Approved: January 29, 1997
Date

MINUTES OF THE SENATE COMMITTEE ON TRANSPORTATION AND TOURISM.

The meeting was called to order by Chairman Ben Vidricksen at 9:05 a.m. on January 21, 1997 in Room 254-E of the Capitol.

All members were present except:

Committee staff present: Hank Avila, Legislative Research Department
Emalene Correll, Legislative Research Department
Bruce Kinzie, Revisor of Statutes
Marian Holeman, Committee Secretary

Conferees appearing before the committee: Greg Krissek, KS. Dept. Of Agriculture
Marty Vanier, KS Agriculture Alliance
Leslie J. Kaufman, KS Farm Bureau
Jere White, Corn Growers Association
John Bottenberg, KS Ethanol Association

Others attending: See attached list

The minutes of the January 14, 1997 meeting were approved.

SB 2: Concerning expiration date for agricultural ethyl alcohol incentive program.

Greg Krissek,Kansas Department of Agriculture appeared before the committee representing Kansas Secretary of Agriculture Allie Devine as well as the Governor's office. Mr. Krissek spoke in support of the bill (Attachment 1). He stated they wish to go on record that they feel ethanol continues to be a great opportunity for adding value to Kansas agricultural commodities and strongly urge continuation of the incentive fund.

Marty Vanier, DVM, Kansas Agricultural Alliance addressed the committee as a proponent of the bill (Attachment 2). She emphasized the positive impact of the Ethyl Alcohol Incentive Program.

Leslie J. Kaufman, Assistant Director, Public Affairs Division, Kansas Farm Bureau provided some historical information and commented positively on the Agricultural Ethanol Incentive Program (Attachment 3).

Jere White, Executive Director, Kansas Corn Growers Association and Kansas Grain Sorghum Producers Association testified as a proponent of the bill (Attachment 4). The attachment includes a leaflet on E-85 vehicles. Mr. White announced the opening of the first public E-85 fueling station in Kansas and invited members to attend the official opening at the Topeka Truck and Travel Plaza, Wanamaker and Huntoon on February 6th at 9:00 a.m. He pointed out that the support for ethanol has been very diverse - that the basis for a lot of that support and the basis for the industry to be a player in the national markets and to continue to be an important part of the Kansas agricultural value added movement has been the Ethanol Incentive Program.

Members questioned Mr. White regarding the pricing structure on ethanol fuel, mileage, emissions, etc. He anticipates a reduction in the present mid-gasoline price range. Mileage can be less, depending on the vehicle involved. It is a much cleaner burning fuel. Also discussed last year's increase in the price of corn and the fact that plants do not collect the incentive unless they are actually producing ethanol. Kansas plants have the ability to be flexible and thus can survive high corn prices. Mr. White advised that he sees no problem with changes in the Federal farm program.

In response to question regarding cost of this program to the State, Mr. White stated that it is a maximum of two and one-half million dollars per year, broken out by quarter , pro-rated so that is production declines, the maximum incentive per gallon would be twenty cents. In reality, over the last three years, because of the increase in production, with the flat rate cap it has typically been around eight cents. One quarter because production was down this past year it was eighteen cents per gallon. In other states it is typically a flat twenty

cents. He continued with a description of the plants in Kansas, their production of ethanol,by products and income streams. The Federal exemptions do not go to ethanol producers but rather to the petroleum companies who market the fuel. Ethanol producers receive no monies from the federal treasury. Members requested a chart detailing, tax credits, ethanol competitiveness, mileage economy, etc.

John Bottenberg, along with Kathy Peterson, represents the Kansas Ethanol Association. Mr. Bottenberg spoke in support of renewal of in-state ethanol producer's incentive fund. For a brief historical perspective on federal incentives for alcohol fuels, Mr. Bottenberg referred members to pages 12-15 of "An Economic Impact Analysis of Fuel Ethanol Production in Kansas: 1996" (Attachment 5). Mr. Bottenberg promised to provide members some data on comparative costs of by products, amount of energy extracted, and how much it basically costs to process everything. He emphasized that producers are using this incentive fund to increase production, to create more jobs and to keep added value production in Kansas. In response to a question Mr. Bottenberg advised that no protein value is lost in making ethanol and he will provide information on some of the research done in this area.

Joe Lieber, Kansas Cooperative Council, provided written testimony (Attachment 6) but did not appear before the committee.

Members were provided a copy of the Special Transportation Committee's interim report regarding **SB 2** (Attachment 7).

No opponents of the bill requested to be heard.

Senator Harrington moved to report **SB 2** favorable for passage. Senator Huelskamp seconded the motion. The motion carried. Since there were no volunteers, the Chairman will carry the bill on the floor.

The meeting adjourned at 9:55 a.m.

The next meeting is scheduled for January 22, 1997.

SENATE TRANSPORTATION AND TOURISM COMMITTEE GUEST LIST

DATE: JANUARY 21, 1997

NAME	REPRESENTING
Jere White	KS Corn & Grain Sorghum
Greg Krissek	KS Dept of Ag
STEVE KEARNEY	KS OIL MARKETERS ASSN.
Tom Whitaker	KS Motor Carriers Assn
MARTHA CARITHERS	KDOR
DEDRA Platt	KDOR
Dick Bauman	KDOT
J. Bottenberg	KS Ethanol Assoc.
William Sanders	Gov.'s office
Kathy Peterson	KS. Ethanol Assoc.
Leslie Kaufman	Ks Farm Bureau
Marty Vanier	Ks Agricultural Alliance

STATE OF KANSAS

BILL GRAVES, GOVERNOR
Alice A. Devine, Secretary of Agriculture
901 S. Kansas Avenue
Topeka, Kansas 66612-1280
(913) 296-3558
FAX: (913) 296-8389

KANSAS DEPARTMENT OF AGRICULTURE

SENATE COMMITTEE ON TRANSPORTATION

TESTIMONY

January 21, 1997

AGRICULTURAL ETHYL ALCOHOL INCENTIVE PROGRAM

Good morning Chairman Vidricksen and members of the committee, I am Greg Krissek here on behalf of Kansas Secretary of Agriculture Allie Devine.

Ethanol is an excellent example of processing basic Kansas agricultural commodities, corn, grain sorghum, and wheat and adding value to them prior to exporting the finished product from Kansas. The commercialization of ethanol as an octane enhancer and an environmentally friendly fuel has been recognized at national levels. Ethanol plays a major part in the federal Clean Air Act which is in place across the country in those areas with serious air pollution problems.

Kansas ethanol plants, currently four in number, have capacity to produce approximately 55 million gallons of alcohol annually. This represents a nearly 450 percent increase in Kansas ethanol production since 1987. For 1996, Kansas ethanol production translates into use of approximately 22 million bushels of corn and milo that ethanol producers purchase from Kansas farmers and local suppliers. It also provides over 100 quality jobs in smaller Kansas communities.

Kansas participates in several organizations at the national level, like the Governor's Ethanol Coalition, which encourages the use of renewable, alternative fuels. Also, as you may be aware, other states besides Kansas have similar ethanol incentive funds, with most of the other states' production incentives being higher than the incentive in Kansas. For Kansas to continue to play

a role in ethanol production, and to work with potential new facilities, this Kansas incentive fund is necessary.

The Kansas agricultural ethyl alcohol incentive program plays an important role in the use of agricultural commodities. The Graves Administration supports efforts to enhance markets and opportunities for Kansas agricultural commodities. We ask your continued support of this program through passage of Senate Bill 2.

Thank you for allowing me to testify today. I would be happy to try and answer any questions.

KANSAS AGRICULTURAL ALLIANCE

STATEMENT OF THE

KANSAS AGRICULTURAL ALLIANCE

BEFORE THE

SENATE TRANSPORTATION AND TOURISM COMMITTEE

BEN VIDRICKSON, CHAIRMAN

REGARDING S.B.2

JANUARY 21, 1997

The Kansas Agricultural Alliance (KAA) is a coalition of agribusiness organizations that spans the full spectrum of Kansas agriculture, including crop production, livestock production, horticultural production, suppliers, allied industries and professions.

The Committee supports S.B. 2 extending the Agricultural Ethyl Alcohol Incentive Program. The program provides a market for Kansas-grown feed grains and makes a positive contribution toward our environment and economy.

Others will present specific information on the impact of the ethyl alcohol industry, but it is important to note that the growth in production of ethyl alcohol has increased the use of feed grains from 4 million bushels in 1987 to over 22 million bushels in 1996. This use of corn and sorghum has increased the market for these grains and increased real income to Kansas farmers an additional $3.5 million to $7 million. This increase in real income has benefited not only farmers, but has also increased economic activity in the sectors associated with production of these grain crops and ethanol production.

The Kansas Agricultural Alliance urges you to support S.B.2 and extend the Agricultural Ethyl Alcohol Incentive Program.

Thank you for the opportunity to appear before this committee.

SENATE TRANSPORTATION & TOURISM
ATTACHMENT 2 - 1/21/97

2-1

Marty Vanier, DVM ◆ Executive Director
1728 Thomas Circle ◆ Manhattan, Kansas 66502 ◆ (913) 539-9506

PUBLIC POLICY STATEMENT

SENATE TRANSPORTATION COMMITTEE

Re: Agricultural Ethanol Incentive Program

January 21, 1997
Topeka, Kansas

Presented by
Leslie J. Kaufman, Assistant Director
Public Affairs Division
Kansas Farm Bureau

Chairman Vidricksen and members of the Committee, I am Leslie Kaufman, the Assistant Director of the Public Affairs Division for Kansas Farm Bureau. We appreciate the opportunity to appear before you today and comment on the Agricultural Ethanol Incentive Program which is due to expire July 1, 1997.

Over the years, Farm Bureau has supported ethanol programs, on both the state and federal levels. We were long-time supporters of the ethanol fuel tax exemption. When it was phased out, we gave our support to the incentive program for the production of agricultural ethyl alcohol. We have

supported two previous extensions of the incentive program's expiration date. We believe this program is important to the state of Kansas and its agricultural industry and we would support another such extension.

The voting delegates of Farm Bureau, themselves agricultural producers, adopted policy at their 78th Annual Meeting in November of 1996 supporting measures, such as the Agricultural Ethanol Incentive Program, which promote research, production and sale of crop-based alternative fuels. Our members believe these types of fuels have great potential for reducing U.S. reliance on foreign oil, addressing environmental concerns, and for crop consumption and crop price enhancement.

Ethanol use impacts our air quality by reducing carbon dioxide emissions. It is estimated carbon dioxide emissions in Kansas could be reduced as much as 20% through ethanol use.

