# REA Response – Transport Decarbonisation Plan: Call for Ideas

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## Key contacts

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## Consultation questions

### Q: What is the approximate total number of employees in your organisation?

*Response*: 45

### Q: What best describes your organisation?

*Response*: The Association for Renewable Energy and Clean Technology (known as REA) is the UK's largest trade association for the renewable energy and clean technology industry, representing around 550 members operating across the decarbonisation of heat, power, transport and natural capital. The REA represents fourteen technology groups, including (particularly for the purpose of this consultation) renewable transport fuels and electric vehicle charging infrastructure.

## Introductory comments to our response

The decarbonisation of transport is a significant challenge. It has become the highest carbon emitting sector of the economy. It encompasses some of the most difficult activities to decarbonise, such as aviation, heavy road freight and maritime. The technical and investment challenges in getting from here to net zero carbon emissions require disruptive thinking and a coordinated response from government, society, industry and the investment community.

The REA, as the voice representing the renewable power, electric vehicle charging infrastructure, and renewable transport fuels industries believes that this endeavour is a major economic opportunity for the UK. In proceeding, a multi-technology approach will be critical.

As outlined in the Road to Zero Strategy (2018) and in subsequent statements, the REA is supportive of the Government's thrust for the electrification of light vehicles, particularly cars and vans. We believe that by 2032 the government should phase out the sale of all new petrol and diesel cars and vans, excluding REEVs. Sustainable renewable fuels such as biomethane, biodiesel, bioethanol and biopropane are available today and there is a huge opportunity to unlock further potential in their

further development and use as road transport decarbonisation tools in the short and medium term. We also believe that electrification, hydrogen and renewable transport fuels have a key role in sectors including rail, buses and coaches, and heavy goods vehicles, as we transition towards net zero transport.

The REA passionately believes that the decarbonisation of transport cannot be seen in isolation. The decarbonisation of the power sector has been a major success story and has shown the UK's leadership and commitment to the climate change agenda internationally. The current Government focus on transport decarbonisation is welcomed, but cannot undermine momentum now in place in the power sector. Electrified cars and vans need a decarbonised power sector and a smart, flexible power system make a major impact in the UK's overall greenhouse gas emissions.

Today's sustainable renewable liquid fuels are likely to have an enduring role to play as they progressively deliver lifecycle GHG reductions in road through to aviation. To that end, we think the CCC's view on the availability of biomass should be revisited. There are a range of academic studies that indicate availability may be much higher than that modelled by CCC. In any event, concern over availability should not be a reason to constrain the role that biomass based liquid and gaseous fuels can play, as renewable fuels of non-biological origin can step in and fill the gap (albeit at a higher cost).

In addition to electrification of different market segments (or aspects of), we believe that key options that the UK Government should consider include:

- biomethane and biopropane for heavy duty vehicles, either spark ignition engines, compression engines or in generators to charge the batteries of range extended electric vehicles.
- renewable liquid and gaseous fuels for shipping
- increased use of renewable diesel (ie biodiesel and HVO) in rail
- A move to higher blends (including B20) to replace fossil diesel in diesel buses, coaches and HDVs
- Hydrogen across various transport types
- Support for refuelling infrastructure across transport fuels, gasses and hydrogen

There are many actions, such as those set out in the IMechE Transport Hierarchy that should also be pursued as a priority, but actions on fuels must be taken in parallel. Their importance goes beyond the near-term carbon savings that they can bring.

Government's role is to work with investors and the existing and emerging industry to deliver truly sustainable transport energy solutions.

**Q: What do you think government should be doing to reduce the greenhouse gases that are produced from:**

***Cars:***

There are 32.6 million cars on the UK roads, of which >1% (279,000) are electric vehicles. Whilst EV deployment is increasing rapidly with 9.5% of new car sales being battery electric or plug-in hybrid in the month of June 2020, a significant number of petrol and diesel cars will remain in the UK vehicle parc for decades to come.

Alongside increasing the proportion of biofuels in road transport fuels, the REA strongly supports the Government's funding and tax support to develop the market for electric vehicles and charging infrastructure to date and support must also be provided for biomethane and hydrogen refuelling infrastructure. The role of hydrogen fuel cars also needs to be strongly considered. The UK Government has an opportunity to accelerate this shift through policies like bringing forward the ban on the sale of new petrol and diesel cars and vans. Doing so would put the UK in a stronger position as a future global leader in these technologies.

