



**Airtricity Response to
Single Approach to Gas Quality
(Consultation CER/08/101)**

17 July 2008



Introduction

The reality of the gas supply situation, the need to ensure a safe operating regime while addressing the issue of security of supply makes addressing the issue of gas quality an imperative.

Equally ensuring interoperability in an all-island context as CAG aims requires addressing this issue.

However a number of technical, environmental, safety and commercial challenges exist that will need to be addressed.

Observations from the Berr Report

The BGN report and recommendations were largely based on the Advantica report titled “ASSESSMENT OF THE IMPACT OF GAS QUALITY ON THE PERFORMANCE OF DOMESTIC APPLIANCES (A PILOT STUDY)”, commonly referred to as the Berr Report. We wish to make some observations from this report as a backdrop for our responses following on in this document.

1. The population size of appliances used in the report is five (5). While this is rather a small sample size, given the safety nature of the issue under consideration, if a risk is identified in even one appliance in the population due consideration will be required.
2. These appliances are;
 - A gas fire
 - A central heating (standard) boiler
 - A water heater
 - A gas cooker
 - A new condensing boiler with SEDBUK band A rating
3. In testing, only the central heating (standard) boiler showed marked sensitivity to increased WI range gas. The other appliances showed little of no change.
4. CO₂ emission: there are no restrictions on CO₂ emissions from domestic appliances operating under normal conditions.
 - The fire and the cooker showed little or no change in response to both increases in both heat input and WI range gas.
 - The condensing boiler showed an increase in CO₂ emission markedly from WI of about 54 MJ/m³, irrespective of the heat input.
 - The water heater and standard boiler showed the most marked relative increases in CO₂ emissions based on increased heat

input. At higher heat input levels, high WI range gas also resulted in increased CO₂ emissions.

5. CO emission: limits exist on CO emission from domestic appliances operating under normal conditions.

- While all appliances showed increases in CO emissions as the WI was increased, particularly after WI of about 54 MJ/m³, only the standard boiler actually exceeded its CO emissions limit, at WI approaching 56 MJ/m³.

6. NO_x emission: limits exist on NO_x emission from some domestic appliances.

- While there were some increases in NO_x with increase in the WI, none of the appliances exceeded its NO_x emissions limit.

7. Soot: limits exist on soot production from domestic appliances.

- The gas fire and standard boiler produced significant levels of soot.
- The gas fire produced soot across all ranges of the WI, including within the GS(M)R. This is only to be expected from this type of flame.
- The standard boiler produced significant levels of soot for test gas above 55 MJ/m³.
- Of the other appliances, the condensing boiler produced an insignificant amount of soot at WI approaching 55 MJ/m³.
- No other soot production was measured.

Conclusions from the Berr Report

1. Of the 5 classes of appliances only the standard boiler really gives cause for concern.
2. The lower Wobbe Index limit after which some of the tests appear to fail is 54 MJ/m³.

Implications for Gas Quality Specifications

The tests reported in the Berr report may have provided the underlying logic for the UK decision not to *widen* their current gas quality specifications – the GS(M)R. This is indeed the task that was assigned the investigation.

That logic does not necessarily extend to a case arguing for the *narrowing* of gas quality specifications to the GS(M)R limit.

From the observations listed above gas quality deterioration appears to commence from about Wobbe Index 54MJ/m^3 . This incidentally is the EASEE-gas higher limit specification.

Hence extending the test results of the Berr report to a case arguing for the *narrowing* of gas quality specifications actually appears to uphold the EASEE-gas specification.

Some Considerations in Application to Ireland

Two areas that may bear some consideration are;

1. Determining the population size/ratio of the deficient family of appliances, and
2. Determining the technological terminal/sunset date for those appliances.

Consultation Questions & Responses

1. Should the recommendations in the BGN report be adopted?

BGN offers various recommendations arising off the back of the report on gas quality which forms the basis for the CER consultation. These recommendations are posed as questions in section 4.0 of the CER consultation paper and Airtricity will answer in the sequence delineated by these questions.

2. Should the Wobbe Index range in the Code of Operations be narrowed?

Given the safety concern posed to domestic gas appliances in the event of delivery of gas beyond a certain Wobbe Index, it would seem conclusive to narrow the Wobbe Index range in the COP.

However thought should be given to the signalling effect of such a decision. Without having carried out any tests ourselves, it would seem reasonable to assume that the appliance population in the risk category would be the oldest appliances. Anecdotally we understand that newer appliances can tolerate a wider range of gas quality and with the immediate past residential boom in Ireland, appliances may have been purchased from wider afield than the UK (evidence the sales adverts touting 'American' fridges).

