The Role of Biomass in Achieving Net Zero
Call for Evidence

About the RTFA

The Renewable Transport Fuel Association was formed in August 2021, with 12 founder members. It now has 34 members, including all UK bioethanol and biodiesel producers, all suppliers of biomethane to transport, many of the companies seeking to produce development fuels and sustainable aviation fuel along with renewable diesel and biopropane suppliers. For more information see www.rtfa.org.uk

Two iterations of these answers were circulated for comment, and the RTFA responded to an invitation from BEIS to facilitate a stakeholder workshop, which was held on 8th July which was attended by BEIS and DfT officials.

We give permission for your evidence to be shared with third party contractors for the purpose of analysis be made public.

We have also encouraged our members to respond directly to the call for evidence.

General

We welcome the opportunity to comment on the importance of the role of Biomass in achieving net zero. Over the years different administrations have accumulated a great deal of evidence on the role that biomass energy and biobased products can play in meeting environmental goals. This is demonstrated by the summary information at the beginning of each of the sections in the consultation document.

This submission, however, aims to give our views on the potential ways we envisage the Government may choose to use the information it receives. The questions in the call for evidence are so broad and we do not have the resources to do them justice. We do make some comments however, and we have encouraged our members to contribute to this detailed evidence gathering. We also responded to an invitation from BEIS to facilitate a stakeholder working group.

It is mentioned in the document that a tightening of sustainability standards is a likely outcome, and page 8 refers to these being "as robust as possible". We welcome this as an aspiration and recommend that all forms of biomass use (and therefore land from which it is sourced) should be encompassed. It is worth noting that the standards applied to biofuels are at the more robust end of the spectrum and recommend a levelling to at least the current approach used for biofuels, across all biomass uses. If standards can be improved still further for biofuels (and other sectors) this would be welcome.

Although it is not referred to in these words within the document, we are assuming that another output might be some form of biomass use hierarchy, given that an objective is to see how biomass can be "sourced and used across the economy to best contribute to meet our net zero target".

A range of solutions is needed to achieve net zero, and renewable fuels - in particular biofuels - have an important role to play. Biomass feedstocks for fuel production, therefore, are an

extremely important consideration in the biomass strategy. Their role in surface transport will continue to expand until optimum displacement of fossil transport fuels is achieved through higher blend levels and growth is eventually balanced by the uptake of electrification. Hence they play a huge role in the near to medium term and are a no regrets means of building sustainable feedstock supply chains which could transition over time into hard to decarbonise modes of transport including aviation, and into chemical feedstocks. In both of these areas they are likely to have an enduring future but, in the meantime, continued attention to the support required for expensive waste-to-biofuels investments is as essential as the support for future fuels. Without it the short to medium term solutions will disappear early, leaving a mitigation gap that could cost UK dearly in GHG emissions.

Biofuels should not be overlooked on the basis that they will eventually be replaced by electrification, for four reasons.

- Firstly, the carbon savings they deliver can be realised now, with today's vehicle and fuelling infrastructure. Carbon emissions are cumulative, and it is widely understood that carbon savings that are achieved sooner have more impact in reducing climate change than carbon savings that come later.

- Secondly, availability of waste feedstocks for biofuels is expected to continue to rise as collection for re-use increases with demand. For example, the UK still has no effective regulations for collection of grease trap wastes that could lead to another 300,000 tonnes of raw materials for biodiesel or HVO.

- Thirdly, incorporation levels in petrol and diesel can increase significantly. E10 is not yet introduced and ethanol blending can and should increase further; B10 is under review by the EU to replace B7 as the standard for diesel, and higher blends in HDVs are well-proven and could be widespread with some relatively minor support as proposed by Zemo Partnership.