Ethanol production also creates another market for Kansas grain crops. Nearly 35 million bushels of Kansas grain were utilized for ethanol production from 1994 to mid - 1996. These are just two of the many ways ethanol production and use benefits Kansas.

The full text of our policy on Crop-based Alternative Fuel Production is attached, as well as the text of our position on Highway Development and Funding. As you will note in the policy on Highway Development, we are also

seeking support from the federal government for continuation of the tax credit on ethanol.

As you contemplate the future of the Agricultural Ethanol Incentive Program, we respectfully request you consider further extending this program. Again, we thank you for this time to share with you our support for the Agricultural Ethanol Incentive Program.

Kansas Farm Bureau Policy

Crop-based Alternative Fuel Production AG-11

We believe ethanol and biodiesel have great potential for reducing U.S. reliance on foreign oil, for addressing environmental concerns, and for crop consumption and crop price enhancement. We strongly support ethanol and biodiesel production and encourage consumer education concerning crop-based alternative fuel use, octane enhancement and emission reduction .

We support tax credits and other appropriate measures which will promote research, production and sale of crop-based alternative fuels.

Highway Development and Funding TU-5

We believe safety of drivers and vehicle passengers will be enhanced by maintaining present weight and length limits on tractor-trailers and motor carriers.

We support the concept of highway users paying, through gallonage taxes, vehicle registration fees and sales taxes on motor vehicles, for the construction and maintenance of highways, roads and bridges. We oppose any downgrading of existing U.S. highway designations in Kansas or the shift of any funds now designated for highways.

We believe the federal government should provide a tax credit equal to the federal motor fuel tax for ethanol and biodiesel.

Toll road and turnpike construction in Kansas should not be contemplated unless a feasibility study on any such project shows the toll road or turnpike will pay its own way.

We are opposed to the use of State General Fund revenue to guarantee toll road or turnpike bonds, or to provide for highway construction or maintenance.

Highway design and planning should avoid, where feasible, diagonal routing. Diagonal cuts are most disruptive to agricultural operations. Highway design, development and construction should assist rather than deter economic development in Kansas communities.

Kansas
Grain Sorghum Producers
Association

Kansas
Corn Growers
ASSOCIATION

Senate Bill #2

Testimony of Jere White
Executive Director
Kansas Corn Growers Association
Kansas Grain Sorghum Producers Association
January 21, 1997

I appreciate this opportunity to give a few brief comments on behalf of Kansas corn and grain sorghum farmers in support of the proposed extension of the Kansas Ethyl Alcohol Producers Incentive Fund. We have a long standing history of support for all programs that provide an opportunity to grow the Kansas ethanol industry. The increase in Kansas ethanol plant production capacity indicates that as a state we have been successful. This has been a cooperative effort between growers, ethanol producers and the State of Kansas itself. We can all take pride in that success.

Ethanol is a value added agricultural product. Ethanol production provides good jobs for our citizens and good markets for our grain. Ethanol production even allows that value added process to occur when the quality of the grain is undesirable for other uses. Kansas enjoys a good rate of return on it's investment in the ethanol industry. An industry not unlike farming in the fact that it purchases inputs from one sector, agriculture and sells largely on another, energy. The incentive fund has been a stabilizer for this industry.

Does an incentive fund really make a difference? Merely look across the border to Missouri. They have a lower grain market and a higher population base. Yet Kansas has four ethanol plants and Missouri has none. The difference has been the commitment of Kansas resources to the ethanol industry. Yes, these resources include the incentive fund. But there are many more. Governor Graves is a member of the twenty-one state

P.O. BOX 446, GARNETT, KS 66032-0446•PHONE (913) 448-6922•FAX: (913) 448-6932

SENATE TRANSPORTATION & TOURISM
ATTACHMENT 4 - 1/21/97

Governors' Ethanol Coalition. The Kansas Department of Agriculture and Kansas Corporation Commission have provided support for the expansion of ethanol markets. Our corn and grain sorghum farmers through the Kansas Corn and Grain Sorghum Commissions and Associations have funded and supported a variety of ethanol market development efforts over the years. And the ethanol producers themselves have supported financially and otherwise these same efforts.

Four years ago when I last gave testimony to this committee in support of this program, I was the only Kansan driving a vehicle powered with 85% ethanol or E-85. Today there are a few dozen such vehicles operating in Topeka, with more to come. Kansans have been pioneers in this effort. USD-365, Garnett, operates three E-85 cars. They were the first school district in the nation to teach drivers education using this type of vehicle. The Anderson County Extension Council acquired an E-85 last spring, the first Extension Office in the nation to do so. Satanta Coop, in Haskell County, Kansas, purchased the first E-85 in the Farmland system. And Beckman Motors, Garnett, offered daily E-85 car rentals over three years ago...the first such program in the United States.

I experienced a milestone yesterday when I filled our associations E-85 Taurus up at the first public E-85 fueling station in Kansas. It is located at the Topeka Truck and Travel Plaza or Roost Truck Stop at Wanamaker and Huntoon. This facility will supply fuel to the federal and state E-85 fleet, as well as others in need of the fuel. I wish to personally invite this committee to join Governor Graves and other leaders when we officially open the E-85 pump on February 6th at 9:00 AM.

The continuation of all of these efforts is in the best interest of the State of Kansas. We respectfully ask for your support of Senate Bill #2. Thank you.

The 1997 Ford Taurus

85% Ethanol Flexible Fuel Vehicle

The Choice of Americans Everywhere

* For a limited time only

Costs $345 Less* Than a Gasoline Model

*Limited Offer

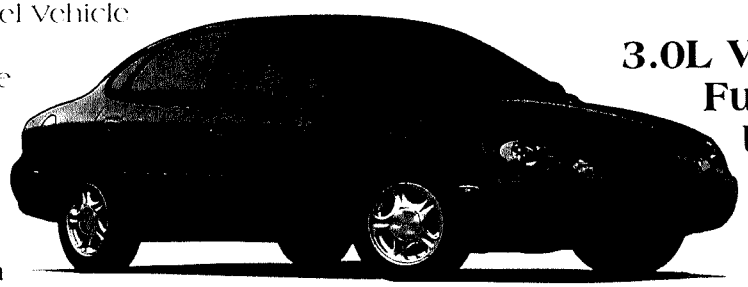
The 1997 E85 Taurus

Flexible Fuel Vehicle

Flexible Fuel Benefits in America's Best-Selling Fleet Car

A Commitment to the Environment

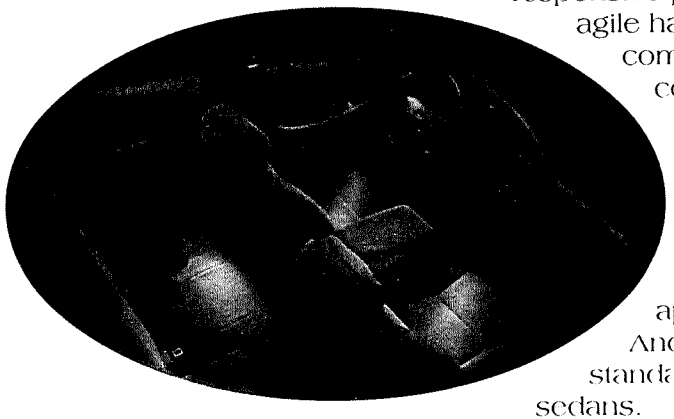
The Taurus Flexible Fuel Vehicle is a prime example of Ford's commitment to protecting the environment and world leadership in the development of alternative fuel vehicles. It's an advanced Flexible Fuel Vehicle that is available in an ethanol version. Ethanol is a renewable fuel that burns clean.



Taurus Flexible Fuel Vehicles operate on E85 — 85% ethanol and 15% unleaded gasoline — or any mixture of gasoline and ethanol in the same tank. This flexibility makes it ideal for use in any location.

A Dynamic Taurus

America's #1 fleet car was totally redesigned in 1996. This next generation Taurus is designed to be safer and quieter with more responsive performance, more agile handling and more comfort and convenience features than any Taurus before it. Aerodynamically, it incorporates advanced design with the sleek appearance to match. And it sets new, higher standards for mid-size sedans.



The 1996 E85 Taurus was a sellout. More than 3,500 were purchased — more than any other type of alternate fuel vehicle manufactured. While federal, state and local governments across the nation ordered more than half the cars, utilities and agricultural

Specifications for the 1997 E85 Taurus

3.0L V-6 Flexible Fuel Engine Upgrade

- Unique block material
- Increased wear-resistant piston rings
- Exhaust valve seat inserts
- Engineered cylinder head combustion chamber
- Alcohol compatible 25 pounds per hour fuel injectors

1997 Taurus Flexible Fuel Vehicle Improvements

- New steel fuel tank (18 U.S. Gallons/68 Liters)
- Revised fuel composition sensor
- New in-tank fuel delivery module
- New "miles to empty" gauge

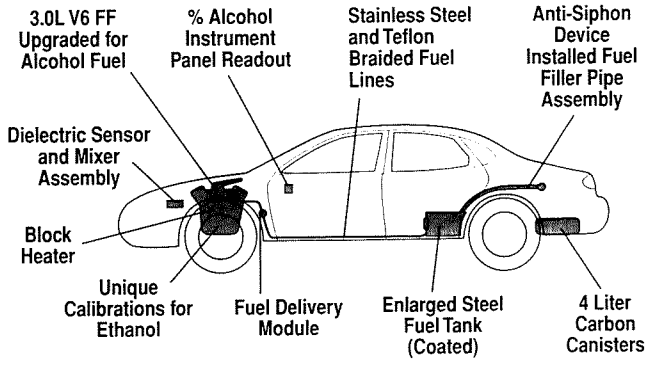
1997 Taurus Feature Highlights

- Dual air bags*
- Seats designed to prevent occupants from sliding forward under safety belts
- Childproof rear door locks
- Heated mirrors to help clear ice or snow
- Advanced MacPherson front and quadralink rear suspensions
- Variable-assist power steering

Ask for Option 992

1997 TAURUS 3.0L

Flexible Fuel Vehicle



- More rear seat knee and leg room
- 60/40 split fold-down rear seat track
- Particulate cabin air filtratio.
- Optional hands-free cellular phone

*Always wear your safety belt.

hit.

