raw data, such as the privacy of research subjects. But data from most studies based on confidential information can be coded in a way that will guarantee their subjects' anonymity. The few cases where this is not possible can be exempted from the move towards data sharing.

A second factor deterring openness is a natural desire to retain exclusive access to data that took years of care and attention to collect. Like many researchers in other disciplines, psychologists fear that if different analytical approaches are brought to bear on their data, different conclusions could be drawn, casting doubt on their competence — or even their integrity. But in most cases, if data have been collected, selected and analysed correctly, researchers have little to fear in this regard, and the resulting discussion is likely to prove enlightening for the field as a whole.

An associated concern is that data could be wilfully misinterpreted by anyone with a political agenda. But this should not prevent the sharing of data sets: false interpretations of the data will fail to find any foothold in the community as whole.

A less frequently articulated reason for resistance to data sharing is the fact that some researchers are simply unable or unwilling to record and present their data in an unambiguous, reader friendly and archivable form.

The APA's editors and publishers are now planning their response to Wicherts' report. One result should be the acceleration of moves, already under discussion, to require the deposition of data as supplementary electronic material in APA databases. Where the APA leads, other psychology journals are likely to follow.

Granting bodies must also play a part. In 2003, the US National Institutes of Health introduced rules requiring the public sharing of data in psychology studies for grants exceeding $500,000, allowing exemptions where confidentiality issues cannot be circumvented. Other agencies should follow suit. And university departments need to do more to teach the basics of note-keeping and data presentation, to prepare their students for an era in which data sharing will increasingly become the norm. ■

Green shoots of growth

Energy from biomass is an idea whose time has returned.

Until the twentieth century, biomass was humanity's principal source of energy, heating our stoves and feeding our draught animals. Even today, roughly 10% of all our energy comes from biomass — far more than from any other renewable energy source or, for that matter, from nuclear fission.

But this use of biomass for energy supply is accompanied by many challenges (see page 669). For one thing, it is often not all that renewable — the biomass sources that provide firewood to the world's poor, for example, are not being replanted. For another, it is very inefficient: gathering firewood takes a long time. The history of the past couple of centuries has been in large part one of people moving away from biomass as soon as they can afford to do so.

Three recent developments have spurred renewed interest in biomass, however. One is the need to reduce greenhouse-gas emissions. The requirement for other external energy inputs during biomass processing means that it often involves some net carbon emissions — but the amount of carbon dioxide given off by burning biomass is the same as that taken from the atmosphere by photosynthesis in the first place. If biomass projects could sequester carbon, either by enriching the soil beneath plantations or by storing any carbon dioxide produced in combustion, they could even be carbon negative — a unique selling point for this energy source.

The other two developments are the upward movement in the prices of oil and natural gas, and the related revival of concerns about the security of their supply. Most nations are seeking home-based energy sources that do not rely on political stability in the Middle East or Russia.

It seems unlikely that these factors will provide sufficient impetus to propel biomass energy to the very front rank of possible alternatives to fossil fuels. But biomass clearly has a potential role as part of a portfolio of energy sources for the twenty-first century.

If that role is to be fulfilled, two things need to happen. Nations have to build regulatory mechanisms that recognize the carbon benefits of technologies such as biomass — through emissions pricing, a carbon tax or a combination of the two. And intensive research needs to be conducted into both the efficient production of biomass and its conversion into useable energy.

One focal point for such research should be finding ways to grow biomass quickly and in an easily processed form while minimizing external inputs, such as fertilizer and pesticides. Another is the systems engineering of farms and ecosystems, finding ways to fit biomass projects into and around present land use and possible changes in farming practice.

A major attraction of biomass is that it is likely to benefit poorer countries, which tend to be in tropical regions where plants grow quickly. There is plenty of scope for more collaboration between developing countries on biomass research and development, both to meet local needs and for export.

"Biomass is likely to benefit poorer countries, which tend to be in tropical areas where plants grow quickly."

But this requires consideration of the local and global ecological impact of biomass expansion. Vast tropical monocultures eating away at primary forests — as exemplified by the production of palm oil in Indonesia — will benefit no one, except those who profit from selling the fuel. In effect, such approaches take green subsidies from richer countries, and use them to despoil the tropics.

Similar problems afflict existing biomass programmes in the United States, where ethanol refineries often burn fossil fuel and are reliant on subsidized corn monoculture. More innovative approaches would include firing the refineries with agricultural waste, and feeding them with plants of many different species. Biomass energy should be developed energetically, but within the context of appropriate environmental policies, and using approaches that are both sustainable and cost-effective. ■