

Making aviation fuel mandates sustainable

An analysis of aviation fuel mandates in seven European states

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Summary

The EU and many European governments are adopting or proposing mandates to bring about the uptake of alternative fuels in the aviation sector. Mandating the use of Sustainable Advanced Fuels (SAFs) in the aviation sector is the right approach to ensure the deployment of these fuels. However, experience to date has shown that SAF mandates, when done wrongly, can have disastrous consequences, resulting in the use of fuels with an even worse emissions profile and environmental impact than the fossil fuels they seek to replace.

This briefing details the current state of development of these aviation mandates and highlights areas where national governments risk repeating past mistakes. In particular, there remains a worrying focus on crop-based biofuels, and many targets under consideration are unreasonably high, running a risk of dragging in unsustainable feedstocks.

As the European Commission plans, in early 2021, to propose its ReFuelEU initiative to bring about an uptake of SAF in the aviation sector, lessons from these past mistakes must be learned. European regulators must provide a course-correction to some of the worrying proposals coming out of national capitals. Otherwise, Europe's aviation fuels policy will fail even before takeoff.

Recommendations:

- Mandates are an essential tool, but they must exclude all crop based biofuels, and should only include advanced biofuels that meet strict sustainability criteria
- Mandates should include a subtarget for e-fuels, to ensure investment is directed at these fuels which can substantially reduce aviation's climate impact
- Targets should be established, but should be set based on realistic and credible forecasts of feedstock availability, including the availability of additional renewable electricity

- Targets should be based on the GHG intensity instead of a energy-based target, in order to incentive the use of those fuels with the greatest emissions benefits.

1. Context and background

The European Union and several states in Europe have begun or are about to begin a new strategy to reduce aviation emissions: mandating the use of sustainable aviation fuels (SAFs) in the aviation sector. This is a departure from previous strategies to bring about an uptake of SAF, which has relied on voluntary initiatives and non-binding targets. Such a voluntary approach has failed. While some European initiatives, such as the bloc's emissions trading scheme (ETS), have attempted to reward SAF use, these incentive measures have not been successful. As a result of this failure to cut the carbon footprint of kerosene, emissions from flying were on an upward trajectory pre-Covid-19.

While mandating the use of renewable fuels in aviation is a new strategy for the sector in Europe, the EU has regulated the use of these fuels in road transport for a long time. The Renewable Energy Directive (RED), first adopted in 2009, sets a target for the use of renewable fuels in the transport sector: by 2020, 10% of the energy used in land transport must be renewable. However, due to poor sustainability criteria and lack of consideration of the full life cycle emissions of the fuels, the target has driven the use of unsustainable crop-based biofuels such as palm and rapeseed oil, which have devastating effects in the environment such as deforestation, loss of habitat and increased GHG emissions¹. The revised REDII (adopted in 2018) takes some steps to reduce the use of these biofuels and puts a strong emphasis on advanced fuels (such as advanced biofuels based on true waste and residues without negative direct or indirect impacts²; renewable electricity; etc.) but still allows for crop biofuels to count towards the RED targets. Due to environmental concerns and policy U-turns, the biofuel debate has been dragging on for years now, and yet another review is due in June 2021.

The EU is developing legislation to mandate SAF in the aviation sector, known as its ReFuelEU initiative. Due to be published in 2021, it remains to be seen how it will interact with existing RED and ETS legislations. However, early signals indicate that it will impose some form of blending mandate, likely on either fuel suppliers or airlines. This is a long overdue, as voluntary initiatives will not deliver. Prior to the publication of this EU-level legislation, several member states and other European states have begun drafting and implementing their own aviation SAF mandates. This allows us to ask a simple question: are they learning from past mistakes i.e. fixing the errors in the road transport sector. Or does history repeat itself, first in cars and then in planes?

¹ Transport & Environment (2020). Globiom: the basis for biofuel policy post-2020. Retrieved from: <https://www.transportenvironment.org/publications/globiom-basis-biofuel-policy-post-2020>

² Transport & Environment (2020). RED II and advanced biofuels. Retrieved from: https://www.transportenvironment.org/sites/te/files/publications/2020_05_REDII_and_advanced_biofuels_briefing.pdf

If we are to avoid past mistakes, Europe needs to think carefully before adopting mandates in the aviation sector. It needs to choose only those advanced fuels which have the potential to substantially reduce emissions and to adopt targets which can be credibly met with such advanced renewable feedstocks. In particular, the deployment of renewable e-fuels must be prioritised³. In this briefing, we define e-fuels as fuels produced from additional renewable electricity and captured CO₂, meaning they are near zero in their lifecycle emissions⁴.