- Finally, electrification may end up happening at a slower pace than anticipated. For the avoidance of doubt, the RTFA has no desire that electrification should take place more slowly. But should that happen, then once again, the near-term carbon savings become even more important. Perhaps the only area where we disagree with the direction of Government policy on electrification is that we don't believe that series hybrid electric vehicles should be encompassed in the ending of sales of ICE cars and vans. (By this we are referring to range extended EVs (REEVs), where a small ICE, which should be fuelled entirely on renewable fuel, recharges the battery, rather than powers a drive train). The reasons for this are set out in an Appendix below. We favour letting the market decide on this. If full BEVs achieve better carbon performance than REEVs, the OEMs will respond. Legislation driving ever tighter emissions should be the means of achieving this.

The two activities, decarbonisation via fuels and decarbonisation via electrification, should progress in parallel. There is no reason why activity on decarbonising fuels should slow the rate of electrification, and similarly no reason why replacing fossil fuels with renewable alternatives should prolong the use of fossil fuels in transport.

The benefit of robust sustainability standards

Having said this, it is clearly paramount that the biomass feedstocks used are exemplary in terms of their sustainability characteristics. Biomass feedstocks used for making transport fuels have, indeed, lead the way in terms of setting sustainability standards and the UK has been influential in the process.

A number of voluntary schemes have developed to certify supply chain compliance with the RED and RTFO sustainability and GHG requirements required of biofuel chains. ISCC is a major contributor to certification of UK biofuels, and guidance and standards are regularly reviewed to reflect changing policy and best practice and maintain confidence. Such schemes also support development of an EU wide database to support traceability of feedstock and fuel and provide audit training which has been increased for identified 'high risk' waste and residue chains.

We would be pleased to work with Government on sustainability criteria, should the outcome of the Biomass Strategy recommend these be made more rigorous.

The problems with best use hierarchies

We support biomass being used where it has most impact with respect to reducing carbon emissions. However, we are sceptical that best use hierarchies are the way to deliver that objective. Current uses of biomass are heavily influenced by the waste hierarchy, which in itself is a questionable starting point, for reasons described in Appendix 2.

Getting the best carbon saving outcome for biomass needs a more nuanced, case-by-case approach, to cater for the following situations.

- The **geographical location** of feedstocks relative to end uses has an impact. A feedstock which could deliver a better carbon performance were it to go to an end use other than fuel may be located so far away from that "better" end use, that fuel production becomes the better option.

- **Economic viability**. There may be cases where a feedstock stands no chance of being collected for "better" end uses, as a prospective fuel user may be the only entity interested in it. There may be a range of reasons why this could be the case, from the economics / logistics of collection to the characteristics of the particular material, or what it is mixed with.

- **Temporal aspects**. The best use may change over time. Ultimately, biomass will need to replace fossil fuel as a source of chemical feedstocks. Using biomass for heat or power is no 'bridge' to this end point, whereas converting it into liquid and gaseous fuels is vastly more likely to be so. In the very long run conversion into materials and chemicals should be a more sustainable use of biomass (whether evaluated on a counterfactual or absolute basis); but as transport fuels deliver an earlier 'win' it makes sense to facilitate this use. Having said that, there are transport sectors for which biomass will have an enduring role as a fuel, either because there are no viable alternative means of decarbonisation, or because on a lifecycle basis it is superior to the alternatives.

- **Differing counterfactuals**. In some cases, using a waste biomass stream to run a CHP plant might deliver higher net GHG savings than when it is converted into a biofuel, however there are alternatives for heat and power, whereas there are not for some uses of liquid / gaseous fuels.

The experience of Government trying to direct biomethane for heat production as opposed to transport is an example of trying to direct biomass to a supposed "better use". It has not been successful in the sense of steering biomethane towards heat. Instead, there has been a recognition of the benefits of its use in transport, and over 90% of the methane used in UK transport (primarily in long haul HGVs) is biomethane.

The current approach used for the RTFO involves the RTFO unit making a case-by-case decision for each feedstock, and then assigning all those it has reviewed to the category of waste (double counting), waste (single counting), agricultural residue, and product or co product. Whilst this is not perfect (as it does not deal with the geographic aspect described above, it is a pragmatic way of catering for the great diversity in biomass feedstocks). The current guidance lists 66 separate biomass feedstock types, and it is growing all the time.

