

## Proalcool: the Brazilian alcohol programme

**P**roalcool, the Brazilian alcohol programme, is the largest commercial biomass programme for energy production in the world. Advantages include environmental benefits, reduced imports and employment in rural areas.

There are currently one million people working in the sugar-alcohol sector, with 300,000 jobs in 350 private industrial units and 50,000 sugar cane growers. São Paulo has 500,000 staff at the 132 sugar-alcohol plants established in the state.

Sugar cane production reached 320 million tons during the 1998/99 harvesting season. Sugar and alcohol production rose to 18 million tons and 14 billion litres respectively. São Paulo totalled 198 million tons, corresponding to 12 million tons of sugar and 10 billion litres of alcohol. The sugar cane plantation area is 3.9 million hectares in Brazil, with 1.8 million hectares in São Paulo.

These figures show the important role played by São Paulo State. Productivity here is higher than other regions; average industrial efficiency is 80.6 litres of alcohol (both dry and hydrated) per ton of crushed cane (tc), against 78.3 l/tc

in Brazil. Some industries reach 100 litres of alcohol per ton of cane. The government is interested in establishing policies for clean fuels under the Kyoto Protocol, and biomass-based fuels could receive funds through the clean development mechanism (CDM). Sugar/alcohol producers see new opportunities in the energy market.

Since 1995 the Brazilian fleet of alcohol-based vehicles has dropped to 4 million units, i.e. less than 40% of the national fleet. New alcohol vehicles represent less than 1%, after reaching a peak of 80% during the 1980s. However, manufacturers are now being asked to increase production substantially. The establishment of green fleets by local governments, and tests on an alcohol-diesel mix for municipal buses, also increase alcohol utilisation.

Sugar-cane-based cogeneration substantially reduces carbon emissions responsible for global warming. In 1996 the alcohol programme reduced carbon emissions by almost 13 million tons. Electricity cogeneration in sugar/alcohol plants is from sugar-cane bagasse<sup>1</sup>. Because bagasse production is quite high<sup>2</sup>, any surplus is sold to other industries.

Revenues from bagasse sales depend on the location of the plant (up to USD 10 per ton of 50% wet bagasse). However most industrial plants burn this fuel inefficiently; their 21-bar boilers and back-pressure steam turbines are inefficient.

Energy production meets the needs of the production process (500 kg of low-pressure process steam per ton of crushed cane and around 20 kWh/tc of electricity) and in São Paulo State most plants are self-sufficient. Total installed power was around 750 MW in 1999, but little surplus electricity is generated; only 10 plants sell electricity to local utilities.

Prices offered by local utilities were low (around USD 23/MWh in 1999, for long-term contracts and USD 6.5/MWh for short-term contracts). Utilities were not obliged to buy from cogenerators and wheeling tariffs were not yet established to allow electricity to be sold to other consumers. However, in June 1999, the Federal Government considered new policies, e.g. power purchase agreements (PPA) to improve private investments.

Higher efficiencies in cogeneration processes are possible with conventional technologies already commercially available in Brazil. More advanced technologies (gasifier/gas turbine systems) will be available in the near future, with even higher efficiencies. Eletrobrás forecasts estimate over 4,000 MW of potential sugar-cane-based electricity generation, using commercially available technologies.

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<sup>1</sup> Bagasse is a by-product from sugar cane crushing. For 300 million tons of cane, bagasse availability is around 42 million tons (dry weight) (Macedo, 1997)

<sup>2</sup> 30% of harvested sugar cane, 50% wet.

Other evaluations suggest that installed power could increase to 9-14 GW, using more advanced systems.

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Photo: The Santa Elisa mill in São Paulo State.

## UK takes action on Kyoto

**I**n response to Kyoto, the UK Government has agreed a target of 12.5% reduction in greenhouse gas emissions, compared to 1990 levels, over the period 2008-2012. In addition, the government has a domestic goal of a 20% reduction on 1990 levels of CO<sub>2</sub> emissions by 2010.

In 1990, UK emissions of the six greenhouse gases covered by the Kyoto Protocol were 212 million tonnes of carbon. However, reduction measures have already resulted in annual emissions falling by 9% between 1990 and 1997.

To help meet these demanding targets, the government is introducing a Climate Change Levy (CCL) on non-domestic energy use, which will take effect from April 2001. However, electricity generated from new forms of renewable energy, such as solar and wind power, will be exempt from CCL, as will fuel used for 'good quality' on-site combined heat and power (CHP) production.

