CNG Fuels Response to CCC Bioenergy Review

Response produced by Philip Fjeld, philip.fjeld@cngfuels.com

I am responding on behalf of CNG Fuels Ltd where I am the Chief Executive Officer and a Director. We develop, own and operate Bio-CNG refuelling stations in the UK. Our customer base is almost exclusively made up of large UK operators of Heavy Goods Vehicles (Waitrose, John Lewis, Asda, Argos etc.). 100% of the fuel dispensed at our stations is RTFO-approved biomethane from a waste feedstock, that has been mass-balanced through the UK gas pipeline grid. We no longer supply fossil gas to our customers.

CNG Fuels believes that bioenergy, and in particular renewable gases, can make a significant contribution to meeting 2050 climate change targets, in particular when initially supporting decarbonisation of the transport sector and other hard-to-decarbonise sectors later on. The transport sector is currently lagging behind the electricity sector. We believe that bioenergy should be focused on where it delivers solutions which cannot readily be serviced in other ways and there are currently very few options to decarbonise Heavy Goods Vehicles (HGVs) in the transport sector.

Analysis, based on the most recent evidence, shows that biomethane used to decarbonise HGVs increases GHG savings by approx. 25% compared to using the biomethane in the heat sector. I have included one slide in the supporting evidence that has been attached to my email. An image of the same slide has been included below.

Increased GHG Savings From Allocating Biomethane to Transport

- For a typical 40 GWh grid-injecting AD plant, using biomethane as a fuel for HGVs would increase GHG savings by 1,734 tons/year compared to using biomethane for heat
- The analysis shown below has been carried out using:
  - A well-to-wheel model for GHG emissions from diesel vs. CNG HGVs that has been developed by Element Energy and that supports the analysis in the following report *"Independent assessment of the benefits of supplying gas for road transport from the Local Transmission System"*
  - Vehicle testing data has been sourced from independent testing carried out by the LowCVP - *"Emissions Testing of Gas-Powered Commercial Vehicles"*
  - Greenhouse gas reporting factors have been obtained from BEIS' *"GHG Conversion Factors – 2017"*

Natural Gas	49.51	MJ/kg
Fossil NG	56.84	gCO2eq/MJ
Diesel (average biofuel blend)	72.47	gCO2eq/MJ
Leyland Biomethane supply (from waste)	11.61	gCO2eq/MJ
Diesel HGV (WTW Average LowCVP testing)	1,202	gCO2eq/km
CNG HGV (WTW Average LowCVP testing)	231	gCO2eq/km
CNG vehicle fuel efficiency (Average LowCVP testing)	2.92	km/kg

1 kg biomethane used for heating			**1 kg biomethane used for HGVs (WTW)**		
CO2eq. Emissions from NG	2,814	gCO2eq	CO2eq. Emissions from Diesel	3,510	gCO2eq
CO2eq. Emissions from Biomethane	575	gCO2eq	CO2eq. Emissions from Biomethane	675	gCO2eq
CO2eq. Savings	2,239	gCO2eq	CO2eq. Savings	2,835	gCO2eq
			Increased GHG savings compared to heat	596	gCO2eq

Conclusion: 1 kg of biomethane from waste-derived feedstock yields increased GHG reduction of 596 gCO2eq from transport vs heating

CNG Fuels is not advocating ending the non-domestic Renewable Heat Incentive (RHI) subsidy for Biomethane-to-Grid (BtG) projects. On the contrary, the RHI has been a great success in building a strong UK BtG sector and should be continued for the foreseeable future. However, the fact remains that biomethane used as a fuel for HGVs does increase GHG savings compared to using biomethane in the heat sector.

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Amendments to the Renewable Transport Fuel Obligation (RTFO) were laid in Parliament on the 15th of January. The amendments are expected to be implemented from April 2018 onwards and remain in place until at least the end of 2032. The amended RTFO effectively more than doubles the renewable fuels blending obligation for UK fuel suppliers and also introduces a "development fuels" sub-target for sustainable advanced fuels for automotive, aviation and road freight.

As shown later in this response and in the supporting evidence document, the majority of motorists' money under the RTFO scheme is spent on importing biofuels or biofuel feedstocks. Supplying renewable gases from waste feedstocks as fuel for HGVs is an immediate, "no-regret" strategy that offers a clear pathway (ready now) for how money that would otherwise end up supporting biofuel suppliers abroad, can be invested in the UK and help grow a bioenergy sector of national importance.

CNG Fuels believes that both the RHI and RTFO should be supported and encouraged as support mechanisms in order to maximise UK production of biomethane and BioSNG. The current structure of the RHI works well for production volumes up to 40 GWh but does not necessarily provide sufficient economic support for volumes above 40 GWh in annual production. The RTFO is a market-based mechanism that does not have a price floor, which makes it challenging for producers to secure long-term finance on the back of Renewable Transport Fuel Certificates (RTFCs). However, for expansion volume above 40 GWh, utilising the RTFO scheme is an attractive option and there is significant interest within the UK BtG industry for supplying biomethane to the transport sector.