There are a number of actions that can and should be implemented immediately, to bring down emissions from the current car parc. The Government's focus on electrification of this market segment is welcome, but must not side-track Government from acting on the following:

- Introduce E10 in April 2021, or failing that, in September 2021. Given the length of time its implementation has already been delayed, any later would be totally unacceptable . Higher blends of bioethanol will have a role to play, beyond this. Once the compatibility of the car parc permits it, E85 could replace the 98RON E5 protection grade.

- Increase the basic target of the RTFO in 2021 to a level which will absorb the additional bioethanol from the introduction of E10 plus the anticipated growth in biomethane and other renewable fuels. Thereafter the basic target should be increased each year, in order to provide a market pull for the various measures set out in under the headings below (i.e. driving up the renewable fuel content of standard petrol and diesel grades, growth in renewable gaseous fuels, greater adoption of B20, B30 and B100 in dedicated fleet, the introduction of biodiesel in trains and the replacement of fossil diesel and petrol with drop in fuels).

- For those renewable fuels that are blended into petrol and diesel, the highest blends possible should be mandated for the existing vehicle parc, and the ultimate long term aim net zero aim should be that all ICEs eventually run on 100% renewable fuel. DfT should work with OEMs to

determine the extent that biofuels could be included in standard grade fuels, in order to keep the momentum moving forward. The next step after E10 would be to work towards making B10 the standard diesel offered in UK filling stations. The Fuel Quality Directive does permit member states to offer higher biodiesel contents than B7, if they ensure appropriate information is provided to consumers. ACEA publishes a list of vehicles that are compatible with B10[1].

- Do not include range extended electric vehicles (REEVs - also referred to as series hybrids) in the ban of sale of new ICE vehicles. Instead recognise that these vehicles when run entirely on sustainable renewable fuel, have a future in a net zero world. At present there may be few of these on the market, but banning them would send a message to OEMs that would discourage any further innovation in this sector of vehicles. This combination (REEV) with high blend biofuel would deliver extremely low $CO_2$ emissions.

- The Government should continue to support the work of the Faraday Institution (and other organisations), and keep aligned with the work by the EU Battery Alliance, on the topic of well-to-wheel electric vehicle sustainability. The REA welcomes the development of BSI PAS standards 7060 and 7062[2] to provide further support to the automotive sector to ensure the sustainable production, use, and recycling of batteries. Managing a sustainable supply chain in electric vehicles is critical to maintaining public confidence in the technology.

- Ensure that all power supplied to public charge points is renewable.

- For EVs to become widespread, then there must be an increase in renewable generating capacity to ensure that the carbon intensity (CI) of grid electricity does not start to increase. It is worth noting that there are very tight specifications for ensuring that hydrogen produced for transport (and rewarded via the RTFO) does not result in increasing the CI of the grid. In short, the only practical way of producing qualifying hydrogen for the RTFO is to have it directly connected to a newly built wind (or solar) farm. This is to ensure that even on a minute to minute marginal timeframe, there is no reduction in renewable electricity feeding into the grid. A more joined up approach like this for EVs would assuage concerns over well to tank emissions.

- Introduce measures to incentivise all forms of hybrids to be driven in electric mode, and penalise the use of the ICE (particularly in urban areas).

- Treasury should continue to develop its thinking about how it will replace lost income from fuel duty in the transition to electrification.

[1] https://www.acea.be/uploads/publications/ACEA_B10_compatibility.pdf
[2] https://www.bsigroup.com/en-GB/about-bsi/media-centre/press-releases/2020/july/public-consultation-open-for-the-faraday-battery-challenge-standards/

- The Government should also harmonise its approach in regard the application of VAT to low-carbon fuels. VAT levied on the sale of biofuel and bio- diesel is currently at 20%, and should be reduced to 5% to support greater market-led deployment. Electricity sold at public charge points has VAT applied at 20% and should be reduced to 5% to align with the rate charged for those who charge at home. Smart home energy technologies such as solar and battery storage, particularly when their deployment is supporting the decarbonisation of transport in homes and businesses, should also have VAT applied at 5%.

- There are significant sustainability requirements in place for renewable fuels. While the issues are different, in that their environmental impact is front-loaded relative to the ICE cars, the embodied energy requirements and environmental impacts of sourcing the components for batteries need to be considered for Electric Vehicles.

- Although not within the remit of the Association, the Government should in parallel consider non-fuel or electrification means of reducing carbon emissions from transport, such as demand reduction through modal shift.

