Gas Network Innovation Competition Full Submission

Supplementary Answer Form

Project: __Real-Time Networks_____

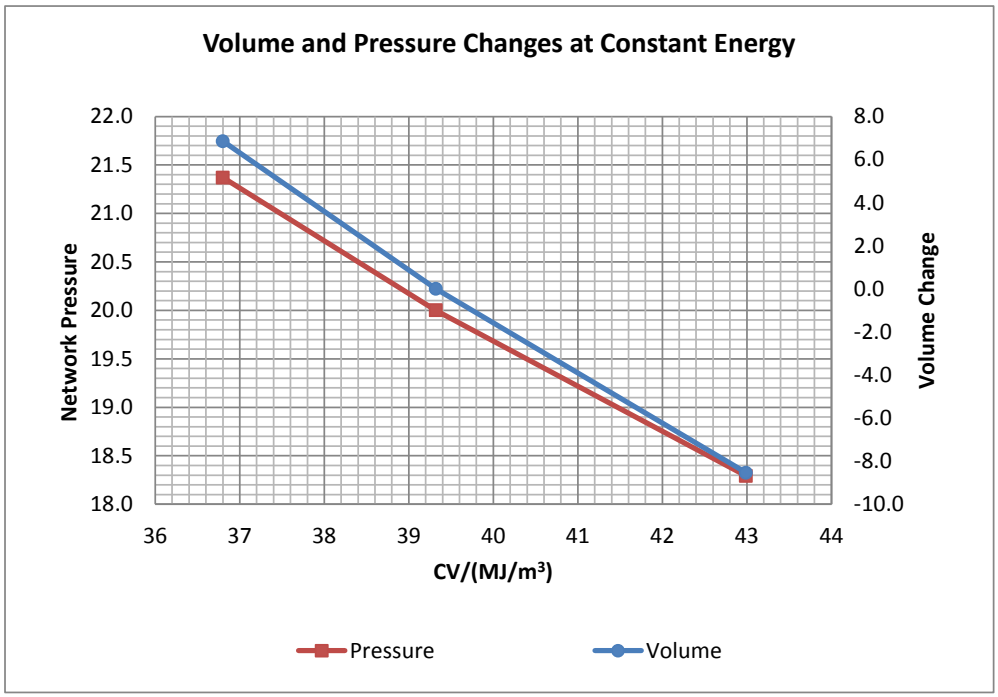
Tick if this answer has been provided verbally: ☐

Project code	SGN_GN_03	Question Number	8
Question date	27/08/15	Answer date	02/09/15
Submission section question relates to	a) Enviro+consumer bens		
Topic			
Question	One of the major benefits claimed is a reduction in Nitrogen Ballasting (worth about £325k per year) at GB level. This will also be a potential benefit of other work e.g. the Oban project. How would you apportion this benefit to what you are doing under this project and why?		
Notes on question			
Answer	The ballasting of LNG with nitrogen is currently required to reduce the Wobbe Index of a gas to within the GS(M)R range; this ensures that the gas will burn safely on gas appliances connected to the GB network. The aim of the Oban project is to demonstrate that unballasted LNG, or any other form of rich and lean Wobbe Index gases, can be conveyed and used safely on appliances. The HSE Exemption granted for Oban allows gases with a Wobbe Index of up to 53.25 MJ/m^3. The output from the Oban project is to devise a roadmap for a GB rollout to change GS(M)R. Oban is an isolated network which is perfect for a well-controlled field trial on a known population of gas consumers and their appliances. The gas within the Oban network comes from a single source and each tank of LNG is likely to be of a consistent gas quality (although gradual changes may occur due to stock weathering, or short-lived fluctuations due to plant operation). If the Oban project is successful and unballasted LNG is found to be safe for GB gas consumers, a natural next step is to look at the impact of unballasted LNG (and other gases) on an integrated network such as Medway (immediately adjacent to the largest GB LNG terminal). The impact		

of gases with high and low Wobbe Index and, by inference, high and low calorific value (CV) on a network can be estimated.

Assuming a constant energy demand, the impact on consumer volumes and network pressures is shown in the table and plot below. The mean CV in GB during 2014 was 39.3 MJ/m^3. A typical domestic energy demand of 48600 MJ per annum has been sourced from British Gas. The high CV gas is typical of unballasted LNG and the low CV gas is typical of unpropanated biomethane.

Property	**Units**	**High**	**Typical**	**Low**
CV	MJ/m^3	43.0	39.3	36.8
Typical domestic energy demand	MJ	48600	48600	48600
Gas Volume	m^3	1130	1236	1320
Deviation from typical volume	%	-8.5	0	6.9
Network pressure	mbar	18	20	21
Deviation from typical pressures	mbar	-2	0	1



Current network models do not account for changes in energy; this was an acceptable approach when gas quality was relatively constant. Modern gas networks are subject to gas quality variations which can be of both short and longer duration.

It is not appropriate to apportion the benefit of reducing nitrogen ballasting between the Oban project and the real-time network project as one follows the other. The Oban project is aiming to establish the principle that unballasted LNG is safe for GB gas consumers. The real-time networks project will investigate the impact of varying gas qualities on network modelling, demand and operation.

Attachments	