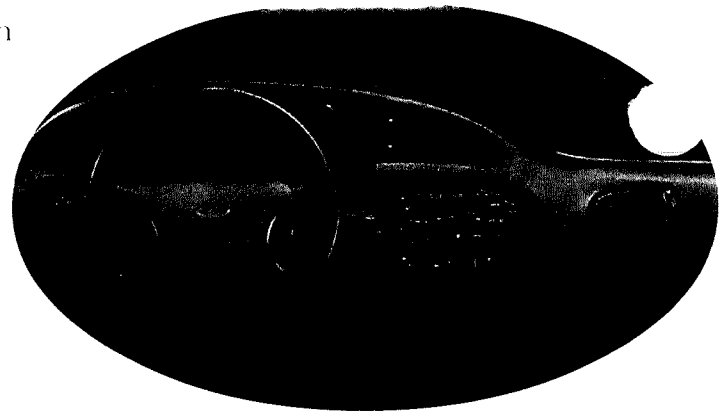
The Best of Both Worlds

The 1997 Taurus Flexible Fuel Vehicle has all the quality, safety and comfort of the gasoline-powered version. And because it's FordBuilt, the E85 Taurus carries the same service and warranty◊ benefits as Ford's gasoline-powered vehicles.

* For a limited time only

◊ Ask your dealer for a copy of the limited warranty

- impact protection requirements
- "Safety-cell" body construction
- Sturdier body structure

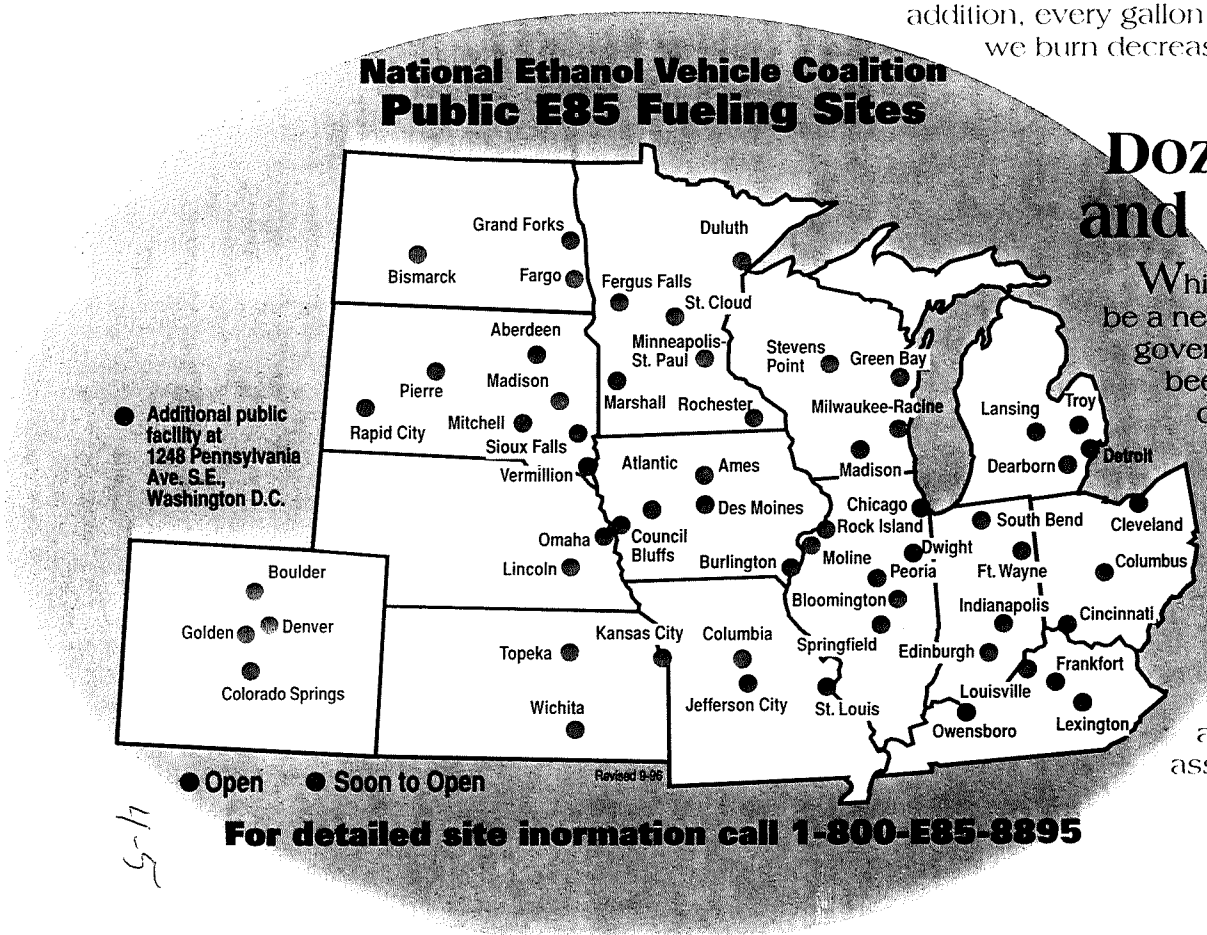


Why Use 85% Ethanol Fuel?

The 1997 Flexible Fuel Taurus operates the same as a gasoline-powered model, only it was designed to operate on higher blends of ethanol that burn cleaner than gasoline. Because it is a flexible fuel vehicle, it can operate on any blend of ethanol and gasoline — up to 85 percent ethanol.

Using ethanol as an alternate fuel boosts America's economy by adding markets for farmers and creating jobs for Americans in the ethanol industry. In addition, every gallon of E85 that we burn decreases our use of imported oil and makes us less dependent on unstable countries.

Maybe you've already been using ten percent ethanol blends in your vehicles. Making the switch to E85 utilizes a clean-burning renewable fuel that provides us with economic, environmental and energy security benefits — it's a win-win for everyone.



Dozens of Public E85 Stations... and More On the Way.

While 85 percent ethanol may be a new fuel to you, state governments and others have been using E85 in thousands of cars for several years.

In 1995, the National Ethanol Vehicle Coalition was formed to expand the use of 85 percent ethanol. The Coalition is jointly supported by the Governors' Ethanol Coalition, the National Corn Growers Association and its affiliated state corn grower associations.

As part of that project, dozens of public fueling stations are opening throughout the nation's Heartland and elsewhere. Nineteen stations are already open in eight states and the District of Columbia and in 1997, at least 40 more will be opened.

Additionally, dozens of 85 percent ethanol stations are serving state government's vehicle fleets.

Quick Facts

- Ethanol production is beneficial to our agricultural economy. When grain is used for ethanol, only the starch is used. The value-added proteins are diverted into food for cattle and people.
- Ethanol production can help stabilize the grain market for Kansas and U.S. farmers.
- More than 30 million gallons of renewable ethanol are produced annually at the four Kansas ethanol plants. Fuel for the future — jobs and grain markets for today.

KANSAS GRAIN SORGHUM COMMISSION

ETHANOL *clean fuel from* Kansas

KANSAS CORN COMMISSION

Kansas Grain Sorghum Producers Association

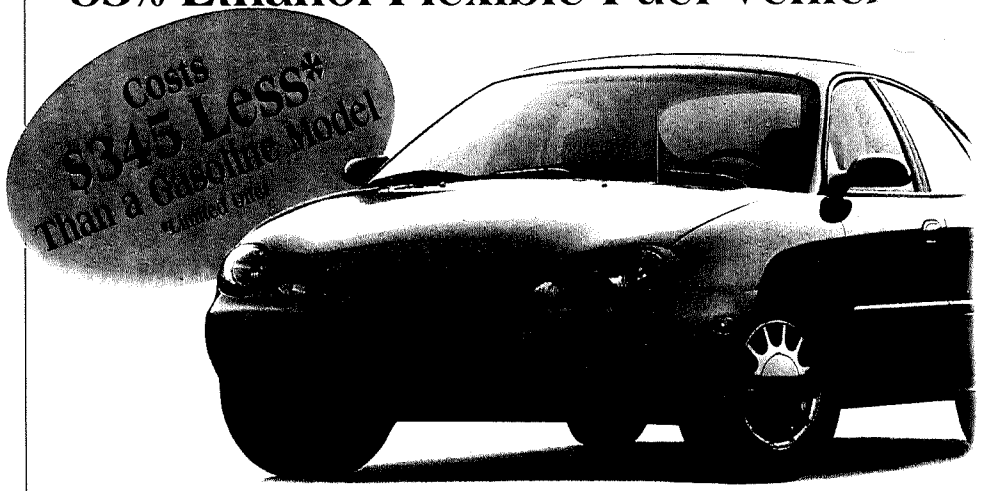
Kansas Corn Growers ASSOCIATION

For more information about ethanol contact:

Kansas Corn Growers Association
Kansas Grain Sorghum Producers Association
P.O. Box 446
Garnett, KS 66032
(800) 489-2676

9-11

The 1997 Ford Taurus 85% Ethanol Flexible Fuel Vehicle



For more Information on...

- Ford's ethanol vehicle, or the dealer nearest you, please call Ford at 1-800 ALT-FUEL.
- The ethanol-fueled Taurus or for locations of E85 refueling sites in your state or throughout the Midwest, please call the National Ethanol Vehicle Coalition at 1-800-E85-8895.

* For a limited time only.

National Ethanol 85 Vehicle Coalition

Kansas Corn Growers Association
Kansas Grain Sorghum Producers Association
P.O. Box 446
Garnett, KS 66032

SB 2

RENEWAL OF IN-STATE ETHANOL PRODUCER'S INCENTIVE FUND

- Funding $2.5 million annually. (Included in Governor's Budget Recommendation)

- Kansas Ethanol Production
  1987 - 11 million gallons annually
  1992 - 27 million gallons annually
  1996 - 56 million gallons annually

- Production facilities located in Atchison, Colwich, Garden City and Leoti.

- Employees - direct
  1987 - 50
  1992 - 117
  1996 - 130

- Grain used in production at capacity
  1987 - 3.3 million bushels
  1992 - 11 million bushels
  1996 - 22 million bushels

- Producers have expanded into cattle and fish feeding, using the by-products of alcohol production.

- Economic Development proposal
  Stronger markets for Kansas Grain.
  Create employment opportunities for Kansans.
  Maintain and enhance the development of additional in-state production.
  Create a cleaner environment for Kansans - both present and future generations.