**EV Charging Infrastructure**

Regarding the deployment of EV charging infrastructure at a range of scales and locations, the REA believes the following should be actioned by Government:

*Home Charging*

- Lack of clarity around the definition of 'smart charging,' which is incentivising the deployment of low-cost, low-quality and 'NON-SMART' infrastructure.
- Lack of development of transparent and deep flexibility markets behind the meter.
- Slow uptake of domestic battery storage, and a significantly reduced uptake of solar PV (and other forms of microgeneration) following the introduction of the Smart Export Guarantee.
- Lack of clarity around future Government plans around building regulations.
- Lack of enforcement of poor quality installation practices.
- Constrained existing and new local electricity distribution networks.
- Slow processes and a lack of harmonisation between DNOs around securing Maximum Demand Assessments on properties and associated approvals.
- A lack of visibility of where (and speeds of) chargers are being deployed.
- A skills shortage of qualified electricians. The outputs of a survey of installers conducted in September 2020 by the Electrical Contractors Association and REA will be released the week of 7th September, which will provide further evidence on this.
- The EV Homecharge Scheme should be reviewed in light of the trend towards greater leasing

(rather than upfront purchase) of assets.

*On-Street Charging & local authorities*

- Slow progress in normalising the 'Milton Keynes Promise' (aka the Right to Plug), in which a Local Authority commits to providing residents who want an onstreet charge point with one in their area (details of which can be found in the REA's local authority report here).
- Overall, fiscally constrained local authorities with a lack of clarity of who in the organisation 'owns' charge point delivery and maintenance. Slow progress on the normalisation of tenders / concessions for deployment of infrastructure on local authority land.

*Workplace Charging*

- The workplace charging scheme grant, although welcome and a streamlined process, is only available to companies with the capex to purchase chargers outright and pay for the installation and make-ready costs up front. WCS is not available to companies who want or have to minimise capex exposure by leasing charging infrastructure bundled with infrastructure costs.
- Local-authority controlled planning regimes vary across the country, meaning that in some commercial premises there are no barriers to installing charging infrastructure and in others such as Edinburgh, a rapid charger must be installed at locations with more than 10 parking spaces, creating uncertainty for developers.

*Depot Charging*

- Significant grid upgrade costs facing operators and often high grid access and usage chargers.
- The value of co-located 'flexibility' assets not fully recognised by local grid operators.

*Public charging & rapid charging*

- Prohibitive costs for electricity network upgrades particularly when developing rapid charging hubs.
- Slow processes and a lack of harmonisation across DNO's connections processes.
- Land rights are an increasingly significant problem, with issues such as 99 year substation leases and securing wayleaves becoming barriers to developers.
- A lack of interoperability and roaming, making for infrastructure that is not able to be upgraded and a confusing experience for consumers who are functionally required to hold multiple payment accounts to move around.
- Significant volume of legacy infrastructure which is not well maintained which impacts the overall reputation of the public charging sector.
- Functional monopoly for provision of rapid charging services across English motorways.

**Buses and Coaches:**

For the existing petrol and diesel bus parc, Government should increase the basic RTFO target level, as described earlier, in order to encourage:

- the uptake of higher biodiesel blends in place of B7 diesel in the existing fleet of diesel buses
- the blending of drop in fuel to replace fossil diesel where fleet operators are not able to accommodate more biodiesel. (Such drop ins would be expected to comprise HVO, renewable paraffinic diesel or e-fuels)
- the uptake of biomethane-fuelled buses, (and in the longer run busses run on renewable hydrogen.)

There is a key role for electrification to play in the bus market segment. Electric buses have the greatest uptake in UK local authority areas where pollution or ultra-low emissions zones have been introduced, with the BYD and Alexander Dennis models being particularly popular. Prices for these urban and suburban buses are expected to fall particularly with the entrance of new market players such as Arrival, who are manufacturing their products in the UK.

The REA notes discussions with Local Authorities who are also considering hydrogen and biomethane-powered buses, particularly in hilly cities such as Glasgow. All these technologies will have a key role to play, and it is too soon to be able to estimate the % market penetration of either by 2030 or 2040.

*Coaches*

The coach market poses particularly challenges for decarbonisation, particularly relating to the range and international journeys that coaches endure. Electrification of this segment has seen less progress in comparison to cars - whereas around 8% of new bus sales are of EVs, there is only one demonstration electric coach.

Higher blends of biodiesel (up to B100) should be encouraged in order to decarbonise the current diesel coach parc. Where warranty issues prevent more biodiesel blending, and these cannot be overcome, higher renewable content can be achieved by replacing the fossil component of the fuel with drop in renewable fuels.