In parallel, the UK Government is currently negotiating with several sector Trade Associations to achieve an 80% discount on the CCL in return for signing up to an energy efficiency target. This should encourage energy-intensive sectors of industry to reduce their energy consumption. Further details of these targets and measures, which have been derived jointly by central government and the devolved administrations, are given in the report: *Climate Change: Draft UK Programme* available from the website: <http://www.environment.detr.gov.uk/climatechange>.

### Potential for emissions reduction

The major emphasis is on reducing CO<sub>2</sub> emissions because, in the absence of further measures, CO<sub>2</sub> emissions are projected to account for 84% of UK total greenhouse gas emissions in 2010, compared to 78% in 1990.

### Energy production sector

Key to this sector is the development of CHP, which significantly reduces both primary energy use and emissions. The government is also aiming for 10% of the UK's electricity to be supplied from renewable energy by 2010, subject to the cost for consumers being acceptable.

### Business sector

As in most sectors, the main emphasis is on reducing CO<sub>2</sub> emissions. Of the other greenhouse gases, methane emissions will fall as a result of the higher landfill tax, and nitrous oxide emissions will decline sharply due to the installation of emission-abatement technology. To date improvements in energy efficiency have been driven by commercial pressure and supported by the government's *Energy Efficiency Best Practice Programme (EEBPP)*. These factors will continue to drive down energy use in the future.

Further pressure will come from the Climate Change Levy and the Integrated Pollution Prevention and Control Directive (IPPC).

Carbon emissions trading is recognised as a key part of the long-term solution to greenhouse gas emissions. Around 40 major companies and trade associations within the UK are involved in an emissions trading group, which addresses the key issues involved in designing a domestic emissions trading scheme.

### Transport

The UK's integrated transport policy sets the framework for supplying a modern, safe, efficient and sustainable integrated transport system for the 21<sup>st</sup> century. Measures that will result in savings include:

- European Union agreements to improve the fuel efficiency of cars;
- changes to local taxation;
- investment in public transport and improved technology;
- action to promote the sustainable transport of goods.

### Domestic sector

Recent emissions reductions have resulted from more efficient electricity generation as well as improved energy efficiency within the home. Measures that have already, and will continue to, deliver savings include:

- Energy Efficiency Standards of Performance (EESOPs) have reduced greenhouse gas emissions since their introduction in 1994, and will continue to do so;
- government energy efficiency campaigns have targeted homeowners with the Energy Saving Trust, providing free advice to over 500,000 householders;
- appliance manufacturers are encouraged to make more energy-efficient appliances for home use, and to provide information to allow the consumer to choose the most energy-efficient product;
- in the longer term, the wider use of community heating and CHP will increase carbon savings.

### Agriculture, forestry and land use

A fall in emissions is projected in this sector due to:

- improved countryside management;
- reduced use of inorganic fertilisers;
- protection and enhancement of carbon sinks;
- IPPC regulation;
- improved energy efficiency.

### Public sector

Future emission reductions will be achieved by:

- new targets for improving the energy management of public buildings;
- energy efficiency targets for local authorities, schools and hospitals;
- development of travel plans.

### Priority technologies for greenhouse gas mitigation

These will vary from sector to sector, but CHP is a common theme, as is waste heat recovery and building efficiency measures such as lighting and better

insulation. In the business sector, energy management systems, waste heat recovery, higher efficiency pumps and fans, and improved process control will help reductions in energy use to be achieved. Other technical measures include process intensification, water minimisation and more efficient refrigeration.

### Opportunities for GREENTIE

As a result of the Climate Change Levy and IPPC, there will be significant and continuing demand within the UK for advice, techniques and technologies to reduce greenhouse gas emissions, particularly CO<sub>2</sub>. This offers a great opportunity for GREENTIE to help meet that demand by increasing awareness of improved technology sources.

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# The CTI World Climate Technology and Leadership Awards 2000

**T**he Climate Technology Initiative (CTI) is continuing its Awards Programme, which recognises success in deploying climate friendly technologies. Applications for the 2000 Awards should be submitted by 13 July 2000.

