies and requirements for increased propanation in some locations. The recommendation is therefore that processes should remain as-is.

Further detail is provided below:

Target CVs are set by GDNs to ensure that they do not cause capping to billing CVs for the Local Distribution Zone (LDZ). CV capping occurs when the lowest CV gas injected into an LDZ is more than 1 MJ below the flow weighted average (FWACV) CV for the LDZ. As such, targets CVs are always calculated based on other CVs coming into the network which are currently predominantly from the National Transmission System (NTS).

The LDZ CV characteristics which have driven the different GDN approaches to target CV setting are:

1. CV variation day to day
2. CV variation within the day
 - a. particularly where for example NTS flows from LNG terminals can have a fast and significant impact on the LDZ average
3. CV variation between different sources of gas feeding the LDZ

The impact of these characteristics can be summarised as follows:

1. Where CVs are fairly consistent on a day to day basis, a pragmatic approach can be taken where target CVs are set on an enduring basis and only changed where NTS flow patterns change significantly. Where this approach is taken the target would be based on the highest CVs that are reasonably anticipated. However, as this could lead to over propanation on some days, the target is reduced taking into account an element of the 1MJ allowance for capping to provide a target that seeks to protect against CV capping whilst not unduly leading to over propanation.

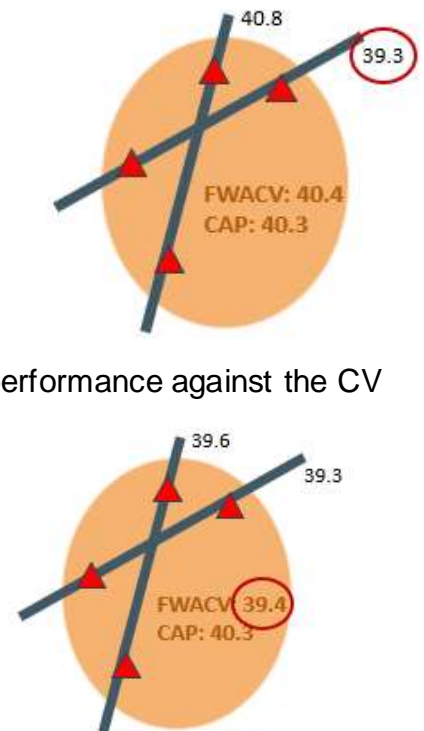
Where CV variation is expected to occur on a day to day basis, automated processes tend to be used for calculating real time CVs based on the CVs of gas being delivered to the LDZ. These are sent electronically to biomethane sites and require real time adjustment of propanation at site.

2. Where significant CV variation is anticipated within the day at a LDZ level, the tolerance applied to specific sites' target CVs takes this variation into account and as a result may be narrower compared to a tolerance set for a LDZ where less CV variation is anticipated within the day. This is to account for the fact that it is the end of day CV which feeds into



billing calculations. Tolerances can also be set based on specific sites' historical performance in relation to meeting target CVs.

- Where LDZs receive CV from different parts of the NTS, potentially with significantly different CVs the target CV will often be based on the lowest source CV rather than the FWACV (circled in red). This goes some way towards protecting producers from having to match with a FWACV which could be capped because of CV variation at NTS offtakes. In these cases the lower CV target for biomethane sites should not increase the risk of capping as the cap is calculated based on the lowest CV irrespective of whether it is from a biomethane site or an NTS offtake (from a different NTS pipeline with a lower CV). The tolerance against which performance against the CV target is measured will be lower in this case as some account of the 1MJ tolerance in the CoTE has already been applied in this case.