1-21-97

SENATE TRANSPORTATION & TOURISM
ATTACHMENT 5 - 1/21/97

5-1

800 SW Jackson • Suite 1120 • Topeka, Kansas 66612 • (913) 235-2324 • FAX (913) 435-3390

AN ECONOMIC IMPACT ANALYSIS OF FUEL ETHANOL PRODUCTION IN KANSAS: 1996

December, 1996

Prepared for the

Kansas Ethanol Association
Topeka, Kansas

By

Peeples Consulting Associates, Inc.
Falls Church, Virginia

An Economic Impact Analysis of Fuel Ethanol Production in Kansas: 1996

Table of Contents

An Economic Impact Analysis of Fuel Ethanol Production in Kansas: 1996

Scope

Peeples Consulting Associates, Inc. (PCA) of Falls Church, VA was commissioned by the Kansas Ethanol Association (KEA) to provide a supplemental analysis examining the current and potential impact of the fuel ethanol industry on the economy of Kansas. Based upon the widely accepted methodology of the previous iteration of this analysis, this report provides a public policy rationale for continued support for the fuel ethanol industry in the state.

Objectives

The primary objectives of this economic impact assessment of the Kansas fuel ethanol industry for KEA are:

- To evaluate the potential of Kansas to support a viable fuel ethanol industry;
- To review the Kansas fuel ethanol industry in light of U.S. public policy concerns with respect to agriculture, energy security, and the environment;
- To assess the potential direct, indirect, and induced socio-economic impacts of this industry on the economy of Kansas; and
- To present the results of the analysis in a form useful for agricultural, economic, fiscal, and energy planning in Kansas.

To accomplish these objectives, PCA utilized an integrated analysis methodology to conduct an economic impact analysis of the alcohol fuels industry in Kansas. This methodology has been used previously by PCA and others to conduct similar policy-relevant assessments for a wide variety of energy technologies, including biomass-derived fuels. The methodology used is market-driven rather than technology-driven; as such it has yielded new insights into the dynamics of the fuel ethanol industry.

The analysis has been conducted on a differential basis to determine the net impacts of fuel ethanol production and use and the state and highway fund losses. This analysis also explored the direct, indirect, and induced economic impacts of the current ethanol-blend fuel tax exemptions and alternative financial incentives for the fuel ethanol industry on Kansas state economy.

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The result of this effort is designed to be an input to the future energy, economic development and fiscal planning in Kansas, and incorporates and integrated, quantitative assessment of the potential market, economics, and impacts of the state's fuel ethanol industry.

Introduction

In the 1980s, Kansas established a program consistent with the policies of the federal and other state governments to ensure energy security by developing a fuel ethanol industry to replace imported crude oil and gasoline products. The original fuel ethanol tax exemption incentive provided by Kansas was consistent with similar programs offered by more than 40 states to bring about investment in the fuel ethanol industry, with the associated employment, income, energy development, and agricultural benefits.

Since then, incentives for fuel ethanol have changed as the industry has evolved. At present, only fifteen states provide market-based sales or excise tax incentives, while seven states -- including Kansas -- provide a direct form of incentive to producers of fuel ethanol who make an investment in and operate fuel ethanol production facilities in their states. Several states provide both market-based and direct producer incentives to stimulate a market and in-state production for economic development purposes.

The objective of this study was to analyze the costs and benefits of maintaining such a policy on the economy of the state of Kansas. For this study, the authors considered extension of the state's current incentive policy that would maintain this higher-value industry in ways that the market-based incentive could not achieve. The primary element of this policy is continuation of the state's direct producer payment of $0.20 per gallon of ethanol produced at Kansas facilities, subject to a maximum quarterly payment of $625,000. During the 1993 session of the Kansas legislature, this incentive was extended from July 1, 1993 through July 1, 1997.

Summary of Findings & Observations

The major findings of this study are as follows:

- At $2.5 million per year, the current incentive program provides a net of $0.045 per gallon of ethanol produced in Kansas. ***This is the smallest fuel ethanol incentive any state provides***;

- The Kansas fuel ethanol incentive fund has provided $2.5 million annually to Kansas ethanol producers;

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- According to the Kansas Department of Revenue, this fund is less than 1% of 1995 motor fuel tax distributions to all funds (the latest data available). Overall, state motor fuel tax revenues increased by more than $1.4 million from 1994 to 1995;

- Starting in 1994 through about mid-1996, the Kansas fuel ethanol industry consumed nearly 35 million bushels of Kansas grain. ***Using the widely-accepted ethanol production impact multipliers of USDA and independent agricultural analysts, this rate of usage means an additional $3.5 - 7 million in real income to Kansas farmers;***

- Since 1993, fuel ethanol production capacity in Kansas has expanded from 27 million to 56 million gallons per year as Kansas producers improved efficiencies and added new capacity;

- From 1993 to present, preliminary data on the Kansas fuel ethanol industry indicates that $3.7 million in new plant production and equipment were purchased and installed, thereby boosting production;

- From 1993 to present, an analysis of the Kansas fuel ethanol industry estimates that producers have paid more than $20 million in Federal, State, and local taxes;

- At present, the Kansas fuel ethanol industry employs over 100 full-time professionals, not to mention part-time employees and construction workers during plant expansions, while providing a wide-range of additional indirect employment in other sectors like agriculture, transportation, motor fuel marketing, material suppliers, etc. ***This level of employment stimulation equates to a net annual direct and indirect employment benefit of 1,567 person-years***;

- Based upon these estimates, the Kansas fuel ethanol industry also generates about $50 million of net taxable personal income annually;

- Not taking a wide range of other positive economic and other impacts into account, it is estimated that Kansas earns $3.00 - 7.00 on every dollar it invests each year in fuel ethanol production in the state;

- Based upon the study results, the fuel ethanol industry will continue to generate about $750 million in total new economic activity for Kansas over a 20-year period. When the total direct, indirect, and induced taxation is considered, the state would recapture about $130 million of this investment in increased revenues;

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- Fuel ethanol is a significant octane alternative for Kansas's independent gasoline marketers, helping ensure their competitive position and lower fuel prices for consumers;

- Fuel ethanol blending permits refiners to reduce operating rates of reformers, thus reducing gasoline aromatic content, increasing refinery product yields, and lowering costs to consumers;

- Ethanol-gasoline blended motor fuels are high-octane products which Kansas consumers are able to purchase at prices lower than traditional all-hydrocarbon gasolines;

- Fuel ethanol is a benign replacement for environmentally-harmful gasoline components. Ethanol also reduces deadly carbon monoxide emissions from automobiles by as much as 20% in Kansas; and

- The fuel ethanol industry represents a meaningful diversification of the Kansas economy, adding to the state's "portfolio" of energy options for the 21st century.

The following is a general synopsis of the potential for an Kansas fuel ethanol industry and its economic impact upon the state of Kansas.

Potential Market for Fuel Ethanol in Kansas

Kansas gasoline sales remain in the range of 1.2 billion gallons per year for several years. PCA does not anticipate a significant change in this factor.

Market penetration is the percentage of ethanol blends used in the state as a share of the market. Market penetration for ethanol blends in the state rose to over 22% of the total gasoline market in the mid-1980s. Even without market-based tax incentives, ethanol blends still comprise about 6% of the Kansas gasoline market, according to Federal Highway Administration (FHwA) and Kansas data. Independent gasoline marketers, the primary marketers of the blends, now comprise nearly 50% of the Kansas market.

Fuel Ethanol Production in Kansas & The United States

According to the Renewable Fuels Association, the U.S. fuel ethanol industry has an annual capacity of 1.5 billion gallons. In the late 1990s and into the next century, U.S. ethanol production is expected to increase in response to oxygenated fuels and reformulated gasoline demand pursuant to the Clean Air Act Amendments of 1990 as well as extension of federal incentives for fuel ethanol beyond the year 2000.

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The Fuel Ethanol Incentive in Kansas

Only a handful of states provide some type of incentive for the production and use of fuel ethanol, with a range from one to eight cents per blended gallon. As Table I on page 8 indicates, states that have provided gasoline tax incentives or direct producer incentives have seen the development of growing ethanol industries. Historically, a fuel ethanol industry has not been able to develop in any state without the benefits of a fuel ethanol incentive.

It should be noted that total Kansas ethanol production capacity now exceeds 55 million gallons annually. Although the producer incentive earmarks $0.20 per gallon for qualified production, the financial allocation limit of $2.5 million annually ($625,000 per quarter) under the law actually returns a net payment of about $0.045 per gallon to each ethanol producer. ***The Kansas incentive is the smallest producer incentive on a per gallon production basis of any state in the nation.***

Fuel Ethanol & Kansas Agriculture

Originally, the majority of the nation's fuel ethanol productive capacity was developed by Archer Daniels Midland, Pekin Energy, and A.E. Staley as an adjunct to their corn milling operations located in the grain producing region of the United States, primarily Illinois. Many of these large-scale plants were built as add-ons to corn processing facilities to take advantage of the seasonal fluctuation of co-product prices, such as corn sweeteners. These production facilities have largely recovered their capital costs, etc.

More recently, New Energy Co. of Indiana, Cargill Ethanol, High Plains Corporation, and other producers have contributed the largest share of new ethanol production expansion, particularly since the mid- to late 1980s. Kansas, Nebraska, and Minnesota have seen the largest increase in fuel ethanol production capacity since 1993.

Producing fuel ethanol from corn provides a significant stimulus to the agricultural economy, regardless of where the corn was produced. For example, a series of studies conducted by Purdue University, the U.S. Department of Agriculture (USDA), and the U.S. General Accounting Office (GAO) have estimated that these overall national benefits range from about $0.10 to $0.20 per bushel of <u>all</u> corn and other grains.

However, for the purposes of this Kansas analysis, PCA excluded these net substantial benefits to the entire agriculture industry arising out of the existence of a national fuel ethanol industry.

5-8

Fuel Ethanol and the Environment

The Clean Air Act Amendments of 1990 requires the use of ethanol and other oxygenates in gasoline for environmental reasons. Automobile exhaust and refineries are the most significant sources of noxious emissions. Ethanol blends have been shown conclusively to reduce carbon monoxide (CO) emissions. Ethanol also reduces the need to manufacture octane-enhancing aromatic hydrocarbons, which cause the formation of ozone, as well as reduces the exhaust emissions of those toxics. ***If all Kansas vehicles were fueled with ethanol blends, EPA has estimated that the environmental effect would be equivalent to removing one out of every five cars from the highways of the state.***

Under the Act, 39 metropolitan areas failing to meet this standard began implementing this requirement in November, 1992. Ethanol, as an oxygenated fuel, is one of the most important blending component available to refiners and marketers to meet these standards. PCA projects that this market for fuel ethanol will provide price stability for fuel ethanol during a significant part of the year in prime marketing areas for Kansas-based fuel ethanol producers. Oxygenate markets in the Western states are served by Kansas producers, including Colorado, Oregon, Washington, and California.