Coaches are split between those used for city centre express services, those for specialist holiday use and older vehicles that are used for school runs and lesser tourist applications. In terms of technology transfer in to the coach sector, it is generally the higher weight rigid truck technology that finds its way into the coach market and this should be borne in mind as DFT supports transition technologies in the rigid truck market.

There will likely be a clearer role for hydrogen in the coach market than in the bus market due to the longer ranges of the vehicles. However, there will be an electric element and numerous groups, including fuel forecourts and the Government's Project Rapid (investigating requirements for rapid EV charging along the English A roads and strategic road network) and electricity networks are incorporating electric coach and HGVs into their thinking as they plan future refuelling and electricity network upgrades. A key barrier will be whether ultra-rapid charging infrastructure bespoke for this and the heavy goods vehicle segments can be deployed in time for expected uptake, the provision of which is a more significant barrier for electric coach deployment than for electric cars or vans.

Government need to encourage replacement of diesel in diesel vehicles on the road with biodiesel high blends and HVO. Support for biomethane and hydrogen refuelling infrastructure is also essential.

## Vans and Lorries

For vans up to 3.5 tonnes GVW, please see the answer for cars. The REA acknowledges that the deployment of electric vans is behind that of cars but believes that electrification will have a significant role to play in this segment. Electric van manufacturers, including LEVC, and Arrival have recently released new models and further editions are expected by Daimler, Nissan and others in the coming years.

In reference to the suggestions on incentivising the electric mile, this could be applied to commercial vehicles in the first instance provided an adequate system was introduced.

For larger vans and trucks up to 7.5 tons (including specialist vehicles such as ambulances), many of the suggestions made in the bus section are applicable. I.e. fleet operators should be encouraged to transition to higher blend biofuels. DfT should encourage OEMs to warranty for high blend biofuel use and encourage fleet operators to use this fuel, through education initiatives to this effect. For new vehicles both REEV and electric only platforms are options. Given that Internet shopping has resulted in a large growth of this category, then transition to these options should be encouraged in order to mitigate the vehicle mileage growth of this category.

## Rigid Trucks from 7.5te to 16te GVW

There are electric versions of trucks in this vehicle category that are starting to appear on the market. Payloads range from 2Te (7.5te GVW) to 9 te (16te GVW) but adding additional batteries could reduce payloads by 1 to 2 tonnes. Therefore, in addition REEV and hydrogen technologies should be encouraged in this category where the on-board generator would use high blend biofuels to minimise the carbon footprint during any use of the on-board generator. These vehicles could utilise GPS ring fencing to enable electric only mode in towns and cities. If OEM manufacturers could be persuaded

to warrant high blend biofuel usage this could also provide an interim lower carbon solution for the next 10 years. It should be noted that there are around 170,000 trucks on the UK roads in this category.

## Heavier Goods Vehicles

There are around 500,000 trucks on the roads, of which <1% new truck sales are EVs. There are <50 BEV/REEV trucks on the road, and as yet no hydrogen fuel cell trucks. The heavier duty the vehicle, the more there will be a trade off with haulage size and the weight and size of batteries. That said, there have been some high-profile electric heavy goods vehicles come to market over the past two years. For this segment, the REA believes that renewable transport fuels will have a crucial role to play, supported in the longer term by electrification.

The following are all options

- higher biofuel blends of diesel should be promoted for existing fleets B20, B30 and B100
- where fleets cannot increase the biodiesel content, drop in renewable fuels can further boost the renewable content and help decarbonise the fuel further.
- The introduction of biomethane-fuelled trucks, (and in the longer run trucks run on renewable hydrogen). Biomethane can achieve large GHG savings, and in some cases it can deliver a negative carbon footprint, for example when utilising waste feedstocks (e.g. manures and biowastes) and when coupled with technologies such as Bio-CCUS.

The Government should increase the basic RTFO target level, as described earlier, in order to encourage greater uptake of renewable fuels, and the fuel duty differential for gas should remain in place until 2032.

To support electrification of aspects of this segment, the Government should ensure that it's Project Rapid modelling work incorporates coach and heavy goods vehicle deployment. Network planning should envision some electrification of this segment and distribution electricity networks should be reinforced in anticipation.

Multi-modal transport hubs, which incorporate distribution services alongside hydrogen and biomethane fuelling stations with high-power charging infrastructure should be deployed strategically, with the identification of sites led by Government.

