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BIOFUELS

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It was too good to be true: a world powered by an energy-packed liquid that we can conveniently tap from the ground. As more countries took advantage of these liquid riches it became obvious that there isn't enough crude oil to carry on indefinitely, especially as the biggest stores are in some of the least stable countries. What's more, we have begun to appreciate the huge environmental cost of releasing vast amounts of prehistoric carbon.

Since kerosene began to replace whale oil in lighting more than 150 years ago, petroleum products have come to power everything from leaf blowers to jet fighters — and we have become utterly dependent on them. This is not sustainable. We need an alternative that functions like crude oil, but without the same drawbacks; that can break our addiction to fossil fuels and reduce greenhouse-gas emissions, without risky deep-sea drilling or fear of oil spills.

Biofuels might be the answer. These fuels can be made from many different starting materials, from waste wood to algae or even genetically engineered bacteria. Such variety means a range of biofuels could be produced in disparate locations to fulfil different roles.

Biofuels have big boots to fill; expectations are high, yet initial attempts have had chequered success. The oil- and sugar-rich crops that need premium land to grow shift the problem, turning fuel shortages into food scarcity. There are other issues: production of these first-generation biofuels is water and energy intensive; few actually yield a net reduction in greenhouse-gas emissions. But these are surmountable challenges. Indeed, they are teething problems for a young technology. Next-generation biofuels are already learning to walk. It might take 20–30 years before biofuels are free to run, but it's an enterprise worth fostering. We are pleased to acknowledge the financial support of Biotechnology and Biological Sciences Research Council, BP, Ceres, São Paulo Research Foundation and US Department of Energy's BioEnergy Science Center. As always, *Nature* retains sole responsibility for all editorial content in this *Outlook*.

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