Another consideration is the impact a hierarchy approach can have on project development. It is clearly a disincentive to encouraging investment in biomass utilising projects of any kind, if the project developer is required to demonstrate that better prospective uses are inappropriate before being allowed to proceed with a project. Where would the line be drawn? How does one prove a negative? What if a better use emerges in the future or is likely to emerge in the future? Is it better to develop a project now, or wait? There is danger in letting the best be the enemy of the good.

It is very difficult for these considerations to be managed at a project-by-project level. It has proven challenging for Government itself to manage it at a macro level. If one takes the example of energy from waste combustion – there was a time when there was a sound environmental case for residual MSW to be used for power generation. It would have been desirable for MSW plants to have been commissioned at that point. However, it is only now that EfW capacity is coming through at volume, and power generation manifestly doesn't give the best carbon outcome. Given how much the grid has decarbonised and will continue to do so, it now makes much more sense to make a part-renewable-part-RCF fuel to displace petroleum fuels.

Other principles to consider when developing a biomass strategy

BEIS does not need to have a detailed view of all the potential sources of biomass in order to set a strategy. Given that biomass can also be imported, the task of quantifying the resource becomes almost impossible. The RTFA commissioned a study on quantifying the availability of sustainable biomass resources in the context of setting an appropriate RTFO target). The PRIMA report can be accessed via the RTFA website on https://rtfa.org.uk/wp-content/uploads/2021/04/RTFA-05042021.pdf

The goalposts are also moving. Given the right sustainability framework and incentives for carbon reduction, industry will innovate, with the result that more sustainable biomass resources become available. There is a danger in aiming to quantify resources and limiting aspirations to match that. It may result in potentially usable biomass not being utilised at all (e.g. FOG that ends up the sewers) or being used in a less environmentally optimal way (e.g. end of life tyres exported to developing countries).

Government may argue that there is a danger in financial incentives which are too high, and which result in pulling in resource which could be better utilised elsewhere. Given the UK has legally binding carbon budgets, it is a question of meeting them in the most cost-effective way. There is a metric for decision making – the £/tonne Carbon saved. This must be nuanced by industrial strategy objectives too, of course. (E.g. if ultimately, sustainable aviation fuel is required at volume and it is ultimately the cheapest means of achieving net zero-carbon long haul flight, then whilst it may cost more initially to incentivise its production, it makes economic sense in the longer run).

With means of comparing biomass with different decarbonisation options across the economy, and the safeguards of sustainability criteria to prevent the exploitation of unsustainable resources (a consideration which should fall on other resources as well as biomass) the government should have the confidence to set ambitious targets. The RTFA would like to see an equivalent level of ambition for renewable fuels as there is for electric vehicles.

Call for evidence questions

Q2 What is the potential size, location and makeup of the sustainable domestic biomass resource that could be derived from the a) waste, b) forestry, c) agricultural sectors, and d) from any other sources (including novel biomass feedstocks, such as algae) in the UK? How might this change as we reach 2050?

The RTFA commissioned some research on this (focusing on biomass feedstocks suitable for renewable fuel production and in the context of setting an appropriate RTFO target). We attach this report.

Q3 What are the current and potential future costs of supplying these different biomass feedstock types, and the key environmental and land-use impacts (positive or negative) associated with supplying and utilising these different types of biomass, e.g. impacts on GHG emissions, air quality, water quality, soil health,biodiversity, food security, land availability, etc?

There are some considerable potential benefits from the supply and utilisation of biomass, primarily the reduction in CO2 emissions, however there is also the opportunity to contribute to a circular economy and deal with problematic waste streams, reducing waste exports to countries where negative environmental and health impacts can occur.

Biomass presents a significant opportunity to contribute to the Green Industrial Revolution in providing fuels for 'jet zero and green ships'. Where this can be done through building the domestic supply and utilisation of biomass there is also the opportunity for contribution to the UK, regional and local economies through jobs, development and innovation, which could provide exportable products, skills and technologies.