The Act also require limits on the aromatic content of new reformulated gasoline (RFG). These octane components are found in gasoline in levels of up to about 35%. The aromatic benzene has been shown to be an active carcinogen and a major contributor to ozone formation. More severe refinery reforming processes raise the amount of benzene and other aromatics in the fuel, but reduce gasoline yield, and are thus more expensive to the refiner and the general public. EPA's expected steps to curb benzene, and other gasoline aromatic compounds, will increase demand for cleaner octane alternatives such as ethanol.

Fuel ethanol is also being pursued as an alternative fuel for light-duty vehicles and urban buses. Pursuant to the CAA and the Energy Policy Act of 1992, the U.S. fuel ethanol industry has launched an aggressive campaign to introduce fleets of vehicles operating on "neat" ethanol -- either 85 vol% (E85) of 95 vol% (E95) ethanol -- as part of a federal program to reduce the nation's dependence on crude oil and refined fuel products, to improve air quality, and to lower greenhouse gas emissions from motor vehicles.

The "Big Three" U.S. automakers are now marketing light-duty flexible/ variable-fuel and vehicles optimized for E85 and dedicated E85-powered vehicles, as are heavy-duty urban bus engine manufacturers like Detroit Diesel Corp., making expanded use of neat ethanol a reality for the next century.

5-9

Conclusion

Between 1981 and 1987, the state of Kansas provided millions in excise tax incentives for the blending and use of fuel ethanol in the state. While this type of incentive helped develop an in-state fuel ethanol production industry, it allowed lower-cost producers in other states to claim the lion's share of the tax exemption. Even in the absence of a tax exemption, ethanol production has expanded and blending continues in Kansas, underscoring the wisdom of the current incentive policy.

Maintaining the current Kansas incentive designed to benefit directly only in-state producers of fuel ethanol has stimulated substantial new investment in the state which has created new jobs, stimulated new economic activity, and provided Kansas a significant return on its investment, while increasing net personal (and taxable) income.

In addition, fuel ethanol production has created expanded demand for Kansas agricultural products, as it has for the nation in general and other states. Ethanol represents a viable octane alternative for refiners, but especially Kansas's independent gasoline marketers. Ethanol helps ensure their competitive position, meaning lower fuel costs for consumers. Ethanol-blended motor fuels are high-quality, high-octane products which Kansas consumers are able to purchase at prices lower than all-hydrocarbon gasolines.

Fuel ethanol is a benign replacement for environmentally harmful gasoline components such as lead, aromatics, and benzene. Moreover, its positive energy balance and biomass feedstocks make fuel ethanol a significant contributor to the reduction of greenhouse gas emissions in the transportation sector. ***This will be the major environmental issue of the next century.***

Finally, the fuel ethanol industry represents a meaningful diversification of the Kansas economy, adding to the state's "portfolio" of energy options now and into the 21st century.

5-10

Table I

Ranking of State Incentives & Production Capacities

(**Note:** Unless otherwise indicated, the incentives described below are tax exemptions or credits computed to determine their value per gallon of ethanol blended and sold in the state.)

State	Amount ($/gal. ethanol)	Production Capacity (million gallons/yr.)
Alaska	.80	0
South Dakota	.20[1]/.20[2]	14
North Dakota	.40[1]	12
Minnesota	.20[1]/.20[2]	75
Missouri	.20[1]/.20[2]	0
Hawaii	.40[3]	5
Nebraska	.20[1]	273
Montana	.30	4
Ohio	.10	0
Illinois	.20[3]	772
Iowa	.10	397
Connecticut	.10	0
Kansas	**.045[1]**	**55.6**

[1] Net Value of Incentive Paid Directly to Producer.

[2] Total Value of Excise Tax Exemption (per gallon of ethanol).

[3] Based Upon Retail Sales Tax (Percentage) Exemption.

Sources: Renewable Fuels Association, Herman & Associates

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Public Policy Overview

Background

On the 1980s, the federal government and more than forty states, including Kansas, enacted legislation and implemented programs to stimulate the development of a fuel ethanol industry in the United States. The purpose of these efforts was to reduce gasoline consumption by replacing a portion of this demand with U.S.-produced renewable liquid fuels.

Although the goal of these policies -- replacing 10% of the nation's gasoline consumption with U.S.-produced ethanol -- remains a dream nearly 20 years later, the rationale for these incentives remains sound. In the mid-1990s, U.S. oil dependence has increased dramatically, now reaching about 50% of total U.S. consumption. The nation's transportation sector is now more than 60% dependent upon crude oil or finished product imports, according to DOE's Energy Information Agency.

According to a highly publicized DOE analysis, the demand for petroleum products and its price may never again be as moderate as it is today. In fact, there is every reason to believe that in the coming decade, world demand for crude oil, and the price paid for it, will increase sharply and permanently.

According to testimony by former CIA Director James Woolsey presented in October, 1996 at a hearing before the U.S. Senate Committee on Agriculture, Nutrition, and Forestry, it will not be long before the U.S. will import over 60% of its total petroleum needs, up from the current 50%. About one-third of that will originate in the highly volatile Persian Gulf region. If this prediction comes to pass, the U.S. will transfer about $1.5 trillion to the Mideast over the next 15 years. Since over 30% of the U.S. economy is highly dependent on transportation and the transportation sector is almost completely dependent on petroleum, this is not a prescription for U.S. fiscal or energy security.

Additionally, an April, 1996 article in *Atlantic Monthly* entitled "Mideast Oil Forever?" by Joseph J. Romm, DOE's Principal Deputy Assistant Secretary for Energy and Renewable Energy, described the extent to which the changing world economy will affect worldwide crude oil demand and price. He and his co-author Charles B. Curtis cited the admittedly conservative estimates of EIA that the world will require an additional 20 million barrels per day of crude oil to meet demand in 2010, up from 69 million barrels today. The International Energy Agency's estimates are much higher, based upon the world's growing population, urbanization, and industrialization.

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Also testifying at the Senate hearing, Romm cited a 1995 article in Fortune magazine that if the power capita energy consumption of China and India ever reach the relatively modest level of South Korea, at current projected rates, "these two countries alone would need a total of 119 million barrels of oil per day. That's almost double the world's entire demand today."

It should not be forgotten that China and India have two of the fastest growing economies in the world today. The rest of Asia is not far behind. These areas will bid away crude oil from the rest of the world which even according to the conservative EIA estimates will increase its price to over $24 per barrel, a level which makes alternatives to crude oil, such as fuel ethanol, much more economically attractive in the transportation sector.

Thus, the range of federal incentives, research and development funding, and other support for non-petroleum fuel alternatives now appears to have been a prescient move, despite intensive criticism of them from various opponents of these policies. The results of the rather modest investment in biomass-based (and other) fuel development over the past 20 years, not even taking into account the knowledge and expertise gained in the process, are a tribute to government-private sector partnerships and cooperation.

The original rationale for continued federal and state subsidies for fuel ethanol production has assumed new dimensions based upon the fuel's inherent advantages. For example, heightened environmental concern over vehicle-related emissions of carbon monoxide (CO), ozone-forming compounds, and air toxics has stimulated new demand for ethanol-blended fuels (and other ethanol products) than has occurred since the industry's inception.

Moreover, the environmental importance of fuel ethanol and other biofuels is itself evolving. According to research conducted by DOE and USDA, modern fuel ethanol production facilities, led by Kansas producers, require many fewer energy inputs than the energy content of the fuel they produce. This has significant importance as the United States develops and implements its required response to the international treaties to control fossil fuel-based emissions that contribute to the greenhouse effect.

New research results announced by USDA suggests that fuel ethanol yields can be increased by more than 10% through processing other grain components and residues, yielding more ethanol per acre, increasing plant production capacities, and providing additional greenhouse gas and energy balance benefits. In an October 25, 1996 announcement by USDA's Economic Research Service, use of genetically-engineered microbes can effectively convert grain fiber into fermentable sugars. According to USDA researchers, this could increase the current 2.5 gallons per bushel yield for ethanol to 2.8 gallons. Once scaled-up, this biotechnology could open the door to expanded cellulosic fermentation of farm commodities and other feedstocks.

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Other dimensions of the agricultural impacts of the fuel ethanol industry has evolved as well. During the agricultural crises of the 1980s -- huge commodity surpluses, billions of dollars spent by the U.S. treasury in the form of price supports, shrinking export markets, and widespread bankruptcies among family farmers -- state and federal governments looked for ways to create new markets for U.S. agricultural abundance. One solution was for many states to help establish the U.S. fuel ethanol industry, the nation's fastest growing market for corn and other agricultural feedstocks.

Today, the situation has changed, in part due to the same circumstances that are driving the worldwide demand for crude oil and refined fuels. Explosive economic development in the Far East and South Asia is putting pressure on U.S. inventories of grain and soybeans, thus helping to increase prices. Combined with a poor harvest in 1995 and fundamental changes in farm policies, grain prices reached historic highs in 1995 - 96. While these prices are projected to decline somewhat, due to reduction of price supports, federal controls on planting, and the existence of non-food uses such as fuel ethanol, they will remain firm.

The energy crop provisions of the 1996 Farm Bill, nicknamed "Freedom to Farm" offer new opportunities for bioenergy products like fuel ethanol. Planting flexibility which is the central feature of the bill, according to the Renewable Fuels Association "means that the opportunities to produce biomass on all agricultural land will be far greater than any time since the 1930s. The elimination of payments tied to specific commodities makes a large percentage of cropland in this country available for energy crop production for the first time."

Elsewhere, the Farm Bill extends the Conservation Reserve Program (CRP) for seven additional years, giving farmers the option of breaking support contracts after five years. Another key element of the Farm Bill eliminates commodity-based payment programs with a series of fixed annual payments which will decline over the period. These payments are based on the amount of program crop acreage a producer's base acreage.

Previously, payments varied annually based on market conditions. However, the producer was forced to grow the same program crops on the same acres every year in order to retain base and continue to receive payments. Under the new program, producers will receive payments based on that historic base, but will be free to plant virtually any crop they want on the land. Farmers will be prohibited from planting fruits or vegetables on the land receiving contract payments unless there is a history of double-cropping.

This change makes prime crop land available for the production of energy crops. The continuing of contract payments can act as a subsidy to the development of a variety of biomass feedstocks.

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Altogether, these trends provide significant benefits to the farm sector, as well as a challenge to fuel ethanol producers to remain competitive in the face of higher feedstock costs. New biotechnology breakthroughs as those announced last month by USDA and improved, third-generation production techniques, will help ensure fuel ethanol producer viability.

Underscoring the importance of fuel ethanol to the U.S. agricultural sector, the National Corn Growers Association (NCGA) has set a goal that grain utilization would increase to one billion bushels of corn per year for fuel ethanol -- a three-fold increase from current levels, and an eventual market for 12% - 15% of total U.S. production.