The concern of technology lock-in by directing a valuable and limited resource such as sustainable biomethane or BioSNG as fuel towards the heavy goods vehicle sector is an unfounded concern. High-mileage HGVs are typically kept for 5-7 years, before being sold at auction or scrapped. This means 2-3 vehicle replacement cycles will fit into the 15-year period of the amended RTFO. During this period many GWh of additional biomethane and BioSNG capacity can be built in the UK, on top of what can be funded by the RHI subsidy. In the event the RTFO is ended post 2032, then biomethane and BioSNG capacity of national importance will have been built and funded by RTFO payments, at no cost to Treasury. This capacity could then become immediately available for other hard-to-decarbonise UK sectors.

In summary, CNG Fuels advocates taking a holistic view when trying to maximise development of UK biomethane and BioSNG production capacity. Isolated "silo thinking" of heat vs. transport should be discouraged and a pragmatic stance should be adopted where it is recognised that significantly more renewable gases production capacity will be developed, at a much lower cost to Treasury and the economy, by supporting renewable gases for both transport and heat.

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As requested, in our detailed response below we have answered only those questions in which CNG Fuels has knowledge or expertise.

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12. What are the most credible and up-to-date estimates for global bioenergy resource potential through to 2050, broken down by feedstock type? What key assumptions underpin these estimates?

Please provide details of any assessments of global bioenergy resource explicitly tied to sustainability standards (covering GHG emissions, biodiversity, water use, land-use, land-rights, air-quality and other social and environmental issues)

CNG Fuels: *We refer to the replies provided by Cadent and Advanced Plasma Power (APP)*

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14. What are the most credible and up-to-date estimates for the amount of bioenergy resource that could be produced from UK waste sources through to 2050? Where possible please state any assumptions relating the reduction, reuse and recycling of different future waste streams.

CNG Fuels: *We refer to the replies provided by Cadent and Advanced Plasma Power (APP)*

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18. What are the main opportunities to scale-up the supply of sustainably-produced domestic bioenergy supply in the UK? Where possible please provide details on the scale of opportunity.

CNG Fuels: *As outlined in our introduction we are convinced that UK biomethane and BioSNG production capacity will be significantly higher by 2030 in the event both the RHI and RTFO are used as support mechanisms for renewable gas production capacity.*

The RHI mechanism is funded by Treasury, while the RTFO is funded by motorists. It is highly likely that the RTFO will be extended until 2032 and Government estimates (please see supporting evidence) that the vast majority of motorists' funds will be spent on importing biofuel feedstocks and biofuels. This is a waste of an excellent opportunity to fund UK renewable gas production capacity instead. Funds from motorists will be collected in any case and it is a huge missed opportunity that potentially as much as 80% of these funds (more than £8 billion over a 15-year period) will be spent on importing biofuel feedstocks or biofuels.

Steering funds from the RTFO towards UK renewable gases production is a "no-regret" opportunity that is available today, which does not require any policy intervention, other than making sure uptake of dedicated gas HGVs is supported. Renewable gas for HGVs should be seen as a bridging fuel for HGVs from the

current reliance on imported diesel to a point in time in the future (likely at least 15-20 years away) when HGVs can be electrified on a broad scale.

CNG Fuels is in dialogue with more than 10 UK biomethane producers who are looking to supply sustainable biomethane, from a waste feedstock, under the RTFO and we expect to see a growing supply as soon as the RTFO amendments have passed Parliament. We are currently aware of approx. 400-500 GWh of additional biomethane capacity, on top of RHI-supported volume, that would become operational as a result of the RTFO scheme. Based on ongoing discussions, we would expect this volume to increase significantly over the coming years.

CNG Services, one of CNG Fuels' shareholders, has been involved in the development of approx. 80% of UK BtG projects. This gives CNG Services the ability to "take the pulse" of the UK BtG industry. In addition to our own intelligence gathering, we are hearing from CNG Services that expansion plans are now being developed by numerous producers as a result of the opportunity to supply to transport under the RTFO.

The amended RTFO introduces a "development fuels" sub-target for sustainable advanced fuels for automotive, aviation and road freight. BioSNG (bio-substitute natural gas from gasification or pyrolysis) is classified as a development fuel and there is great UK potential to develop a BioSNG industry. I refer to consultation responses from Cadent and Advanced Plasma Power for comments on the overall sustainable gas production potential. However, we understand that commercial scale BioSNG would produce so much gas that the RHI tiering system is unsuited as a support mechanism. However, the RTFO in combination with the RHI subsidy is expected to provide ample financial support to encourage BioSNG projects on a commercial scale to become established.

