Notes:

1. *Tariff as per MNES Guidelines for 2002-03 6.77 Cents / KWh*
2. *Favorable = Policy announced, wheeling, banking and third party sale as per MNES guidelines.*
3. *Moderately Favorable = Policy announced, wheeling, banking and third party sale allowed with minor deviations as per MNES Guidelines*
4. *Not Favourable = Policy yet to be announced or large deviations in wheeling, banking and third party sale terms compared to MNES Guidelines*
5. *Very High – Estimated Biomass Power potential exceeding 2000 MW*
6. *High – Estimated Biomass Power potential in the range 1000-2000 MW*
7. *Average - Estimated Biomass Power Potential in the range 500-1000 MW*
8. *Low – Estimated Biomass Power Potential below 500 MW*

Although mainstream financial institutions have expressed interest in financing biomass power projects, most projects are still being financed by a handful of financial entities, namely, the Indian Renewable Energy Development Agency, Industrial Development Bank of India (IDBI), and Industrial Credit and Investment Corporation of India (ICICI). The United States Agency for International Development (USAID) under the Greenhouse Gas Prevention Project (GEP) has also provided development assistance to this sector over last few years.

Status

As of March 2003, 43 bagasse cogeneration projects, aggregating to 304 MW of exportable surplus and 37 biomass power projects aggregating to 180 MW capacity, totaling to 484 MW projects have been successfully commissioned. Additional 33 bagasse cogen projects aggregating to 323 MW and 39 biomass power projects aggregating 240 MW, totaling to 563 MW are in advance stages of implementation. Out of this, about 1800 biomass power projects based on gasifiers are operational aggregating to 53 MW. High pressure and temperature configuration of 67 kg/cm2 and 495°C have been established in bagasse cogen and biomass power sectors and extra high pressure configurations are being tried out. Most of the commissioned projects or projects under construction, both in bagasse cogen and biomass power, have been from the private sector, based on captive biomass resources from sugar mills or rice mills. However, a large number of sugar mills in the co-operative and public sector are still unable to implement these projects, despite substantial incentives offered. Also, apart from rice husk, no other major distributed biomass material or combinations thereof have been tried out.

Need for Accelerated Development

The poor results of biomass power development in India, despite strong efforts as well as high potential, are mainly attributable to a complex set of associated barriers related to capacity building, adequate information dissemination, policy and regulatory framework and financing. It is necessary to undertake a critical review of the development so far, identify focus areas and undertake value added efforts for barrier removal. The biomass power development in India is at the spin off stage and specific efforts will accelerate the development, through large scale multiplication. Accelerated development is essential to overcome slow moving status of this sector and achieve maximum potential in the foreseeable future.

Barriers Faced by Cooperative Sugar Mills

- *High transaction costs* – On account of non-standardized agreements and delays in signing of the project development agreements (PDAs) and power purchase agreement (PPAs), the costs per transactions are prohibitively high.
- *Limited access to funds and difficulties in raising equity* – Financial institutions are reluctant to finance cooperatives and small investors, which expresses itself in unreasonable securitization requirements.
- *Long gestation period* – The experience to date has been that the project development cycle requires several years to complete. The pre-project implementation phase (involving project design, documentation, loan sanctions/approval) has taken more than two years in many projects.
- *Low technological confidence* – The lack of standardization and the introduction of high pressure boilers (greater than 67 kg/cm^2) have led to a resistance to switch over to alternative processes and business models.
- *Limited capacity* – Cooperatives have a low capacity to design/develop, operate, and manage grid connected power projects.
- *Fuel supply risks* – As these projects are largely considered to make use of captive biomass, the fuel-supply risks revolve mostly around the question of physical availability, which is a function of rainfall, harvesting effectiveness, and productivity.
- *High management risks* – Since the cooperative sector is subject to change in management every five years, and is influenced by political factors, the risks for biomass power projects becomes high.

Barriers Faced by Private Sector/other Entrepreneurs, including Biomass Processors, > 1 MW scale on Distributed and/or Captive Biomass

- *High transactions cost* – Private sector/other entrepreneurs have difficulties raising loans on existing financing norms due to perceived high risks by FIs, negotiations on PPA clauses related to escrow/LC, etc.
- *Limited interest in power projects* – Private sector/other investors have been unable to put equity/debt on power development due to limited "proof-of-concept" demonstrations, apart from rice-husk power plants.
- *High investment risks* - For the project promoters and financial institutions, there is a perceived high investment risk due to the limited number of visibly successful demonstrations.
- *Lack of working capital* – Limited access to banks for working capital requirements for storing huge stocks of biomass materials for ensured year round operation.
- *Fuel supply risks* – For biomass processors, the fuel-supply risks are twofold. The first set are the physical availability, found in the case of all biomass power projects (rainfall, harvesting effectiveness, and productivity). The second are the questions of contracted supply encountered when dealing with distributed biomass supplies. The in-ability to lock-up sufficient supplies of biomass from various sources will serve as a hindrance to project finance and implementation.
- *Operational risks* – These include the use of high-pressure boilers with multi-fuel based biomass power plants; the lack of experience using distributed biomass materials.