



Ministry of Petroleum & Natural Gas

Developments in India in Advanced Biofuel Sector

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Indian Bio Fuel Program - Background

- **Energy Security** and **Environment concerns** are the two primary reasons that drive the program at global level
- India being an **agrarian society** has added a new dimension
- Can Bio Fuel program be the **tool for rural development** and can it provide the much desired **stability to agriculture** sector
- Indian Bio fuel program started in **2002-03 with EBP and National Bio Diesel mission**
- National Bio Fuel Policy -2018 targets 10% Ethanol blending by 2022 and 20% by 2030 and 5% blending of Bio Diesel by 2030

Snap shot of Petrol, Diesel, Gas and ATF consumption in 2018-19

in '000 Metric tonnes

Product	Consumption between Apr 2018 –Mar 2019
Petrol (MS)	28284
High Speed Diesel	83528
LPG	24907
LNG	60798 (MMSCMD)
ATF	8300

Update on 1st Generation Ethanol

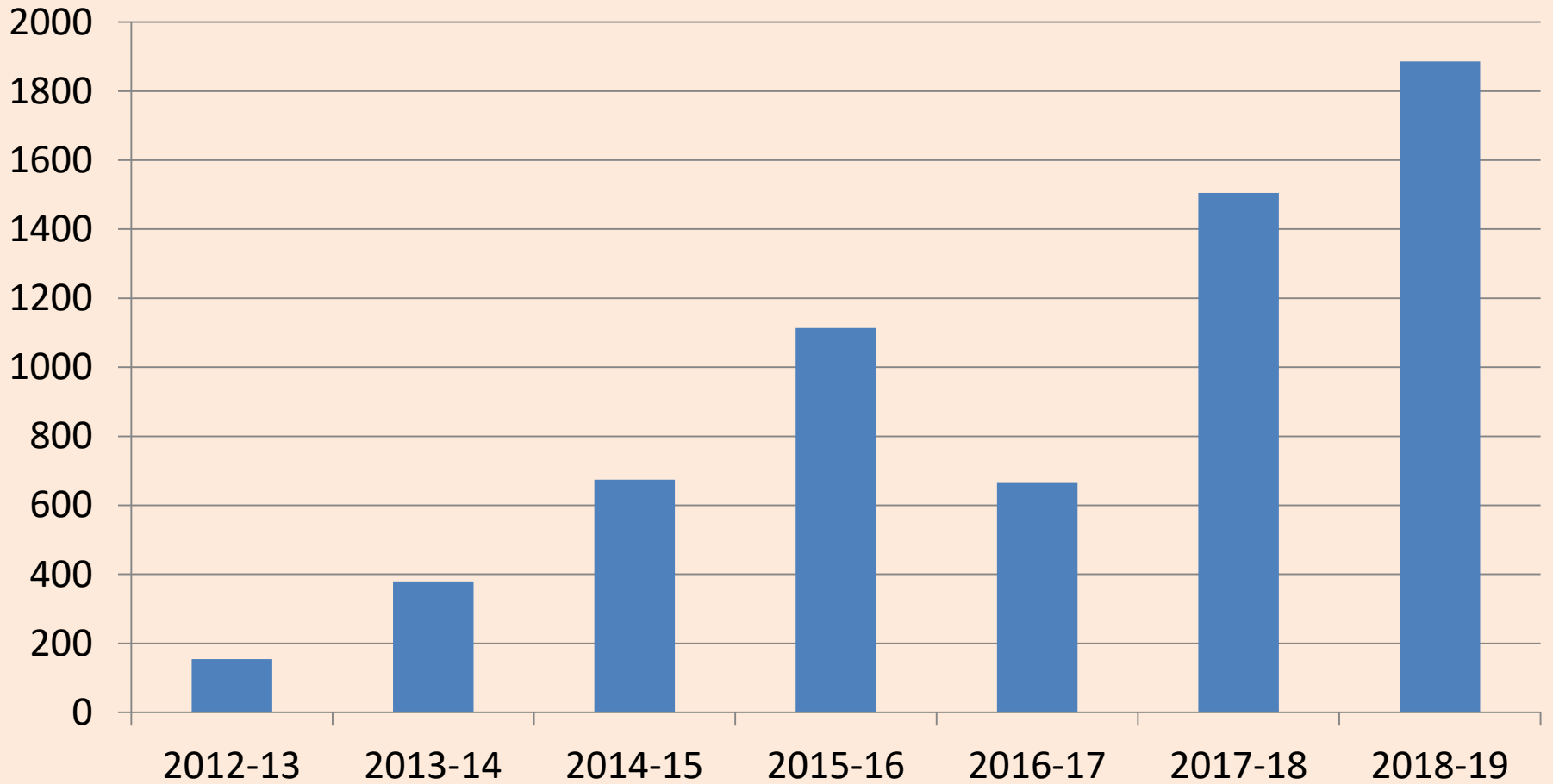
Ethanol Demand Supply

Parameter	Present Qty (Million Lit)	Qty by 2022 (Million Lit)
Projected MS Consumption (16-17)	31780	44040
Ethanol (10% blending)	3170	4404
Ethanol available - Molasses Route	1110	1800
Ethanol Deficit	2068	2604

Augmenting 1G Ethanol supplies

- Reintroduction of administered pricing.
- Production of Ethanol from **B Molasses and sugar cane Juice** is allowed. **Higher price** offered on Ethanol from B Molasses and sugar cane Juice (**Rs. 43.75 to Rs.59.48 per liter**)
- Ethanol production from **Sweet Sorghum, Corn, sugar beet, cassava and damaged food grains** encouraged
- All states directed to implement new **IDR act which disallows state government control on denatured Alcohol**
- Scheme for financial assistance to sugar mills for enhancement and augmentation of the ethanol production. Interest subvention scheme with an outlay of 1800 Crores