Award winners are outstanding individuals and organisations that have helped to commercialise and diffuse climate-friendly technologies in developing countries and countries with economies in transition<sup>1</sup>. Award winners will receive global, high-profile recognition for their valuable work at a ceremony held in their honour at a United Nations Framework Convention on Climate Change (UNFCCC) sponsored event, such as the Sixth Conference of the Parties (COP-6) to be held in The Hague, the Netherlands in November 2000.

There are two categories of awards for which an individual or organisation may qualify. The CTI World Climate Technology Award is intended for organisations that have successfully introduced climate-friendly technologies or practices particularly, but not necessarily exclusively, in the developing world or in economies in transition. The Climate Technology Leadership Award is geared toward individuals who

have furthered the goals of the CTI and the UNFCCC, and have shown continued dedication to sustainable development, particularly overcoming barriers to deployment of climate-friendly technologies in developing countries.

Three organisations and two individuals received an award in 1999. The winners came from industrialised and developing countries alike. Peter Versteegh, Chairman of the CTI Awards Committee says: "It's not just the winners. Many of the other 1999 applications were also fascinating success stories in climate technology transfer. Sometimes you would not believe what is going on in the field! The thing to do now is to write out the details on an application form and send it in."

Do you know an individual who has brought a new technology to a region where it was previously unavailable or seldom used? Or perhaps an organisation that has designed and

implemented successful programmes that demonstrate outstanding and innovative management, finance techniques, or other successful measures to get climate-friendly technologies into the field where they are needed? If so, the CTI wants to reward you, your organisation, or your nominated person or programme for their outstanding contributions made in this challenging field. We look forward to hearing from you today.

Applications and criteria for the CTI Awards, plus a multimedia display of past winners and ceremonies, are available on the CTI website: <http://www.ClimateTech.net>.

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<sup>1</sup> Economies in transition include those countries of the former USSR and Eastern Europe that are transitioning to market economies. Developing countries are those that are not members of the Organisation for Economic Co-operation and Development.



GREENTIE is an intergovernmental information centre on greenhouse gas mitigating technologies. It was established in 1993 by the International Energy Agency (IEA) and the Organisation for Economic Cooperation and Development (OECD), in response to Agenda 21 and the UN Framework Convention on Climate Change (FCCC). GREENTIE operates a worldwide technology database, the Directory, containing approximately 7,500 suppliers, R&D centres, consultants, information centres and other experts whose products and services help to reduce greenhouse gas emissions. The Directory is available both online through GREENTIE's Internet site and on CD-ROM through GREENTIE's network of Liaison Offices and Distribution Centres in participating countries. Participating countries include Argentina, Australia, Brazil, Bulgaria, Cameroon, China, Denmark, Eritrea, France, Hungary, India, Indonesia, Italy, Japan, Mexico, Nepal, the Netherlands, Norway, Pakistan, Philippines, Poland, Republic of Korea, Russian Federation, Singapore, Slovak Republic, Sweden, Tanzania, Thailand, United Kingdom, United States of America, and Zambia.

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## GREENTIE website revised

Take a look at the new revised GREENTIE website at <http://www.greentie.org>. The site is now much easier to navigate and contains far more information, such as news on international greenhouse gas mitigation developments, new publications, events, etc. Please let us

know what you think of the new site by using the comments or suggestions option on the home page!

If you have any material suitable for publication in the Newsdesk section, please send it to [greentie@greentie.org](mailto:greentie@greentie.org).

This can be anything from a publication on greenhouse gas mitigation that you found interesting, to a conference planned in your country. Please mention which Newsdesk section the material is intended for: News online, Events or Publications. ■

## GREENTIE News

The Slovak GLO, the Energy Centre Bratislava (ECB), as a member of OPET (Organisation for the Promotion of Energy Technologies), played an active role at the recent CONECO / RACIOENERGIA / CLIMATHERM 2000 trade fair and exhibition in Bratislava. Held during the last week of March 2000, this is the largest energy efficiency exhibition in Slovakia. The exhibition gives the public an excellent opportunity to get in touch with the newest and innovative achievements in the fields of building industry, energy efficiency and heating.

The ECB stand offered a wealth of information and advice to visitors, including:

- GREENTIE information and products, plus computer demonstrations of the GREENTIE Directory;
- ECB services and publications;
- free energy advice for householders;
- information on EU programmes, projects and publications available in Slovakia;
- information on renewable energy sources, rational use of energy, and innovative energy technologies.

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