2. Analysis of aviation SAF mandates in different EU countries

This briefing provides an overview of some proposed and existing legislation at the national level. By and large, the results are not positive: governments are still considering unreasonably high mandates, and in some cases explicitly including crop-based biofuels. Only one member state (Germany) stands out as committing to e-fuels, and even there, some questions remain.

What have we looked into?

In this analysis we have picked a total of seven countries in which there are ongoing discussions about SAF mandates. In most cases, the mandates are not yet adopted legislation, and the level of details varies across the board. This rating has been elaborated on the basis of available sources and discussions with relevant policymakers in the respective countries, including our partners from civil society.

The questions that we have evaluated and inquired about in each country are:

- **Is there currently a mandate including aviation?** This is helpful to understand the ambition and the intentions of the different countries. The quality of the national mandates can help shape EU policy in this regard.
- **What are the targets and the timing?** What targets are being set, and when are they due to come into effect?
- **Are crop biofuels included?** T&E opposes the use of these kinds of biofuels due to their direct and indirect negative impacts, such as land use change, deforestation, biodiversity loss, food insecurity, etc.
- **Are high-ILUC risk biofuels specifically mentioned/targeted?** The EU is taking steps to reduce and eventually phase out high deforestation risk biofuel feedstocks. The EU labels only palm oil as such, but other feedstocks such as soy oil are also leading to deforestation

³ Transport & Environment (2020). How EU legislation can drive an uptake of sustainable advanced fuels in aviation. Retrieved from: <https://www.transportenvironment.org/publications/how-eu-legislation-can-drive-uptake-sustainable-advanced-fuels-aviation>

⁴ Transport & Environment (2017). The role of electrofuel technologies in Europe's low-carbon transport future. Retrieved from: <https://www.transportenvironment.org/publications/role-electrofuel-technologies-europes-low-carbon-transport-future>

worldwide. While the EU allows a limited amount of these biofuels to be used under the REDII, these should be excluded from any fuels mandates

- **Are advanced biofuels promoted (sub-target, subsidy, multiplier etc.)?** Advanced biofuels, if done correctly and based on true wastes and residues (see footnote 3), can play a role in the decarbonisation of aviation. These should be based on realistic targets and against the backdrop of robust knowledge of the sustainable availability of the materials.
- **Are e-fuels promoted (sub-target, subsidy, multiplier etc.)?** T&E recommends member states to put efforts to develop and promote the use of e-fuels for the aviation sector. These efforts should be based on strong sustainability criteria, for example ensuring that renewable energy and sustainable carbon sources are used for their production.
- **Is the mandate based on the RED II sustainability criteria (or better)?** T&E considers that the sustainability criteria under REDII does not cover all the potential sustainability issues linked to the advanced fuels that are likely to be used in aviation. For e-fuels, these criteria are not defined yet, thus this is a crucial first step before promoting these fuels.
- **Who is the regulated party?** For simplicity, T&E recommends that the mandates are placed on the fuel suppliers, as there are less fuel suppliers than EU member states/airlines and the current EU fuels framework regulates fuel suppliers to the road transport sector.

All national mandates are considered to include all fuel sales in that state: therefore covering both domestic and international aviation emissions. This is crucial, as international flights are responsible for the majority of aviation emissions and must therefore be regulated.

The aim of these exploratory questions is to help us understand the direction of travel of the different countries. On the basis of the above aspects, we have rated each of the analysed mandates by using a color code, indicating for each mandate why we have rated it that way and providing recommendations for improvement.

Below, we explain why each country was given its ranking. Three factors stood out:

- The first was whether the mandate included crop-based biofuels. Given the disastrous climate and environmental consequences of such fuels, this gave the mandate an automatic red rating.
- The second was whether states were setting targets which were too high - experience has shown that high mandates have a way of sucking in bad biofuels. Another automatic red flag.
- On the other hand, states which mandate the use of e-fuels were given a better rating - these are the fuels which governments should be encouraging.

As the image below suggests, no country mandate has reached the green “Good to go!” status. Germany comes closest, given its focus on e-fuels, but questions remain. The number of countries flashing red and orange is a concern: Europe now has years of experience with fuel mandates, it

should be able to do better than this. We hope the European Commission's ReFuelEU can introduce a binding target for SAF uptake, but in doing so, will learn from these mistakes.

