Velocys' response to the Environmental Audit Committee inquiry on net zero aviation and shipping

About Velocys

Velocys PLC is a sustainable fuels technology company, headquartered in Oxford and traded on the Alternative Investment Market (AIM) of the London Stock Exchange.

Velocys is leading a project to build the UK's first commercial waste to sustainable aviation fuel (SAF) facility – Altalto Immingham – in North East Lincolnshire, in collaboration with British Airways. Altalto will take hundreds of thousands of tonnes per year of black bag municipal and commercial waste, otherwise destined for landfill or incineration, and convert it into clean-burning SAF using its proprietary Fischer-Tropsch reactor technology. Blended with conventional fuel, this product is fully approved for use in today's aircraft, without any need for modifications to engines or refuelling infrastructure. In June 2020, Altalto received planning permission from North East Lincolnshire Council and, subject to further policy support and financing, aims to be producing SAF from the mid-2020s in enough volumes to fuel the equivalent of over 1000 transatlantic flights every year. Velocys sits on the Jet Zero Council alongside other SAF producers and technology providers looking to grow the industry in the UK.

Velocys' technology has been demonstrated in six projects on five continents, most recently in Japan where it was used to power the world's first commercial flight using SAF made from waste woody biomass. Velocys' fuel delivers a net lifecycle CO_2 saving of 70%. When integrated with carbon capture and storage (CCS), our process can deliver fuels with net negative carbon emissions (i.e. over 100% lifecycle CO_2 saving).

We are responding to this consultation because, due to the commercial readiness of our technology and the ease with which the fuel can be used, we expect SAF produced using this technology to deliver a major share of aviation decarbonisation worldwide, starting from the middle of this decade when our first facility will be operational. As mentioned above, when integrated with CCS, fuel produced using our technology can deliver net zero flight meaning our technology can help the Government deliver its own ambition of "zero emission transatlantic flight within a generation". Indeed, if CCS transport and storage infrastructure is developed in the Humber as expected in the coming years, we could deliver on the Government's objective this decade.

If the Government moves first to commercialise this technology by supporting our project in Immingham through policy, the UK could become a major SAF producer and technology exporter. This will help the Government deliver net zero by tackling emissions in one of the hardest to decarbonise sectors and build a new green industry in the UK.

We welcome the opportunity to provide evidence to this inquiry and would be very happy to support with further written or oral evidence as requested.

Questions

We have only answered questions relevant to our technology, i.e. sustainable fuels for aviation as opposed to shipping.

How close are zero carbon fuels to commercialisation for aviation / shipping?

SAF is a proven and commercially ready technology capable of being deployed today. It is the only solution to delivering net zero flight at scale this decade, and indeed for all medium and long-haul flights into the future. Our Altalto project has planning consent and is only awaiting clarity on policy for a SAF price stability mechanism (expanded on in the answer to questions below) before moving into the final stage of engineering prior to construction. As mentioned above, Altalto aims to be producing SAF from the mid-2020s in enough volumes to fuel the equivalent of over 1000 transatlantic flights every year. This means zero carbon fuels like those produced using our technology are commercially ready and could be fuelling flights in five years' time.

This project and Bayou Fuels, our project in the US to make jet fuel from waste woody biomass, both offer fuels that are better than net zero – they offer negative carbon emissions, due to the combination of renewable feedstock with CO_2 capture. Altalto is part of the East Coast CCS cluster and is ideally positioned to deliver net zero fuel from the mid-2020s once the associated transport and storage infrastructure is operating.

On the broader need for zero carbon fuels, if the aviation sector is to reach net zero whilst meeting passenger growth projections – in line with the recent commitment made by the UK industry coalition Sustainable Aviation – SAF will be essential. Indeed, Sustainable Aviation sees SAF delivering over 20% of aviation's total emissions reductions by 2050 according to their Decarbonisation Roadmap published last year.

This is because liquid hydrocarbon fuels offer an energy density and thrust well suited to medium and long-haul flight (flight routes over 1,500km) which account for 80% of global CO_2 emissions from aviation. Whilst hydrogen and electric flight technologies could help decarbonise the remaining 20% (i.e. short-haul flights) these are in their infancy, and require major investment in new aircraft and infrastructure. As a result, flying is likely to remain largely liquid fuel based up to and beyond 2050.

Liquid hydrocarbon alternatives to kerosene from sustainable sources – i.e. SAF – will therefore be essential. SAF is a drop-in fuel, requiring no changes to existing aircraft and airport refuelling infrastructure, and must deliver at least 65% lifecycle carbon savings in order to be classified as such. It is the only viable option to decarbonise medium and long-haul flight, and the only viable option available today to decarbonise short haul flight for the reasons outlined above.

Furthermore, research published by Sustainable Aviation last year found that there is potential for up for 14 SAF facilities across seven cluster regions that could be operational in the UK by the mid 2030s. Many of these locations for SAF clusters (Teesside, Humberside, South Wales, the North West, Southampton, Grangemouth, and St Fergus) overlap with potential CCUS clusters. These sites were identified based on the availability of feedstock, where existing refineries are located, and their proximity to enabling infrastructure and skills which closely aligns with the infrastructure and skills necessary for establishing CCUS clusters.