## Rigid Trucks from 16te

These vehicles predominantly are used for regional distribution covering up to 350 miles per day. Range restrictions and payload impacts make full electrification challenging, and a multi-technology approach should be progressed.

DfT could develop a LEFT 2 programme to encourage the development and testing of REEV technologies where the on-board generator would use high blend / drop in biofuels to minimise the carbon emissions from the on-board generator. These vehicles should utilise GPS ring fencing to enable electric only mode in towns and cities.

## Articulated Trucks up to 44te GVW

Full electrification of this segment will be challenging for the same reasons presented to Rigid Trucks above 16te. Hydrogen fuel cell, battery electric, range extended electric, and renewable gas-fuelled vehicles should all be advanced so that end customers are able to have multiple options available depending on the driving patterns and use cases required.

Akin for other vehicle segments, biofuels should be used to decarbonise the existing vehicle parc. The most environmentally friendly solution for articulated lorries is drop in or high blend renewable fuels (e.g. biodiesel, HVO, biomethane) and uptake of high blend biofuels and gaseous fuels should be encouraged in order to give steady decarbonisation of HGVs. When run on totally renewable fuel, these vehicles will deliver the necessary carbon emissions reductions.

## Passenger Rail

In the near term, Government should promote biodiesel and drop in renewable fuel equivalents while the REA is also supportive of the promotion of electrification of the rail network wherever possible. Onsite renewable generation, including from solar integrated into train tracks, should be considered. Government should incentivise the application of hydrogen where electrification is not possible, enabled by innovation funding.

Regarding electrification of the rail networks, one of our members has been involved in a number of studies in the UK on connecting renewables to the traction side of the rail network. This has very great opportunity effectively as a large private wire for the connection of new generation assets using a range of renewable technologies. Challenges and solutions include:

1. Exploration of the UK potential, and aiming to deliver on that potential via a national strategy would become material in local planning terms.

2. Significant technical issues in connection to the rail network when demand changes so rapidly it can resemble fault conditions, which needs further research and technical solutions and

3. Procurement of power is focused on short term power supplied to high voltage Grid Supply Points, and tendering arrangements for private wire on a long term basis need to become open and transparent

## Aviation

Aviation is similar to the maritime sector in terms of the challenge to decarbonise because the energy density and performance of battery and fuel cell technologies currently cannot match liquid hydrocarbon fuel when it comes to getting commercial aircraft up into the air, particularly when travelling longer distances. Sustainable Aviation Fuel (SAF) will therefore play an integral role if we are to continue flying and cut emissions. Sustainable Aviation's SAF Road-Map[3] published earlier this year shows how these fuels could meet over 30% of aviation fuel demand by 2050, which would cut aviation emissions by 32%.

The first commercial-scale SAF facility in the UK is currently under development, having recently received planning permission. The facility is expected to be producing commercial volumes of fuel from 2025. There is also a hydrogen aviation project currently underway in the United States and at Cranfield University in the UK.

Despite this progress, financing first-of-a-kind projects like this is challenging, and requires additional financial support and long-term policy stability in order to attract the required levels of investment. Among measures required:

- Government should ensure that as the market moves to aviation renewable fuels alongside road transport fuels this is done with appropriate market support and sustainability procedures in place.

- The Government should invest £500m over five years, matched by industry, to support early stage SAF facilities. This could be done wholly or partly through providing Government-backed loan guarantees, potentially through reviewing and amending the existing eligibility criteria for the UK Guarantees Scheme.

- It currently costs more to produce SAF than conventional fuels (in the absence of a carbon price that reflects the full cost of climate change). The RTFO provides the mechanism to bridge the gap, by providing a traded market for Renewable Transport Fuel Certificates (RTFCs) and a category of them targeted at Development Fuels including aviation fuel (dRTFCs). For potential investors in SAF facilities, one of the biggest risks is the uncertainty of the value of these dRTFCs. An investor has no protection against a fall in the dRTFC price and therefore (in the absence of a trading history) will discount their price heavily to reflect that uncertainty. This makes such projects uneconomic and unfinanceable. A floor price, or its equivalent, is

[3] https://www.sustainableaviation.co.uk/wp-content/uploads/2020/02/SustainableAviation_FuelReport_20200231.pdf

needed to protect investors from losing their money as a result of short-term supply/demand changes – in the long term the demand for sustainable fuels is undoubted.

