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INDIAN BIO-JET FLIGHT PLAN: READY TO TAKE-OFF

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On April 05, 2019, the government of India notified an amendment¹ to the Indian Standards for Aviation Turbine Fuel (ATF), commercially known as IS:1571, ATF, Kerosine Type, Jet-A-1-Specifications². This document for the first time, permitted the blending and use of bio-jet fuel with conventional crude based ATF in India. Although, the process for producing bio-jet fuel from non-edible tree-based oil, like Jatropha, was indigenized in 2013-14 and proved earlier in research labs, its use in aviation sector was prohibited due to missing regulatory approvals.

Flying a heavier than air object is inherently risky endeavour; but has achieved the distinction of being the world safest mode of transport³ due to fail-safe technology and effective regulatory mechanisms. ATF Jet A-1, is a widely used fuel that powers commercial and military aircraft. It has to qualify strict quality checks before being filled in to the aircraft. Similarly, any product or process that delivers aviation consumables like fuel, oil, lubricants, etc,

has to qualify similar multi-layered checks or get summarily rejected. Therefore, without mandatory approvals for production test and certification, the use of bio-jet fuel in aircraft was virtually banned in India. The document released earlier this month, had mitigated the provisions of this exclusion by approving the testing mechanism.

Earlier, in 2015, India had started on a formidable mission to reduce its dependence on imported crude oil. The target was to achieve a 10% cut in import by 2021. Heeding this clarion call, the National Biofuel Policy⁴ was revised and notified in May 2018. The new policy encouraged embracing new technologies for converting waste into fuel and heralding renewed interests in accelerated and targeted adoption of carbon neutral fuels. The policy for the first time included 'drop-in bio-jet fuels' in the national narrative. Concurrently, the ICAO's CORSIA⁵ regulations also came into effect from 2019, requiring all international flights to monitor CO₂ emissions. The policy professes the use

innovative technologies, like green fuels, to reduce aviation sector's carbon footprint⁶.

In light of these changes, it was imperative for the Indian aviation industry to measure-up and absorb new technologies and regulatory changes. One such cost effective strategy was to promote the use of indigenously produced sustainable green bio-jet aviation fuel. The inherent advantages of this approach were that it would promote indigenous R&D, reduce dependency on imported crude and enhance earning of marginal farmers and tribal (the suppliers of feedstock).

However, the roadmap enabling use of bio-jet fuel within the existing downstream infrastructure in India was entwined with layers of regulatory limitations. The Indian standards for aviation fuel, until 2018, did not permit blending and dispensing of non-conventional, synthetic sourced jet fuel with crude based ATF. While concurrent international standards for ATF Jet A1 like ASTM D1655⁷, Def Stan 91-091 (issue 9)⁸, etc, permitted use of such fuel, the Indian standard was silent on the same.

According to international conventions⁹, aircraft and aero-engine performance data on new fuel is required to be deeply analyzed, before it qualifies for adoption in quality standards. The technical facilities required to undertake such aero-engine tests and evaluations were not availability for the civil aviation sector in India. Thus, preventing the

approval and commercial exploitation of the indigenously bio-jet fuel technology.

Understanding these limitations and the learning from the US Air Force's experiments, the Indian Air Force embarked on a project to enable the adoption of bio-jet fuel, as a national mission. The project "Development and Testing of indigenous 'drop-in' bio-jet fuel for military aircraft" conceived in October 2017, intended to promote the use of bio-jet fuel for strategic gains. The project also aimed to build a supportive ecosystem, including facilitating necessary policy revisions to speed-up its commercialization. The IAF offered¹⁰ its aero-engine production and flight-testing facilities, including test aircraft, to perform the evaluative trials so that the local process and product could be certified and accepted for commercial use. Simultaneously, IAF also marshaled the inter-ministerial efforts for the formation of a sub-committee on bio-jet fuel at MoP&NG¹¹ and thereafter, a 'panel for alternate jet fuels'¹² at the Bureau of Indian Standards (BIS). The Indian standard for bio-jet fuel drafted by this panel was notified in January 2018 as IS:17081¹³ and defined the production process and quality requirements for ATF made from synthetic source.

