

CASE STUDY: SETTING THE STAGE FOR BIOMASS POWER IN BRAZIL

Two separate UNDP-implemented projects have helped to prepare the way for commercialization of an efficient new biomass power technology in Brazil, with potentially global impact. The technology involves gasification of biomass—woodchips from plantations of rapidly-growing trees in one project, sugar cane bagasse and field wastes in the other—and combustion of the resulting gases in a high-efficiency gas turbine to generate electric power. The projects were undertaken at a time when interest in biomass power and concern over climate issues were not high in Brazil. GEF grants were thus essential to engage major private sector entities—a major regional utility, CHESF, and the sugar cane industry, through its Copersucar cooperative—in development of an unproven technology.

The two projects produced a number of results. They resolved virtually all technology and system integration issues, including developing and testing equipment to harvest, dry, and feed the biomass fuels. The sugar cane project showed that field wastes can be successfully gasified, thus roughly doubling the available fuel supply and making possible year-round power generation. Both projects completed the engineering design of a commercial demonstration plant.

Moreover, both projects helped change attitudes of key stakeholders about the potential of biomass power and increased Brazil's capacity to commercialize this technology. Hydropower-based utility companies like CHESF came to see growing trees as a form of energy storage, much like water behind a dam. The sugar cane industry, which already generated much of its own power using conventional (steam) technology, became aware that the gasifier-turbine technology could increase the efficiency of biomass power generation from 5% to 27%. The Copersucar technology center gained an international reputation as a leader in biomass power. The projects also contributed to heightened awareness of the energy and climate potential of biomass power among university scientists and government officials at the state and federal level.

But neither project had proceeded to commercial demonstration in Brazil. Indeed, long delays in taking this step for the wood chip project, for which a World Bank loan had been approved, had led to negative internal reviews, even though a commercial demonstration plant based on the same technology and strongly influenced by the Brazilian work is now underway in the United Kingdom. Then, in early 2001, Brazil experienced an energy crisis brought on by several years of low rainfall and a drop in hydropower production, necessitating extreme conservation measures and setting off a scramble to find additional sources of power.

The sugar cane industry awoke to discover a lucrative new commercial opportunity on its doorstep, with utilities bidding ever-higher prices for the modest amounts of power it generates. One mill is already producing 15 MW of power for sale, and 5 additional mills are installing equipment to produce similar quantities, using conventional technology. Suddenly, being in the power business was more than a sideline, and the major efficiency gains available from gasifier/turbine technology seemed commercially significant. Sao Paulo State energy officials, aware of the strategic importance of the State's bagasse resource, are committed to pushing ahead rapidly with commercial demonstration. CHESF, its hydropower reservoirs depleted, decided to go ahead with the woodchip commercial demonstration plant and asked the Bank to execute the loan. And CHESF reports that it has been approached by other private sector entities, including Japanese companies, about participating in commercializing the technology.

The market opening created by Brazil's energy crisis may prove to be the tipping point for commercial biomass power, but the GEF projects clearly created the potential for commercialization and put Brazil in a position to be the world leader in this technology. Moreover, if commercialization occurs, as now seems likely, it could well have global climate significance. The worldwide 1-billion ton sugar cane industry alone, if it turned its bagasse and field waste to power, could displace nearly 250 million tons of oil (or its equivalent in other fossil fuels) annually.

Source: "Second Overall Performance Study of the GEF," November 2001, www.gefweb.org.