Energy from sugarcane can strengthen Brazil's electrical power system
By Marcos Jank

The level of emissions from sugarcane is almost nonexistent if compared to conventional thermoelectric plants.

The 2014 World Cup of Soccer, the 2116 Olympics and Brazil's above-average economic growth expected in coming years will require more planning and an adequate electrical energy production model, to ensure that supplies meet growing demand. The country needs a model that minimizes the effects of unforeseen events, such as the latest blackout which knocked out power in about two-thirds of the country.

Over the last decades, Brazil has been characterized by "centralized energy generation" through the construction of large hydroelectric plants distant from major consumption centers. This formula demands heavy investments to expand energy transmission systems. The recent major blackout that affected a major portion of the country happened precisely because of flaws in one of the main distribution lines, carrying electricity to the rest of the country from the Itaipú hydro plant, one of the largest in the world.

Several countries have been striving to diversify their sources of electricity and reduce the risks of a blackout, through decentralized generation systems positioned near major consumption centers and a growing reliance on renewable energies, featuring low greenhouse gas emissions. The 2008 Beijing Olympics was a positive example of a decentralized system, based on power generating units that guaranteed greater system reliability in terms of maintaining a continuous flow of electricity.

There are 434 sugar and ethanol mills throughout Brazil, all of them self-sufficient in energy due to the production of vapor through the burning of sugarcane bagasse in boilers. However, only 20% of all mills (88 units) produce a surplus that is then sold to distribution grids. In all, there are 54 cogeneration centrals exporting electrical energy from sugar and ethanol mills to the grid in the State of São Paulo (61% of all electricity produced from bagasse) and 34 additional centrals in 11 other Brazilian states.

Bagasse used as biomass is a typical source of decentralized generation, installed near electricity consumption centers, which has responded adequately to growing demands for reliability in Brazil's electrical power system. Furthermore, bioelectricity is a renewable energy source that complements hydroelectric power, since production takes place during dry seasons for traditional hydro plants (from April to November in South-Central Brazil). Domestic technology, and operations with shorter deadlines for completion and operation are rooted into this strategy. Bioelectricity also has clear environmental benefits, because its emission levels are practically zero in comparison to other conventional thermoelectric energy sources like coal, petroleum and natural gas.

The potential for expanding bioelectricity from Brazilian cane fields is immense. It is estimated that if all cane biomass in the country were used, by the 2017/18 harvest Brazil would be able to sell approximately 10,000 MW to distribution grids, which is

equivalent to a power plant the size of Itaipú. In São Paulo State alone, cane reserves would produce 4,800 MW by the 2017/18 harvest, about 20% more than what is currently being generated by the entire São Paulo Energy Company (Cesp) complex.

As the electrical energy sector is further developed, bioelectricity from sugarcane should be considered a major source of distributed generation to make the system less vulnerable or dependent on large generation and transmission infrastructures. This would reduce the risk of blackouts by facilitating restoration and stabilization of the system should there be any sort of mishap. At the same time, it would help to meet ambitious commitments to reduce greenhouse gas emissions that the federal and various State governments took to the COP-15 gathering in Copenhagen this year.

However, the task of extracting this huge power reserve from Brazilian sugarcane does not depend only on the goodwill of the private sector. Regular specific auctions for this source of electricity are needed, if possible as of the beginning of 2010. Special attention should also be dedicated to modernization projects for older plants (retrofits), especially in the State of Sao Paulo. Furthermore, it is essential to find definitive solutions to connecting mills that produce electricity to the distribution grid, which have hindered investment decisions by entrepreneurs.

Inspired by 1990 Nobel Economics Prize winner Harry Markowitz, one could say that planning an energy auction focused on diversification of supply sources is the most appropriate mechanism to consistently dilute the risk of failure in power supply. Transmission systems and hydro plants are important, but it would be desirable to further diversify in the direction of decentralized, small and medium-sized power sources, closer to major consuming centers and featuring positive environmental balances.

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