

Production and use of biofuels—fuels derived from crops and agricultural wastes—advanced rapidly in 2004, spurred on by agricultural, environmental, and consumer interests. In general, biofuels burn cleaner than fossil fuels, are renewable, and can be domestically produced in many countries—creating agricultural jobs and revenues while displacing imported fuels.

Global production of fuel ethanol increased 13.6 percent in 2004, reaching almost 33 billion liters.¹ (See Figure 1.) Nearly twice as much ethanol was produced in 2004 as in 2000.² Ethanol is by far the most widely used biofuel for transportation; Brazil and the United States dominate the market. World production of biodiesel fuel, based on vegetable oils and fats, is smaller but has been growing even faster, nearing 1.8 billion liters in 2003, up 18 percent over 2002.³ (See Figure 2.)

Ethanol derived from sugarcane accounts for 30 percent of auto fuel in Brazil, which generates some 14 billion liters of ethanol annually.⁴ In the United States, corn-distilled ethanol provides more than 10 billion liters of fuel each year, but this accounts for just 2 percent of U.S. transportation fuel.⁵

The ethanol fuels market grew rapidly in the 1980s due to Brazilian and U.S. government efforts to provide alternatives to high-priced oil, but then it languished for much of the 1990s. Since 2000, however, rising environmental concerns, new technologies, and the desire to find new income streams for farmers have provided a large boost.

The European Union (EU) is the third largest producer of biofuels but the leading manufacturer of biodiesel. With the help of tax breaks for diesel fuel, nearly 1.6 billion liters of biodiesel were produced in Europe in 2003, a 43-percent increase over 2001.⁶ While conventional diesel vehicles can run on 5–30 percent blends of bio- and fossil diesel, several European vehicle manufacturers have approved the use of 100 percent biodiesel in their engines.⁷ The EU hopes biofuels will supply 2 percent of the fuel market in 2005, 5.75 percent in 2010, and 20 percent in 2020.⁸

The growth of biofuels may accelerate even

more as others introduce favorable policies. Australia, China, India, South Korea, and Japan already support biofuels.⁹ The government of Thailand has endorsed a 10-percent ethanol/gasoline blend, and 18 new ethanol plants are being developed.¹⁰ In the Philippines, coconut-derived biodiesel is expected to cut demand for petroleum diesel by 5 percent.¹¹

The cost of biofuels varies widely by region. In Brazil, for example, the retail price of ethanol is often lower than that of gasoline due to low land and labor costs. In North America, in contrast, ethanol is more expensive because of the lower efficiency of corn as opposed to sugarcane and higher costs.

The greatest potential for biofuels lies in tropical and subtropical developing countries, where growing seasons are longer and production costs are lower.¹² But unlike oil, trade in biofuels is limited by tariffs and other trade restrictions.¹³ Although producing ethanol costs about half as much in Brazil as in Europe, ethanol trade between the two is nearly nonexistent. In 2004, Brazil exported 2.3 billion liters of ethanol to India, the United States, and the Caribbean, a figure that could be much higher if Brazil were not constrained by high agricultural tariffs.¹⁴

Reducing the cost of biofuels is the key to their continued growth. New conversion technologies, such as cellulose-derived ethanol made from the non-food portion of renewable feedstocks, could bring significant cost reductions over the next decade. Canada-based Iogen, the world leader in cellulose ethanol technology, now produces approximately 100,000 liters a year; several new plants are planned that could quadruple the country's ethanol supply.¹⁵ Less expensive processes for biodiesel production are also being developed.

The International Energy Agency projects that if supportive policies continue to proliferate, world biofuels production could nearly quadruple, to more than 120 billion liters, by 2020.¹⁶ More than 2 million additional alternative fuel vehicles could be introduced worldwide by 2010, driving up demand for biofuels.¹⁷

LINKS
p. 56

Figure 1. World Ethanol Production, 1980–2004

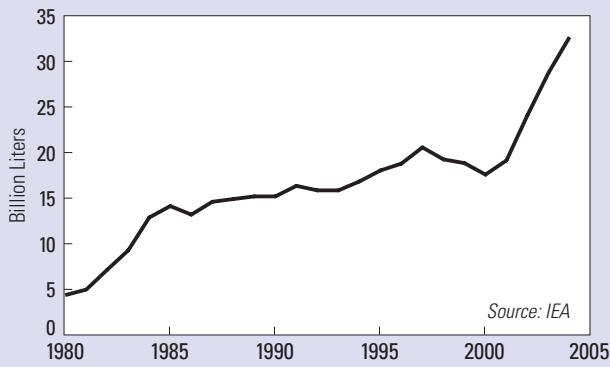
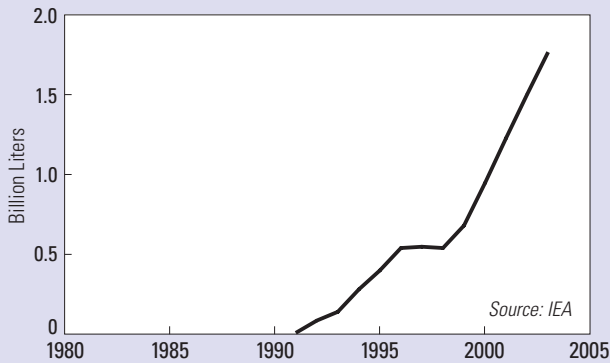


Figure 2. World Biodiesel Production, 1991–2003



World Ethanol and Biodiesel Production, 1980–2004

Year	Ethanol	Biodiesel
	(million liters)	
1980	4,368	
1981	4,977	
1982	7,149	
1983	9,280	
1984	12,880	
1985	14,129	
1986	13,193	
1987	14,599	
1988	14,902	
1989	15,191	
1990	15,190	
1991	16,348	11
1992	15,850	88
1993	15,850	143
1994	16,829	283
1995	18,033	402
1996	18,789	542
1997	20,562	550
1998	19,247	542
1999	18,840	683
2000	17,580	949
2001	19,136	1,231
2002	24,106	1,504
2003	28,745	1,768
2004	32,655	n.a.

Source: International Energy Agency.

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