While this goal still remains elusive, PCA projects that rising gasoline prices, environmental pressures, and other factors will increase U.S. fuel ethanol demand. Kansas's support for the fuel ethanol industry and its numerous agricultural, manufacturing, and economic development impacts has been significant in the evolution of a diverse, domestic motor fuels industry.

Legislative History: Federal Incentives for Alcohol Fuels

Since 1978, it has been the policy of the United States to encourage the development and use of alcohol-blended fuels, especially fuel ethanol. The Energy Tax Act of 1978 established the first incentive for ethanol blends, a national policy that was reaffirmed on several occasions in the 1980s. This section explains the terms and conditions of current federal tax incentives for fuel ethanol.

Federal Fuel Ethanol Incentives: In addition to increased demand for oxygenated fuels as a result of passage of the Clean Air Act Amendments of 1990, the prospects for new fuel ethanol production in particular are also boosted as a result of the passage of the 1990 budget bill extending existing federal tax incentives for the fuel through the year 2000.

Federal Fuel Ethanol Excise Tax Exemption: Effective December 1, 1990, the excise tax exemption for gasoline blended with 10% ethanol was reduced from 6¢ to 5.4¢ per gallon through September 30, 2000. The reduction in the amount of the excise tax exemption allowed Congress to extend the exemption through the year 2000. The ten-year extension provides the longest sustained term for growth since the ethanol incentive was introduced in 1978.

The Miscellaneous Tax and Budget Reconciliation Act of 1990 increased the federal gasoline excise tax from 9.1¢ to 14.1¢ per gallon effective December 1, 1990. This legislation also extended the federal motor fuel excise tax exemption for ethanol-blended fuels through September 30, 2000.

5-15

Until enactment of the Energy Policy Act of 1992 (P.L. 102-486), the federal excise tax exemption for qualified alcohol-blended fuels (primarily ethanol) only applied to 10 vol% blends. As adopted, this legislation contains two additional blend levels -- 5.7 and 7.7 vol% -- for which the federal excise tax exemption are eligible. This revision to the U.S. tax code permits refiners and other gasoline blenders greater flexibility in blending ethanol to meet the requirements of Clean Air Act reformulated gasoline (RFG) and oxygenated fuel regulations.

The Omnibus Budget Reconciliation Act of 1993 (H.R. 2264) also raised the excise tax rates for gasoline, diesel, and other motor fuels by 4.3 cents per gallon. See Table IV, below.

Table II
Rates of Federal Excise Taxation for Gasoline and Fuel Ethanol

Motor Fuel	Tax Rates ($/gal)
Gasoline	0.1840
Gasoline (w/10 vol% ethanol[1])	0.1300
Gasoline (w/7.7 vol% ethanol[1])	0.1424
Gasoline (w/5.7 vol% ethanol[1])	0.1532
Gasoline (w/10 vol% methanol[1])	0.1240
Neat Ethanol (E85)[2]	0.1295
Neat Alcohol Fuels[3]	0.1140

[1] If derived from other than petroleum, coal, natural gas, or peat.
[2] If derived from other than petroleum or natural gas.
[3] If the alcohol (ethanol, methanol, etc.) is derived from natural gas.

These modifications to the excise tax exemption are the most important elements in determining the profitability of producing fuel ethanol. This incentive permits ethanol to be the lowest-cost, highest-octane gasoline component available in the marketplace.

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Blender Income Tax Credit: The federal blender income tax credit is more complex and less desirable for the marketer of alcohol fuels than the excise tax exemption, the benefits of which are immediate. The taxpayer eligible to claim this tax must be the owner of both the gasoline and the qualified alcohol at the time the components are blended together for sale.

The $0.54 per gallon tax credit for fuel ethanol is a deduction from adjusted gross income and is itself taxable. For blenders of other than 10 vol% ethanol (or other qualified alcohol) in gasoline, the tax credit applies to each gallon of the alcohol, not the blend. In other words, if 100 gallons of ethanol are blended into 5,000 gallons of gasoline, then the tax credit is $0.54 x 100 gals. = $54.00. The resulting volume of finished fuel is not relevant to computing the tax credit, in contrast to the excise tax exemption.

While the tax credit can be carried forward, it is non-refundable and non-transferable. Therefore, it is of little value to entities that have no federal income tax liability. In addition, the benefits of the tax credit are not realized until the taxpayer's quarterly income tax return is filed with IRS.

Income Tax Credit for ETBE Blending: With the advent of federal oxygenated fuels programs in 1992 and the RFG program in 1993, interest has grown in other uses of fuel ethanol. One of these applications is the production of ETBE, one of several ethanol-derived oxygenated fuel components, produced as a result of the reaction of ethanol and isobutylene (a refinery co-product) in the presence of a catalyst.

Because of the relative technical advantages of ETBE derived from ethanol when compared to its methanol-based chemical cousin, methyl tertiary butyl ether (MTBE), many refiners are considering the relative economics of manufacturing ETBE, a decision that is enhanced by favorable tax interpretations.

As a result of this interest in ETBE, Congress was persuaded to extend the Section 40 blender tax credit both for eligible ethanol blenders or manufacturers and ETBE through December 31, 2000. This allows fuel ethanol customers to take the $0.54/gal. credit for blending in amounts lower than the traditional 10 vol%, permit its fuel ethanol to be used by manufacturers of ETBE, and allow the introduction of neat ethanol (E85) for use in private fleets. These varied applications of the tax credit are providing flexibility, helping expand the market for fuel ethanol.

Small Producer Income Tax Credit: Under the 1990 budget bill, effective January 1, 1991, eligible small fuel ethanol producers may receive an income tax credit for any taxable year of 10¢ for each gallon of qualified (denatured) ethanol fuel produced. This new tax credit does not apply to fuel ethanol produced through mere dehydration.

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This law limits the qualified ethanol fuel production of any producer for any taxable year to no more than 15,000,000 gallons produced at a facility whose total production capacity does not exceed 30,000,000 gallons annually. The law also limits the tax credit to the producer's cumulative production.

Legislative History: Kansas Incentives for Alcohol Fuels

In 1981, Kansas enacted a state gasoline excise tax exemption of $0.02 per gallon for 10 vol% ethanol-blended fuels, formerly known as "gasohol." This incentive was increased to $0.05 in 1985, and then was reduced by one cent per year until it was replaced with the current producer incentive.

This incentive helped improve the price of ethanol sold in Kansas, permitting blenders to offset the cost of transportation of the product into the state, providing an incentive to the blender to provide extra tankage for ethanol blending at or near the gasoline terminal, increasing the value of agricultural feedstocks for ethanol production, and allowing the producer to capture a modest additional return on the sale of the ethanol. It also permitted several smaller-scale Kansas ethanol producers to survive in a highly competitive market. However, most fuel ethanol sold in the state was produced at large fuel ethanol production facilities in other states, primarily Illinois and Iowa.

State tax incentives of this type once existed in over 40 states, averaging nationwide at about four cents per gallon. Today, 16 states provide some type of incentive for the production and use of fuel ethanol, with a range from one to eight cents per blended gallon. Historically, the fuel ethanol industry has not been able to develop in any state without the benefits of a fuel ethanol incentive or other creative financial support from the states.

In 1987, the Kansas legislature enacted a direct payment incentive to producers based upon actual ethanol production, but capped at an annual rate of $2.5 million. Based upon current annual Kansas ethanol production of 56 million gallons, this equates to about $0.45 per gallon. In fiscal year 1995, the Kansas Alcohol Producers' Incentive Fund, from which the incentive is paid to each producer on a quarterly basis, was less than 1% of motor fuel distributions totalling over $290 million, a fund balance which increased by $1.6 million from fiscal year 1994 (see Appendix).

Potential Market for Fuel Ethanol in Kansas

Since 1986, gasoline sales have remained in the range of 1.2 billion gallons per year in Kansas. PCA does not anticipate any significant near term change in this factor. Even though the tax exemption for 10% ethanol-blended fuels expired in 1987, the market for the fuels has remained strong.

5-18

It is estimated that the market for ethanol blends in Kansas will remain constant in the range of 7%.

If additional supplies of in-state produced ethanol are made available at a reasonable price and ethanol is sold for its octane value, the market could again rise into the 22% range. The maximum market penetration of ethanol blends in Kansas is estimated to be no more than 60%, given the fact that the many major oil companies continue to resist the use of ethanol-blended fuels. By contrast, significant levels of ethanol are used by independent marketers, helping them to survive in an increasingly competitive motor fuel market.

Potential Fuel Ethanol Production in Kansas & The United States

In 1985, about 28 million gallons of ethanol were sold in the state in 1985, the peak market penetration (on a percentage basis). In 1995, the most recent year for which data are available, PCA estimates that over 32 million gallons of ethanol were sold in Kansas. In the meantime, the state's fuel ethanol production has grown to 56 million gallons per year. The U.S. fuel ethanol industry has developed nearly 1.5 billion gallons of capacity, producing an estimated one billion gallons in 1995. Because of increased feedstock (corn, etc.) prices experienced in 1995 - 96, less than one bilion gallons of fuel ethanol were sold in the United States, a decline of about 20% from the previous year.

With the implementation of the Clean Air Act Amendments of 1990, which requires the increased use of gasoline containing oxygenates such as ethanol, PCA expects that national demand for ethanol will grow steadily over the next decade. With this new demand will follow new expanded ethanol production across the country in the next several years.

Fuel Ethanol & Kansas Agriculture

Based upon existing fuel ethanol production in Kansas, annual feed grain demand is in excess of 12 million bushels each year. Since a majority of the fuel ethanol feedstocks are Kansas-produced agricultural feedstocks, this is demand that would not exist but for the fuel ethanol industry.

Thus, the Kansas fuel ethanol producer incentive serves as an indirect incentive provided to Kansas farmers. It provides about $3.5 - 7 million in additional agricultural income to Kansas farmers, according to studies conducted by Purdue University and the U.S. General Accounting Office (GAO), which have estimated that fuel ethanol demand boosts prices of all corn sold by about $0.10 to $0.20 per bushel. A similar range of benefits accrues to other agricultural feedstocks as well.

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Fuel Ethanol and the Kansas Gasoline Marketer

Since the mid-1980s, Kansas gasoline marketers have been adversely affected by EPA's lead phasedown requirements which created an "octane gap." Increasing consumer octane demand will force all refiners and gasoline blenders to seek additional octane enhancers apart from those which they may be able to produce using their existing refining process.