- At present dRTFCs are only awarded in relation to the biogenic proportion of the waste, whereas municipal and commercial waste contains a mixture of biogenic and non-biogenic components, often bound together in the same item. This means there is no incentive to process the non-biogenic fraction – yet separating it out would be practically very difficult, consume energy and result in a waste stream which would either be burnt, landfilled or released into the environment. The RTFO should support strategically important fuels from all residual waste that cannot economically be separated or recycled, especially where facilities offer multiple opportunities for recycling and recovery of hydrocarbons using a common platform.

- SAF currently receive the same policy incentives as those provided to road fuels. As road fuels are less tightly specified, and require slightly less processing to produce, unless aviation fuels are prioritised in policy frameworks, producers are highly likely to continue to focus on road transport. Applying at least a multiplier of 1.2x for SAF would provide a signal to fuel producers to invest in aviation fuel production instead of using the same feedstock to produce road fuels, which currently provide more return for investors. This is in line with the Renewable Energy Directive II (RED II), which will be supporting fuels providers in the EU, and the UK outside of the EU needs to remain competitive.

The development fuels sub target of the RTFO, as well as failing to deliver price certainty, is unsuitable in the long term as the cost of supporting low carbon aviation (and marine fuels for that matter) should fall on the relevant users (i.e. those flying or sailing rather than motorists via the RTFO). However, we are not proposing that DfT abandons the development fuel sub target. That should not be considered until an alternative mechanism is up and running and effective. A Contract for Difference approach might be suitable for the medium term, but in the future there needs to be some form of market-based obligation or mandate for both aviation and marine. This would have to be compatible with the fact that the fuelling of planes and ships will take place in and outside the UK and any measures introduced by the UK should fit with international initiatives such as Corsia and the International Civil Aviation Organisation.

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compatible with the fact that the fuelling of planes and ships will take place in and outside the UK and any measures introduced by the UK should fit with international initiatives such as Corsia and the International Civil Aviation Organization.

The REA views electrification as a viable option for the light elements of aviation, including up to 8-seater aircraft between now and 2035. The REA also sees batteries to be likely deployed in commercial aircraft from 2025, not as a primary means of propulsion but in order to improve airline fuel efficiency at cruising altitude.

**Freight**

The RTFO is the appropriate policy mechanism to drive an increase in the renewable content of road freight fuels, but the target levels must be dramatically increased.

**Maritime**

There needs to be more dedicated incentives for the decarbonisation marine sector which could include a number of measures, and this should be subject to further discussions.

Ammonia or another vector for hydrogen may be promising as a means of decarbonising the heavy maritime sector. However, the maritime fleet has a long lifespan and therefore we still anticipate that liquid renewable fuels will have an enduring role in maritime transport within the legacy fleets and until clear international policy consistency and governance fixes on low carbon solutions that allow the UK to compete on an even platform for the ships bunker fuel market.

# Additional comments

### Q: What other views do you have on how to decarbonise the UK transport network? Any other comments?

**The importance of niche sectors**

An important point to make but not covered in any specific question is that niche transport applications (eg construction) could deliver significant decarbonisation – including via biomethane and other renewable gaseous fuels.

**Dual participation of Biomethane plants under the NDRHI / GGSS and RTFO**

In their recent consultation on the closure and future proof of the non-domestic Renewable Heat Incentive (NDRHI), the Government has included NDRHI payment calculations for biomethane to allow producers registered under the RHI to flexibly access the Renewable Transport Fuel Obligation. We anticipate that similar flexibility will be allowed under the new Green Gas Support Scheme, as set out in BEIS recent consultation on the future support for low carbon heat.

The REA very much welcomed this proposal, as this is something we have been advocating for a long time. We agree with the consultation document's analysis that the current situation restricts the potential for producers to benefit from diversified revenue streams and can disincentivise production from some plant. We anticipate this change will result in significant additional biomethane injection from existing biomethane injection facilities as well as enabling any new projects joining the scheme to optimise their output.

It will also make more biomethane available to the transport sector than has been supplied to date.

As highlighted in our response to the above BEIS consultations, **we recommend that Government explores the possibility of setting up a central registry of green/low carbon gas injection data, based on secure and independent data provided by the existing GEMINI system.** Green/Low Carbon gas producers could then access this registry, provide verification of GHG values and allocate volumes of gas to different support schemes. Administrators of the RTFO, RHI, Renewable Gas Obligation Certificates and Guarantees of Origin could all receive information from this registry which would eliminate the risk of double counting. Relevant bodies should discuss who is best placed to operate such a registry and work together with the aim of minimising administration costs across all support schemes as well as the compliance cost to the gas producers. Clear rules will be needed on the interaction of the obligation and any disclosure to customer of GHG levels of gas supplied (which should/must be done via a GoO system).