The graph below shows the dispensed volume of RTFO-approved biomethane from a waste feedstock, at our Bio CNG stations since Jan 2017. Please note that we no longer dispense fossil gas to our customers. The graph below shows kg of biomethane, in GWh terms we dispensed close to 5 GWh of biomethane in January 2018. We expected to see continued exponential growth.

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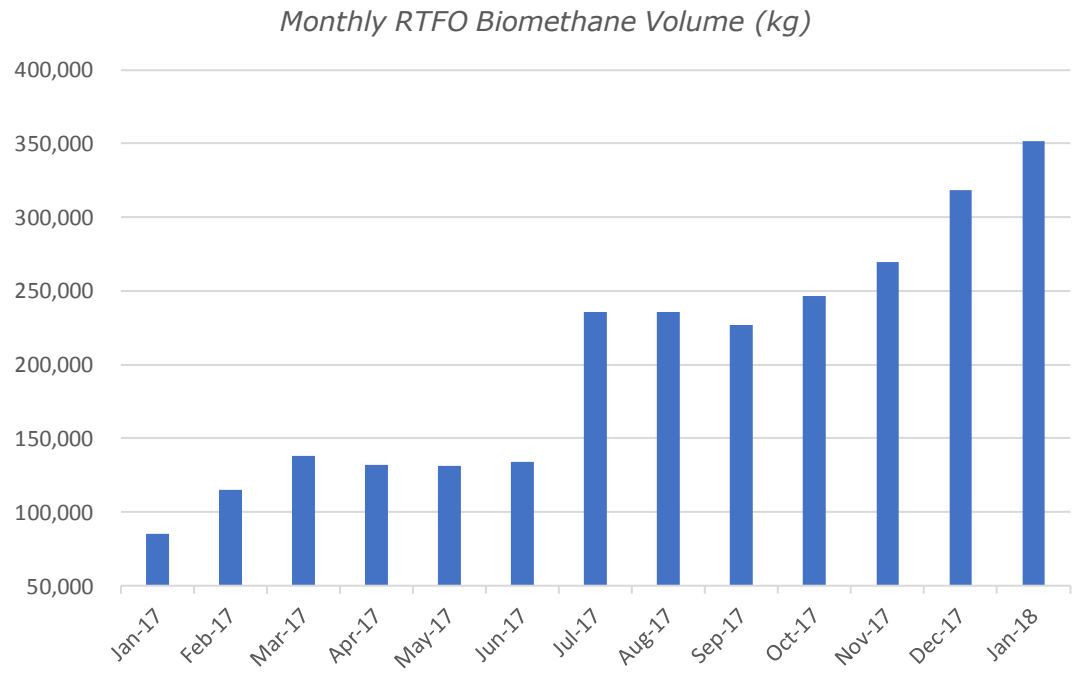

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20. What 'low-regrets' measures should be taken now (e.g. planting strategies) to increase sustainably-produced domestic bioenergy supply?

CNG Fuels: *As mentioned under question 18, making sure that funding provided by UK motorists is spent on UK sourced biofuel feedstocks and biofuels is an opportunity that should not be wasted. The amended RTFO provides ample support for an extensive development of UK production capacity for sustainable and renewable gas production. This is a "no-regret" opportunity that should be seized as it will ensure significantly more production capacity is developed, than if the RHI subsidy is the only support mechanism. Renewable gas as a fuel for transport is likely to be a bridging fuel, which means the production capacity developed under the RTFO will become available (post 2035?) for hard-to-decarbonise sectors such as industrial production etc. However, in the period prior to 2035 HGVs would be decarbonised and greater GHG savings are achieved than if the renewable gas capacity is utilised to decarbonise heat.*

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22. What policy measures should be considered by Government to help scale-up domestic supply?

CNG Fuels: *The supply of sustainable and renewable gas under the RTFO is only possible if dedicated gas HGVs are adopted on a larger scale than today. Dedicated gas HGVs typically cost £20-30,000 more to purchase than equivalent diesel HGVs. A fuel duty differential has been in place since 2013. It is critical that this fuel duty differential is extended beyond the end of 2023. We are experiencing an exceptional increase in renewable gas interest among large fleets. ALL our new customers demand renewable gas and this "demand pull" is*

a terrific opportunity to ensure growth of UK renewable gas production under the RTFO.

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23. Gasification has been identified as a potentially important technology for unlocking the full potential of bioenergy to support economy-wide decarbonisation.

a. What are the likely timescales for commercial deployment of gasification technologies?

b. What efficiencies and costs are likely to be achieved? What scope is there for improvement and/or cost reductions over time? Please differentiate between feedstocks where possible/necessary.

c. What are the main barriers and uncertainties associated with the development, deployment and use of gasification technologies?

d. What risks are associated with gasification technologies and how can these be managed?

e. What policies and incentives are required to facilitate commercial deployment?