3. Country ratings

- **Good to go!**
This SAF mandate is the way to go.
- **Pass with care!**
This SAF mandate is a solid effort but why not make it even better?
- **Stop!**
This SAF mandate needs to be rethought to address some major shortcomings.
- **Reverse!**
This SAF mandate is a cure that's worse than the disease. Start again.



Finland

Finland does not currently have a SAF mandate for aviation, although a legislative proposal will be developed from early 2021 with a start date around 2023, regulating fuel suppliers⁵⁶⁷. At this early stage, the political objective is for SAFs to account for 30% of aviation's fuel needs by 2030 and e-fuels and advanced biofuels might have sub-targets. Crop biofuels are likely to be allowed but potentially subject to a cap. It is not currently known whether high-ILUC biofuels will be excluded or specifically tackled. The mandate will probably be based on RED II sustainability criteria.

⁵ Finnish Government (2019). Programme of Prime Minister Sanna Marin's Government. Retrieved from: <https://julkaisut.valtioneuvosto.fi/handle/10024/161935>

⁶ Naturskyddsforeningen (2020). Interview with an official from Ministry of Economy and Employment

⁷ Finnish Ministry of Transport and Communication (2020). Valtioneuvoston periaatepäätös lentoliikenteen kasvihuonekaasupäästöjen vähentämisestä. Retrieved from: <https://www.lausuntopalvelu.fi/FI/Proposal/Participation?proposalId=fb903941-5920-4833-9ebb-bc632ce4ff3f>

Our rating



Reverse!

This SAF mandate is a cure that's worse than the disease. Start again.

Why this rating? We are concerned that Finland will most likely allow crop biofuels to count towards the aviation mandate, a concern reinforced by the high target (30% in 2030) which is unlikely to be met by advanced fuels alone. We also have concerns about the classification of palm fatty acid distillate (PFAD) as a residue in Finland, which excludes it from the palm oil phase-out and the crop biofuels limitation.

What should Finland do to improve the mandate?

Finland should ensure that **crop biofuels** are excluded from the aviation mandate, particularly palm (and its byproducts, e.g. PFAD) and soy.

The case of PFAD in Finland

Compared to other countries, Finland presents a particularity as it classifies PFAD as a residue and thus it does not fall under the crop biofuels category. However, PFAD is a *by-product* of the palm oil industry that is actually being used in other industries. Thus, its promotion for biofuel use, beyond directly creating an incentive for more palm oil cultivation, leaves a gap in these other industries as they would need other feedstocks - such as virgin palm oil.

The reason why PFAD is classified as a residue in Finland is because the country is home to Neste Oil, the biggest producer of renewable diesel and big user of PFAD for its biofuels. The government of Finland is the largest shareholder of Neste Oil.⁸

The **level of the target** (30%) is high, and without robust sustainability criteria and the exclusion of crop-based biofuels, such targets will most likely drive the use of unsustainable fuels. Such targets should focus on e-fuels, and be revised (downwards if necessary) on the basis of potential sustainable and realistic supply. If advanced biofuels are to be used, Finland should prioritise feedstocks that are not risky - even if they are in the annex IX of the RED. The **sustainability criteria** for advanced biofuels should go beyond the RED ones, and include elements such as an impact assessment on the sustainable availability of the materials; factoring competing uses and the waste hierarchy.

⁸ Neste (2020). Shareholders. Retrieved from: <https://www.neste.com/investors/shareholders>

France

France will have a SAF mandate for aviation in force from January 1, 2021, regulating fuel suppliers⁹. The mandate presents energy-based targets which will probably only include advanced biofuels, standing at 1% (2021), 2% (2025) and 5% (2030). Crop biofuels are not allowed, with the exception of sugar molasses. High-ILUC biofuels are not specifically mentioned, although palm oil is excluded. The mandate is based on the RED II sustainability criteria.

Our rating



Why this rating? There are concerning elements in the French SAF measures, for example the lack of focus on e-fuels and the fact that molasses can count. The target, relatively low relative to other states, saves France from a red rating.



Stop!

This SAF mandate needs to be rethought to address some major shortcomings.

What should France do to improve its SAF mandate?

