5. POWER FORM RENEWABLES

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Research & Development

5.34 The R&D component of the Programme aims at the development of biomass conversion technologies, technology application packages; strategic developmental demonstration pilot projects; improvement in efficiency; reduction in cost; and, eventual commercialisation and development of biomass power/cogeneration on an industrial scale. An R&D project on "Strategic Development of Bio-energy" (SDB) is being implemented, which entails development of technology packages for a variety of biomass materials for power generation, as well as industrial applications. The important development relates to producer gas based reciprocating engines. Experimental work on an industrial natural gas engine of 360 kW_e produced 195 kW_e with a gas calorific value of 4.5 MJ/kg. The specific fuel consumption of the engine was 1.1kg/kWh. Peak output of 214 kW_e, with a gas calorific value of 5 MJ/kg, is likely to be achieved in the field systems with an enhanced design of the reactor, slightly different from the one used in the laboratory. The modelling of the reciprocating engine for predicting the pressure-crank angle diagram using fluid dynamic inputs from three dimensional flow computational tools has been taken to a logical conclusion in predicting the performance of the engine with varying compression ratio or ignition timing.

5.35 A multi-institutional co-ordinated project on "Advanced Biomass Gasification" (ABG) is being implemented, which aims at the development of a high pressure gasifier coupled with gas turbine engines for generation of power. The progress during the year relate to the procurement of a micro-turbine derived from an Auxiliary Propulsion Unit (APU) of an aircraft with aviation kerosene as the fuel, and the establishment of all the elements of the high pressure gasifier. They have been individually run and they are to be coupled. The full automation system is being put together to enable the operation of the gasifier and the power generation system run by the gas turbine.

Progress and New Initiatives

5.36 43 bagasse based co-generation projects with aggregate capacity of 304 MW capacity have so far been commissioned; 31 projects with aggregate capacity of 312 MW are under implementation; 34 commercial grid connected biomass based power projects with aggregate capacity of 164 MW capacity have so far been commissioned, and 36 projects of 218 MW capacity are under implementation. The status of projects commissioned and under implementation is given in **Table5.10**. The State-wise list of commissioned biomass power/co-generation projects is given in **Table 5.11**.

Table-5.10

Status of Projects Commissioned and under Implementation

Projects Status	Biomass Power		Co-generation		Total	
	MW	Nos.	MW	Nos.	MW	Nos.
Commissioned	164	34	304	43	468	77
Under Implementation	218	36	312	31	530	67

Table-5.11

State-wise list of Commissioned Biomass Power/ Co-generation Projects

No.	State	Biomass Power	Co-generation	Total

5.37 Capacity addition of 86 MW in three States has been achieved, up to December 2002, against the annual target of 100 MW. Another 25 MW of capacity addition is

expected to be achieved during the year.

High pressure & temperature configurations of 67 kg/cm^2 and 495^{o}C have been demonstrated in several bagasse co-generation and biomass power projects in the country. Extra high pressure configuration at 87 kg/cm^2 and temperature of 515^{o}C was established during the year in bagasse co-generation projects in Andhra Pradesh and Tamil Nadu; a number of projects are being planned with similar pressure and temperature configurations.

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