CNG Fuels: *We are responding to 23 e. We also refer to answers provided by Cadent and Advanced Plasma Power.*

As mentioned above, commercial scale BioSNG plants produce so much gas that the RHI currently does not provide the support required to successfully develop a plant. However, in combination with the RTFO, there is ample support available to ensure commercial-scale BioSNG plants can be developed over the coming years. This does require market demand for the BioSNG in the transport sector and as mentioned in our response to question number 22, a fuel duty differential is critical to ensure a growing number of dedicated gas HGVs in the transport sector

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35 Please submit any further evidence that you would like us to consider.

CNG Fuels: *Below we have included a high-level analysis of the percentage and cost of biofuel feedstocks and biofuels supplied under the RTFO. We have not got access to the supporting analysis and assumptions used by the DfT, so some of our assumptions might be wrong, which again could have an effect on the accuracy of our assumptions and analysis.*

That said, what is clear from historical data is that the majority of funds paid by motorists under the RTFO is spent on non-UK biofuel feedstocks and biofuels. It is also evident that the DfT expects the non-UK percentage to increase once the amended RTFO has been implemented. We would like to stress again that this is an unfortunate situation and all possible measures should be taken to ensure that the majority of RTFO funds are spent in the UK.

The RTFO came into force in 2008 as a market-based mechanism that is funded by UK motorists and not by Government. According to DfT RTFO statistics, on average 25% of sustainable biofuels were sourced from UK feedstocks during the 5-year period from 2012/2013 – 2016/2017, meaning 75% of sustainable feedstocks were sourced from abroad in the same period.

For the last two RTFO periods (periods 8 and 9) an average of 2.45 billion Renewable Transport Fuel Certificates (RTFCs) have been issued each year. The price of an RTFC is volatile and can be hard to track due to limited trading. However, based on market intelligence gathered by CNG Fuels, it seems prudent to assume that the average minimum price of an RTFC for periods 8 and 9 has been 18 pence/RTFC. This means the annual value of 2.45 billion RTFCs is approx. £440 million, which is an indication of the annual sourcing cost of sustainable biofuel supplied in the UK.

With 25% of biofuel feedstock sourced from the UK, this indicates that 25% of £440 million, or £110 million, has benefitted domestic feedstock suppliers with approx. £330 million per annum being paid to non-UK biofuel feedstock suppliers.

In the Government's response to the consultation on RTFO amendments, Annex A, Cost Benefit Analysis, page 13, a central scenario is presented that assumes less than 15% of additional sustainable biofuel feedstocks required for the increase in blending obligation, are UK sourced, with more than 85% being sourced from abroad. The Present Value (PV) of the resource cost for the central biofuel supply estimate shows a PV of £4.276 billion (2018 – 2033) in resource cost in addition to baseline RTFO costs.

This means it is estimated that 15% x £4.276 billion = £641 million will be spent on UK sourced biofuel feedstocks in the 2018 – 2033 timeframe, while £3.634 billion is paid to non-UK biofuel suppliers. This is in addition to existing total baseline annual resource cost of approx. £440 million, where 25% was spent in the UK, meaning £330 million a year is already spent on importing biofuels or biofuel feedstock.

By adding £330 million/yr in baseline non-UK biofuel costs to the 2018 – 2033 period mentioned above, total estimated amount spent on non-UK biofuels or biofuel feedstocks for the 2018 – 2033 timeframe is (15 x £330 million) + £3.634 billion = £8.584 billion.

In summary UK motorists are expected to spend more than 8 billion for non-UK biofuel feedstocks or biofuels during the 2018 – 2033 timeframe.

CNG Fuels believes that using more than £8 billion on importing biofuel feedstocks is a very unfortunate situation and is a huge missed opportunity. There are existing UK sources of waste feedstocks that could benefit from immediate additional investment and by sending more than £8 billion abroad, the UK bioeconomy is losing out and climate change targets are suffering unnecessarily.

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The RTFO is an existing, well-functioning policy that is currently being extended for another 15 years and supplying renewable gases from waste feedstocks as fuel for heavy goods vehicles under the RTFO is an immediate, "no-regret" strategy that offers a clear pathway (ready now) for how money that would otherwise end up supporting biofuel suppliers abroad, can be invested in the UK.

Due to the structure of the RTFO, only "double counting" feedstocks from waste would be used to produce biomethane or BioSNG. "Single counting" feedstocks from crops are uneconomic to produce under the RTFO as the value of RTFCs generated per kg of renewable gas is too low.

The Renewable Heat Incentive (RHI) in its current structure runs out in 2021. There is more than adequate funding available from the RTFO to ensure a strong UK renewable gases sector well beyond 2021, independently of what happens to the RHI post 2021.