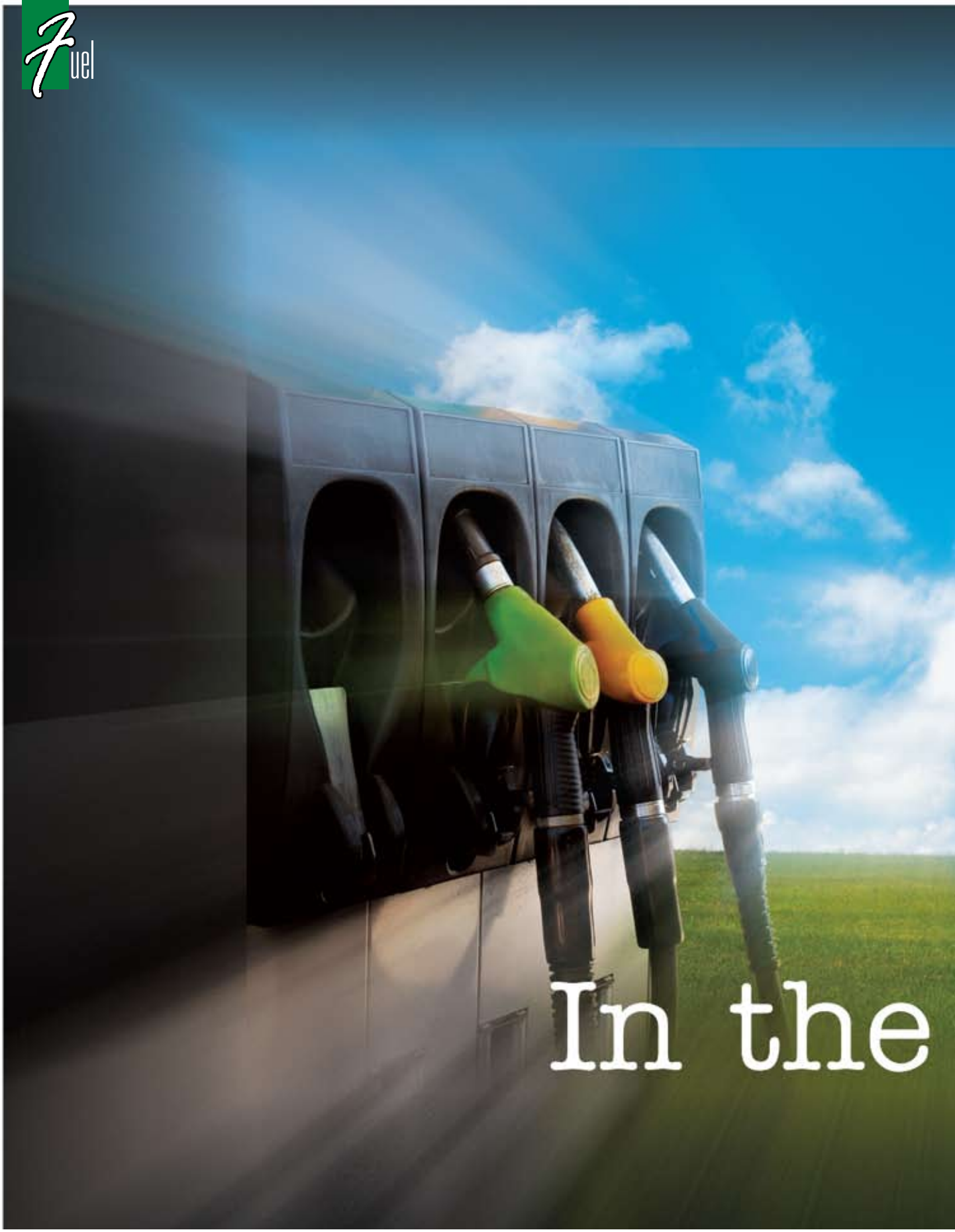

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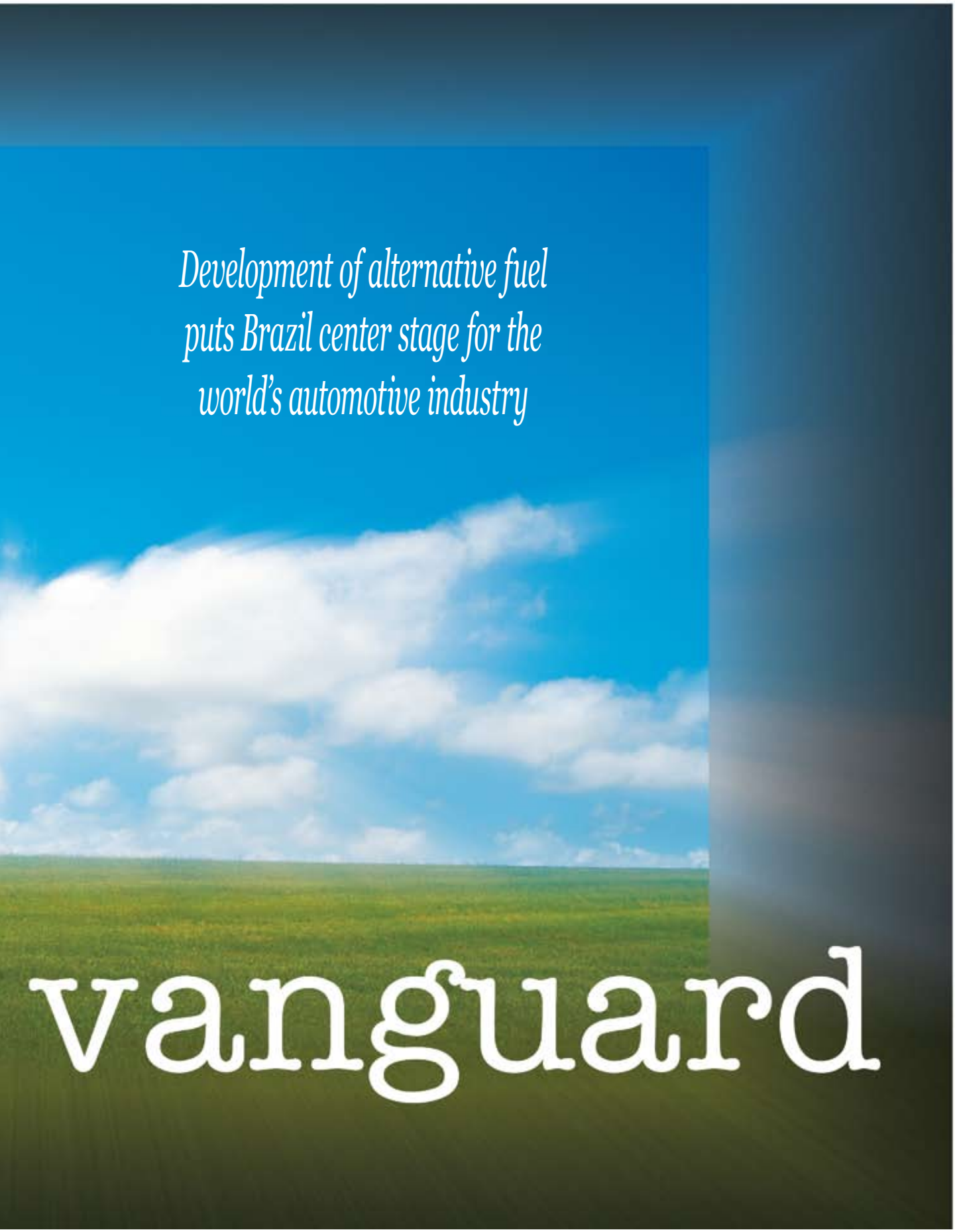

Development of alternative fuel puts Brazil center stage for the world's automotive industry
vanguard

Launched in 2003, four million bi-fuel vehicles were sold in the first four years, in 2007 accounting for approximately 85% of monthly domestic vehicle sales

The needs to become less dependent on imported oil and to reduce the foreign trade deficit are just two of the factors that have led Brazil to look for alternative supplies. This effort has not only worked out, it has made Brazil a pioneer in the development of successful technology throughout the 50-year-history of its automotive industry. A recent example has been "flex fuel," which allows vehicles to run on ethanol, gasoline, or a mixture of both in any proportion.