Notwithstanding all this, the aviation industry can accept the new fuel only if it is delivered to the aircraft from the existing supply lines. Similarly, commercial production of bio-jet is possible only if its blending, dispensing and use is freely permitted through the existing

downstream at airports. The amendment issued on April 05, 2019 has concurred this practice, by inserting the following text and related instruction in the ATF standards of 2018. Thus, supporting commercial production and use of bio-jet fuel by the industry. "Para 3.2.8-Synthesized hydrocarbons as specified in IS:17081 can be blended upto 50%, max v/v with conventional Jet fuel. Such blended fuel shall meet the requirement prescribed in.....standard"

The aviation sector's demand for green fuel is likely to witness a quantum jump, primarily driven by growing foreign traffic and environmental regulations like CORSIA. This would require investments in technologies for producing bio-jet and supply chains for managing farm waste and forest produce. The approval of the amalgamating amendment has provided the congenial milieu for enabling this carbon neutral growth of the aviation sector and supporting agrarian economy.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

Notes

¹ The Gazette of India, Ministry of Consumer Affairs, Food and Public distribution, Bureau of Indian Standards, SO 1526(E), dated April 01, 2019, published on April 05, 2019

² The Gazette of India, Ministry of Consumer Affairs, Food and Public distribution, Bureau of Indian Standards, *Indian Standard IS 1571:2018*, Aviation Turbine Fuels, Kerosine Type, Jet A-1-Specification (10th revision), SO 5802(E), dated November 14, 2018, published November 20, 2018

³ Bureau of Transportation Statics, US Department of Transportation, *Transportation fatalities by Mode*, <https://www.bts.gov/archive/publications/transportation>

[_statistics_annual_report/2015/tables/ch6/table6_1](#), May 20, 2017, accessed on April 06, 2019

⁴ National Policy on Biofuel 2018, Ministry of Petroleum and Natural Gas, <http://petroleum.nic.in/national-policy-biofuel-2018-0>, uploaded Jun 21, 2018, accessed on April 07, 2019

⁵ Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), is an emission mitigation approach for the global airline industry, developed by the International Civil Aviation Organization (ICAO). It addresses emissions from international air travel.

⁶ Mihai Andrei, *ZME Science*, 'What the aviation industry is doing to reduce carbon emissions', April 04, 2019, <https://www.zmescience.com/research/technology/aviation-on-industry-reduces-emissions-04042019/>, accessed on April 06, 2019

⁷ An American national standard, developed in accordance with internationally recognized principles of standardization established, recommended and issued by the World Trade Organization, Technical Barriers to Trade (TBT) Committee. The standard defines specifications for ATF for use on civil and military aircraft

⁸ ATF standard produced by Ministry of Defence, UK on behalf of the Standardization Advisory Group (SAG) in collaboration with the UK Aviation Fuels Committee (AFC).

⁹ ASTM D4054, defines the American standard practice for Qualification and Approval of New Aviation Turbine Fuels and Fuel Additives

¹⁰ Biofuel Day: IAF's Contribution, CAPS Issue Brief 124/18, August 14, 2018,

¹¹ Sub-committee formed at the working group for biofuel under the aegis of the Ministry of Petroleum and Natural Gas

¹² The panel with members from IAF, CEMILAC, DGAQA, CSIR-IIP and the oil refineries was instrumental in drafting the quality standards for ATF containing synthesized hydrocarbons, in-line with international standard like ASTM D1755

¹³ The Gazette of India, Ministry of Consumer Affairs, Food and Public distribution, Bureau of Indian Standards, SO 329 (E), dated January 14, 2019, published on January 16, 2019