## The importance of Biomethane production – a Case Study

The COVID pandemic has highlighted the need to develop lower carbon business models, to prevent GHG emissions resuming their upward trajectory. For the UK, emissions must be reduced in hard to decarbonise sectors such as freight and agricultural production. Government wants to support innovative, shovel ready projects as part of the Covid-19 green recovery. This should include the transition to low carbon transport.

An effective response to the Climate Emergency means rethinking how food and beverage products are produced, processed and transported. This also includes replacing fossil fuels used in farming activities like cultivation, harvesting, storage and distribution. Investment in green gas fuels will help deliver agri-food carbon reduction and support the initial stages of national transition to carbon neutrality.

Converting bio-residues to bioenergy, including onsite biogas, must be an integral part of the food sector's plans to achieve Carbon Net Zero by 2050. Clean gas to power commercial vehicles offers an immediately available, ready to deploy, diesel replacement. Biogas from food processing residues can provide fuel for uses like operation of farm machinery, picking up raw milk from farms or distributing food products.

One case study example is The Onsite Compressed Biomethane (OCBM) consortium, which is developing commercial use of Compressed Biomethane (CBM) in the haulage sector. Smaller-scale biomethane upgrade and HGV fuelling stations on existing Anaerobic Digestion (AD) plants or food factory sites will enable bio-residues to be used to fuel farming activities as well as the haulage of raw materials and finished products.

1. CBM - Technology Innovation

Government plans to "build back better" in the aftermath of Covid-19 must include helping businesses to create greener growth, including delivering a long-term reduction in agri-food sector emissions.

A Virtual Gas Network (VGN) based on multiple smaller biogas plants dispersed across the UK will supply biogas to support fuel decarbonisation. Integrated virtual networks have been used in other sectors, (private-wire power supply) or combined with small-scale generation (virtual power station models). A virtual gas network model is the next step to freeing up opportunity to fuel HGVs away from the grid.

To achieve this existing and future AD facilities need to be adapted to convert biogas into negative-carbon compressed biomethane (CBM) in locations independent of a gas network connection. This approach will revolutionise bio-energy storage and support decarbonisation of a range of farm and commercial vehicles. CBM from AD plants will fuel HGVs or tractors without the need for large-scale upgrade installations.

This approach will reduce reliance on fossil fuels for hauling food products and raw materials (milk to ready meals) replacing diesel with biomethane from dispersed biogas sites without a gas network connection.

By deploying scalable, modular plants and operating them in collaboration with existing biogas producers, the consortium will offer smaller biogas generators plug-and-play access to CBM markets – primarily as low carbon fuel to replace diesel, plus onsite or near-site heat applications and compact bioenergy storage.

2. Commercial Opportunity and Demonstration

Modular technology can be used to create a network of fuelling sites in areas that cannot support large network-connected centralised gas fuelling stations, but where there is ample supply of biogas. On smaller AD plants remote from the gas grid, modular fuelling stations will supply fuel for agri-food distribution.

With over 9,000 natural gas-powered HGVs in use in Europe (e.g. Italy, Sweden, Spain), technology for compressed or liquified gas fuels is included in the EU Alternative Fuels Infrastructure Directive. With pressure to decarbonise, biomethane infrastructure rollout includes early adoption by some fleet operators (e.g. Waitrose). Post Covid-19 this must now become a greater priority for the UK agri-food industry.

Adoption-ready CBM technology will deliver immediate carbon savings and is deployable now.

WRAP (2018) estimated that food manufacturing produces 1.5Mt of food waste annually (6,700 SME's account for 97% of businesses). 100 of these (1.5%) with onsite AD producing 100 $m^3$/hr of biogas, could generate circa 400 GW per annum of clean heat or over 30,000 tonnes of HGV fuel.

Compressed Natural Gas (CNG) is a viable HGV fuel but fossil-based. It delivers only modest emissions reductions. CBM will reduce the carbon emissions of a 42-tonne laden HGV by >80% compared to <20% for CNG. Gas engines will run on both gases interchangeably. A mass-balanced grid-connected network (with biomethane fed into the grid & natural gas taken out) is compatible with the Virtual Gas Network model. Physically connected gas network sites involve significant scale and capex hurdles and require high vehicle flow locations. CBM produced off-grid is free of these constraints.

