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Agenda Item 3: Challenges and policy making

CHALLENGES AND OPPORTUNITIES IN POLICY MAKING FOR SUSTAINABLE AVIATION FUELS

(Presented by the ICAO Secretariat)

SUMMARY

Several challenges exist for the development, production, and deployment of sustainable aviation fuels (SAFs). This paper suggests possible means to overcome these challenges with the use of policy measures and presents benefits and opportunities in all pillars of sustainable development that might be created with the development of an SAF industry, which are consistent with the UN Sustainable Development Goals.

Action by the Conference is in paragraph 6.

1. INTRODUCTION

1.1 This paper covers some of the main challenges facing policy making for sustainable aviation fuels (SAFs), and highlights the potential opportunities and benefits associated with SAF development, production, and deployment. New policies may be needed to support the development of a new SAF industry, which in turn can contribute to many of the UN Sustainable Development Goals (SDGs). The benefits of developing, producing, and using SAF can go far beyond the immediate benefits of reducing the impact of international aviation on the global climate, and can provide opportunities for greater economic growth, expanded employment, revitalized infrastructure, and reduced inequality throughout States' economies.

1.2 Similarly, the UN SDGs provide a useful framework when developing policies to support an SAF industry. The SDG framework can encourage the adoption of harmonious regulations amongst States, create opportunities for the development of partnerships, and promote actions to share information as a means to spread associated economic and social co-benefits. Development of new supply chains for SAF production present opportunities to craft policies to promote inclusive and equitable education and training to meet the workforce needs and will present opportunities to promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or

other status. Creating a new industry from the beginning is a rare occasion for meeting positive and diverse economic, social, and environmental goals and extending the growth of clean energy.

2. SUSTAINABLE AVIATION FUELS POLICY MAKING CHALLENGES

2.1 The great challenge faced by the emerging SAF industry is the high risk (real and perceived) caused by the volatility of energy prices, which can result in price shocks. Adequate policies are needed to reduce the production cost gap between SAF and CAF, reduce the risk of SAF investments, and integrate efforts among all stakeholders involved in the SAF supply chain.

2.2 Current State policies, targets, and mandates to promote alternative fuel production are presented in CAAF/2-IP/04. It highlights that most policies are focused on ground transportation, and that few policies exist for SAFs. One possible cause is the challenges encountered in conceiving and implementing policy reforms and targets for aviation due to its international nature, in contrast with ground transportation over which there is greater degree of local control.

2.3 An example of market distortions caused by the lack of incentives for SAFs compared to alternative fuels for ground transportation is when sustainable fuel production intended for SAF is diverted to use as renewable diesel to take advantage of incentives. This may be particularly likely in the United States and the European Union[1]. For the development of a viable SAF industry that meets the aspirational goals of ICAO and its Member States, it is essential that SAF is able to compete on an equal basis with other transportation fuels.

2.4 An integrated policy approach for SAF development and production, from research and development into new fuels and production processes, feedstock development, fuel production facilities, distribution networks, to final consumption, is complex due to the involvement of many stakeholders from different sectors (e.g., feedstock and fuel producers, governmental agencies within and between States, airlines, certification bodies, airports, etc.). Different SAF policies and sustainability criteria under national and regional frameworks could hinder, limit, or distort competition between producers that are willing to export SAF into different markets. The SAF industry is relying on the combination of dropping costs of alternative fuels and rising prices of conventional fuels to overcome the cost constraints[2].

2.5 For the foreseeable future, commercial aviation has no alternatives to liquid fuels as a source of energy, while ground transportation can rely on other sources such as electricity to reduce its dependence on conventional fuels and reduce its carbon emissions. For these reasons, the prioritization of the use of SAF for the aviation sector or, at a minimum, to guarantee a level playing field between aviation and other transportation sectors, is a good way of reducing the carbon emissions of the transport sector as a whole.

3. POSSIBLE SUSTAINABLE AVIATION FUELS POLICIES

3.1 Given the nature of international aviation, SAF policies have to be based on a comprehensive assessment of local, regional, and global impacts. To successfully stimulate SAF deployment, stakeholders will need to reduce the risk associated with SAF investments. There are multiple policy strategies that can be employed to address the technology and market risks and some of

[1] U.S. Department of Energy, *Alternative Aviation Fuels: Overview of Challenges, Opportunities and Next Steps*, 2017, https://energy.gov/sites/prod/files/2017/03/f34/alternative_aviation_fuels_report.pdf

[2] P. Gegg, L. Budd, and S. Ison, International Journal of Sustainable Transportation, 9: 542–550, 2013.

the existing policy strategies can be found in CAAF/2-IP/04. For example, supporting research and development into feedstock production, process technologies for producing SAF and policies to increase SAF deployment are needed to expedite and advance supply chain development. Table 1 illustrates some SAF policy actions, the challenges they help to overcome, and the key stakeholders associated.

