

India' emerging SAF Policy & land scape

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Ramakrishna Y B

BEST Associates

(Indian Federation of Green energy)

Email: ybramakrishna@gmail.com

ATF-SAF current Scenario

- ATF Consumption for the year 2023-24 was 8247MMT
- ATF Consumption by International flights is 25% which is approximately 2000MMT
- India is in tune with ICAO's aspirational goal of Carbon Neutral Growth
- There is a need to give necessary thrust to the indigenous renewable sources of Bio-Jet or SAF from standpoint of:
 - ❖ Local & National Supply Security (IAF : Strategic Oil Reserve)
 - ❖ Environmental Concern
 - ❖ Boosting Indian Rural Economy
- It is already mandated to blend 1% SAF 2027-28, 2% SAF by 2028-29 and 5% by 2030 for all international flight
- SAF requirement would be 20MMT for 1%, 40MMT for 2% and 100MMT for 5% blending

ATF-SAF current scenario

- In India key body work has been done in 2010 consortium mode involving Indian Institute of Petroleum, Dehradun (IIP-Dehradun), Indian Oil Corporation Limited (IOCL), Hindustan Petroleum Corporation Limited (HPCL), Indian Institutes of Technology (IIT) Kanpur and Indian Institute of Science (IISc) Bangalore
 - ❖ IIP Dehradun : Development of process for Bio-jet fuel from Jatropha oil
 - ❖ IOCL/HPCL : Testing of Bio-Jet blended in ATF, purpose testing, additive optimisation, material compatibility tests etc
 - ❖ IIT Kanpur : Numerical & computational fluid dynamics modelling, droplet size & distribution and combustion model studies
 - ❖ IISc, Bangalore : Fuel spray atomisation testing & establishment of co-relation with spray properties & fuel blends
 - ❖ Infotech Bangalore : Can combustor design, rig combustor modelling, CFD modelling etc,
 - ❖ Pratt & Whitney, Canada : Engine testing, material compatibility testing, Flame kinetics, bench tests, emission studies, ASTM approvals etc.
- Final report submitted on 28th Feb 2023

ATF-SAF current scenario

- Further to consolidate these efforts a sub committee was constituted by Working group on Biofuels under the aegis of Ministry of Petroleum comprising of members from OMCs, CSIR-IIP Dehradun, IIT Kanpur, CBDA, DGCA, DST & Spice Jet with the objectives of
 - ❖ Document various global & indigenous Bio-jet fuel specifications, Policies and examine its suitability for India
 - ❖ Aspects of R&D to cover Feedstock & product development, scaling up, storage & distribution, blending studies, long term engine testing, in-flight performance studies, emission studies, LCA
 - ❖ Techno-feasible analysis of indigenous and global technologies
 - ❖ Risks associated with commercialisation and risk mitigation strategies
- Final report submitted in August 2018

Developments on Home made SAF & trials

- SAF produced from Jatropha oil by Indian Institute of Petroleum (CSIR-IIP)– Dehradun (HEFA) blended in ratio of 1:4 (SAF:ATF) was used in one engine of Bombardier Q400. Aircraft for 01 hour flight from Dehradun to Delhi in August, 2018
- Indian Air force have been carrying out test on various carriers with 1-10% blends for more than 4 years now successfully with SAF supplied by CSIR-IIP
- Air Asia IS-767 a commercial flight from Pune to Delhi was flown on 19 May with 1% SAF produced at Praj Matrix and tested and supplied by IOCL laboratories
- DGCA has granted approval to one of its airlines to carry out its first international ferry flight with 10% blended fuel from Toulouse to Delhi on 17 Feb 2022. The flight was successful.
- Engine performance was satisfactory and parameters were within limits
- Bureau of Indian Standard (BIS) – issued Indian Standard for Bio-jet ATF IS:17081 in January 2019

Production initiatives

- MRPL to set up 40TPD plant with HEFA technology from IIP Dehradun
- IOCL has MOU with Praj & LanzaJet for setting up ATJ facilities with 2G & 3G ethanol
- HPCL is setting up 3 SAF plants with \$1 billion investment 1) with UCO – 40TPD plant with their own technology 2) 40TPD with Camelina sativa oil with their own technology 3) 80-KLPD ATJ plant – Technology yet to be finalised
- BPCL is planning to establish sustainable aviation fuel (SAF) facilities at its three refineries. BPCL plans to allocate investments totaling \$ 1.1billion for the development of these units
- TruAlt & Greenko plans to set up multiple commercial plants

Future Vision - Actions

- Laying the foundation for the SAF supply thorough robust framing and implementation of appropriate policies.
 - ☐ Establish a plan for certifying SAF under CORSIA
 - ☐ Develop SAF related laws and regulations
 - ☐ Implement a mandatory SAF blending ratio system
 - ☐ Promote SAF usage environment
- DGCA with representatives from OMCs & MoP&NG had participated in the ICAO conclave recently.
- DGCA is the process of identifying the consultant who will advise on the feedstocks, technologies, commercialisation, techno-commercial feasibility, fiscal incentives etc by end of the year based on which a clear policy eco- system will evolve.

Challenges – needs to be fixed

- No ICAO approved certification scheme to certify CORSIA eligible fuel
- Cost & production of SAF - Each state is committed but is limited by their resource capability. How the high cost of SAF be compensated through administered pricing is an issue. Different feedstocks and pathways add to the complexity.
- Maturity of technologies to scale
- Lack of infrastructure & ecosystem is adding to the cost of SAF
- Access to finance (High Capex- front end investment) is a big challenge
- Airline operator claim on emission reduction due to CORSIA eligible fuel- Complex challenges related to traceability & LCS assessment. Absence of ICAO approved certification scheme due to divergent approaches