If the Wobbe Index range were then narrowed, it could signal to appliance manufacturers that Ireland requires 'customised' appliances which could lead to increases in retail appliance costs (both for products and services) and equally resulting in a 'fulfilling prophecy' whereby we tilt the indigenous appliance population towards the narrow gas range.

If this were the case, it would be short-termism to narrow the Wobbe Index for just there oldest appliances, when the wider range of appliances would tolerate a wider band. This is especially the case where in wider Europe; the range is much wider than in the UK, evidenced by the EASEE-gas specification.

The UK operates a 2-part gas quality specification; the GS(M)R which is specified in law and the indicative specification set by Transco as operator of the UK onshore system. The GS(M)R is a fixed condition while the Transco specification is flexible within the GS(M)R limits and indeed is described anew each year in the Transco's annual Ten Year Statement.

Ireland also operates a dual system of specifications with a general, default specification detailed in the COP and individual specifications agreed with upstream operators at entry points into the system through the Connected Systems Agreements (CSA's).

If the critical determining factor is the lowest common denominator in the appliance population, and if these are the oldest population members, we would recommend that either the current COP specifications be retained or consideration be given towards adopting the EASEE-gas specifications. Practically, and to maintain safe operations, BGN can still use Connected Systems Agreements to operationally limit the quality of gas that enters into its network.

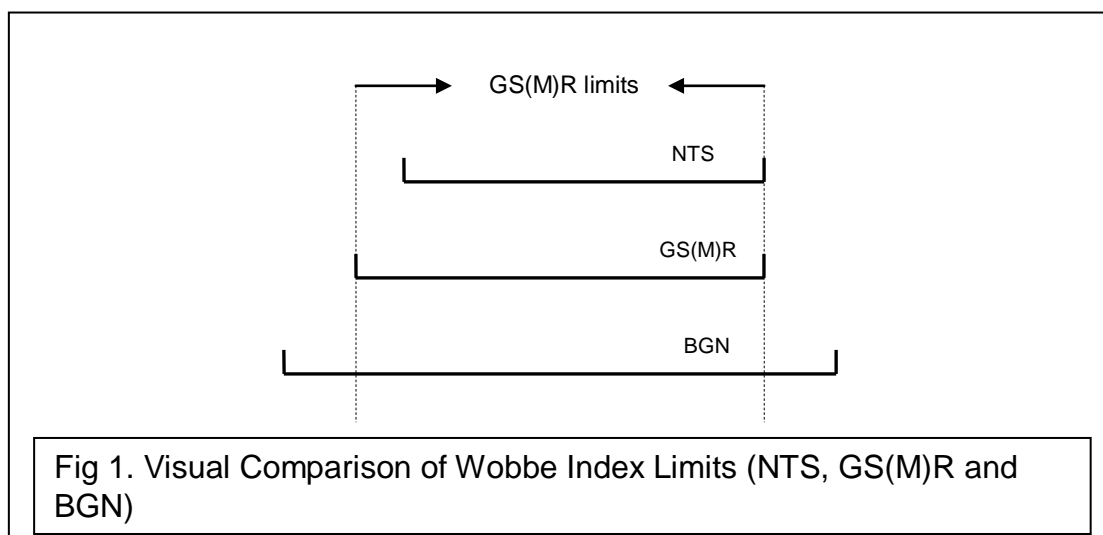
Going forward, it may be more advantageous to ensure that newer installed appliances can tolerate a wider range of gas quality than limiting the feedstock itself.

3. Should the Wobbe Index range in the Code of Operations be brought in line with the GS(M)R range (including the GS(M)R emergency range)?

GS(M)R as a GB gas quality standard aims to ensure safe transportation and utilisation of gas at *domestic* premises. It does not deal with calorific value (CV) or inert content (N₂, CO₂, etc), which have considerable commercial significance.

In addition to GS(M)R, there is the Transporter's (NTS) standard which imposes even stricter restrictions than the GS(M)R and forms the basis of contractual arrangements with shippers. The Wobbe Index is narrower than GS(M)R.

The Wobbe Index range in the Code of Operations is contrasted against the GS(M)R and the NTS ranges in the diagram below:



Our argument in Q2 recommends that such a dual system of gas quality specifications be formalised in Ireland. BGN can publish an annual/bi-annual statement similar to UK Transco's Ten Year Statement that indicates gas specifications for new connections. This annual/bi-annual review will help

keep abreast developments in the domestic gas appliance population, industrial gas needs, development of the gas network, gas safety and security of supply.

