Appendix D

Federal and State Market Considerations

Federal Programs and Incentives

The environmental benefits of alternative fuels compared to traditional transportation fuels and the renewable nature of ethanol have prompted several environmental and energy related programs at the state and national level. The production and use of renewable fuels increase the diversity in our nation's energy mix while tapping domestic energy resources.

Federal Tax Credits for Blenders. The Energy Tax Act of 1978 established an exemption for 10-percent alcohol blended gasoline, or gasohol. This provision has been changed several times since then. The Budget Reconciliation Act of 1990 adjusted the federal credit to the current $0.54 per gallon. The Energy Policy Act of 1992 again revised the tax exemption allowing blends less than 10 percent.

Ethanol Blend (% volume)	Oxygen Content (% weight)	Tax Exemption (cents/gallon blended)
5.7	2.0	3.0
7.7	2.7	4.1
10	3.5	5.4

There are two ways to receive this federal credit: excise tax exemption and blender's income tax credit. The producer of finished product (ethanol blended gasoline) that is responsible for tax collection from the consumer is the only entity that may use these methods. Usually it is the blender of ethanol who is marketing the fuel at retail. In no case can the producer of ethanol claim the federal tax credits.

These credits to fuel blenders are scheduled to sunset in 2007 on a declining scale with a reduction to 5.2 cents in 2001, 5.2 cents in 2003 and 5.1 cents in 2005.

Excise Tax Exemption. The current federal excise tax for motor gasoline is 18.3 cents per gallon. The federal excise tax exemption provides blenders a forgiveness of 5.4 cents of this for a qualified blend of 10-percent fuel grade ethanol. The excise tax exemption reduces the retail price of neat ethanol by 54 cents per gallon. The exemption is prorated for blends of less than 10 percent. Amounts greater than 10 percent, however, are not allowed by EPA regulations at this time. For qualified alternative fuels of 75-percent ethanol or greater, the blender's tax credit must be used.

Income Tax Credit. The Crude Oil Windfall Profits Action of 1980 established the first income tax credit for fuel alcohol blends of 10 percent or less. A blender may elect to receive a federal income tax credit of 54 cents per gallon of ethanol used, instead of the excise tax forgiveness, for any percentage of ethanol sold as fuel, whether low-percentage blends (10 percent or less) or alternative fuel (75 percent or higher). The blender must have a tax liability to which the credit can be applied.

Small Producers Credit. The Budget Reconciliation Act of 1990 established a 10-cent per gallon tax credit to help encourage the development of new ethanol production facilities, effective January 1, 1991. This credit is available for ethanol produced at plants with

30 million gallons or less of annual capacity. Ethanol producers that qualify can deduct from their federal income tax 10 cents per gallon on the first 15 million gallons produced annually. The small producer tax credit is scheduled to sunset December 31, 2007.

Energy Policy Act of 1992. The Energy Policy Act of 1992 (EPACT) provides federal mandates for alternative fuel vehicles (AFV). The primary goal of EPACT is to reduce the nation's dependence on crude oil imports. The Act defines alternative fuel as natural gas, liquid propane gas or other fuels containing at least 85 percent alcohol by volume. Hydrogen, liquid fuels from coal, and electricity are also included.

Government and private sector fleets that qualify (fleets with 20 or more vehicles operating in metropolitan areas with a population of more than 250,000) under this program are required to include AFVs in their fleets. The introduction of this program began in 1996 with the requirement that 30 percent of vehicles are AFVs followed by increments up to 90 percent by 1999. In addition, federal fleets are mandated to use, whenever possible, commercial fueling facilities that offer alternative fuels to the public.

EPACT also addressed provisions regarding the production, utilization and technological advancement of renewable energy. In 1994, $50 million was authorized through the Renewable Energy & Efficiency Technology Competitiveness Act of 1989, which set specific goals regarding the production of ethanol from biomass. While no commercial plants have been built as of yet, there has been significant research on collecting, transporting, and processing of biomass for renewable energy production. The actions initiated by EPACT have been driving factors in bringing the biomass industry to the very brink of success.

Federal Regulatory Programs

Clean Air Act Amendments of 1990. The Clean Air Act of 1970 (CAA) gave the Environmental Protection Agency (EPA) the authority to promulgate regulations affecting fuel quality of conventional fuels, such as lead phase-out. In 1990, the CAA was amended to include vehicle emission reductions. The Clean Air Act Amendments of 1990 (CAAA) authorized the EPA to establish air quality standards for pollutants including smog-forming carbon monoxide and numerous ozone-forming emissions.