T&E welcomes the fact that France excludes the use of **crop-based biofuels** in its aviation mandates. Assuming palm and soy are part of this phase-out, we recommend that France explicitly excludes Palm Fatty Acid Distillate (PFAD, a palm oil by-product) from the mandate. We are however concerned about the inclusion of molasses as part of the aviation mandate: molasses are not considered advanced biofuels and they are used in the food industry - if used for biofuels, this can have displacement effects¹¹.

France has a strong emphasis on promoting the use of **advanced biofuels** in aviation. Our concern in this regard is that setting high targets for them can result in the use of unsustainable feedstocks. For this reason, our recommendation is that France sets robust sustainability criteria (beyond REDII) for these biofuels, including elements such as the consideration of competing industries, waste hierarchy

⁹ French National Assembly (2020). Projet de loi de finances pour 2021, article 15. Retrieved from: http://www.assemblee-nationale.fr/dyn/15/textes/l15b3360_projet-loi#_RefHeading_Toc407208_1701531476

¹⁰ Association Canopée (2020). Interview with an official at the Ministry of Ecological Transition.

¹¹ ICCT (2017). Indirect greenhouse gas emissions of molasses ethanol in the European Union. Retrieved from: https://theicct.org/sites/default/files/publications/EU-molasses-ethanol-emissions_ICCT-working-paper_27092017_%20vF.pdf

and cascading principle. In setting targets, a robust impact assessment of the sustainable availability of the feedstocks should be carried out, focusing on the materials that are not risky (i.e. those that are really wastes and/or residues).

Finally, we recommend that France puts a strong emphasis on the development of **e-fuels** for aviation by setting dedicated targets.

Germany

Germany does not currently have a SAF mandate for aviation, but is proposing to have a specific aviation mandate for e-fuels by Q1 2021, with the regulated party being fuel suppliers¹². The e-fuels targets will be energy-based and are expected to be 0.5% (2026), 1% (2028) and 2% (2030). Germany does not set a target for the use of advanced biofuels in aviation, instead focusing on the development of e-fuels. This is a good step to avoid driving additional demand for advanced biofuels up to unsustainable levels (the RED already sets a target for these biofuels) and promoting investments into the development of e-fuels.

Our rating



Why this rating? In this comparison, Germany presents a robust proposal, clearly excluding crop-based biofuels. The actual effect of the mandate on CO2 reduction will depend on the sustainability criteria for e-fuels, and that remains to be determined.



Pass with care!

This SAF mandate is a solid effort but why not make it even better?

What should Germany do to improve its SAF?

E-fuels should only count when using Direct Air Capture CO2 and green hydrogen and both these requirements remain unclear in the absence of a dedicated EU sustainability framework and more details in the German proposal. Without the use of DAC, e-fuels will rely on waste CO2 from fossil sources, potentially extending the reliance on fossil sources. Green hydrogen, produced from

¹² BMU (2020). Referentenentwurf der Bundesregierung: Entwurf eines Gesetzes zur Weiterentwicklung der Treibhausgasminderungs-Quote. Retrieved from: https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Glaeserne_Gesetze/19_Lp/thg_aenderung_gesetz/Entwurf/thg_aenderung_gesetz_refe_bf.pdf

additional renewables, is the cleanest pathway. We expect German government to take a leading role in developing robust methodology.

Netherlands

The Netherlands do not currently have a SAF mandate for aviation, although there will be one in force by 2023, which would regulate fuel suppliers¹³. At this early stage, the political objectives for the volume of SAFs to be used stand at 14% (2030) rising to 100% (2050). It is not currently known whether advanced biofuels or e-fuels will be specifically promoted. Crop biofuels seem to be allowed, with the exception of palm oil, and there is currently no information on whether other deforestation-risk biofuels will be specifically mentioned. The mandate is likely to be based on the revised RED (RED III) sustainability criteria.

Our rating



Reverse!

This SAF mandate is a cure that's worse than the disease. Start again.

Why this rating? Setting such high targets without a proper impact assessment of the feedstocks available can drive the use of unsustainable fuels, and because in its current iteration, the Dutch plan will include crop-based biofuels.

What should the Netherlands do to improve its SAF?