4. Would narrowing the range restrict gas supplies?

With the medium- to long-term situation of global gas pointing to increased dependence on LNG imports for countries in the developed world and with increasing evidence of tightness in that market, narrowing the gas quality range *excessively* may pose a risk to supply from sources that fall outside the range, LNG being a very likely candidate.

5. What is the impact on gas-fired generators and how should this be addressed?

Not addressed.

6. Is nitrogen ballasting the most effective method of treatment?

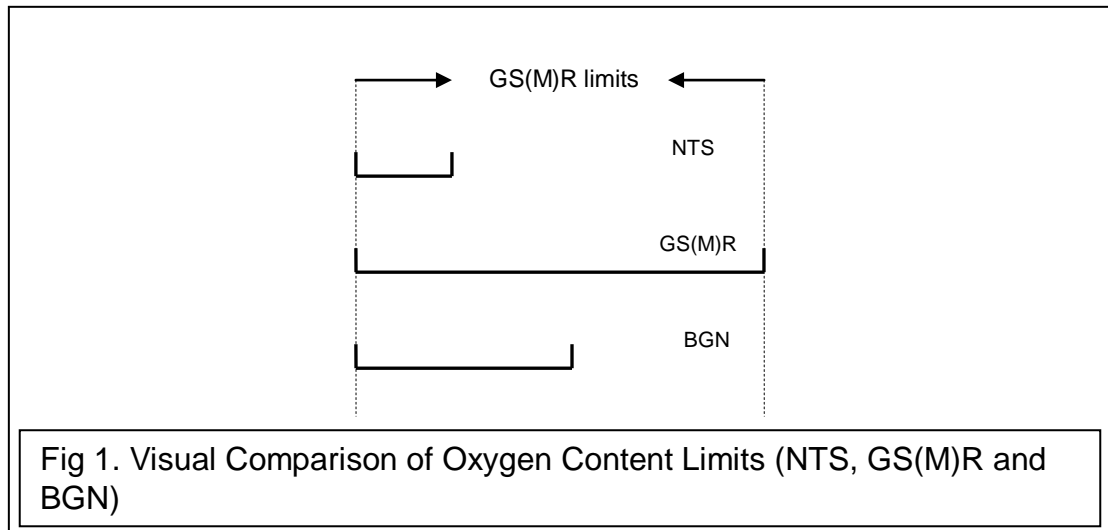
While this is widely used in the industry we feel that nitrogen ballasting has been positioned as the preferred option without adequate analysis of alternatives. As a choice between gas blending and ballasting, we agree that ballasting makes better sense given Ireland's particular resource conditions. But that does not automatically mean Nitrogen Ballasting.

Nitrogen Ballasting requires substantial capital outlay and at the same time is quite expensive to operate. An alternative, air ballasting, requires both lower capital and operating costs. However the reason why it is not recommended in the UK is because of the NTS oxygen limits; ballasting with air could potential push O₂ content of gas over the limits (Air: N₂ – 78%; O₂ – 21%). Since the BGN oxygen content limit is presumably higher than the NTS limit, Air Ballasting should be considered as an option.

Upper Limits of Natural Gas Impurities

Parameter	BGN	GS(M)R	NTS
Oxygen	<= 0,1% (molar)	<= 0,2 % (molar)	10 ppm
Nitrogen	<= 5% (molar)	N/A	<= 5% (molar)

The O₂ content range in the Code of Operations is contrasted against the GS(M)R and the NTS ranges in the diagram below:



Other considerations with regard to Nitrogen Ballasting include;

- Technical – situations where ballasting requirements will exceed the 5% (molar) N₂ limit,
- Environmental – increase in CO₂ emissions as a result of ballasting,
- Commercial – impact on calorific value shrinkage.

7. Should the capital costs of the treatment facilities be funded by the upstream producer and on what basis?

Not if a particular solution is mandated, i.e. Nitrogen Ballasting.

If gas quality specifications are defined with no particular treatment mandated and an upstream operator determines that air ballasting will enable it meet its regulatory requirements then the capital costs of such an investment should then be a part of its commercial considerations.

8. Should the costs and responsibility for the operation of the treatment facility lie with the upstream operator?

Response same as above.

9. Should the BGN recommendations in regards to measurement be implemented?

We are generally in agreement with the BGN recommendations with regards to measurement.