



Biomass is *in vogue*



Many companies rely on fast growing bamboo for their bio-mass plants. Photos (3): ClEnergien

Bio seems to be the buzzword of the moment when experts in India talk about the country's future energy supply. India's government wants to put more emphasis on biomass and the industry shows increasing interest.

Considering the enormous size of the agricultural sector, Boris Alex, expert for India at Germany Trade and Invest, the foreign trade and inward investment agency of Germany, believes that India provides good conditions for the energy utilization of biomass. According to the Ministry of

New and Renewable Energy (MNRE) at the end of 2009, India is currently trying to find ways of intensifying its efforts in the area of biomass to meet the rising energy requirements in the country. Conservative estimations by the Ministry indicate that up to 17 GW of electricity could in the future be contributed

by the energy form. Optimists believe even more GW could be possible. “Studies sponsored by the MNRE estimate a surplus of 120 to 150 million tons of usable agro-industrial and agricultural residues that can be made available for power generation. With the technologies at hand, this surplus agricultural residue could be used to generate more than 17,000 MW of grid-quality power. If all the 550 sugar mills in the country switched over to modern techniques of cogeneration, over 5,000 MW of power could be produced. Thus, India can be considered to have biomass power potential of around 22,000 MW. However, currently, only about 3 % of the sugar mill potential is being utilized”, says Dr. Arun Tripathi, Director of MNRE. The State Bank of India and Beltron Telecommunication have now recognised the situation and signed a mutual declaration of intent in January envisaging the financing and setting up of biomass gasifier systems in about 500 rice mills. “The project will allow savings of between 20 and 25 million litres of diesel per year”, says Shri Deepak Gupta of MNRE.

An uncertain element: feedstock supplies

According to the MNRE, the interest in biomass-based projects for electricity generation has grown over the past years. In the financial year 2008/09, newly installed capacities in the range of 345 MW were added – meaning 45 MW more than initially expected. India’s government now targets an ambitious number of 150 new biogas systems in the next two years. “India is expected to add 1,700 MW biomass-based power capacities – including cogeneration from bagasse-fired plants – during the ongoing Eleventh Five Year Plan period from 2007 to 2012”, says Tripathi. Financing is expected to come from the introduction of a feed-in tariff at state level and a national biomass programme. Besides India offers fiscal incentives (table 1). Hopes at the Ministry are that the current incentive of between Indian rupees (INR) 2.63 and 5.14 per kWh (1 rupee = € 0.0156) depending on the state will soon be upgraded. Currently, a total of 2 GW of grid-connected biogas systems are installed in the country, estimates the MNRE. Pursuant to India’s present energy policy, the expansion of production capacities is expected to take place mostly in the states of Uttar Pradesh, Andhra Pradesh and Tamil Nadu (see table 2, page 178).

Though compelling, the mission might be too ambitious. “The uncertain feedstock supply is at the heart of the problem. The agricultural sector in India is largely unorganized and decentralized, i.e. based on millions of small cultivators and subsistence farmers. Buying agricultural-based mass is therefore labour and cost intensive for bio power developers. What’s more, India’s road infrastructure is rather deficient making transportation an additional cost element,” says Alex. “Since the feedstock comes from many different sources, the levels of price and quality can vary considerably. There also exists no guarantee over full or steady capacity utilization of



The company Clenergen uses greenhouses to accelerate the growth of bamboo.

the system and this poses an additional risk for the investor. At the same time, the prices for property have experienced drastic increases over the past years driving up also project costs. 20 projects with a capacity of 180 MW in the state Haryana, Northern India, were already put on hold.” The lengthy licensing procedures of course add to the problem as potential investors are discouraged. Especially at national level, the outcome is often hard to predict.

Energy form with prospect

But despite the current situation, the government hopes to spur the development of biogas through a number of financial incentives. In the first year, for examples, 80 % of the capital costs for a heat-power cogeneration plant are tax deductible and the system operator is additionally exempt from income tax during the first ten years. Biomass is a promising energy form in India, agrees Boris Alex who also points to the involvement of the German Reconstruction

Federal fiscal incentives

Depreciation	100 % depreciation in the first year can be claimed for the following power generation equipment: - fluidized bed boilers - back pressure, pass-out, controlled extraction, extraction and condensing turbine for power generation with boilers - high efficiency boilers - waste heat recovery equipment
Tax holiday	10 year tax holiday
Customs duty	Duty leviable for NRSE power projects of less than 50 MW capacity (under Project Import Category) is 20 % ad valorem. This covers machinery and equipment components required for generation of electric power.
Central excise duty	exempted for renewable energy devices, including raw materials, components and assemblies
General sales tax	Exemption is available in certain states.

Table 1: There are five fiscal possibilities of promoting biomass power generation.

Source: Indian Renewable Energy Development Agency Limited



In the future biomass plants like this one – operated by E.ON – can become an everyday sight.

Photo: Eon

Loan Corporation (KfW). “In October 2009, KfW development bank and the Indian Renewable Energy Development Agency Limited – IREDA – closed a loan agreement for € 19.97 million. The credit will be used to finance a programme for electricity generation through biomass systems”, says Dr. Charis Pöthig, the bank’s Vice Press Officer. Direct aim of the initiative is to bring the realization of seven new biomass systems with an annual capacity of 49 MW underway. The invitation for bids recently ended. “In total, the tender has attracted a number of 22 proposals. Those that now qualify best in terms of innovation and environmental and social aspects will be considered.” But Germany-based KfW development bank is not the only company active in the Indian biomass sector.