The EPA established National Ambient Air Quality Standards (NAAQS) for six designated air pollutants: carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), sulfur dioxide (SO_2), ozone (O_3) and lead. Urban areas not meeting minimum clean air standards for these pollutants were required to utilize cleaner burning fuels.

There are few states that do not have an urban area in violation of NAAQS for either ozone or carbon monoxide from gasoline powered vehicles. Areas in nonattainment were classified according to the severity or source of pollution. In 1991, the EPA identified 98 metropolitan areas in nonattainment of ozone levels and 40 areas in nonattainment of carbon monoxide.

Through the CAAA the EPA created a winter oxygenated fuel program for carbon monoxide nonattainment and a year-round reformulated gasoline (RFG) program for ozone nonattainment. The standards for emission reductions can be achieved by adding oxygen to gasoline. Ethanol contains 35-percent oxygen and, when blended with gasoline, helps to increase the combustion efficiency in the engine, thereby significantly lowering harmful

tailpipe emissions. The reduction of carbon monoxide, volatile organic compounds, nitrogen oxides and carbon monoxide emissions result in improved air quality.

There are two primary oxygenates used in carbon monoxide and ozone nonattainment areas: ethanol and methyl tertiary butyl ether (MTBE). MTBE is produced from methanol and natural gas and is largely imported from the Middle East. MTBE is blended 15 percent in gasoline to achieve the minimum oxygen requirement for reformulated gasoline. It is used predominately in the year-round ozone nonattainment markets. Ethanol is used predominately in the winter CO nonattainment markets.

MTBE has been found to contaminate ground water supplies in areas where RFG is used containing this oxygenate. California has already initiated a phase-out of MTBE and other ozone nonattainment markets are expected to follow. California alone uses 10 billion gallons per year of RFG. This is a potential market of over 550 million gallons of ethanol.

The majority of the increase in ethanol demand in the past 10 years has resulted from these programs. Since 1990, the nation's ethanol production capacity has more than doubled from 850 million gallons per year to 1.779 billion gallons in total production capacity in 1999. The industry continues to grow with an additional 60 million gallons of new annual capacity slated to come on-line in 2000.

Oxygenated Fuels Program. Areas classified as carbon monoxide nonattainment were required to establish an oxygenated fuels program for a period of no less than three months each year during winter. Beginning November 1992, the minimum oxygen requirement for gasoline sold in these areas was 2.7 percent by weight. This is the equivalent of 7.7-percent ethanol by volume in a gasoline blend. If the federal air quality standard for CO is not achieved by a designated period (at least three months), then the minimum oxygen content increases to 3.1 percent.

Of the original 40 carbon monoxide nonattainment areas, 27 have been re-designated to CO attainment. Of the total CO original and opt-in nonattainment areas, 15 areas are still implementing an oxygenated fuel program to mitigate CO pollution. In Oregon, Grants Pass, Klamath County and Medford, each of which is currently participating in the oxygenated fuels program, applications are being made for re-designation to CO attainment.

Phase I Reformulated Gasoline Program. Areas in nonattainment of ozone require gasoline sold to be reformulated to lower volatile organic compounds (VOC) and toxic chemicals by 15 percent beginning in 1995 and 25 percent in the year 2000. The emission reduction requirements for air toxins apply year-round, and the VOC emissions apply only during the summer months.

The air toxins – benzene and aromatic hydrocarbons – cannot exceed 1.0 percent and 25 percent by volume of gasoline respectively. Nitrogen oxides (NO_x) may not exceed 1990 levels of conventional baseline gasoline. The minimum oxygen content for reformulated gasoline is set at 2 percent by weight or 5.7 percent by volume of ethanol blended with gasoline.

While the wintertime carbon monoxide program only requires a minimum of 2.7 percent by weight oxygen in the gasoline, the summertime program for smog is far more complex. The summertime program requires RFG. RFG has numerous restrictions such as reductions in volatility, aromatic compounds, sulfur reductions, toxic reductions, and the addition of a

minimum of 2 percent by weight oxygen. These restrictions are designed to minimize the formation of ozone. The volatility issue is perhaps the most troublesome for ethanol. Ethanol raises the volatility of gasoline by approximately 0.8 pounds per square inch (psi). In a volatility-driven program, this means that, to be a contender for use in RFG, ethanol must be blended into a lower vapor-pressure gasoline so that the blended fuel does not exceed baseline volatility standards for the area of the country where it will be blended.