In 2021 OCBM plans to provide install proven biogas upgrade equipment on three demonstration sites to showcase the modular solution and how this approach could be deployed on multiple existing and future AD plants. Upgraded biogas from agri-food residues can fuel farm tractors or HGV trucks without using the gas grid. AD plants can supply gas propulsion for local HGV operators that currently rely on diesel vehicles for delivery of feedstocks to AD sites or tasks like collection of milk from dairy farms.

3. Adoption Ready Emissions Reduction

The Virtual Gas Network approach avoids costly biomethane grid injection. Technical hurdles have been overcome and engine technology is proven to cut GHG emissions. Most existing AD plants are not located at gas network injection points. Upgrade units located on existing AD plants, factory sites or farms can convert all or part of daily biogas output to CBM, to supply sites not served by the natural gas network.

To meet carbon targets the UK haulage sector will need to increasingly adopt biomethane to replace diesel with continued rollout of grid-connected biomethane refuelling infrastructure (e.g. CNG Fuels Ltd and Gas Bus Alliance). Food processors or farms can also participate, using their own biogas from process residues with an onsite upgrading solution, and help increase the distribution of green gas refuelling infrastructure.

Biomethane fuelled HGVs exist in varied axle configurations and industry uptake is increasing amongst truck suppliers and fleet operators. A two-year trial by Cenex, (with Euro VI factory-fitted gas HGV's), reported that 100% biomethane vehicles saved ~81% well-to-wheel GHG emissions compared to diesel vehicles. Emission savings across the 20 vehicles was equivalent to displacing 16 diesel trucks.

A unit that upgrades 60 $m^3$/hr of biogas will fuel 5 HGV trucks on an annual basis. Use and accessibility of biomethane as HGV fuel will be boosted by a supply network independent from grid-linked fuelling stations.

The UK can take a lead in the wider development of gaseous fuels by investing in adoption ready projects ('shovel ready technology') on existing AD sites. The VGN model will create a step change, with better access to low carbon transport fuel for food products - putting the British biogas sector at the forefront of developing sustainable transport for rural and urban areas. It will also support future Clean Growth.

4. Conclusions re Biomethane CBM

Biogas is a cost-effective, low-emissions fuel that can reduce the carbon impact of food production and distribution. Producing Compressed Biomethane (CBM) without the costs of grid connection will reduce investment risk for upgrade solutions on AD plants, including factory sites or farms.

Multiple biogas facilities dispersed across the country will be able to support decarbonisation, with biogas from 'off network' locations. Co-location of upgrade and fuelling stations at the point of biogas production will allow smaller rural AD sites to supply HGV transport fleets and agricultural users.

If the UK is to develop the market for on-site CBM produced as a side-stream from existing AD plants or from future plants on farm or factory sites, BEIS should do more to support the sectors development:

- ensure that biogas is fully supported under the proposed Green Gas Support Scheme at all scales,
- recognise that future growth of the low carbon gas fuelled vehicle sector needs off-grid solutions,
- provide funding for demonstration projects that showcase smaller scale gas upgrade technology,
- promote the concept that farms, SME businesses and hauliers have access to local CBM supplies,

- include on-site biogas and biomethane production from bio-process residues in the UK's Transport Decarbonisation Plan (TDP) as a solution that can boost supply HGV fuel to the agri-food sector.

Government departments should recognise that the main competitive advantages of on-site CBM supply over centralised gas fuelling stations are greater flexibility, access to off-grid gas and lower cost, plus ease of installation and access to end-users. This will create a step change in the supply of CBM for HGV fuel, complementing, reinforcing and extending the reach of the network of centralised fuelling stations.

**Local Authorities' role in Transport Decarbonisation**

There should be particular encouragement for councils to plan local decarbonisation infrastructure projects as part of local Net Zero strategies. Currently some 250 out of around 400 local councils have declared climate emergencies, but currently only around 50 have local plans to meet local targets. Local plans become material in local planning decisions, and are also material in getting local buy-in politically, but sometimes buy in can be literal, via locally owned community renewable energy.

Allied to this, Major car parking locations also provide opportunities for new electrical connections for private wire renewable electricity (including for example shopping centres, rail stations, airports and motorway service areas). Whereas the current electricity network is in many places seen as constrained, the connection of new charging loads could open up the electrical network to new renewable energy generation. Some of it may be solar car ports, some of it may be offsite and directly connected using a range of technologies. This needs outlining in any new Transport Decarbonising Plan so that it can become material in local planning.

**REA**

**September 2020**