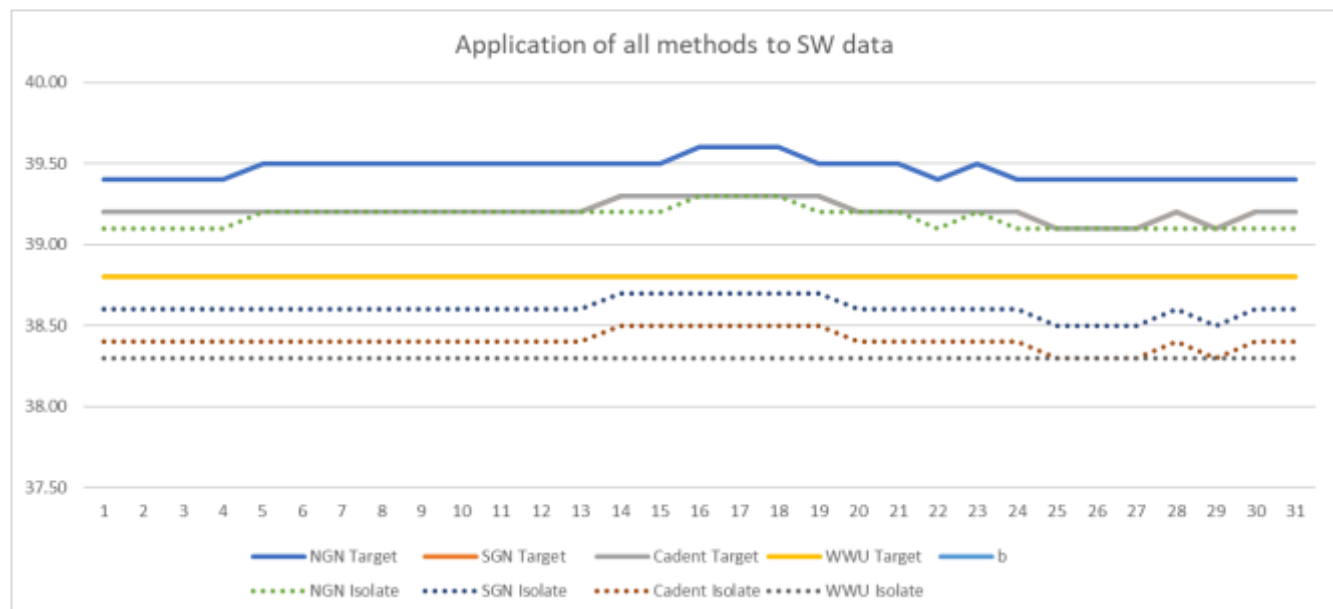
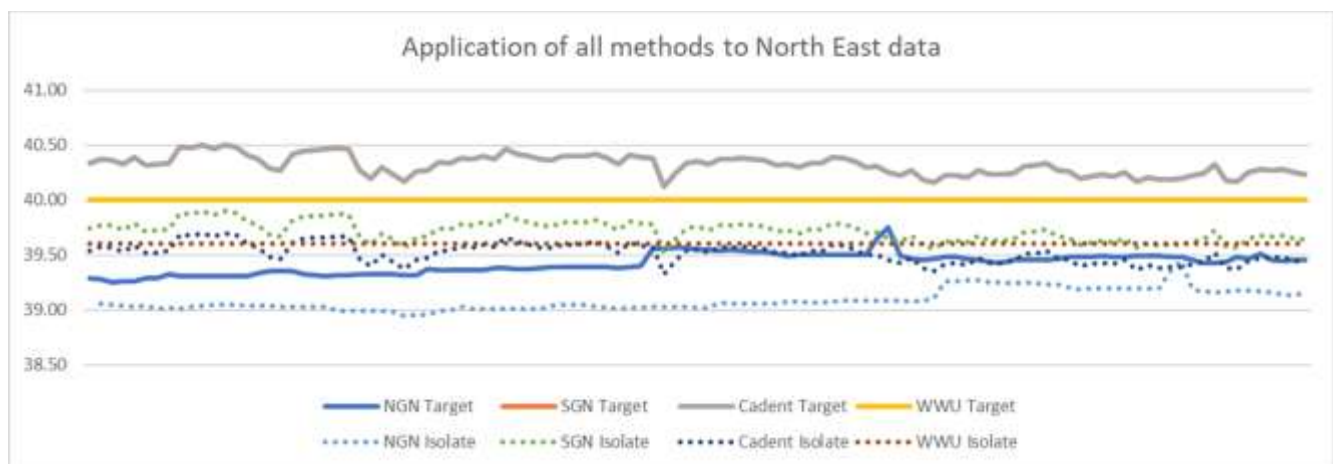


Conversely, where LDZ receive CV with similar CVs from the NTS, the target CV is usually based on the flow weighted average CV (circled in red) and a higher tolerance against which performance against the CV target is measured can be applied.

Analysis:

In order to test the different approaches we trialled the application of different methods on sample LDZ data. The examples below show that the methods developed locally give the lowest targets for the region.

Note: that as Cadent and SGN use the same process for setting targets the SGN lines are beneath the Cadent lines:



Next Steps

The results of this work have been shared at ENCF which concludes the review of processes by GDN.

Following further discussions on findings and recommendations the remaining actions can be summarised as follows.

In relation to:

Review of CV real time monitoring:

Biomethane producers will propose new processes including new data point calculations. These processes will be reviewed by GDNs so that a mutually agreed solution can be developed for implementation.

CV target setting:

It was agreed that the findings would be recorded in this document.

New areas raised through the project

There is a specific issue in some LDZ where LDZs have particularly high CVs this could not be addressed through this work and is being considered separately.

The benefit of forecasting CVs was discussed to increase stability in the process. This was raised with NTS who suggest that the best way forward would be to raise a formal data request through the newly released ENA data triage process. This will enable you to specify what data you would like to see, and then ENA and National Grid to separately triage the request, track and record it, as well as formally presenting a verdict on whether the data can be legally, commercially and physically offered to the requestor and published online for transparency. This process includes a consultation period.

Please submit requests via the [ENA Data Triage Process](#).