

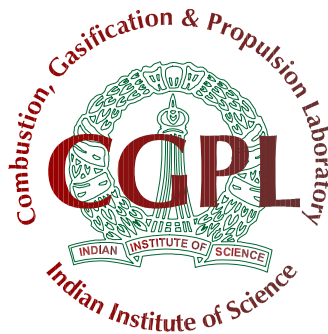
Report on International Training Programme on Bioenergy

(June 20 – 27, 2007)

Held at CGPL, IISc

Sponsored by

Ministry of Non-conventional Energy Sources
New Delhi



Combustion, Gasification Propulsion Lab
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Photograph of the participants with the CGPL team

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International Training Program was held at CGPL, Indian Institute of Science between June 20 and 27, 2007, the event was sponsored by Ministry of New and Renewable Energy Sources (MNRE). There were around nine participants from six countries (Bangladesh – 1, Jordan – 1, Thailand – 1, Marutius – 1, Srilanka – 1, Nepal – 4). The accommodation for these participants was done at Main Guest house and Hoysala guest house. The food arrangement for all the participants was done at JNC guest house so that all the participants could meet and discuss at a common place.

The training program was aimed at creating awareness on the use of bio-energy. This included training modules on combustion, gasification, and bio-methanation of bio-residues for conversion into useful energy. Other technologies addressed were related to bio-diesel and biomass cook stoves. The first few lectures were focused on topics from combustion and gasification. The participants were exposed to various topics on these subjects. The course on combustion and gasification was organized with a right mix of theory and demonstration sessions. The lecture sessions included topics from basics of renewable, gasification to more on science of gasification, applications and aspects of power generation. One of the gasifier manufacturers also shared their experience with the participants. The National biomass resource assessment (NBRAP) was also shown to the participants. In the laboratory sessions, the participants were shown demonstrations on biomass stoves and gasification systems. There were two field visits organized, in the first field visit, the participants were taken to 4.5 MWe Malavalli Power Plant located at Malavalli in Mandya district of Karnataka. The participants got an exposure on the power plant which works on Rankine cycle using coconut fronds as the primary feedstock. In the second field visit the participants got exposure to the operations of a 500 kWe biomass gasification unit installed at BERI, Kabbigere village of Tumkur district in Karnataka. They were also shown the energy forestry being cultivated for this project along with dung based biogas plant installed in the village.

On the concluding day, the participants made a presentation on the possible opportunities of using bio-residues for energy generation in their respective countries. The meeting ended with presenting of certificates to the participants. The participants also received a CD containing the course material of the two weeks and the photographs during their field visits.

The details of the participants who attended the training program are:

Enclosures:

- 1) Annexure I (List of Participants)**
- 2) Annexure II (Course Time table)**

International Training Programme on Bio-energy (June 20 - 27, 2007)

PROGRAMME

Date	9.30 – 11.00 AM	11.00 -11.15 AM	11.15 – 12.45 PM	12.45 – 2.15.PM	2.15- 3.45 PM	3.45 – 4.00 PM	4.00 to 5.30 PM
Wednesday, 20-6-2007	Welcome and introduction	T E A	Introduction to renewables (PJP)	L U N C H	All about Gasifiers (SD)	T E A	Lab tour – Demonstration of 1 kg/h system (HVS)
Thursday, 21-6-2007	Gas/Dual-fuel Engines (GS)		Application of Gasifiers (HVS)		Byproducts from biomass – (DNS)		Gasifier + engine lab (GS)
Friday, 22-6-2007	Biomass assessment (NKSr)		Biomass assessment package view (Sheshagiri)		Village Empowerment – BERI model Dr. Swaminath		Bio gas (HNC)
Saturday, 23-6-2007	FIELD VISIT TO BERI						
Sunday 24-6-2007	Break						
Monday 25-6-2007	Bio diesel (US)		Presentation on MPPL (Krishen)		Biomass Cook Stoves (BPEIL)		Combustion devices Lab – (BD)
Tuesday, 26-6-2007	FIELD VISIT TO MPPL						
Wednesday 27-6-2007	Presentation by MNRE or any other topic		Presentation by BETEL/ARRYA		Presentation by participants		Concluding session

PJP-Prof. P J Paul; SD- Dr. S.Dasappa; NKSr- Dr. N.K.S. Rajan; GS- Dr. G. Sridhar; HVS: H.V. Sridhar; DNS- D.N. Subbukrishna; BD- Dr. Bhaskar Dixit; HNC: H N Chanakya; US: Prof. U Shrinivas

Welcome, introduction and familiarization to the activities of lab



Site visit to Malavalli Power Plant, Mandya district



Discussion with Plant Manager



Malavalli Power Plant



Coconut Fronds used as fuel



**Site Visit to BERI's 500 kWe Power Plant, Kabbigere, Tumkur dist.
Green Power**





BERI Gasification Power [Top], Control Panel in Power station [Bottom]





Gas Engine



Energy Plantation