The Netherlands should make clear that crop based biofuels are excluded, particularly high ILUC risk biofuels such as palm (including PFAD) and soy oil. While it is unknown what types of fuels will be promoted under the SAFs mandate, there are a few basic elements that the Netherlands should take into account. With respect to advanced biofuels, they should ensure the use of used cooking oil (UCO) for biofuels is limited on the basis of available domestic supply (by conducting a robust impact assessment) and with strong monitoring schemes to avoid fraudulent use of UCO. Furthermore, there should be a focus to prioritise feedstocks that are not risky (i.e. real wastes and residues). The sustainability criteria for advanced biofuels should go beyond the REDII one, and include elements such as an impact assessment on the sustainable availability of the materials; competing uses; waste hierarchy. We furthermore recommend a stronger emphasis on e-fuels.

The political SAF target in the Netherlands is too high. We do not recommend setting such a high target without a proper impact assessment of the available feedstocks and technologies; otherwise, such a high target can drive the use of unsustainable fuels.

¹³ Dutch government (2020). Kamerbrief ontwikkelingen duurzame brandstoffen luchtvaart. Retrieved from: <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/03/03/bijmengverplichting-luchtvaart-en-andere-ontwikkelingen-duurzame-brandstoffen>

Norway

Norway is the only country in this comparison to already have a SAF mandate for aviation¹⁴. It entered into force on January 1, 2020 and regulates fuel suppliers. The SAF targets are energy-based and are at 0.5% (2020) and 30% (2030). E-fuels are not included in the mandate. Crop biofuels are not eligible in the mandate. While high ILUC risk biofuels are not particularly mentioned, the government has stressed that feedstocks such as palm oil are not to be used in aviation. The mandate is based on RED I sustainability criteria, since RED II still needs to be implemented in the EEA.

Our rating



Why this rating? This rating is due to the fact that only advanced biofuels, and not e-fuels, are included in the mandate. High volumes of advanced biofuels can lead to unsustainable feedstocks.



Stop!

This SAF mandate needs to be rethought to address some major shortcomings.

What should Norway do to improve its SAF?

We welcome the fact that crop-based biofuels are not included, but Norway is putting too much emphasis on advanced biofuels, which have limited availability in a sustainable way. We thus recommend that the focus shifts towards also supporting e-fuels.

We furthermore recommend that the use of advanced biofuels is based on the sustainable availability of the feedstocks, taking into account competing uses and potential displacement effects.

¹⁴ Lovdata (2020). Forskrift om endring i forskrift om begrensning i bruk av helse- og miljøfarlige kjemikalier og andre produkter (innføring av omsetningskrav til luftfart). Retrieved from: <https://lovdata.no/dokument/LTI/forskrift/2019-04-30-555>

Spain

Spain does not currently have a SAF mandate for aviation, although the Spanish Climate Change law¹⁵, which is expected by mid-2021, will probably establish annual SAF targets for aviation^{16,17,18}. It is not yet known who will be the regulated party, which might be both fuel suppliers and airlines. The targets and timings of the prospective mandate are currently not known. A promotion of advanced biofuels and e-fuels is expected. Crop biofuels are expected to be allowed under the mandate, although high-ILUC biofuels might be explicitly excluded. The mandate will be based on RED II sustainability criteria.

Our rating



Reverse!

This SAF mandate is a cure that's worse than the disease. Start again.

Why this rating? As specified at the start of this document, this rating is tentative while we wait for a concrete proposal. We are rating Spain red because we are concerned about the fact that crop biofuels are likely to be eligible in the mandate. Our concerns are based on the fact that Spain allows for a high percentage of these biofuels to be counted towards the RED targets, although this might be different in the case of aviation.

What should Spain do to improve its SAF?

There is a big lack of available information on Spain's proposal but there are some basic recommendations to take into account for the development of the SAF mandates in Spain. First, Spain should make sure that all crop biofuels - including palm and its derivatives as well as soy oil - are excluded and thus not eligible for the mandate.

In these early stages of the design of the law, we recommend that Spain focuses particularly on e-fuels. If advanced biofuels are to be included, Spain should prioritise feedstocks that are not risky (i.e. real wastes and residues). The sustainability criteria for advanced biofuels should go beyond

¹⁵ Spanish Parliament. (2020). Boletín oficial de las Cortes Generales. Retrieved from: http://www.congreso.es/public_oficiales/L14/CONG/BOCG/A/BOCG-14-A-19-1.PDF

