ETHANOL

by
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Introduction and Brief History

Over the last few years, several factors have contributed to the decision of policymakers to encourage the search for alternative fuels. Among those factors were the environmental consequences of the usage of fossil fuels, the high price of crude oil and the high dependency of the United States on foreign oil.

Chief among the alternatives encouraged are fuels from "renewable sources", and among them, "biofuels". The two most important biofuels supported in current policies are ethanol and biodiesel, with the former getting the lion's share of assistance.

Until to the mid-1970s, policymakers' support for alternative fuels was insignificant; however, the oil embargo of 1974 changed that. It created a consciousness that the United States needed to reduce its dependence on imported crude oil. In that spirit, the Energy Tax Act of 1978 (ETA) was the first piece of legislation passed by Congress (and signed by President Carter) that actively subsidized the use of gasohol. Specifically, it introduced an excise tax exemption of gasohol (an exemption that would change in form over time). This subsidy "created" ethanol as fuel for the first time, and in the same year of passing the ETA, the first 20 million gallons of commercial ethanol production capacity came on-line. The Clear Air Act Amendment of 1990 required, for the first time, the use of oxygenated or reformulated gasoline, a further boost to ethanol production. And finally, the Energy Policy Act of 2005 established a renewable fuel standard, which mandates the use of ethanol and other renewable fuels in gasoline.

In addition to federal subsidies, Louisiana began subsidizing ethanol production in 1979 by exempting gasohol from the state gasoline tax. In 1986, the tax exemption was dropped in favor subsidies paid directly to ethanol producers. In 1987, the subsidy payments were limited to a total of $15.1 million which was reached in early 1988, and in 1989, the subsidies were repealed.

Production

Production of ethanol has steadily, and at times, dramatically, increased since 1980. In the United States it is usually produced from the distillation of fermented simple sugars derived from corn. Ethanol may be produced from other sources, like wheat, potatoes, or cellulosic material such as switchgrass, rice straw and sugar cane. Brazil, a very big producer of ethanol as well, produces it mostly from sugar cane.

Figure 1 below shows the total amount of bushels of corn produced in the period 1980-2007, and the amount from it dedicated to the production of ethanol. In the early 1980s, less than 200 million bushels of corn were used to manufacture ethanol, representing no more than 2% of the total production of the grain. This share increased steadily throughout the 80s and 90s, with a big jump after the turn of the century. In 2002 the percentage of corn production for ethanol reached double digits with 11.1%, and currently, in 2007, it stands at almost a quarter (24%). In the same period the amount of ethanol

produced increased dramatically. While in the early 1980s production was less than 400 million gallons, in 2006 it reached almost 5 billion gallons (see figure 2).

FIGURE 1
MILLIONS OF BUSHELS PRODUCED AND USAGE FOR ETHANOL

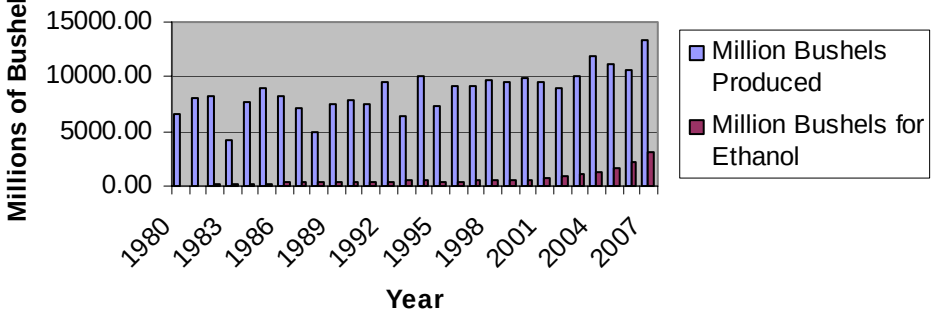
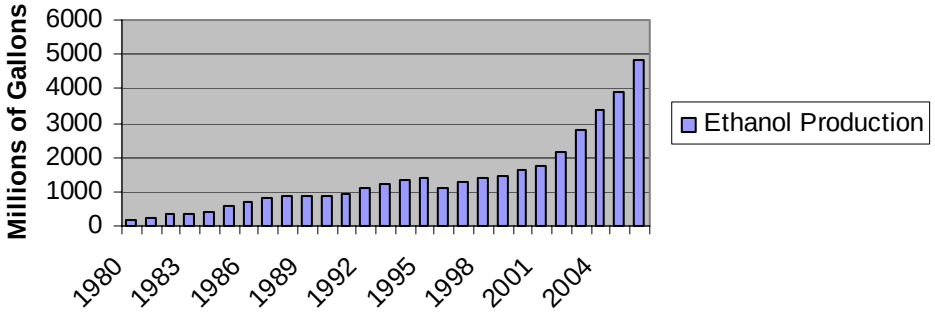


FIGURE 2
Total Production of Ethanol



Nine ethanol plants were built in Louisiana with a peak production of 32 million gallons in 1986. When state subsidies ended, production ceased. There has been no commercial production of ethanol in Louisiana since 1990.

The only ethanol production in Louisiana is from a pilot-scale cellulosic plant in Jennings. Other ethanol plants are planned or under construction in Jennings, Lacassine, Donaldsonville, and Belle Chase.

Incentives for Ethanol

Ethanol production and consumption is highly subsidized. There are numerous incentives at the federal and state level. A table by the U.S. Department of Energy (accessible at:

http://www.eere.energy.gov/afdc/progs/tech_matrx.cgi) summarizes most available incentives at the federal level and in the various states. It shows that, for ethanol alone, the total amount of state level incentives around the country added up to 323, while the count at the federal level stands at 20. The following is a summary of federal and Louisiana incentives.

