FUTURE BILLING METHODOLOGY

UNLOCKING A LOW CARBON GAS FUTURE

CONSULTATION RESPONSE

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Consultation question responses

For each of the questions below, please explain:-

- **why you agree or disagree and;**
- **your views on what, if any, alternative changes you would consider to be appropriate.**

Use as much space as required on the below tables.

1.	**Do you agree that the existing LDZ FWACV methodology presents a barrier to a low carbon gas future and that alternative methodologies should be explored?**			
	Agree	**Yes**		
			Please treat answer as confidential (delete as appropriate)	**No**

Reasoning

Gas is an important, customer focused means of delivering heat because:

- It is ideal for meeting the fluctuating demand of heat; to achieve this through electrification, even with heat pumps would require massive network reinforcement, additional generating capacity, and all with relatively low utilisation if peak demand is to be met
- Much of the UK housing stock is not suited to low temperature heat; whilst insulation will help this, it is not clear that retrofitted heat pumps alone will easily deliver the comfort required and CoP expectations. Whilst new build can be much more suited (providing the commercial drivers are in place), much of our existing housing stock will be with us beyond 2050
- Few customers think about their heating until it breaks down, at which point the requirement is for rapid reinstatement. Invariably the most straightforward solution is replacement of a gas boiler into eth existing wet central heating system. Rarely do customers have the ability not only to understand the options, to replace the primary source of heat, or the delivery of a different grade of heat around the home where existing radiators aren't suitable.
- There may well be a role for hybrid systems to handle peak heat, but this would still require gas delivery

- Economically we have a world class asset in the gas grid; we should seek to exploit that asset rather than invest in significant addition infrastructure if not required.

For gas to play a role the carbon needs to be abated. There are two routes; either the fossil carbon is replaced with biogenic carbon; ie biomethane (from AD or BioSNG) or the carbon is removed completely through delivery of hydrogen.

Given that existing sources of natural gas are a mixture of methane and higher order hydrocarbons, inevitably these low carbon forms of gas ('pure' methane, and hydrogen) have lower CVs. Associated CV and Wobbe reductions can be accommodated to ensure that appliances and network can operate safely and deliver customer performance.

However, at present the billing regime does present a barrier, relying as it does on metering volume rather than energy. The 'Fix' of adding propane to biomethane simply to mimic other sources of gas from a billing perspective has been a pragmatic solution, but as the network moves from single point sources to distributed generation, this needs to be addressed properly. Adding propane:

- Represents an unnecessary cost burden
- Undermines the carbon benefits of the solution, particular in terms of customer perception
- With wider sources of gases being considered, including using higher CV gases via LNG, then the bar is raised and even more propane could be required

Furthermore, hydrogen is increasingly seen as playing a role in future gas. If hydrogen has to be blended with sufficient propane (which is higher carbon intensity than natural gas) to bring the CV up to the grid average, this undermines the entire raison d'etre, magnifying the issues raised above still further.

Therefore, in all future low carbon gas scenarios, addressing the billing issue is critical. The ideal solution would simply be to bill at the customers point of use directly measuring the energy consumed. This is recognised to be unfeasible in cost terms at this stage. Therefore identifying pragmatic solutions is important. This is what we understand that the FBM project is seeking to do.

Without a solution to this issue, there are short term barriers to biomethane injection and fundamental constraints on the use of the gas grid to deliver low carbon heat. If the gas grid cannot deliver low carbon heat, then the UK consumer will face unavoidable disruption and substantial cost to change out their heating system as well as the cost and disruption associated with upgrading the electricity network and substantially increase generation capacity.

Indicative cost impact (if applicable)

As outlined above, the cost implications of not addressing the issue, and therefore not being able to use the gas grid to deliver low carbon heat are not only the short-term costs associated with propane injection, but fundamentally preclude the future use of the gas grid. Therefore, the cost impact relates to the costs of electrification of heat.

Work by various parties have considered this, including KPMG's 2050 Energy Scenarios , July 2016, as summarised in the table below taken from Section 9 of that report. This suggests that a low carbon approach based on gas evolution is between a half and third of an all-electric future, saving between around £150-210billion over the period.

Therefore a good solution to gas billing has the opportunity save substantial costs for the consumer compared with alternatives

	Scenario 1 Evolution of Gas	Scenario 2 Prosumer	Scenario 3 Diversified energy sources	Scenario 4 Electric Future
Costs	**£104bn - £122bn**	**£251bn - £289bn**	**£156bn - £188bn**	**£274bn - £318bn**
Technical Feasibility	— Gas networks already meet peak demand — Hydrogen well understood but conversion yet to be tested at scale — No additional storage needed to cover peak	— Major difficulty in meeting peak heat demand — Large amount of interseasonal heat storage a major barrier — Large electricity back up capacity needed to cover renewable intermittency — Prosumer technologies not yet tested at scale	— Meeting peak is achievable, with additional investment in some areas — Uses available local resources — Some storage needed in some scenarios	— Major difficulty in meeting peak demand — Large amount of interseasonal heat storage a major barrier — Large electricity back up capacity needed to cover renewable intermittency — Overall technology proven and well understood
Customer acceptance	— Functionality and space requirements the same as today — Customers may be reluctant to change	— Very challenging to get consumers to accept different functionality — Space not available for many customers — Affordability will be a major barrier	— Regional differences in functionality — Restrictions on available space and access — Customers may be reluctant to change	— Heat pumps efficient but challenging where space is limited — Challenging to get consumers to accept different functionality — Affordability will be a major barrier
Societal & Political acceptance	— Limited disruption from new gas infrastructure — Acceptance of new CO2 disposal facilities required	— New electricity infrastructure will cause significant disruption — Domestic retrofitting will be a considerable challenge	— Considerable disruption in urban areas from heat network installation — Regional systems untested in UK	— Significant urban disruption as electric infrastructure is reinforced — Domestic retrofitting will be a real challenge