The Environment Bill will require 10% biodiversity net gain for any developments, which presents a 'win-win' situation and a real opportunity for businesses to give back more to nature than what they take out through developments, and will contribute to directionally improving nature and biodiversity in the UK.

Q5 How could the production of domestic biomass support rural employment, farm diversification, circular economy, industrial opportunities, and wider environmental benefits? This can include considerations around competition for land, development of infrastructure, skills, jobs, etc.

To take one example, the production of bioethanol results in a protein feed by product which substitutes for (typically) soy-based protein feed imports from South America. This has GHG and land use benefits, as well as supporting the UK agricultural industry. The NFU and APPG on British Bioethanol are good sources of information on this subject. DfT has been made aware of this benefit on many occasions.

Q6 What are the main challenges and barriers to increasing our domestic supply of sustainable biomass from different sources?

A range of **regulatory and land use planning barriers** impinge on the ability of project developers to utilise sustainable biomass and biomass-containing feedstocks. Examples include:

- Some of the regulatory burdens arising from materials being classified as waste. Many of these do not contribute to better protection for the environment. For example, the regulator carrying out overly detailed analysis of a biomass feedstock, as compared with the variable and much greater volumes of crude oil processed through refineries every day that do not require analysis by the regulator. The impact assessments, monitoring and mitigations already in place for oil refineries are not affected by the processing of biomass. More onerous TFS authorisation is required for moving a biomass waste feedstock than is allowed for under REACH, some biomass feedstocks have been classified by the EA as waste, despite the feedstock being registered under REACH.
- Delays or failure to obtain planning permission. (In relation to EfW capacity, this has meant that only now are projects emerging from the pipeline, and power generation is no longer the most effective carbon outcome. Another consequence of the delay has resulted in the UK exporting its biomass resource in the form of Solid Recovered Fuel. Once established, this is difficult to change.).

On the other hand, there is **lack of effective regulation in relation to grease management**. A huge amount of fats oils and greases could be collected before they enter the sewerage system, if food service establishment had proper grease management practices. There are various reasons why the UK falls short in terms of grease management, and fatbergs can build up in the sewers; ineffective regulation (building regulation), water companies needing to become more effective at enforcement of infringements, and also financially rewarding those FSEs that do install grease management, the insurance industry needs to work with FOG management equipment supply an maintenance industries need to work together to ensure that restaurants without proper grease management cannot get insurance unless effective equipment is installed an properly maintained. The biofuel industry is ready to accept volumes of grease trap waste, were greater volumes to become available through properly enforced collection. If it were, the collection would be providing other non-GHG benefits to society, and indeed should be awarded credits for the GHG emissions avoided from the current requirements to dispose of the fatbergs removed when blockages and flooding dictate.

Difficulty in establishing an environmentally-superior, circular economy solution for end-of-life tyres. The rubber in car tyres comprises just over 40% biomass, and for heavier duty vehicles the proportion is higher still. Whilst this is a very specific and limited waste (UK arisings are (very roughly) 400k tonnes per annum, equivalent to around 200k tpa tyre pyrolysis oil (of which around 80k tpa comprises biomass), the RTFA has many members active in this area. Environmentally, using end of life tyres for the production of liquid fuels is better than exporting them or burning them in cement kilns. There are numerous benefits from chemically recycling end of life tyres either into fuels or feedstocks (tyre pyrolysis oil and recovered carbon black which could be used to manufacture new tyres). As well as the GHG benefits there would be less export of end-of-life tyres to developing countries (where their processing can lead to environmental and health problems). There is potential for the UK to develop a strong pyrolysis industry, and the learning involved could be extended to other biomass-containing and / or difficult to dispose of waste streams.

Not having EfW encompassed in the EU emissions trading scheme (and UK follow on) has not been helpful in encouraging beneficial use of MWS.

The UK's Department for Transport has imposed a **crop cap** on food and feed-based biofuels under the RTFO. This has been triggered by concerns over indirect land use change (ILUC). We are concerned that the methodology has been applied too bluntly. There appear to be three broad categories of potential harm, high, medium and low.