¹⁶ Spanish Environment Ministry (2020). Proyecto de Real Decreto por el que se modifica el Real Decreto 1085/2015, de 4 de diciembre, de fomento de los Biocarburantes, y se regulan los objetivos de venta y consumo de biocarburantes para los años 2021 y 2022. Retrieved from: <https://energia.gob.es/es-es/Participacion/Paginas/DetalleParticipacionPublica.aspx?k=341>

¹⁷ Spanish Environment Ministry (2020). Estrategia de descarbonización a largo plazo 2050. Retrieved from: [miteco.gob.es/es/prensa/documentoelp_tcm30-516109.pdf](https://www.miteco.gob.es/es/prensa/documentoelp_tcm30-516109.pdf)
https://www.miteco.gob.es/es/prensa/documentoelp_tcm30-516109.pdf

¹⁸ Spanish Environment Ministry (2020). Plan nacional integrado de energía y clima. Retrieved from: https://www.miteco.gob.es/images/es/pniecconpleto_tcm30-508410.pdf

REDII, and include elements such as an impact assessment on the sustainable availability of the materials, competing uses and waste hierarchy. We furthermore recommend a stronger emphasis on e-fuels.

Sweden

Sweden does not currently have a SAF mandate for aviation, although a political agreement on a mandate is expected to occur by June 30th 2021, with the regulated party being the fuel suppliers^{19,20}. The prospective targets are based on annual levels of emission reduction for aviation through alternative fuels and are as follows: 0.8% (2021), 4.5% (2025) and 27% (2030). This is expected to imply energy-based targets of 1% (2021), 5% (2025) and 30% (2030) for SAFs, without specific subtargets for any fuel type. Crop biofuels are expected to be allowed under the mandate, and high-ILUC risk biofuels (like palm oil based) are not specifically mentioned at this stage. The mandate will use the sustainability criteria in the REDII as its basis.

Our rating



Why this rating? The negative rating for Sweden is based on the fact that food based biofuels are eligible in the mandates. Furthermore, we are concerned about such high targets without a robust impact assessment.



Reverse!

This SAF mandate is a cure that's worse than the disease. Start again.

What should Sweden do to improve its SAF mandate?

Sweden must ensure that crop biofuels - particularly high ILUC risk ones - are excluded from the mandate. Promoting these in the aviation sector goes against the RED provisions that limit and exclude these biofuels. Thus, Sweden must focus on the promotion of advanced fuels in its SAF mandate. In the case of advanced biofuels, it is important that the life cycle emissions accounting

¹⁹ Swedish Government (2020). Bränslebytet förstärks med högre inblandning av förnybart i drivmedel.

Retrieved from:

<https://www.regeringen.se/pressmeddelanden/2020/09/branslebytet-forstarks-med-hogre-inblandning-av-fornybart-i-drivmedel/>

²⁰ Swedish Government (2019). Biojet för flyget. Retrieved from:

<https://www.regeringen.se/rattsliga-dokument/statens-offentliga-utredningar/2019/03/sou-201911/>

approach they seem to favour is accurate and includes indirect effects. Furthermore, Sweden should prioritise feedstocks that are not risky (i.e. real wastes and residues). The sustainability criteria for advanced biofuels should go beyond REDII, and include elements such as an impact assessment on the sustainable availability of the materials, competing uses and waste hierarchy.

We overall recommend that more focus and specific measures are implemented to promote e-fuels - such as specific targets for these types of fuels.

4. Conclusions & recommendations

The EU and European countries are finally getting serious about reducing emissions from aviation. By focusing on developing new fuels, they are proposing policies which are broadly going in the right direction: advanced fuels have the potential to substantially decrease emissions from the sector.

However, much remains to be done before these policies achieve their stated goal of actually reducing emissions from the sector. In particular, Europe must finally **break free from its use of unsustainable crop-based biofuels**, and adopt a cautious approach to fuels produced from advanced feedstocks. When it comes to selecting which fuels to support, too many states in this report seem not to have learned the mistakes of the past.

In drafting national mandates, and in ReFuelEU, regulators must adopt the following positions:

- Mandates are essential tools, but they must exclude all crop based biofuels, and should only include advanced biofuels that meet strict sustainability criteria
- Mandates should include a subtarget for e-fuels, to ensure investment is directed at these fuels which can substantially reduce aviation's climate impact
- Targets should be established, but should be set based on realistic and credible forecasts of feedstock availability, including the availability of additional renewable electricity for e-fuels
- Targets should be based on GHG intensity instead of an energy-based target, in order to incentive the use of those fuels with the greatest emissions benefits.

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