- GST lowered from **12% to 5%**
- Ethanol from 1G should go beyond **4000 million liters by 2022**

Ethanol procurement in Million liters



Progress on 2nd Generation (Ligno Cellulosic) Ethanol

- OMC's and PSU's under Ministry of Petroleum has been directed to set up **12 commercial plants** with investment of **14000 Crores**. Combined 330 Million liter annual production
- Government has launched “Pradhan Mantri JI-VAN Yojana” for providing viability gap funding to provide initial thrust to create 2G Ethanol capacity in the country with an outlay of 1969.50 crores
- Significant progress with regard to **Enzyme development and lignin valorization**
- 100 percent **off take guarantees** extended by OMC's and **differential pricing** support considered
- Big private investment in pipeline. Open to any Technology and investment. Target to produce **1000 million liters of 2G Ethanol by 2025**

Progress on 3rd Generation Ethanol –CCU, Syngas, Gas fermentation & Bio Oil

- **CCU – 1st Gas fermentation plant** to start construction at IOCL Panipat refinery (100kl/day Ethanol from tail end gas) with Lanzatech, USA Technology. To be commissioned by mid 2021
- **EOI floated by CHT** for 14 more plants to be co located with refineries. Work on feasibility studies initiated in 4 of them
- **Syngas to Ethanol through fermentation** – trials carried out with different feed stocks at Vaddodara by Lanzatech and Ankur with very encouraging results
- Talks to set up **10KLPD and 60KLPD plant by BPCL and MRPL** respectively is in advanced stages
- CTL – Catalytic Thermal Liquefaction technology is **ready for commercialization** from Reliance Industries to **convert biomass, MSW, sewage sludge into Bio - Crude**