RTFA member, Broadmanor Consulting, has conducted a study which looks in depth at the GHG savings from different types of feedstock and shows that a crude crop vs waste approach is not appropriate. This can be found on https://rtfa.org.uk/wp-content/uploads/2021/06/RTFA-GHG-study-Broadmanor-Consulting.pdf

This suggests it may not be appropriate to limit the contribution of all crop-based biofuels. We attach a study done by RTFA member Broadmanor consulting which demonstrate this.

Q7 What is the potential biomass resource from imports compared to the levels we currently receive? What are the current and potential risks, opportunities and barriers (e.g., sustainability, economic, etc) to increasing the volumes of imported biomass?

See the answer to Q2.

Chapter 2: End use of Biomass

Q8. Considering other potential non-biomass options for decarbonisation (e.g. energy efficiency improvements, electrification, heat pumps), what do you consider as the main role and potential for the biomass feedstock types identified in Question 2 to contribute towards the UK's decarbonisation targets, and specifically in the following sectors

- **Heat**
- **Electricity**
- **Transport**
- **Agriculture**
- **Industry**
- **Chemicals and materials**
- **Other**

We see significant potential for biomass to contribute to decarbonising certain aspects of transport, such as aviation, shipping and long-distance trucking. Ideally biomass should be directed to end uses where it has most GHG emission mitigating potential. However, as discussed in the opening remarks of this response, aiming to steer the outcome though a best use hierarchy is a flawed concept. Overarching carbon policies such a carbon tax set high enough to drive the correct behaviour and fully internalise the social and environmental cost of carbon, accompanied by a Carbon Border Adjustment Mechanism to prevent the emissions simply being offshored to the detriment of UK manufacturers) or a global and totally leak-proof emissions trading scheme would theoretically drive the right outcomes, although clearly they are extremely challenging to achieve.

Therefore, in the short and medium term, until these overarching policies can take over, sector specific measures such as the RTFO (which is working effectively and should be increased), and CfDs for sustainable aviation fuel (which would kick start some UK production of a much-needed fuel) are crucial. . In addition, the UK government can continue to extoll the benefit of developing and participating in international efforts to limit and mitigate climate change. Effort also needs to go into removing perverse incentives between sector specific policies. (An example of this from Europe is REFuelEU Aviation roadmap which would divert feedstocks that are currently used for decarbonising road transport (i.e. used in biodiesel and HVO production) into HEFA. This

results in increased GHG emissions[1] and undermines previous investments. Happily, the DfT recognises this is something to be avoided, and in the RTFO does not allow segregated oils and fats to be used as a feedstock for the production of development fuel.)

Q9. Out of the above sectors, considering that there is a limited supply of sustainable biomass, what do you see as the priority application of biomass feedstocks to contribute towards the net zero target and how this might change as we reach 2050? Please provide evidence to support your view.

Q10.What principles/framework should be applied when determining what the priority uses of biomass should be to contribute to net zero? How does this vary by biomass type and how might this change over time?

Both 9 & 10 are addressed in the opening paragraphs on biomass hierarchies.

Q13.Are there any policy gaps, risks or barriers hindering the wider deployment of biomass in the sectors identified above?

Regulation needs to keep pace with government policy. A significant portion of biomass could originate from waste materials and legislation relating to waste and end of waste is proving to be a potential barrier. There is some confusion around the relationship between REACH and waste, with waste requirements being imposed on REACH products. The process for End of Waste assessment is unclear. The process for Trans Frontier Shipment of Waste is cumbersome when other legitimate mechanisms (such as REACH) could be applied.

Q14.How should potential impacts on air quality of some end-uses of biomass shape how and where biomass is used?

They should not. The biomass strategy should be about mitigating climate change. Air quality should be addressed by regulation and measures targeted on air quality. We believe that existing frameworks for planning, permitting and air quality standards are applicable and sufficient to cover these considerations.
Air quality is a hugely important issue, which needs to be dealt with by a combination of land use planning, environmental permitting, emissions regulation and air quality standards and improvements in technology, driven by continually improving emissions standards for vehicles. e.g. Euro VI engines are 95-98% cleaner than Euro V.