Launched in 2003, four million bi-fuel vehicles were sold in the first four years, in 2007 accounting for approximately 85% of monthly domestic vehicle sales. Consumers can choose from 63 models.

Following the success of Brazil's experience, ethanol began to figure on the international scenario as an effective alternative to oil, either mixed with gasoline, or used straight as a fuel in vehicles equipped with "flex fuel" engines. Governors, business people and automotive engineers in the United States, Europe and Asia began to visit Brazil to learn more about the country's technology.

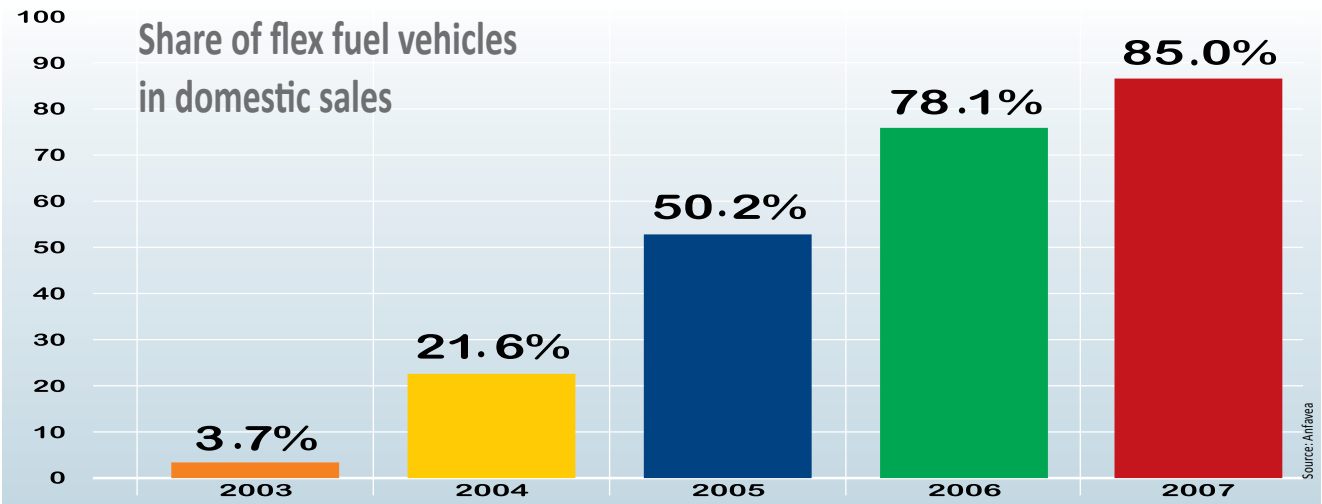
It is undoubtedly a new opportunity to have opened up for Brazil. Data from the Ministry of Foreign Affairs says that in the last three decades the use of ethanol as a replacement for gasoline has saved over one billion barrels of oil. This is equal to about twenty-two months of current production in Brazil. In the last eight years use of ethanol has saved Brazil US$ 61 billion in oil imports, approximately equal to the country's total foreign debt.

For another aspect of the balance of trade, the expansion of ethanol use on the international market has driven foreign trade. According to data from the Department of Sugar and Ethanol at the Ministry of Agriculture, in the first half of 2007 total Brazilian exports of ethanol rose by 70.9% in volume and 98.7% in revenue on the same period in 2006.