How effective will the Jet Zero Council be in catalysing zero emissions technologies?

Velocys is pleased to be a founding member of the Jet Zero Council (JZC) and is supportive of the forum's objectives. The JZC itself can (and needs to) help fast-track aviation decarbonisation policy by seeking senior buy-in from Government and industry on the route to net zero emissions, identifying the priority policies to deliver this, the blockers to implementing this policy, and how to overcome these. We expand on the specific Government policy support required in our answer to the next question.

For the JZC to be effective, the plans agreed at the meetings need to be translated into policy action on timescales consistent with the urgent need to act on the climate crisis, and to avoid the UK from losing out to international competitors in the race to commercialise SAF technology. For example, at the June 2021 JZC meeting it was agreed that "a price stability mechanism is key to speeding up the development of SAF" but there has been no commitment since then from Government on any timescale to implement this policy or even consult on it. The only reference to this has come in the Ministerial foreword of the DfT's SAF mandate consultation document published in July which said the Government was "beginning a conversation about whether there is more we can do to provide price certainty for producers looking to build SAF plants and invest in the UK".

How should the Government's net zero aviation strategy support UK industry in the development and uptake of technologies, fuels and infrastructure to deliver net zero shipping and aviation?

We welcome the Government's ambition on SAF as demonstrated by the publication of the Transport Decarbonisation Plan and both the Jet Zero and SAF mandate consultations. However, to ensure that the first SAF projects in the UK can progress in the early 2020s (which will in turn ensure the industry can scale-up in the 2030s and build a world-leading green industry), urgent Government action is needed today. Specific asks are outlined below, listed in order of priority.

Introduce a price support mechanism for SAF

Whilst the proposed SAF mandate is welcome, a mandate does not give any guarantee of SAF prices. Finance experts have consistently delivered the message to the Government, including through the JZC and its sub-groups, that investment in SAF plants in the UK will only occur when there is price certainty. Delivering this price certainty through Contracts for Difference (CfDs) will be critical to commercialising SAF and increasing production.

CfDs have played a critical role in the successful build-out of the UK's renewable electricity industry, particularly offshore wind – the UK's green success story of the 2010s. They are now also being proposed for hydrogen (see recent BEIS consultation). A similar mechanism for SAF is essential if the UK is to establish its own production and become a leader in this market in the 2020s. Work has begun, funded by industry and with collaboration from DfT officials, to develop the foundation for such a mechanism.

Delivery of the necessary policy will require public consultation this year, which should set out detailed policy options and Government preferences. Announcement of this before COP26

would send an important signal that the UK is serious about SAF and enable projects to proceed with development and financing.

With this certainty now, the UK could deliver the first SAF facilities by the mid-2020s, making us a world leader in SAF production from waste, and delivering thousands of jobs which contribute to the levelling-up agenda. Without this certainty soon, projects will not go ahead, investment will go elsewhere, and the opportunity for global leadership in this growth market will be lost. This is a very real risk, particularly in relation to the US, where favourable policies are attracting strong interest; the incentive per litre for negative-emission SAF in California is more than double that in the UK, and yet the cost per tonne of carbon saved is lower – consumers there are getting a better deal and a bigger climate impact.

Reform the Renewable Transport Fuel Obligation to admit Recycled Carbon Fuels

At present development fuel Renewable Transport Fuel Certificates (dRTFCs) under the Renewable Transport Fuel Obligation (RTFO) are only awarded in relation to the biogenic proportion of the waste, whereas municipal and commercial waste such as our feedstock contains a mixture of biogenic and non-biogenic components, often bound together in the same item. This means that currently we have no incentive to process the non-biogenic or “Recycled Carbon Fuels” (plastic) fraction of the feedstock. Complete separation of the non-biogenic from the biogenic waste would be practically very difficult, consume energy, and result in a waste stream which would either be burned or landfilled, releasing carbon dioxide into the atmosphere.

We believe that processes should therefore be incentivised through the RTFO to make strategically important fuels from all residual (biogenic and non-biogenic) waste that cannot economically be separated or recycled. This is needed in order to make projects such as Altalto, and others that put waste to good use, financeable.

We welcome the positive messages about reforming the RTFO along these lines in Government’s response to the RTFO consultation, published on 14th July, but this response indicates further delay before a decision on the value of the dRTFCs for Recycled Carbon Fuels is known – a necessity for them to attract investment.

Support early projects with Government-backed loan guarantees

Government-backed loan guarantees can help de-risk investments in nascent industries like SAF. Examples in the US show that such guarantees lower the barriers to attracting capital into such complex first of a kind projects and thus allow them to progress. The new UK Infrastructure Bank, with its net zero and levelling-up remit, is ideally placed to support SAF facilities located in industrial heartlands – like Altalto in the Humber – as they seek to raise finance.

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