Table 1. Examples of policy actions, associated challenges and stakeholders

Possible Policy Action	Challenge to be Addressed	Key Stakeholders
Grants or tax credits	R&D on feedstock and process development	Federal energy & research agencies, Universities
Loan guarantees	Risk associated with investment	Federal energy, agricultural, and defence agencies
Production facility grants	Access to capital	Federal agencies, SAF producers
Subsidies	Cost gap between CAF and SAF. Promotion of market development.	Farmers, SAF producers
Incentives	Cost gap between CAF and SAF. Promotion of market development	Farmers, SAF producers
Blending Mandates	Promotion of market development.	Airlines, SAF producers

4. POSITIVE IMPACTS OF DEVELOPING A SUSTAINABLE AVIATION FUELS INDUSTRY

4.1 The United Nations Sustainable Development Goals (SDGs) provides the framework to support sustainable development in its three dimensions – economic, social, and environmental – in a balanced and integrated manner. Reflecting the targets and indicators of the SDGs while establishing policies to incentivize, support, and encourage SAF research, development, production and deployment will ensure maximum advantages and benefits are achieved from this new industry.

4.2 Over time, as price parity between SAF and other transportation fuels is approached, States will benefit from access to more affordable, reliable, sustainable, and modern fuels throughout their economy. As such SAF will contribute not only to States' efforts on environmental protection, but also to their economic development.

4.3 Producing energy domestically will provide economic benefits, and potentially open opportunities for energy exports in sectors where there are presently net imports. Developing the SAF industry will create employment in the construction industry over multiple years, while the SAF industry will result in permanent employment for the long term. For example, the UK Department for Transport (DfT) is committing £22m to fund development of five new alternative fuel production plants using waste-based feedstocks[3]. Through their commitment to using SAF, UK Airlines[4] expect a reduction of CO2 emissions of up to 24% by 2050. They anticipate the UK Gross Value Added may reach as high as £265 million and an export value of £220m in 2030. The expected 12 UK operational sustainable fuel production facilities by 2030 could result in 3,400 direct jobs and a further 1,000 jobs in global exports as a result from using SAF instead of CAF.

[3] http://biofuels-news.com/display_news/12812/uk_promotes_advanced_biofuelpowered_planes/
[4] http://airlinesuk.org/wp-content/uploads/2017/01/Airlines-UK-Responding-to-the-Carbon-Challenge.pdf

5. OPPORTUNITIES TO CONTRIBUTE TO SUSTAINABLE DEVELOPMENT GOALS

5.1 When devising policies to ensure that SAF is competitive with CAF, it is important to capture associated benefits that may be realized. Particularly, the further development and deployment of SAF can contribute to 13 of the UN SDGs (see Appendix). For example, ensuring SAF is competitive with other transportation fuels presents opportunities to reduce inequality within as well as among countries (SDG 10). Using SAF will inherently combat climate change (SDG 13) as well as LAQ impacts, contributing to healthy lives and promoting wellbeing for all ages (SDG 3). At the same time sustainable industrialization can encourage resilient infrastructure and foster innovation (SDG 9). Well planned SAF feedstock development can protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and stop biodiversity loss (SDG 15). Policies to encourage gender equality and empowerment for women and girls (SDG 5) can be readily adapted as part of a well-constructed SAF policy. Similarly, educating a workforce to support a new SAF industry creates opportunities to ensure inclusive and equitable quality education (SDG 4). The result of a growing and robust SAF industry can assist in achieving sustained and inclusive economic growth and full, decent, and productive employment (SDG 8).

5.2 Therefore, by building a new SAF industry states can realize economic, social, and environmental advantages, contributing to the ambitious and transformational vision set out in the United Nations SDGs. Since the SAF industry is still at its infancy, these advantages need to be promoted and showcased, in order to expand the benefits of the SAF industry to a greater number of states.

6. ACTION BY THE CAAF/2

6.1 The CAAF/2 is invited to:

a) recognize that few policies are in place for the deployment of SAF, in contrast with the several policies for ground transportation alternative fuels;

b) acknowledge the need to prioritize the use of SAF for the aviation sector or, at a minimum, to guarantee a level playing field between aviation and other transportation sectors;

c) encourage States to implement comprehensive policies to incentivise SAF research, development, production, and deployment;

d) encourage States to implement adequate policies to reduce the production cost gap between SAF and CAF, reduce the risk of SAF investments, and integrate efforts among all stakeholders involved in the SAF supply chain;

e) acknowledge the need for policy integration between the various stakeholders involved with aviation alternative fuels, at different levels, in order to avoid inconsistent policies; and

f) encourage States to promote and showcase the economic, social, and environmental advantages that may arise from the development of an SAF industry that contributes to 13 of the United Nations Sustainable Development Goals (SDGs).

