

To: Gas shippers, gas suppliers,
network companies, consumers,
consumer representatives, investors
and other interested parties



Making a positive difference
for energy consumers

Direct Dial: 020 7901 7034
Email: rob.church@ofgem.gov.uk

Date: 21 August 2014

Dear colleague

Open letter: Gas energy measurement in consumer billing

Earlier this year we commissioned an independent report covering two key aspects of gas measurement, as follows:

- calculating thermal energy and its impact on domestic consumers
- technical standards for calculating calorific value (CV) at biomethane injection sites.

We have published the report in full on our website.¹ This letter summarises the report's findings and our conclusions that:

- the prescribed method for converting metered volumes of gas into thermal energy remains appropriate
- the technical standards for CV determination devices at bio-methane injection sites should be proportionate to the size of such sites and the effect on downstream gas.

Background

Unlike electricity meters which measure in energy units (kWh), gas meters in Great Britain measure the volume of gas that is being used. However, volume for a given mass of gas is variable, ie the gas may expand with increased temperature or reduced atmospheric pressure, and vice versa. So, to ensure that the consumer is accurately billed for the amount of energy consumed, rather than simply the volume of gas, it is necessary to both correct for the volume changes using a volume correction factor (VCF) and determine the energy content of the gas supplied, known as the CV of the gas. CV is measured in MJ/m³.

Volume Conversion Factor

The Gas (Calculation of Thermal Energy) Regulations 1996, as amended (the 'Regulations'), prescribe the conversion of volume to energy for temperature and pressure. There is currently a single volume conversion factor for all GB supply points with an annual consumption of less than 732,000 kWh, which covers the vast majority of domestic households² and smaller commercial premises. This volume conversion factor is applied by gas suppliers to their volumetric meter readings in order to bill the consumer.

Our objective for the gas conversion arrangements is to ensure consumers have accurate bills for the energy they consume, without imposing excessive costs on suppliers to operate these rules which are then reflected in consumer bills.

¹www.ofgem.gov.uk/gas/distribution-networks/charging-arrangements

² Typical domestic consumption is 13,500 kWh per year.

As part of our efforts to ensure the regulatory framework continues to act in the interests of consumers, we recently commissioned work to identify the impacts on consumer bills of using a location-specific volume conversion factor. This was to take account of variations in pressure and temperature across the country. The analysis examined the effect of the prevailing volume conversion factor using national temperature and pressure data from 2011.

The analysis demonstrates that energy calculation under the prevailing volume conversion factor is accurate to within -1.48% to +1% for 95% or more of the population. Even at the extremes, the energy calculation is accurate to within -1.569% to +2.477%, which is broadly in line with the maximum permissible error for gas meters themselves.³

Based on the analysis, we do not think that introducing a location-specific volume conversion factor would be in the overall consumer interest because:

- the existing arrangements are already accurate and a location-specific factor would have a very limited impact on reducing overall error
- the costs of implementation within suppliers' systems is likely to impose additional costs on consumers that outweigh the benefits
- we know that data quality⁴ is a problem in the industry, and are concerned that it would create further risk of mistakes that result in less accurate consumer bills
- it would create additional complexity and make bills less understandable for consumers.

While we recognise that there are always options for increasing accuracy, it is not the case that it will always be in consumers' interests to mandate such approaches, as doing so may incur disproportionate additional costs. So, we do not propose to act now to amend the Regulations.

Calculation of Calorific Value of biomethane

As the traditional sources of GB gas (such as the North Sea) decline, alternative sources of gas will become increasingly important to the GB energy mix. For instance, in addition to providing an environmentally sound option for waste management, anaerobic digestion⁵ can offer a sustainable source of biomethane gas.

The Energy Market Issues for Biomethane ('EMIB') work programme was established by Ofgem to address the costs and complexity of injecting biomethane into the gas grid. This included creating a review group, consisting of each of the gas distribution network operators and facilitated by the Joint Office of Gas Transporters. The review group came up with recommendations in each of these five areas:

1. Gas Distribution Network connection policies
2. Network capacity availability
3. Gas quality regulation
4. Data requirements and transmission and third party ownership of CV equipment
5. Technical standards for CV

In March 2014 we issued an open letter⁶ confirming that the first three of these issues had been, or were in the process of being, dealt with. We also confirmed that we thought the issue of third party ownership could be addressed by interpreting the Regulations flexibly,

³ Domestic gas meters are accurate if they measure gas volume to within +/-2%. See the [Gas \(Meter\) Regulations 1983 \(SI 684\)](#) and the [Measuring Instruments \(Gas Meters\) Regulations 2006 \(SI 2647\)](#).

⁴ For instance, in June 2014 we wrote to industry parties requiring that they produce a report on how data quality issues which impact upon customers' transfers could be addressed. Metering and address data is of particular concern. The letter is published at: <https://www.ofgem.gov.uk/ofgem-publications/88308/industrydataqualityownershipandgovernance.pdf>

⁵ anaerobic digestion is a natural process in which micro-organisms break down organic matter in the absence of oxygen

⁶ www.ofgem.gov.uk/ofgem-publications/86979/emibopenletterfinal.pdf

and so we do not intend to do anything else on this. On the issue of data requirements and data transmission, we said that we would work with stakeholders to consider more detailed proposals. This work is ongoing.

Technical standards

This letter addresses the last of the five EMIB review group's report and recommendations for the technical standards for CV determination devices (CVDD).⁷ The recommendation was to reduce the required accuracy of CVDDs from the prevailing standard for Maximum Permissible Error (MPE) from +/- 0.1 MJ/m³ to +/- 0.5 MJ/m³ for entry flows up to 2.5 million m³/day. The principal driver for this was to reduce the obstacles to the uptake of use of renewable gas supplies such as biomethane. However, it was noted that this approach could be applicable and benefit the network entry of any small volumes of gas.

The analysis we commissioned determined that the impact of biomethane injection on CV for billing purposes depends on relative volumes of both the injected biomethane and the flow weighed average CV of the network. As the size of such injection sites is generally expected to be small, ie <100,000 m³/day as compared to >1 million m³/day at conventional system entry points, the impact on the CV of downstream gas is likely to be negligible. As biomethane injection sites are likely to be several orders of magnitude smaller than existing entry points, the analysis supported the view of the EMIB group that the specification for CV determination devices at such sites needn't be as stringent and therefore as expensive as currently required.

Rather than the single additional tier put forward by the EMIB group, the analysis we commissioned considered the implications of wider MPE values, but limited to much smaller sites, given the likely size of biomethane injection sites, as follows:

- ± 1.0 MJ/m³ for sites <100,000m³/day
- ± 0.7 MJ/m³ for sites 100,000 to 250,000 m³/day

We have considered the report and agree that the existing MPE tolerances for CV determination devices at system entry points should be proportionate to the impact they have on flow weighted average CV. The EMIB group report said its recommended relaxation of MPE tolerances could lead to cost savings of £25,000 - £50,000 per CVDD installation.

The prevailing MPE tolerances are not prescribed in the Regulations, but have become custom and practice through Letters of Direction issued by the Authority, according to the Regulations. We therefore do not consider that that the Regulations need amending to give effect to revised technical standards. However, we will have regard to proportionate standards and the recommendations mentioned above as part of any future work on the testing and approving CVDDs.

We also consider that these principles regarding CV determination devices should apply equally to other sources of unconventional gas, such as shale and coal-bed methane.

Yours faithfully

Rob Church
Associate Partner, Retail Markets & Research

⁷ www.gasgovernance.co.uk/emib/report