KPMG's 2050 Energy Scenarios , July 2016

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2.	Do you agree that the Future Billing Methodology Project could provide the basis to deliver an economical and sustainable pathway to decarbonising heat for 2030 and 2050?		
Agree	**Yes**		
Please treat answer as confidential (delete as appropriate)			**No**

Reasoning

See response above:

- The Gas network has an important role to play in decarbonisation of heat
- The solutions to reduce the carbon intensity of gas mean that the nature of eth gas does change. However, this can be accommodated from a safety and performance perspective.
- It is not right that this should be hindered simply due to a billing regime developed when gas sources and flows into the network were completely different
- It is important for the billing regime to be updated to match the current needs of the network
- It is important to identifying deliverable solution to billing, recognising that it would not be currently feasible to meter individual users directly by energy
- The FBM project proposes to investigate such solutions and propose a deliverable route forward. This work is necessary, and is an infrastructure issue to the benefit of gas customers. Therefore it is the kind of project which needs to be undertaken under a network innovation programme; there would be no purely commercial driver for a single entity to undertake this kind of work.

Indicative cost impact (if applicable)

See Question 1

It is worth acknowledging that there will be practical and administrative costs associated with any solution to address this billing problem.

However, against the potential savings achieved through decarbonisation of heat via the gas grid compared with solutions without the gas grid, this will be minimal.

However, it is important that this project should identify the practical, most cost-effective solutions to deliver the billing functionality required in the interests of the consumer whilst enabling new forms of gas.

Given the number of stakeholders in the gas supply chain, it should also be noted that change in regime may results in costs being borne in different parts of the chain. That in itself should not be a barrier; what matters is what is the most cost-effective solution for the customer.

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3.	Do you agree that the proposed Measurement and Validation Field Trials could provide an understanding of the modelled zones of influence of LDZ-embedded gas entry points?		
Agree	**Yes**		
Please treat answer as confidential (delete as appropriate)			**No**
Reasoning Gaining practical understanding of flows in a real network is important. Using oxygen as a marker for biomethane seems a practical approach, and avoids any potential regulatory considerations associated with introducing other markers.			
Indicative cost impact (if applicable) N/A			

4.	If your answer to Q2 and or Q3 was "Disagree", what alternative or modified approach would you like to see considered?		
Agree	**Agree**	**Disagree**	
Please treat answer as confidential (delete as appropriate)			**Yes/No**
Response: N/A			
Indicative cost impact (if applicable) N/A			

5.	What factors and impacts would you like to see considered through the Future Billing Methodology Project?	
Please treat answer as confidential (delete as appropriate)		**No**

Ensure that in evaluating the solutions

Strategically

- The impact of potential increases in network Wobbe are considered; these will place an even greater burden on solutions which seek to mimic network gas, rather than measure it.
- Not only biomethane but hydrogen is considered; requiring propane injection for Hydrogen blending is not sensible, so the strategic need is even higher

Practically

- The practical and administrative issues are considered in assessing the solutions

Future

- Are there further solutions which could be adopted in the future? For example, would it be conceivable in the future for gas boilers to provide a mandatory measurement of CV, directly or using inferential devices and use this transmitted 'big data' to further validate network measurement of CV? Modern boilers have the capability of understanding the quality of combustion, gas flow rate etc. Whilst it might be ideal to measure the gas quality directly, the boiler itself could be used as a calorimeter or other inferential techniques could be used; the requirement here is simply to measure CV, and not full gas composition. Whilst the individual data points would be of lower quality, the population sample size would be huge, so the error would be reduced.
- Even if possible, we couldn't transition directory to this approach, so use the FBM strategies are vital building blocks, with the potential for further refining the solution over time. However, it would be valuable if this work was cognisant of such refinements for the future.

6.	**If implemented, how would the suggested changes to the existing LDZ FWACV billing regime benefit your company/organisation, e.g. what savings would the changes bring?**
Please treat answer as confidential (delete as appropriate)	**No**

Reasoning

We focus on bringing to market new solutions and developing low carbon energy projects.

In the gas market, this includes biomethane (particularly bioSNG) and also hydrogen related projects

In the short term, this would reduce the costs associated with propane injection. In the longer term, it is fundamental to being able to adopt hydrogen in the network

Indicative cost impact (if applicable) See discussions above

7.	**Do you envisage any legal or regulatory issues arising if any of the Future Billing Methodology options were to be implemented?**
Please treat answer as confidential (delete as appropriate)	**No**
Reasoning As we understand it, the project is designed to identify solutions requiring the least regulatory impact. This is important.	
Indicative cost impact (if applicable) N/A	

8.	**Do you have any other comments on the Future Billing Methodology Project? (e.g. issues not covered in this document)**
Please treat answer as confidential (delete as appropriate)	**No**
Not beyond included here.	