For the independent gasoline marketer, ethanol is the most cost-effective octane enhancer on the market today, in comparison with all-hydrocarbon components. Net of federal and state incentives, it is less expensive than benzene, toluene, and xylene; or other oxygenated fuels such as MTBE or methanol (with co-solvents).

Refinery use of ethanol as an octane enhancer permits lower catalytic reformer operations, a process which in turn lowers the cost of production and increases the yield of gasoline produced per barrel of crude. Moreover, the level of aromatics -- benzene, toluene, and xylene -- are correspondingly reduced in the gasoline. These aromatics are considered to be serious health risks and contribute to the formation of ozone in the lower atmosphere, which is also a major health and environmental problem.

Many gasoline marketers in Kansas can take advantage of ethanol by expanding such industry-proven methods as "sub-octane" blending. This is a process of blending 84-octane gasoline with 10% ethanol which raises the octane rating of the finished fuel to 87-octane (R + M)/2.

It should be noted that most of the gasoline sold in the state of Kansas originates from federal outer continental shelf areas, other states, or overseas. Much of Kansas's fuel supply is imported into the state, some of which originated in the Middle East. Production of fuel ethanol in Kansas provides other energy options, thus broadening the state's "portfolio" of investments which can soften future energy shocks brought about by chaotic crude oil prices.

Fuel Ethanol and Kansas's Role in Environmental Protection

The Clean Air Act Amendments of 1990 sets new limits on aromatics such as benzene that can be used in RFG. Benzene has been shown to be an active carcinogen and a contributor to ozone formation. More severe refinery reforming processes can raise the amount of benzene and other aromatics while reducing total gasoline yield. Therefore, they are more expensive to the refiner and the general public. Limits on aromatics under the Act will further exacerbate the "octane gap" and force refiners to seek out alternatives such as ethanol.

5-20

Under the Act, EPA can deny states certain highway revenues, Clean Air Act grants, sewage treatment grants, and impose construction moratoria on certain industries, based upon the their continued nonattainment of federal air quality standards. In short, without "reasonable further progress" toward the goals set forth, markets for Kansas ethanol in other states face the loss of millions of dollars in revenues from the federal government this year.

Automobile exhaust is the most significant source of air pollution. Ethanol blends have been shown conclusively to reduce CO emissions. Ethanol also reduces the need for octane-enhancing aromatic hydrocarbons which cause the formation of ozone. To emphasize this point, ***EPA estimates that if all Kansas vehicles are fueled with ethanol blends, the environmental effect would be equivalent to removing one out of every five cars from the highways of the state.***

Changing the motor fuel standard to include the use of ethanol for environmental reasons is encouraged by several states and supported by the fuel ethanol industry. In fact, prior to the implementation of the 1990 federal requirements, the states of Arizona, Colorado, Nevada, New Mexico, and Texas implemented their own programs to require their vehicle fleets to use oxygenated fuels such as 10 vol% ethanol blends (E10) as a matter of policy.

Although Kansas meets federal automobile-related emissions standards, ethanol produced in the state will make its way into the gasoline pool that will serve the growing markets across the nation, making Kansas a net exporter of high-quality, finished liquid transportation fuels. This permits Kansas to be recognized as making a significant contribution to improving the nation's air quality.

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Kansas Fuel Ethanol Industry Profile

Fuel Ethanol Industry Profile

As a result of the combined federal and various state incentives for ethanol blended fuels, a significant and growing ethanol industry has developed in the United States, especially in states that have provided incentives combined with the availability of substantial agricultural feedstocks. Similarly, the combined federal and Kansas tax incentives from 1981 - 87 stimulated the growth of the use of ethanol-blended fuels (see Table V, next page), a market that can be served by new fuel ethanol production in the state.

Ethanol is made from sugar or converted starch through fermentation. Carbohydrates in crops such as Kansas feed grains (corn, milo, and wheat) are readily converted into sugar by enzymes, and then subsequently into low-purity ethanol. To manufacture ethanol suitable for fuel use, it must be further concentrated by distillation. In an efficient operation, like those in Kansas, one bushel of corn will yield over 2.5 gallons of anhydrous ethanol.

From 1981 through the end of 1987, state tax incentives to Kansas ethanol blenders totaled over $30 million, which combined with the federal motor fuel excise tax exemption, triggered market penetration of ethanol in Kansas to 28 million gallons per year in 1985. Comparatively, 55.6 million gallons of fuel ethanol production currently exists at four plants in Kansas. Based upon the current statutory production incentive level, the state's investment in the industry over a similar seven-year period is $17.5 million.

Agricultural Production Related to the Ethanol Industry

The Kansas fuel ethanol industry is intimately linked with the agricultural sectors of both the Kansas and the U.S. economies. Both the purchase of feedstocks for production and the sale of co-products of fermentation and distillation are directly related to agricultural policies. This section briefly summarizes the characteristics of the Kansas agricultural sectors that are most affected by the state ethanol industry.

Based on interviews with public officials, the private sector, and ethanol industry representatives, it is evident that the fuel ethanol industry has many impacts on Kansas, such as direct employment at the operating facilities and salaries paid to employees, while other impacts are not as readily quantifiable. These include reduced emissions of air toxics and greenhouse gases resulting from the blending and use of ethanol in gasoline sold in the state, providing both direct and indirect economic benefits from reduced health costs.

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Table III-a

Ethanol Blend Fuel Market Data

Year	Annual Gasoline Sales	Annual Gasohol Sales	Annual Gasohol Market Penetration
Kansas *(million gallons)*			
1983	1,245,818	68,750	5.52
1984	1,221,412	275,614	22.57
1985	1,234,185	281,615	22.82
1986	1,248,753	235,960	18.90
1987	1,265,811	139,831	11.05
1988	1,329,323	121,302	9.13
1989	1,296,792	98,586	7.60
1990	1,249,019	83,659	6.69
1991	1,218,326	71,242	5.84
1992	1,227,463	72,221	5.88
1993	1,237,730	51,939	4.19
1994	1,267,190	46,546	3.67
1995	1,265,324	40,625	3.21
1996*	525,829	23,568	9.32

* Data for year, through May, 1996.

Sources: U.S. Dept. of Transportation/Federal Highway Administration
Kansas Department of Revenue
National Petroleum News

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Table III-b

Ethanol Blend Fuel Market Data

Year	Annual Gasoline Sales	Annual Gasohol Sales	Annual Gasohol Market Penetration
United States *(million gallons)*			
1983	103,656,168	433,925	4.18
1984	105,543,691	5,715,062	5.41
1985	108,591,448	8,007,532	7.37
1986	112,017,624	7,974,674	7.12
1987	113,961,431	8,239,906	7.23
1988	114,078,150	8,288,511	7.27
1989	118,799,498	7,531,435	6.50
1990	115,292,500	7,563,010	6.56
1991	113,730,506	8,385,055	7.37
1992	114,583,485	9,142,941	7.97
1993	117,377,395	10,286,567	8.76[1]
1994	118,703,939	11,009,594	9.27[1]
1995	120,986,846	13,092,585	10.82[1]
1996[2]	50,933,674	4,363,885	8.56

[1] Based upon total gallons of ethanol-blend sold (up to 10 vol% ethanol per gallon of gasoline).

[2] Data for year through May, 1996.

Sources: U.S. Dept. of Transportation/Federal Highway Administration
National Petroleum News

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Several independent studies have quantified the fuel ethanol industry's impact on the agriculture sector of the economy. For example, a seminal study by Dr. John Umbeck of Purdue University found that nationally, the fuel ethanol industry generates additional demand for all corn produced in the U.S., helping to increase the price of all corn by at least $0.10 per bushel.

In separate studies, both the General Accounting Office (GAO) and the U.S. Department of Agriculture (USDA) have confirmed the validity and merits of this analysis, a bibliography and brief summary of which is included in Appendix A. A similar level of increased value for Kansas feed grains has also been suggested in the literature.

Kansas Agricultural Feedstocks

Typically, fuel ethanol producers in the United States rely on corn as their primary feedstock, although other grain feedstocks such as wheat and milo (grain sorghum) are also used by Kansas ethanol producers. Recent USDA grain harvest and production data for Kansas are summarized below.

Table IV
U.S. Grain Summary -- Kansas
Area Harvested & Production (1995 and 1996, forecasted)

	Area Harvested (acres)		Production (1,000 bu.)	
	1995	1996	1995	1996
Corn	1,970,000	2,350,000	244,280	340,750
Grain Sorghum	3,100,000	4,600,000	173,600	331,200
All Wheat	11,000,000	8,800,000	286,000	255,200

Source: USDA National Agricultural Statistics Service.

Kansas ethanol producers use about 23 million bushels of grain each year in their ethanol production including milo and wheat in addition to corn in their operations.

The following table provides a summary of recent grain utilization by Kansas ethanol producers:

5.25

Table V
Preliminary Kansas Fuel Ethanol Producer Grain Utilization (1994 - 1996)
(bushels)

Year	Corn	Wheat	Milo
1994	1,293,626	n/a	7,707,465
1995	1,161,032	n/a	15,706,237
1996 (partial)	538,128	n/a	8,529,155

Source: Kansas Ethanol Association.

The existence of the fuel ethanol industry in Kansas helps create demand, at advantageous prices, thus increasing plantings of all three grains in the state.

Grain Prices

While corn prices generally declined in the 1980s, even taking into account the effects of inflation, they have been higher in recent years, particularly in 1995 - 96. In fact, according to a recent analysis by John Urbanchuk of AUS Consultants, the combination of a "short" 1995 harvest and expanding overseas demand for U.S. corn had driven down stocks to their lowest levels since 1973. By the same token, and for the same reasons, corn prices in 1995 were at their highest levels since 1973. Expressed as a percentage of use, experts projected end of season corn stocks to be no more than 3.7% of total demand, a level not seen since the end of World War II.

Earlier this year, USDA projected that 1995 season-average corn prices would be in the range of $3.15 - 3.25 per bushel. In a report to Congress being prepared by USDA, the agency determined the average price to be $3.20 per bushel (see Table VII, next page).

The spot ("cash") price of corn, however, reached nearly $5.00 per bushel in Spring of 1996, or about double what it had been the year before. This corn price spike hit the fuel ethanol industry hard, forcing many plants to shut down or curtail production for periods of time.

