WORLD ENERGY OUTLOOK 2006: FACT SHEET- BIOFUELS

CAN BIOFUELS ERODE THE OIL MONOPOLY IN ROAD TRANSPORT?

Biofuels are expected to make a significant contribution to meeting global road-transport energy needs, especially in the Alternative Policy Scenario. Rising food demand, which competes with biofuels for land, will constrain the potential for biofuels production using current technology. Nevertheless, new biofuels technologies being developed today, notably ligno-cellulosic ethanol, could allow biofuels to play a much bigger role than that foreseen in either scenario.

- **Interest in biofuels is soaring** for energy-security, economic and environmental reasons. Biofuels hold out the prospect of replacing some imported oil, diversifying sources, helping curb greenhouse-gas emissions (depending on how they are produced) and contributing to rural development. Higher oil prices have made biofuels more competitive with conventional oil-based fuels, but further cost reductions are needed for most biofuels to be able to compete effectively without subsidy.
- In the Reference Scenario, **world output of biofuels is projected to climb from 20 Mtoe in 2005 to 92 Mtoe in 2030** – an average annual rate of growth of 7%. Biofuels meet 4% of world road-transport fuel demand by the end of the projection period, up from 1% today. In the Alternative Policy Scenario, production rises much faster (at 9% per year), reaching 147 Mtoe in 2030 – 7% of road-fuel use.
- In both scenarios, **the biggest increases in biofuels consumption occur in the United States (already the world's biggest biofuel consumer) and Europe**, which overtakes Brazil as the second-largest consuming region before the end of the current decade and surpasses the United States by 2030. Biofuels use outside these regions remains modest. Ethanol is expected to account for most of the increase in biofuels use worldwide, as production costs are expected to fall faster than those of biodiesel – the other main biofuel. Trade grows significantly, but its share of world supply remains small as a result of protective farm and trade policies.
- About 14 million hectares of land are currently used for the production of biofuels – about 1% of the world's available arable land. This share rises to over 2.5% in 2030 in the Reference Scenario and 3.8% in the Alternative Policy Scenario. The **amount of arable land needed in 2030 is equal to more than that of France and Spain** in the Reference Scenario and that of all the OECD Pacific countries – including Australia – in the Alternative Policy Scenario. Rising food demand, which will compete with biofuels for

existing arable and pasture land, will constrain the potential for biofuels output, but this may be at least partially offset by higher agricultural yields.

- Biofuels produced from sugar cane and palm oil (as in Brazil, India and other tropical regions) generally avoid more greenhouse-gas emissions and are considerably cheaper than fuels derived from agricultural crops in temperate zones (excluding subsidies), providing strong incentives for trade. And biofuel shipping costs are small as a proportion of total value. But **trade barriers and subsidies currently prevent large-scale shipments** to Europe or the United States. It is very uncertain to what extent these regions and other major demand centres will allow imports of biofuels in future. This is a critical factor in determining where and with what resources and technologies biofuels will be produced in the coming decades, and in assessing the overall burden of subsidy on taxpayers and the cost-effectiveness of biofuels as a means of reducing carbon-dioxide emissions and promoting energy diversity.
- In most parts of the world outside Brazil, biofuels cost significantly more to produce than conventional gasoline or diesel, even at crude oil prices of over $70 per barrel. Brazil has the lowest bioethanol unit costs in the world, at around $0.20 per litre for new plants. Other developing countries in tropical zones may be able to achieve similar costs. In Europe and North America, farm subsidies distort production costs. Grain-based ethanol costs on average around $0.30/litre in the United States, after production subsidies, so that it is competitive with gasoline at an average crude oil price of between $65 and $70 per barrel. In Europe, the ethanol production cost, including subsidies, is about $0.55/litre. Average production costs are projected to drop by around a third between 2005 and 2030. Costs in Europe and the United States would be significantly higher without crop and ethanol subsidies.
- New biofuels technologies being developed today, notably **enzymatic hydrolysis and gasification of woody ligno-cellulosic feedstock, could allow biofuels to play a much bigger role** than that foreseen in either scenario. Ligno-cellulosic crops, including trees and grasses, can be grown on poorer-quality land at much lower cost than crops used now to make biofuels. They may also be more environmentally benign. But significant technological challenges still need to be overcome for these second-generation technologies to become commercially viable.