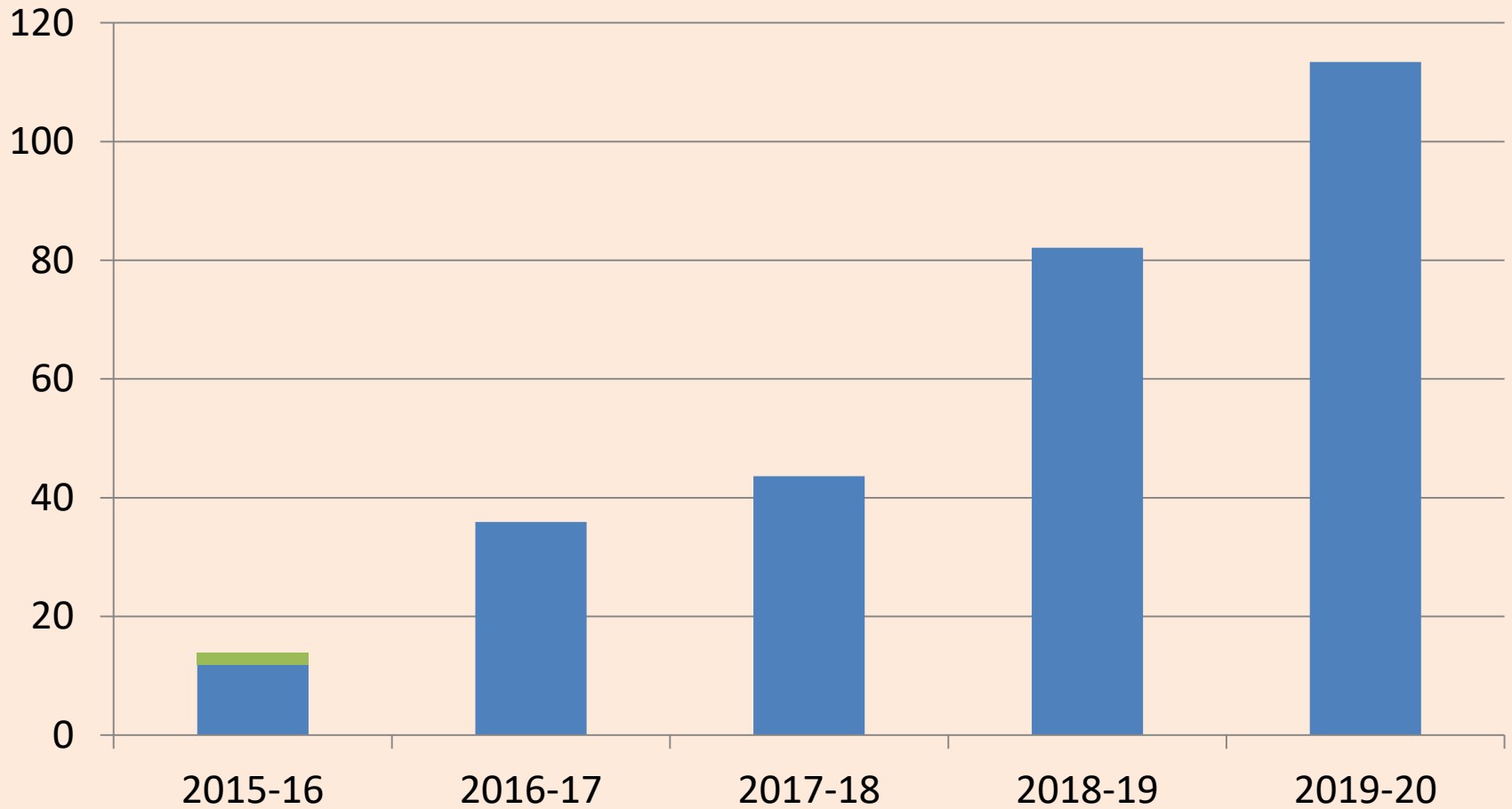
Bio Diesel and UCO Initiative

Demand Vs. Installed capacity

Parameter	Quantity (In Million Litres)
Diesel consumption, Year 2016-2017	91970
Biodiesel requirement @ 5% blending	4600
Installed Capacity	1300
Requirement for additional Biodiesel generating capacity	3300

Bio Diesel Procurement

in million liters



B7 Sales since 1 Apr 2019 to 31 Jan 2020

in million liters

OMC	B100 Procurement	B7 Sales	No. of out lets
IOCL	40.314	579.256	3142
BPCL	12.153	148.376	1004
HPCL	50.746	967.382	1613
Total	103.213	1695.014	5759

UCO Initiative

- The consumption of Used Cooking Oil (UCO) poses adverse health effects.. As per Food Safety and Standards Authority of India (FSSAI) notification used cooking oil with **TPC more than 25% is hazardous** for human health.
- FSSAI launched **RUCO (Repurpose Used Cooking Oil)** – an eco system to enable the collection and conversion of used cooking oil to biodiesel.
- It is projected that India would be consuming approximately **13.2 billion liters HSD by 2022**.
- At **5% blending level 6.6 billion Liters** of Biodiesel would be needed.
- According to FSSAI report about **2.25 billion Liters** of **waste – edible oil based feedstock** (1.88 billion Liters of UCO and 360 million Liters acid oil) could be available for Biodiesel processors.