However, significant research has been undertaken that demonstrates the relationship between the formation of smog and carbon monoxide levels. In fact, the Illinois EPA has petitioned the federal EPA to grant ethanol blends a minimum of a .5 psi waiver. The state bases the waiver request on the fact that the reductions in carbon monoxide attributable to ethanol blends serve to minimize the formation of ozone, even though there is an increase in the base volatility of the gasoline as a result of the ethanol blend. The EPA has not yet acted on that request.

Phase II Reformulated Gasoline. The Phase II RFG standards consist of two fuel specifications (maximum benzene content and minimum oxygen content) and three performance standards applying to automobile emissions of volatile organic compounds (VOC) during the summer months and nitrogen oxides and toxic air pollutants year-round. The emissions-reduction performance standards are measured by use of a mathematical model that relates each type of emission to specific fuel components. The emissions reductions are measured relative to the average gasoline produced in 1990 (the "baseline gasoline"). The application of an emissions model provides refiners some flexibility in producing gasoline to meet the emissions-reduction performance standards.

Clean Fuel Vehicles. The CAAA also introduced a Clean Fuel Vehicles (CFV) concept for federal and state-owned fleets. CFVs are vehicles capable of using ethanol, methanol, RFG, reformulated diesel, natural gas, liquefied petroleum gas, hydrogen or electric power. Beginning with 1998 models, fleets with ten or more vehicles in the nation’s smoggiest cities had to include CFVs. For 1998, 33 percent of the vehicles purchased for fleets had to be CFVs. The requirement increased to 50 percent in 1999 and 70 percent in the year 2000.

State Programs

Many states around the country, primarily in agricultural areas, have initiated programs and policies to support ethanol industry development. For example, one of the biggest programs, implemented in Minnesota, has created one of the largest oxygenated fuel markets, demanding new ethanol production in the state. Minnesota’s program is a statewide, year-round gasoline oxygenate requirement. Along with an incentive program of $.20 per gallon produced in the state, Minnesota now has 15 ethanol plants. Another recent example is Nebraska. An Oxy-Fuel bill is being proposed that will require the phase-in of minimum oxygen content in the fuel beginning 1/2001. A list of state incentives and programs follows in **Table 13**.

Table 13: State Excise Tax Exemptions and Producer Credits for Ethanol

State	State Excise Tax Exemption	State Producer Credits	Special Information
Alaska	$.06 per gallon tax exemption	No producer credit	Tax exemption applies only in Anchorage and only during the winter months. No sunset
Connecticut	$.01 per gallon tax exemption	No producer credit	No sunset
Hawaii	4% tax exemption	No producer credit	No sunset
Idaho	Tax exemption is to equal the amount of ethanol blended in a gallon of gasoline – not to exceed 10%. Average exemption is $.023 per gallon.	No producer credit	No sunset
Illinois	2% sales tax exemption – average exemption is $.01 to $.015 per gallon.	No producer credit	Sunset 2003
Iowa	$.01 tax exemption	No producer credit	Sunset 2007
Kansas	No tax exemption	Average $.07 per gallon	$2.5 million cap is distributed among producers. The average payment is $.07. Sunset 2001
Minnesota	No tax exemption on 10% blend - $.058 tax exemption E85	$.20 per gallon producer credit	Producer credit applies to the first 15 million gallons per plant per year. There is a $3 million annual cap per plant. Cap is 10 years from date of plant start-up.
Missouri	No tax exemption	$.20 per gallon applies to the first 12.5 million gallons. $.05 per gallon to the next 12.5 million gallons produced.	Producer credit applies to the first 60 months of plant production.
Montana	No tax exemption	$.30 per gallon producer credit	Program has a $3 million cap. Sunset is in 2005
Nebraska	No tax exemption	$.075 per gallon on new capacity	“New capacity” is production above and beyond a plant’s production level in the previous years highest producing quarter. New production must be attributed to name plate expansion of ethanol plant.
North Dakota	No tax exemption	$.40 per gallon producer credit	Producer credit applies to specific ethanol plants named in legislation, and applies only to ethanol sold within the state.
South Dakota	$.02 tax exemption	$.20 per gallon producer credit	$1 million per year, per plant. $10 million total cap per plant.
Wyoming	No tax exemption	$.40 per gallon producer credit	Program has a $2 million per year cap – No sunset

Source: Bryan & Bryan Inc., February 2000