Interest also comes from the Punjab Energy Development Agency (PEDA). The company recently unveiled plans to construct a biogas system with a capacity of 10 MW in Dhandhari that will be powered with agro-waste from rice production. The plant will be the last of 32 biogas projects brought forward by PEDA. The majority of these projects that have a total annual capacity of 348 MW are expected to be completed by December 2010. “Indian rice farmers usually burn agricultural residues, which has caused health issues within the region in the past. These systems will produce the electricity that is urgently needed”, says Balor Singh, Director of PEDA. Clenergen India Private Limited plans to invest INR 11.35 billion (€ 177 million) in biogas systems in the states of Tamil Nadu and Karnataka. The company was also able to sign a 25-year lease agreement over 500 hectare of farmland in Tamil Nadu that is now expected to secure the plant’s feedstock supply. “Execution of our feedstock programme is a critical component in meeting the supply requirements of our biomass power plants. Securing lease agreements at this stage allows us to immediately start planting Beema Bamboo which will yield its first harvest in 2011”, says Mark Quinn, the company’s CEO. Heavy investments in biomass also come from Oriental Green Power, a subsidiary of Shriram EPC. According to company information, about INR 7.3 billion (€ 113 million) will be directed at

biogas systems with a total production capacity of 146 MW. “Most of these systems are expected to run by December 2010”, says T. Shivaraman, Managing Director and CEO of Shriram EPC Ltd., with optimism. In a next step, the company plans to become active on the international markets. “We are also looking at taking up overseas renewable projects, for which we are open to joint ventures.” Finally, the French nuclear energy supplier Areva was also able to gain a foothold in India’s biomass sector. In a joint venture with Astonfield Renewable Resources Limited, the company expects to construct systems with a capacity of 100 MW and an investment volume of € 100 million across the country. “Areva currently has 100 bioenergy plants in operation or under construction around the world and will be putting all of its expertise behind a project of this magnitude,” says Anil Srivastava, CEO of Areva Renewables. The company’s project portfolio for India is realized by Areva Bioenergy from Chennai – the first project will be launched in West Bengal.

Market gaining momentum

Next to wind energy that already enjoys considerable support across India, the PV sector has been able to profit from the government’s “Solar Mission” and is meanwhile looking at equally bright perspectives. Biomass could now be next to catch up. In the long term, the government is hoping that an annual capacity of 17 GW of electricity could come from the energy form. Perhaps even more. Driven by the government’s ambitious targets, the industry has been announcing projects until the most recent past. India’s biomass market accordingly seems to be gaining momentum. Recent activities in the state of Tamil Nadu are exemplary of India as a whole. In Tamil Nadu, the Tamil Nadu Energy Development Agency (TEDA) reported that a flood of applications was received for the construction of new biomass systems. “Currently, about 111 MW of biomass energy is produced by 17 units in various districts across Tamil Nadu, including Pudukottai, Dindigul and Kanyakumari. One 10 MW generating unit and a 7.5 MW unit will come up soon in Tiruvannamalai and Krishnagiri”, explains Syed Ahamed, TEDA Deputy General Manager. Meanwhile, the applications are already weighing down TEDA, says Ahamed. If all of them obtained a license, Tamil Nadu would see newly installed biomass systems in the range of 487 MW in the next few years. And Tamil Nadu is only one out of 28 states in India.

Markus Grunwald

Planned biomass projects

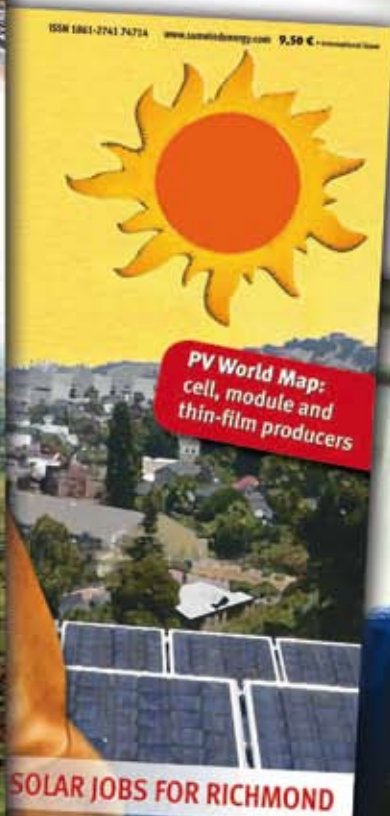
State	Capacity [MW]
Uttar Pradesh	373
Andhra Pradesh	334
Tamil Nadu	309
Karnataka	274
Chhattisgarh	156
Maharashtra	156
Rajasthan	31
Punjab	28
Haryana	6
Madhya Pradesh	1
Gujarat	1
Total	1,669

Table 2: Uttar Pradesh has most projects in the pipeline (373). Altogether India is planning 1,669 biomass projects (October 2009). Source: MNRE

Further information:

Ministry of New and Renewable Energy: www.mnes.nic.in
 KfW Entwicklungsbank: www.kfw.de
 Indian Renewable Energy Development Agency: www.ireda.in
 Punjab Energy Development Agency: www.punjabgovt.nic.in/industry/PEDA.htm
 Clenergen India Private Limited: www.clenergen.com
 Oriental Green Power: www.orientgreenpower.com
 Shriram EPC: www.shriramepc.com
 Areva: www.areva.com
 Tamil Nadu Energy Development Agency: www.teda.gov.in

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