Bio-Aviation Fuels

1.	Title of Technology	Bio-Aviation Fuels
2.	IPR Status Patent/Copyright/Trademark Secured in India/Abroad IPR Details	WO/2016/038633, 179EP-0701SS, WO2014049621 A1, 2622 DEL2014; 3039Del2012; 3144Del2012; 3441Del2012; 3246DEL2013, US 2017 / 0253808 A1, US 2018 /0010052 A1, US 2017/0165655 A1
3.	Application/Uses/Problem being addressed	Transportation sector – Fuels (Road/Rail/Air) Sustainable Bio-Fuels; Alternate Energy Resource
4.	Salient Technical Features including Competing Features	• **Single Step Process** (Lower Investment and Operating Cost) – **Unique and Novel** • **Aromatics in the Biojet (additional blending of aromatics is not required to meet ASTM/BIS specifications.** • **Reduces Overall Carbon emissions over a complete cycle** • **The process is less costly (CAPEX) and less capital intensive as compared to other processes available globally** • By Products – **Diesel (80-90 cetane) & Naphtha (<10 ppm sulfur – for reformer)** **Employment opportunities** - Agricultural / transport/ Refining Industry
5.	Level/Scale of Development	Pilot Scale – 48 Kg/day feed processing Capacity. Demonstration scale (operational)– 250 kg/day feed processing with 50-80kg/day Bio-Aviation fuel production
6.	Environmental Considerations, if any	Reduced emissions COx & SOx Renewable feed Promote Plantation for Greener Environment
7.	Status of Commercialization	TRL-6 (Demonstration Scale)
8.	Major Raw Materials to be Utilized	Hydrogen gas Non-edible oil/ waste cooking oil

<table>
<tr><td>9.</td><td>Major Plant Equipment and Machinery Required</td><td>Compatible to Refinery Infrastructure – Similar to a High pressure Hydrocracker</td></tr>
<tr><td>10</td><td>Techno-Economics (Broad)</td><td>
<table>
<tr><th>Major Products</th><th>TPD</th></tr>
<tr><td>Renewable Naphtha</td><td>10-20</td></tr>
<tr><td>Bio-Jet</td><td>25-35</td></tr>
<tr><td>Renewable Diesel</td><td>25-35</td></tr>
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Plant Through Put – 134 TPD feed processing
Payback Period -2.4 years (@ Feed cost of Rs. 45/kg)
Bio-Jet – 120 Rs/liter; Renewable diesel – 71 Rs/liter

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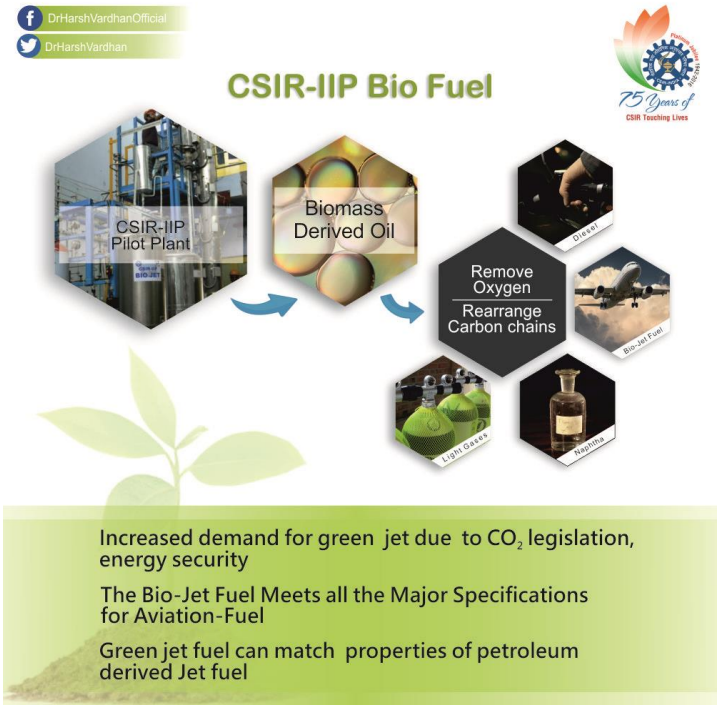
<tr><td>11</td><td>Technology Package (IPR, Process etc.)</td><td>Technology Information Package Prepared and submitted to “BPCL”.
WO/2016/038633, 179EP-0701SS, WO2014049621 A1, 2622 DEL2014; 3039Del2012; 3144Del2012; 3441Del2012; 3246DEL2013, US 2017 / 0253808 A1, US 2018 /0010052 A1, US 2017/0165655 A1</td></tr>
<tr><td>12</td><td>Contact Details</td><td>Director, CSIR-Indian Institute of Petroleum, Dehradun-248005
E-mail: director@iip.res.in</td></tr>
<tr><td>13</td><td>Photographs (please provide high quality photographs of proof of concept & validation)</td><td> 
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Proud moment for our @CSIR_IND

Congratulations to @CSIRIIP team

Under dynamic leadership of @shekhar_mande flying higher & farther should be the aspiration now!

Prof. R. Ravishankar @ravishni

Screen grab of fighter aircraft using a bio-fuel mix... contribution of CSIR to the Nation...big salute to our fearless fighters and our wonderful scientists. @CSIR_IND @rameshmashelkar

TOI-28th August, 2018