BIOENERGY CELL

Program Coordinator : S. N. Jayaram, Sr. Project Engineer

Activities:

- **National Conference on Bioenergy:** A two-day national conference on Bioenergy on the Theme: *"Decoding National Policy on Biofuels - 2018 and Exploring Opportunities in Karnataka"* was held 6th & 7th January 2020 at Central Hall, Suvarna Soudha, Belagavi.

The conference was jointly organized by Karnataka State Bioenergy Development Board and Karnataka State Council for Science and Technology with an aim to

- Contribute towards effective development, promotion and adoption of biofuels in the country
- The conference allows networking of stakeholders from industry, policy makers, investors, and researchers to exchange their experiences, challenges and government support in realizing the adoption of biofuels for creating viable bioeconomy in the country
- Provide a platform for stakeholders and entrepreneurs to look for business and investment opportunity in the State of Karnataka

The event saw networking of stakeholders from:

- Ethanol/ Biodiesel/ Biogas producers and marketers
- Industry, start-ups and potential entrepreneurs
- Finance/Banking/Traders and other potential investors
- Transportation Industry
- Policy and decision makers in the Government
- Energy and Environment experts
- Progressive farmers
- Researchers and Academia

Technical Sessions: Lead talk followed by panel discussions

- Overview of Bioenergy in India – New policy frame work and programmes
- Bioethanol - Technologies and Sector Analysis
- Compressed Biogas (CBG) – As replacement for CNG/ LNG/ PNG – as domestic, transport and industrial fuel
- Biodiesel / Bio jet fuels, UCO opportunities and other potential feedstocks
- Feedstock Supply Chain and Incentivizing & Financing Bioenergy
- New Technologies ready for commercialization – Gasification, Drop-in fuels, Bio oil, Methanol economy

The conference was inaugurated by the Hon'ble Minister Shri. K. S. Eshwarappa, in the presence of Shri. Laxman Savadi, Hon'ble Deputy Chief Minister, Government of Karnataka; Shri. Suresh Angadi, Hon'ble Minister of State for Railway, Government of India; MP and MLAs including the elected representatives from Panchayath Raj Institutions. Shri. Y B Ramakrishna, Member Expert, working group on Biofuels, MoP&NG, GoI presented a keynote address.

Outcomes of the conference:

- The panelist has made good suggestions and points that could make the State government to take a fresh look at the policy issues as well as the finances.
- National policy can be improvised through suggestions, alteration for supply chain management regards in an enhanced manner.

- Karnataka can look at supply chain for biofuel raw materials as an industry.
- Short gestation crops have advantage because we have maximum land held by farmers.
- Very high potential for short gestation crop
- Involving farmers in feedstock supply chain
- Nodal agencies required
- Technology is not a problem but costing to be handled
- Several issues discussed focus on bioethanol, CBG and biodiesel
- Gaps identification in policy, we need to always do mid-course corrections and suggestions are welcome.
- Impact oriented financing is necessary green funding availability at low interest rate, GoI is taking initiatives in their directions.

National Conference on Bioenergy at Suvarna Vidhana Soudha, Belagavi

- **42nd Series SPP-Biofuel:** Under 42nd Series of Student Project Program (SPP) - (Biofuel projects), KSCST received 188 project proposals from final year engineering students of BE, MBA, MSc. and MTech out of which 98 projects (70 BE, 03 MTech, 20 MSc and 05 MBA) selected for sponsorship. The mid-term evaluation of selected projects was held on 6th June 2019 at SIT, Tumakuru wherein, 65 (BE – 39, MTech – 04, MSc – 17 and MBA – 05) projects were selected for the final Seminar and Exhibition held on 26th and 27th July 2019 at KLE Dr. MSSCET. Experts awarded 10 projects under the best project of the year award under SPP - Biofuel.

- **Survey on Used Cooking Oil (UCO) in Bengaluru city:**

According to FSSAI estimates, annually about 23 MMT cooking oil is consumed and there is a potential recover 3 MMT of UCO for Biodiesel. The cities of Dakshina Kannada, Bellary, Mysore, Bengaluru, Tumakuru & Belagavi have major potential for UCO generation in Karnataka. Among these cities Bengaluru has potential of about 1,35,27,901 kg UCO generation. There is no such data available on survey on UCO.