Currently all attention is focused on biodiesel. By definition it is a natural fuel used in diesel engines. Produced from renewable sources such as sunflowers, castor beans, soy, palm plants and other oilseeds, or from animal fat, it must comply with specifications established by the National Oil Agency (ANP). Based on an initial low mixture of 2%, B2, with complete support from the Brazilian automotive industry, biodiesel is set to match the success achieved by ethanol in economic, social and environmental terms (see box, page 34).

Staying in the diesel engine segment, the technology already exists that enables more than one kind of source. It is a multi-fuel system called Diesel/Gas, which can be used in buses, trucks, and generators with engines that originally had mechanical injection pumps.

GNV – Speaking of gas, from 1992 to 1994 another fuel came onto the Brazilian market: Natural Vehicular Gas (GNV), licensed only for taxis



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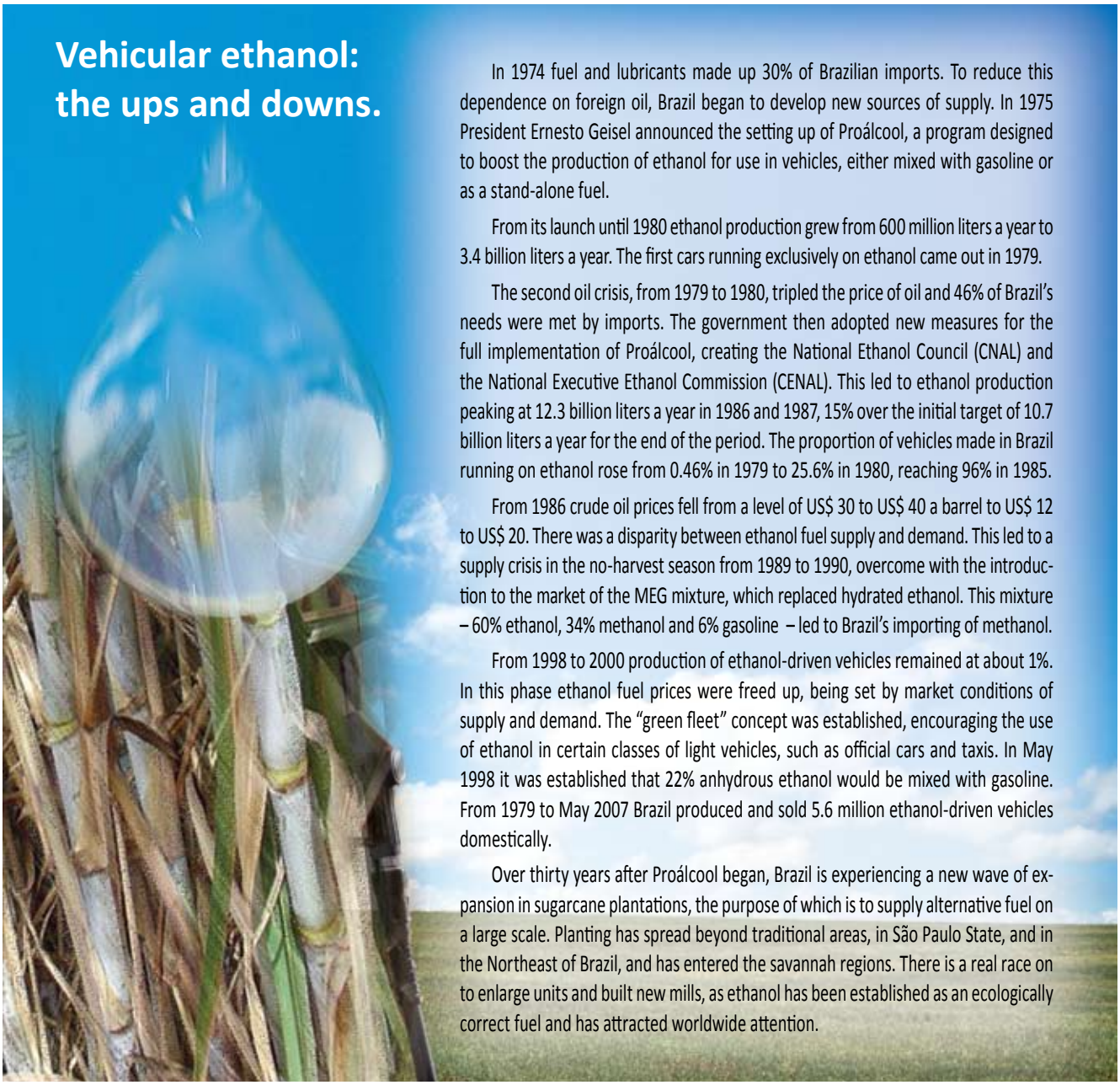
and company fleets initially, before being extended in 1997 for private vehicles. GNV has properties that readily adapt to the substitution of traditional fuel sources for four-stroke Otto cycle or two-stroke engines. These engines generally use gasoline as fuel, but in Brazil ethanol engines are also common.