Chapter 3: Sustainability and Accounting for Emissions

15.Are our existing sustainability criteria sufficient in ensuring that biomass can deliver the GHG emission savings needed to meet net zero without wider adverse impacts

[1] See Conversion efficiencies of fuel pathways for Used Cooking Oil, a study commissioned by EWABA and MVaK https://www.studiogearup.com/wp-content/uploads/2021/03/2021_sGU_EWABA-and-MVaK_Options-for-the-deployment-of-UCO.pdf

including on land use and biodiversity? How could they be amended to ensure biomass from all sources supports wider climate, environmental and societal goals?

Generally speaking, policy making is most effective if it directly addresses the outcome sought. For example, if avoiding deforestation or damage to biodiverse ecosystems is a goal, then land use policies should prevent the undesirable activity from taking place. Where this cannot be achieved directly (e.g., because it is outside the jurisdiction of the country doing the policy making) then the country or region making the policy seek to prevent creating an incentive for the wrong behaviour. For example, REDII strives for this with respect to certain types of forests, grasslands, wetlands, savannahs, steppes, scrublands and prairies by saying that biofuels, bioliquids and biomass fuels made from agricultural raw materials originating in such lands should not qualify for the incentives provided for by this Directive.
The UK should keep pace with REDII and REDIII, and to the extent it can influence regional and global policies, it should do so.

16.How could we improve monitoring and reporting against sustainability requirements?

Align with EU (REDII and III) sustainability certification requirements including enhanced auditing, use of the single Union database for transport fuels and any other improvements arising from the delegated act on the VS.

17.What alternative mechanisms would ensure sustainability independent of current incentive schemes (e.g., x-sector legislation, voluntary schemes)

As stated in the answer to Q15, the best approach for ensuring that valued landscapes / ecosystem are not damaged, is through direct policies which prevent e.g., deforestation or the destruction of a landscape of biodiversity or GHG mitigation importance. If landscape is outside the UK's jurisdiction, and the end use of biomass is not to meet some incentive scheme, then it is very difficult indeed to ensure sustainability.

Chapter 4: Innovation

22.Given the nature and diversity of the biomass feedstock supply (as referenced in Chapter 1), what specific technologies are best positioned to deliver the priority end uses (as referenced in question 9), and how might these change as we reach 2050?

Across the membership there are many differing technologies, and the following comments should not be taken as implying that refineries are best positioned, however as they are not built for the purpose of producing renewable fuels, it is worth outlining how they are relevant.

Refineries are well placed to process biomass, and companies such as P66 are actively diversifying into biomass. Refineries are multi-billion £ assets that have the capability to process biomass into biofuels, with existing infrastructure for easy deployment of the biofuels into the market. This offers a potentially very low-cost and quick route to decarbonisation. Some relatively minor modifications and adaptations may be needed to existing facilities to enable scale up of the biomass processing, which are typically identified through industrial trials. A regulatory framework that allows for timely facilitation of trials is needed to expedite biomass processing. This can be done through, for example, issue of Local Enforcement Positions by the EA. See also other comments relating to waste.

24.In what regions of the UK are we best placed to focus on technological innovation and scale up of feedstock supply chains that utilise UK-based biomass resources?

The Humber Region and freeport of Immingham are ideally situated with good import/export facilities and links to the UK transport network, along with established industry and proposed developments that would be well placed to utilise, incorporate, adapt and innovate biomass into scalable production. The Humber Industrial Cluster is at the forefront of industrial decarbonisation, with offshore wind providing green electricity into the UK, proposed carbon capture and storage projects through Humber Zero and Zero Carbon Humber, and proposed industrial use of Green Hydrogen through Gigastack. The Humber Refinery is the leading refinery in the UK for production of renewable and development fuels from biomass.