A. At the federal level:
    a) By far the most important tax incentive is the so-called Volumetric Ethanol Excise Tax Credit (VEETC) established in 2005 by the American Jobs Creation Act of 2004. This is a tax credit of 51 cent per gallon of ethanol given to gasoline suppliers who blend ethanol with gasoline. The U.S. Treasury Department estimates that over the period 2005 to 2011 this subsidy will cost on average $2.7 billion dollars per year.
    b) Small Ethanol Producer Credit: This credit was introduced in 1990 and expanded by the Energy Policy Act of 2005. This is an ethanol production credit of 10 cents per gallon on the first 15 million gallons produced by a small producer (as defined by law).
    c) Special Depreciation Allowance for New Cellulosic Biomass Ethanol Plant Property: A taxpayer may take a depreciation deduction of 50% of the adjusted basis of a new cellulosic ethanol plant in the year it is put in service.
    d) Fuel ethanol is also protected by a special import duty from foreign countries. A 2.5% ad valorem tariff and a duty of 54 cents per gallon of ethanol imported for fuel use is applied to imports into the United States from most countries. However, most ethanol from the Caribbean Basin Initiative countries may be imported free. Imports from Brazil, the largest ethanol exporter in the world, are subject to the fees.
    e) The Renewable Fuel Standard Mandate: This is a mandate by the Energy Policy Act of 2005, and thus, not a subsidy in itself. However, it may be viewed as an indirect subsidy, since it guarantees a market to the biofuel industry. This standard establishes very specific goals to be achieved until 2012. For example, in 2006 suppliers must have blended 4 billion gallons of renewable fuel into gasoline, and this must increase annually to 7.5 billion gallons in 2012.

B. In the state of Louisiana:
    a) Alternative Fuel Vehicle and Refueling Infrastructure Tax Credit: The state offers an income tax credit worth 20% of the cost of converting a vehicle to operate on an alternative fuel, 20% of the incremental cost of purchasing an Original Equipment Manufacturer (OEM) AFV or hybrid electric vehicle (HEV), and 20% of the cost of constructing an alternative fuel refueling station. For the purchase of an OEM AFV or HEV, the tax credit cannot exceed 2% of the total cost of the vehicle or $1,500, whichever is less.
    b) Renewable Fuels Standard: Subject to certain provisions, within six months following the point at which cumulative monthly production of denatured ethanol produced in the state equals or exceeds an annual production volume of at least 50 million gallons, 2% of the total gasoline sold by volume in the state must be denatured ethanol produced from domestically grown feedstock or other biomass materials.
    c) Beginning July 1, 2006, renewable fuel plants operating in Louisiana and deriving ethanol from the distillation of corn must use corn crops harvested in Louisiana for at least 20% of the facility's total feedstock. In succeeding years, the minimum percentage of Louisiana-harvested corn used to produce renewable fuel in Louisiana facilities must be at least the same percentage of corn used nationally to produce renewable fuel as reported by the U.S. Department of Agriculture's (USDA) Office of the Chief Economist.

Ethanol Benefits and Controversies

Supporters of the industry point out several benefits of ethanol production. The production of almost five billion gallons of ethanol blended into gasoline meant that the United States needed to import 206 million fewer barrels of oil in 2006 (approximately a 5% decrease). Furthermore, the contribution to the country's Gross Domestic Product in 2006 was in the order $23 billion, not an insignificant number. And finally, all the investment and ethanol sales will generate a huge amount of tax revenue to the federal, state and local governments. Such revenues will more than offset the subsidies enjoyed by the industry, and therefore, they will pay for themselves.

Despite all these benefits pointed out by supporters of ethanol, the industry does not lack in detractors. The criticisms to this dramatic support enjoyed by the ethanol industry fall into different categories: 1) pressure on food supply and prices; 2) the net energy balance of ethanol; and 3) the suspected highly intense water usage of the ethanol industry and other environmental effects.

1) Pressure on food supply and prices: As we have seen above, the share of corn used in ethanol production in the total corn harvest has increased steadily, and it is presently 24%. Furthermore, corn is used in several other industries ranging from breakfast food to animal feed. If ethanol uses more and more, less is available to everything else, putting pressure on corn prices, and consequently on the prices of goods produced by the other industries, particularly food industries.
2) Some critics point out the small positive or possibly negative "net energy balance" (NEB) of ethanol. The net energy balance is the difference between the energy that ethanol (or any other fuel) gives minus the energy that one has to devote to manufacture it. There is controversy in the literature whether the NEB is positive or negative; however, there seems to be agreement that, if positive, ethanol's NEB is fairly small. Also, a gallon of ethanol contains about 30% less energy than a gallon of gasoline. This means that 1.3 gallons of ethanol are required to drive a vehicle the same distance as one gallon of gasoline.
3) Finally, some critics point out that ethanol uses fairly high amounts of water for its production. Estimates vary, but some put the number of gallons of water per gallon of ethanol at 1,700 (almost all of which is used to grow the corn; the corn to ethanol process uses 4 – 6 gallons of water per gallon of ethanol). Large increases in the production of ethanol could contribute to rapid depletion of some aquifers. Furthermore, the increase in the planting of corn can have negative environmental impacts through the movement of agrichemicals, especially nitrogen, phosphorus and pesticides from farms to other habitats and other aquifers. For example, it was pointed out that the higher nitrogen inputs could lead to an increase in the so-called "dead zone" in the Gulf of Mexico and Chesapeake Bay, and to nitrate, nitrite and pesticide residues in well water.