In the case of GNV in gasoline or ethanol engines, it is common for them to operate in a bi-fuel manner. In this way vehicles can leave the factory with the system or be adapted in authorized workshops. It can also be used in diesel oil engines – two- or four-stroke engines with compression ignition systems – either in a combined form, using both diesel and gas, or replacing the old diesel engine with an exclusively gas-driven engine.

In both cases, conversion requires equipment to be added to the vehicle basically formed of cylinders to process the GNV; a set of high and low pressure tubes, a pressure regulator, supply valve, fuel change device, and system gauges.

According to data from the Brazilian Oil, Gas and Biofuel Institute (IBP), in June 2007 1,425,000 vehicles were running on this fuel in Brazil.

Vehicular ethanol: the ups and downs.



In 1974 fuel and lubricants made up 30% of Brazilian imports. To reduce this dependence on foreign oil, Brazil began to develop new sources of supply. In 1975 President Ernesto Geisel announced the setting up of Proálcool, a program designed to boost the production of ethanol for use in vehicles, either mixed with gasoline or as a stand-alone fuel.

From its launch until 1980 ethanol production grew from 600 million liters a year to 3.4 billion liters a year. The first cars running exclusively on ethanol came out in 1979.

The second oil crisis, from 1979 to 1980, tripled the price of oil and 46% of Brazil's needs were met by imports. The government then adopted new measures for the full implementation of Proálcool, creating the National Ethanol Council (CNAL) and the National Executive Ethanol Commission (CENAL). This led to ethanol production peaking at 12.3 billion liters a year in 1986 and 1987, 15% over the initial target of 10.7 billion liters a year for the end of the period. The proportion of vehicles made in Brazil running on ethanol rose from 0.46% in 1979 to 25.6% in 1980, reaching 96% in 1985.

From 1986 crude oil prices fell from a level of US$ 30 to US$ 40 a barrel to US$ 12 to US$ 20. There was a disparity between ethanol fuel supply and demand. This led to a supply crisis in the no-harvest season from 1989 to 1990, overcome with the introduction to the market of the MEG mixture, which replaced hydrated ethanol. This mixture – 60% ethanol, 34% methanol and 6% gasoline – led to Brazil's importing of methanol.

From 1998 to 2000 production of ethanol-driven vehicles remained at about 1%. In this phase ethanol fuel prices were freed up, being set by market conditions of supply and demand. The "green fleet" concept was established, encouraging the use of ethanol in certain classes of light vehicles, such as official cars and taxis. In May 1998 it was established that 22% anhydrous ethanol would be mixed with gasoline. From 1979 to May 2007 Brazil produced and sold 5.6 million ethanol-driven vehicles domestically.

Over thirty years after Proálcool began, Brazil is experiencing a new wave of expansion in sugarcane plantations, the purpose of which is to supply alternative fuel on a large scale. Planting has spread beyond traditional areas, in São Paulo State, and in the Northeast of Brazil, and has entered the savannah regions. There is a real race on to enlarge units and built new mills, as ethanol has been established as an ecologically correct fuel and has attracted worldwide attention.

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