Other major industrial centres such as Teesside, Merseyside and South Wales also offer opportunities, and are also well-served with respect to supply chain infrastructure, technical skills, and pre-existing large scale biomass investments, access to CCUS and offshore renewable electricity production and projects under development in both bio (and recycled carbon) fuels.

Appendix 1 – arguments as to why REEVs should not be included in the ending of the sale of new ICE cars and vans

REEVs can offer significant advantages

- A smaller size of battery is advantageous for vehicles which are predominantly used for short-range driving. In private cars, it is a very common driving pattern to drive less than 50 miles on most days, interspersed with an occasionally longer journey. Allowing hybrids enables OEMs to size the battery according to the driver's needs. It is extremely unlikely that OEMs would develop BEV vehicles with a range of less than 100 miles. If hybrids are phased out, it will leave people without an option of a vehicle with a smaller battery. A BEV with a battery capable of a range of 250 – 300 miles is a poor engineering solution for vehicles with this usage characteristic. The battery is more expensive and heavier than it needs to be, and the car is inefficient as for most of the time it is carrying an oversized battery relative to its need.
- REEVs are substantially cheaper than full BEVs, and offer the potential of more rapid uptake in replacing existing dedicated ICE vehicles. The lower cost would open up the option of owing an EV car to a wider section of society.
- A smaller battery has less embodied energy and carbon emissions from production, and for vehicles with lower annual mileage the GHG emissions associated with battery manufacture are therefore more significant. A BEV covering low mileage with a large battery may have significantly worse whole life GHG emissions than a REEV.
- Smaller batteries require fewer resources and manufacturing capacity. Manufacturing capacity will become a limiting factor on electrification without significant changes to battery chemistry in the medium term. Cars and vans are far from the only applications where the trend is towards electrification. They will be competing for materials with a whole range of other transportation modes, as well as larger battery applications including storage. Allowing REEVs beyond 2035 would reduce the challenges of the scaling up of battery manufacturing capacity. The technology will have applicability in the small to medium truck sectors as well so economies of scale will be significant.
- With regards to vans, REEV technology allows for full functionality of the vehicle with lower payload impacts when daily mileages are larger than current electric van ranges of 100 miles. In addition for emergency services, particularly ambulances, where daily mileages are at times 400 miles, REEVs are the obvious solution as battery technology is not available that could provide that range or be recharged on route without severely impinging the functionality of the vehicle or take up too much space.

A complaint against hybrids is that they can be sub-optimally driven, i.e. not charged frequently enough and therefore driven in ICE mode more than absolutely necessary. There are many means of addressing this shortcoming.

Appendix 2 – the waste hierarchy and its relevance to the circular economy

It is well understood that Net Zero (as well as other environmental objectives) require a transition to a more circular economy.
The entire life cycle of product should be considered, from production to through to secondary materials and end products.
To achieve this, both the definition of waste and the waste hierarchy need to be revisited. These were enshrined initially through EU legislation, but following Brexit are now part of our English law.

We recommend that the UK legislation on waste and the waste hierarchy, specifically XXXX are changed so that they are more effective in delivering the best environmental outcome. It is in the application of these definitions to biomass and waste plastics that change is most needed. By contrast, metals and glass are well-served by the existing waste hierarchy.

The waste hierarchy is meaningless for most biomass waste streams. How can such a waste stream be prevented, re-used or recycled? The most environmentally beneficial use might be for energy, yet Article 3.17 of the WFD says

> " 'Recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;"

When it comes to waste plastic or (to pick a waste stream of particular interest to many RTFA members) end of life tyres - Why should the production of a fuel which substitutes for diesel (a 100% fossil petroleum product) be an inferior end use to, say, making plastic street furniture or rubber-derived artificial playground surfaces? If ultimately a net zero approach requires fossil fuels to remain underground, all chemical feedstocks and carbon-based energy carriers will need to be made from biomass.

Article 4.2 of The Waste Framework Directive already makes provision in for a more nuanced approach. It says

> "When applying the waste hierarchy referred to in paragraph 1, Member States shall take measures to encourage the options that deliver the best overall environmental outcome. This may require specific waste streams departing from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste."