Brazilian bioelectricity from bagasse
By Emmanuel Desplechin

As recently as the 1970s, Brazil imported almost 80% of its total oil consumption; now it is virtually energy independent and 46% of its energy mix is sourced from renewables. Brazil is
an inspiring case study for governments on mainstream renewable energy. Sugarcane
not only provides food, but also expands and diversifi es Brazil's energy options.

Renewable electricity is increasingly important because electricity is projected to supply an increasing share of the world's total energy demand, according to the International Energy Agency.**1**

This trend is most dramatic in developing countries, and is also an important European Union priority.

The Energy Information Administration states that hydroelectricity dominates the global renewable electricity sector. Hydro power is among the most well-known sources of renewable energy, such as the famous Three Gorges Dam on the Chinese Yangtze River, which generates the most electricity in the world.**2**

In Brazil, hydro accounts for 85.5% of electric power generation compared with a world average of 2.6%. This is due to the sheer magnitude of Brazil's water resources, such as the Itaipú Dam on the border with Paraguay which has the second biggest generation capacity in the world.

However, Brazil's reliance on water means that any future drought periods, increasingly likely given the impact of climate change, could equal serious energy supply problems. Bioelectricity can play an important role in complementing the current hydroelectricity offer. It is typically produced during the dry sugarcane harvest season from May to November, which is the same time that hydroelectricity production drops.

Other benefi ts of bioelectricity are cost and reliability. Units can be constructed faster and more cheaply than hydro stations, making them more reliable, attracting a broader range of investors and increasing competition. In Brazil, bioelectricity will reduce costs of thermal plants by almost €8.5 million from 2012 to 2020.**3**

Biomass will have an increasingly signifi cant role to play in creating a diverse and renewable energy market. The role of bioelectricity is important inside and outside of Brazil. In Europe, hydroelectricity is well established but has limited potential to expand because of geographical constraints. This means that other renewable energies, including biomass, solar and wind power, are needed to help the EU meet its target to source 20% of its energy needs from renewables by 2020. Biomass accounts for 2% of total EU production of renewable energy, but this share is already rapidly accelerating (it grew by 23% in 2005 compared with 13% in 2003).**4**

Some of the world's biggest challenges can often be dealt with through simple solutions drawn from existing resources. Bagasse is a by-product that the Brazilian industry collects as it harvests sugarcane that is then transformed into sugar and ethanol. Bagasse is used to generate vapour, from which bioelectricity is produced. Given the thriving sugarcane ethanol industry in Brazil, bagasse is the single biggest form of biomass available in the country. For the moment, bioelectricity from bagasse in Brazil is funneled back into the sugarcane mills it came from, to meet 75.5% of our sector's electric energy demands.**5**

Any surplus power is then sold to local electricity grids. In the last fi ve years, bioelectricity from bagasse has become competitive for largescale generation expansion. Bioelectricity from sugarcane biomass already provides 3% of Brazil's electricity needs, a figure that is expected to increase to 14% by 2020.**6**

This growth is possible because sugarcane production is going to increase by 340 million tonnes in coming years, thanks to investments in 90 new sugarcane plants.

Barriers to growth have also been removed, such as the inability of sugarcane processing plants to sell firm yearly forward contracts, as required by the power sector, because sugarcane is a seasonal crop. New rules in 2004 transformed the sector's contracting powers, by making all consumers, both regulated and free, 100% contracted and by introducing 'firm energy certificates' to cover all financial options or forward contracts. Finally, costs of bioelectricity are kept down because the only added cost is the price of more efficient equipment, such as higher pressure boilers.

Brazil is the global leader in renewable energy development. It has three times the world average amount of biomass and is setting the standard for emissions reductions without sacrificing economic growth.

Brazil too faces energy supply challenges ahead. The Institute Acende Brasil's study 'Program of Transparent Energy' predicts that Brazil will lack from 16.5% to 32% of the energy it needs next year, depending on its economic context. In fact, Brazil's electricity matrix will grow to the tune of 130% by 2030.

Brazil needs to reform the sector to see biomass reach its full potential as a clean, green energy supply. Incentives to expand renewable energies are the most cost-effective way to prevent energy rationing in the future and emergency acquisition of energy at elevated prices. The market needs more competition and fewer regional barriers that dictate which energy distributors can link up with which sugarcane mills. It also needs a more supportive bureaucracy so that mills can easily combine straw with bagasse, which creates the best energy yield and could double energy production per hectare. As with so many industries across sectors around the world, it also needs a new wave of investment following the caution brought on by the financial crisis.

Brazil must adopt ambitious policies at home and be a front runner with innovative and proactive international proposals. The sugarcane ethanol industry is committed to producing clean, renewable energy with the highest emissions savings to help

ensure Brazil's leadership in alternative energy.

1 - International Energy Agency, World Energy Outlook 2009, November 2009
2 - Energy Information Administration, International Energy Annual, September 2008
3 - Mario Veiga Pereira, PSR Consultoria, Bioelectricity in Brazil: Opportunities and challenges, June 2009
4 - European Commission, Green Paper follow-up action Report on progress in renewable electricity, 2007
5 - Centro de estudos avancados em economia aplicada (CEPEA), Brazilian Energy Overview
6 - UNICA and APEX Brasil, Taking care of the planet in your daily life: sugarcane's contribution to climate change mitigation, 2009

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