KSCST initiated a project to assess the availability of Used Cooking Oil (UCO) in Bengaluru City and with the support of engineering college students UCO conducted a survey in BBMP divisions in 10 wards so far. The details of survey are as follows:

Sl. No.	Ward Name	Ward no.	Number of hotels	UCO generation	Area (Sq. km.)	Population
1.	Kadumalleswara	65	23	29%	1.36	34,053
2.	Aramanenagara	35	16	22%	7.47	30,397
3.	Malleswaram	45	34	26%	1.81	36,321
4.	RajamahalGuttahalli	64	15	20%	0.73	33,964

5.	Mahalakshmipuram	68	20	18%	0.95	35,976
6.	Subramanyanaga	66	19	20%	0.94	34,883
7.	Subhashnagara	95	22	18%	1.32	35,427
8.	Gandhinagara	94	25	25%	1.93	35,310
9.	Okalipuaram	96	20	15%	0.83	35,875
10.	Shakthi ganapthi nagara	74	18	20%	0.7	34,530

Source: Bruhat Bengaluru Mahanagara Palike, ward wise information system for citizens awareness

Outcome: The sample survey has resulted in collection and collation of data on all types of FBOs and also about the edible oil usage by the hotels. The potential of biodiesel generation from UCO is evaluated in Bengaluru city, in ward level. In this study, it is estimated that a total of 54,300 litres of UCO is available for alternate use out of 1, 87,500 litres of cooking oil used in this ward. It is also estimated that, 71% of cooking oil used for food preparation and about 29% of left-over UCO is available for biodiesel production. The survey will be continued for other wards in Bengaluru city to estimate the total quantity of UCO available for biodiesel production. The UCO samples were also collected from few hotels to analyse and produce biodiesel in laboratory. The data was mapped using GIS package to help in proper routing of aggregators for identification, collection and recycling. Few more sample surveys need to be carried out to strike an average quantification of UCO for a proper aggregation network.

The list of colleges students was participated in the UCO survey internship under Bioenergy

Sl. No	Name of the college	Number of students	Month	Surveyed BBMP Zones
1.	K.S. Institute of Technology	08	July to August	2 wards
2.	Sri Venkateshwara Engineering College (SVCE)	12	October to November	2 wards
3.	Reva University	18	December to January	6 wards

- *Paper published in International Conference held at NITK, Surathkal, on Recent Advances on Renewable Energy (RARE – 2020) titled "Assessing the availability of Used Cooking Oil (UCO) in Bengaluru city" by H. Hemanth Kumar, S. N. Jayram, G. P. Prajanya and M G Nagarjun.*

➢ **Training / Orientation Program**

Sl. No:	Date	Participants	Venue
1.	30th - 31st January 2019	Project staff of I&D centres	Basaveshwara Engineering College (BEC), Bagalkote
2.	13th - 15th March 2019	To ensure good quality of biodiesel to these vehicles it was felt necessary to train all the staffs of BRIDC in the quality analysis protocols of biodiesel production. 10 participants from 10 districts participated	SJMIT, Chitradurga
3.	17th January 2019	28 students	Indian Academy Degree College
4.	18th January 2019	30	Garden City University
5.	12th February 2019	30	Indian Academy Degree College
6.	19th February 2019	30	Mount Carmel College

- Biofuel Cell of KSCST is coordinating and monitoring the activities of all the district I & D centres and compiling their data for evaluation.

- Biofuel Cell laboratory @ KSCST successfully extracted oil from spent coffee powder which can be then be converted into biodiesel. Further experiments are being carried out for analysing the quality of the oil.
- **World Biofuel Day (WBD) celebration:** KSCST organised WBD in collaboration with Sri Venkateshwara College of Engineering (SVCE), Bengaluru on 16th August 2019. The program focused on promoting biodiesel in transport sector. A total of 150 students had participated in the program.
- Bioenergy cell has conducted internship program for the Engineering and PG Students at Bioenergy laboratories at KSCST**.** The projects related to bioenergy sectors, the following projects were conducted for internship.

Sl. No.	Project titled	Sources	Outcome of the project
1.	Biodiesel production process from different sources	Non-edible oil & UCO	About 86% of biodiesel were produced from non-edible seed oil and 82% of biodiesel produced from UCO
2.	Pongamia seed characterization	Pongamia seeds	Extracted 38% of crude oil from pongamia seed and it's a good quantity of oil extracted
3.	Extraction of oil from spent coffee powder	Spent coffee powder	Extracted 20% of crude oil and oil characterization was completed
4.	Detoxification of Pongamia Seed cake	Pongamia seed cake	Karanjin, a potent toxic alkaloid was successfully detoxified in Pongamia seed cake from phytochemical test. Further, HPLC analysis should be done for quantitative toxicity
5.	Used cooking oil characterization	UCO from different Food Business operators	Oil characterization was done for 3 different samples, 2 samples were resulted for cooking and one more sample were resulted not for further usage of cooking