UCO Initiative

- 4 Expression of Interest has been floated by OMCs since 10th August 2019 , World Biofuel Day for procurement of Biodiesel produced from UCO from 100 cities.
- 7 more EOI's will be floated until Nov 2020 covering another 100 cities and several more road shows will be conducted by OMC's
- 14 Offers are received for supply of 532 tonnes per day of Bio Diesel from UCO
- 7 LOI issued for supply of UCO based bio diesel at about 300 tonnes per day
- By end 2020 300 million liters of UCO based bio diesel is expected to be available for blending with HSD
- UCO based bio diesel is expected to give the required initial push to the bio diesel blending program.

Feedstock initiatives

- India generates nearly a **Billion tonnes of agriculture residues** every year. We **burn nearly 200-300 million tonnes of surplus bio mass** – complete Biomass supply chain program is being put in place.
- **Bio mass Study report for 10 crops is released on 31 Oct 2018.** Data captured for 662 districts. Complete **spatial data (1KmX1Km grid)** for the entire country is now available on a portal(Launched on 10 Feb 2020)
- <https://bhuvan-staging1.nrsc.gov.in/bioenergy/home/>
- Bio mass characterization work is in progress at IIP & NIIST
- Initiative with ICAR labs to initiate TBO integration with agriculture and short gestation non edible oil seed crops
- Considerable progress with **Sweet Sorghum for 1G, 2G and Bio gas**

Progress in piloting of sorghum as biofuel feedstock

- Improved sweet sorghum cultivars tested in 5 States and most suitable **genotypes for 1G** ethanol production identified
- High biomass sorghum cultivars with ability to give **multiple cuts from single planting** developed and testing in farmers fields in Numaligarh yielded 16tonne dry biomass
- Biomass types with low-lignin types with high digestibility developed and field tested
- The powdered dry biomass of sorghum **yielded >50% higher gas** than same quantity of paddy straw upon testing in anaerobic digesters



Bio-Jet fuel Initiative

- Work on Bio Jet fuel in India started in consortium mode involving **CSIR-IIP-Dehradun, IOCL, HPCL, IIT Kanpur IISc Bangalore** early this century
- **CSIR- IIP** has the technology (HEFA) at **Advanced pilot stage**
- **First test flight(Bombardier) in August 2018** from Dehradun to Delhi by Spice Jet. **Indian air force flew 3 AN32** with 10% bio jet on Republic day 2019.
- **Recently air force flew AN32 with 10% Bio Jet fuel in bothe Engines from Leh to New Delhi**
- Ground work on **Bio-jet policy framework** aligned to CORSIA and National Bio fuel Policy initiated
- It is also interesting to know that Ethanol can be converted into Bio Jet Fuel. Couple of Demonstration facilities already exist globally.

Bio-Jet fuel Initiative



CBG New initiative

Waste streams and CBG Potential

Waste/Biomass stream	Estimated waste/ Biomass generated	Bio-CNG Potential	Compost
	(in MMT/annum)	(in MMT)	(in MMT)
Surplus Agri-residue	150	20	70
Spent wash/ Press mud	20	2	3
MSW	100	5	15
Sewage treatment plants		10	-
Recoverable cattle dung	1100	25	285
Total potential		62	373

CBG new initiative - SATAT

- Very ambitious SATAT launched in Oct 2018
- **5000 commercial plants** to be set up by 2025, each producing 7-10 tonnes of CBG a day processing 70-100 tonnes of feedstock
- Total **investment of 175,000 Crores** and generate **employment for 75,000**. In addition, these plants shall produce about **50 MMT of bio-manure per annum**
- **100 % off take guarantee** by OMC's on CBG. Highly remunerative price of **Rs.46/KG +5% GST** announced. One can set up their own retail outlet also.
- **15 MMT of CBG capacity** to be built by 2025 replacing almost 75% of LNG Import
- In response to EOI issued **479 LOI's issued by OMC's until end Jan 2020** with estimated CBG production capacity of 2500 tonnes per day

Some of CBG plants in operation



Thank YOU