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APPENDIX

SAF CONTRIBUTION TO UN SDGS

SDG 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture – To increase productivity and production of SAF feedstock, resilient agricultural practices will have to be implemented, while considering maintaining ecosystems, strengthening capacity for adaption to climate change, extreme weather, drought, flooding, and other disasters, and progressively improving land and soil quality. Transferring these practices to food production, in particular in developing and least developed States, could help end hunger and malnutrition whilst ensuring that SAF production avoids competition with food production.

SDG 3 – Ensure healthy lives and promote well-being for all at all ages – Using SAF could result in reduced emissions of particulate matter and sulphur oxides, thereby reducing aviation's impact on local air quality (LAQ)[5]. Further research is ongoing to quantify the impact of SAF on LAQ.

SDG 4 – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all –Access to affordable and quality technical, vocational, and tertiary education, including university, can increase the number of youths and adults who have relevant skills for employment and entrepreneurship as needed to develop a local SAF supply. SAF creates a new industry with needs for new technical skills. ICAO has been convening hands-on training Seminars and Symposia for Member States focused on the exchange of latest knowledge on environmental subjects, as well as assisting States to implement environment-related ICAO policies, Standards and Recommended Practices (SARPs) and guidance, providing inclusive and equitable quality education to all. In addition, webinars and web courses are made available free of charge on the ICAO Website.

SDG 5 - Achieve gender equality and empower all women and girls – A sound policy framework along the SAF supply chain at a national, regional, and global level could help to ensure full and effective participation of women and equal opportunities for leadership at all levels of decision-making in political, economic, and public functions in this new industry.

SDG 7 – Ensure access to affordable, reliable, sustainable and modern energy for all – This is the SDG mostly closely related to SAF, since it is inherently a new source of clean energy for aviation, and its deployment will be a key element for reducing aviation's dependence on fossil fuels, contributing to the diversity of energy sources for aviation and reducing the risks associated with a single energy source.

SDG 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all – All steps are being taken to make the SAF industry sustainable since its onset, helping to decouple economic growth from environmental degradation. Especially on Small Island Developing States with heavy international tourist aviation traffic, a local supply of SAF could reduce high CAF importation costs. Additionally, the SAF supply chain can present broad positive social and economic effects in a variety of ICAO Member states, contributing to promote the sustained, inclusive and sustainable economic growth expected by SDG8.

SDG 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation – Research and development for developing new types of alternative fuel has grown significantly during the last 10 to 20 years as a result of the use of mandates, tax breaks, subsidies, and

[5] CAAF/09-WP/05

advantageous funding arrangements between alternative fuel producers and national governments.[6] Thus, investing in more research on SAF diversity, scaling-up of development, and deployment will contribute to SDG 9 by promoting inclusive and sustainable industrialization and fostering innovation.

SDG 10 – Reduce inequality within and among countries – In the spirit of the ICAO "No Country Left Behind" campaign, ICAO will continue to facilitate communication of initiatives and promotion of the development of partnerships between ICAO Member States, including the sharing of information and best practices related to the development of supply chains for SAFs, aiming at spreading the economic and social benefits associated with this new industry development to an increasing number of ICAO Member States. Additionally, it shall be noted that developing countries are taking the lead on several SAF deployment initiatives, which confirms the potential contribution of the SAF development to this SDG.

SDG 11 - Sustainable cities and communities – Improvements in LAQ from SAF use and the sustainable production of SAF also contribute to SDG 11, helping to make cities and human settlements inclusive, safe, resilient and sustainable.

SDG 12 – Ensure sustainable consumption and production patterns –Sustainability criteria required for SAF production will assure its contribution to SDG 12, which focuses on ensuring sustainable consumption and production patterns, such as an environmentally sound management of wastes throughout their life cycle to reduce their release to air, water, and soil. Further, SAF might enable a substantial reduction in waste generation by for example using municipal solid waste as feedstock. Sustainability certification of SAF might also encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

SDG 13 – Take urgent action to combat climate change and its impacts – Production and deployment of SAFs is inherently a strategy to reduce global greenhouse gas emissions due to their reduced emissions on a life cycle basis when compared with CAF, as was acknowledged during CAAF/1[7]. This action is in line with SDG 13, which appeals to States to take urgent action to combat climate change and its impacts.

SDG 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss – Sustainability criteria for SAF will consider land-use change effects that may be associated with SAF production. This will contribute to a sustainable use of terrestrial ecosystems, such as forests. For example, the production of SAF from forestry residues can be an essential component of sustainable forest management.

SDG 17 – Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development – SDG 17 is in line with SDG 10, which calls for a reduction in inequality within and among countries. In the spirit of the ICAO "No Country Left Behind" campaign, ICAO will continue to facilitate communication of initiatives and promotion of the development of partnerships between ICAO Member States, including the sharing of information and best practices related to the development of supply chains for SAFs, aiming at spreading the economic and social benefits associated with this new industry development to an increasing number of ICAO Member States. The Global Framework for Aviation Alternative Fuels (GFAAF) is a good example of ICAO action in contributing to this SDG.

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[6] Panoutsou et al., 2013
[7] CAAF/09-WP/3