The situation for 1996 and beyond looks somewhat better, both as a function of an improved projected harvest and passage of a more market-oriented Farm Bill. Earlier this year, USDA projected a corn harvest of about 10 billion bushels, with prices stablizing in the $2.70/bu. range in 1996 and about $2.65/bu. in 1997. On November 12, 1996, USDA announced a revised fall harvest estimate of 9.27 billion bushels, on yields of 126.5 bu./acre, a sharp increase of 26% over 1995 levels. 5-26

Table VI
U.S. Grain Summary -- Total
Area Planted & Harvested (1995 and 1996, forecasted)
(in hectares)

	Area Planted		Area Harvested	
	1995	1996	1995	1996
Corn	28,832,140	32,195,110	26,302,830	29,651,230
Grain Sorghum	3,825,940	5,375,900	3,350,020	4,857,900
All Wheat	27,995,240	30,604,280	24,674,350	25,543,220

Source: USDA National Agricultural Statistics Service.

Nevertheless, as summarized by USDA, corn prices will be higher on average for the three year period beginning in 1995 than for any other similar period since 1965.

Table VII
U.S. Average Corn Prices (1988 - 1997)

Year	Price ($/bu.)
1988	2.54
1989	2.36
1990	2.28
1991	2.37
1992	2.07
1993	2.50
1994	2.26
1995	3.20
1996	2.70
1997	2.65

Source: U.S. Department of Agriculture.

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Similar results were seen in other grain markets, particularly wheat. USDA has forecast that 1996 production will be 2.30 billion bushels, up about 5% from the 1995 crop. The U.S. yield is placed at 36.4 bushels per acre, up 0.8 bushels. The effect of this increased production and yields, as with the other crops, will be a moderation in the cost per bushel for ethanol producers.

For this analysis, it was assumed that feedstock prices are seasonal, with winter prices tending to be the lowest during any calendar year. PCA has used actual corn, wheat, and milo prices paid by Kansas ethanol producers, plus freight, for the calculations used in this analysis.

Ethanol Industry By-products

The sale of co-products constitutes an important source of income for ethanol producers. For corn wet millers, the most important products include corn oil, corn gluten feed, corn gluten meal, and sweeteners. For dry millers like those represented in Kansas, co-products include distillers dried grains and solubles (DDGS), a high value commodity that has gained widespread acceptance and use in the beef and dairy industries. These high-value products provide the dry mill fuel ethanol manufacturer a range of options in fuel production. PCA has taken these credits into account in computing the net cost of ethanol production.

Carbon Dioxide

Carbon dioxide is a co-product of the fermentation process, and is recovered and sold in commercial quantities. Although small, this credit has also been factored-in to the net cost analysis. It should be noted that CO_2 recovery is another method that the fuel ethanol industry has employed to maximize the environmental attributes of production. Rather than venting this greenhouse gas into the atmosphere, the CO_2 is captured and used in other chemical processes. This is in addition to the fact that the combustion of ethanol itself recycles CO_2, thus reducing levels of these emissions in the atmosphere.

Agricultural Price Supports and Adjustments

Since the 1930s, the U.S. government had provided various federal incentives to the agricultural sector. These production and price support programs were designed for the purpose of:

- Stabilizing, supporting, and protecting farm income and prices;
- Maintaining adequate supplies of food, feed, and fiber; and

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- Aiding in the orderly marketing of farm commodities.

These programs included commodity loans and purchases, various means of production control, direct payments, farm storage facility loans, and the farm-owned grain reserve. After passage of the 1996 Farm Bill, many of these incentives and support programs are phased out over the next seven years, allowing farmers to plant according to the needs of the market, not in response to available price supports and other incentive programs.

The annual requirements for corn by the mature ethanol industry in Kansas is a significant portion of the state's total corn crop. Consequently, the impact on the agricultural sector is to increase the price for corn in the long run. However, in view of the large fluctuations in the agricultural production over the last decade, and the associated price incentives, it is outside the scope of this study to quantify this impact.

Unquestionably, the Kansas ethanol incentive provides an indirect agricultural price support system, helping to increase the price of corn by more than ten cents per bushel. In effect, it assists Kansas farmers by providing greater demand for the corn they produce.

In addition, the federal excise tax exemption for ethanol blended fuels may be viewed as an alternative indirect agricultural price support and stabilization program, and the needs for additional agricultural financial incentives may be mitigated, with the ethanol production impact on the grain prices neutralized.

Data Base Development

Introduction

The operational and financial data pertaining to the individual ethanol production plants were provided by Kansas fuel ethanol producers subject to nondisclosure of proprietary information. Detailed financial and economic analyses were conducted on the basis of general plant information developed by PCA, based upon its extensive analysis of the fuel ethanol industry. The specific market projections and impact analyses presented in this report are formulated in terms of these parameters.

Detailed descriptions of the technical and financial parameters of the fuel ethanol facilities are contained in the next chapter. A data base has been developed using a number of sources, including published and unpublished reports, industry experts, consultants, and state and federal agencies (see Table of Authorities). Key data requirements are summarized below.

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Kansas Potential Ethanol Industry Characterization

The feed chain for ethanol production includes agricultural (corn) production, transportation to on-site storage facilities at the ethanol production facility, and ethanol production and distribution. The major elements of the ethanol production process include mash preparation, fermentation, and distillation. Subsequently, fuel is shipped to a blending facility and distributed.

For each step in the feed chain, physical and economic data were required to characterize the process in terms of requirements for capital, labor, materials, and equipment. The feed chain for alcohol fuels production has also been characterized in a major report by the Office of Technology Assessment (OTA) of the U.S. Congress. Other important sources of data to facilitate this characterization include the following:

Fuel Ethanol Production

Available industry data, together with referenced studies (see Appendix), were used to develop the economic and performance data base, including projected capital and operational costs for corn-based ethanol production. The fuel ethanol production process has also been characterized in detail elsewhere, resulting in the descriptions for characterizing the Kansas fuel ethanol industry fuel chain and ethanol production process used in this report. Additional detailed information on the capital and operating costs, feedstock requirements, performance, labor requirements (by labor category), financing, etc. were made available by the U.S. Department of Energy.

Fuel Blending, Marketing, and Distribution

Detailed discussions with appropriate industry representatives in Kansas as well as Kansas state officials, was a primary source of data. Additional data were developed by PCA.

Impact Assessment

Much of the essential data contained in the input/output model of the Kansas economy were developed by PCA based upon similar analyses performed in the states of Alabama, Kentucky, Louisiana, Nebraska, and New Mexico. This model contains the necessary characterization of the industry to conduct the differential impact analysis, once the characteristics of the fuel ethanol industry were integrated into the model.

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Description of a Generic Ethanol Fuel Production Facility in Kansas

For the purpose of explaining the significance of variations in technology that would be used in a proposed Kansas fuel ethanol plant, it is necessary to examine the basic processes involved, and to describe a typical or "generic" reference plant. The basic processes, from feedstock production and preparation, to final denaturing and blending of ethanol with gasoline, are discussed below in sequence.

Production Summary

A dry mill ethanol production facility, typical of those found in Kansas, produces three value-added products from each bushel of grain. As indicated, these three products are in good demand throughout the United States: fuel ethanol, distillers dried grains and solubles (DDGS), and carbon dioxide.

The fuel ethanol improves the quality and performance of the gasoline into which it is blended and is an excellent feedstock for the manufacture of ethers that refineries are expected to use in the production of reformulated gasoline. DDGS improves the quality and performance of the livestock feed into which it is blended. Finally, the CO_2 coproduct has many beneficial uses in the food processing industry.

Feedstocks

For the production of ethanol by fermentation, it is necessary to have either a feedstock such as molasses which contains fermentable sugars, or feedstocks such as cereal grains containing starch which may be converted into fermentable sugars. In Kansas, fuel ethanol producers use corn, wheat, and milo (grain sorghum) as their primary feedstocks. For the sake of simplicity, this analysis assumes that corn will be the primary feedstock, given its extensive use in Kansas and elsewhere in the production of fuel ethanol.

Production Process

The following is a brief description of the typical production process at Kansas ethanol facilities.

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Step 1
As indicated, grain used for fuel ethanol production can be wheat, milo, barley, or corn depending on the location of the production facility. In Kansas, milo is widely used primarily because of its slightly lower cost and higher availability. Grain is received at the plant, screened to remove foreign material and stored for future processing. The grain is then metered into a hammer mill where the grain is finely ground in preparation for liquefaction.

Step 2
Water, enzymes and pH-adjusting chemicals are added to the milo to make up the cook formula. This slurry is heated to 190°F to allow the enzyme to liquefy the starch portion of the ground grain. The slurry is then heated to 250°F to stabilize the slurry so that bacteria will not inhibit fermentation efficiency. The slurry is then cooled back to 190°F to complete the liquefaction process.

Step 3
The liquefied mash slurry is cooled to 90°F prior to fermentation. Thin stillage is added to the mash to dilute the slurry to the required concentration as each fermenter tank is filled. A second enzyme is added to convert the liquified starch to sugar (glucose). Yeast is also added along with the enzyme to convert the sugar to ethanol and CO_2. The CO_2 is further purified and liquefied for distribution into the marketplace. The ethanol concentration will continue to increase to a concentration of 12 vol% as the sugar is converted by the yeast. This fermented liquid is now called beer.

Step 4
The beer is pumped to the distillation tower, where the ethanol is boiled out of the beer and concentrated to 95 vol% ethanol (190 proof) and 5 vol% water.

Step 5
The 190 proof ethanol is further processed by molecular sieve (a process used in this generic plant example) to selectively removed the remaining water. The 200 proof ethanol is then denatured with up to 5 vol% unleaded gasoline and transferred to storage. From this the fuel ethanol is shipped by truck and rail to fuel distributors for blending with gasoline at a 10% level.

Step 6
While Steps 4 and 5 proceed separately, the whole stillage is pumped from the distillation column to a centrifuge where the insoluble solids are separated from the water and soluble solids. The insoluble solids or wet cake is augured from the centrifuge to the drier. The soluble solids and water go into the evaporator.

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Step 7
In the evaporator the soluble solids (thin silage) are concentrated from 4.5% total solids to 40% total solids. This concentrated soluble product (syrup) is blended with the wet cake off the centrifuge ahead of the drier.

Step 8
The blended wet cake and syrup are dried to a 10% moisture level and conveyed to storage. From there the distillers grains are shipped to feed companies and farmers as a protein supplement in various feed products.

Denaturation of Ethanol

The production of ethanol is regulated by the Bureau of Alcohol, Tobacco and Firearms (BATF) which requires that the product be denatured, to render is unsuitable for human consumption, before it can be released from a bonded Alcohol Fuel Plant (AFP). The normal method of denaturation, which is approved by BATF, is to add 5 gallons of unleaded gasoline to 95 gallons of ethanol. This constitutes "fuel ethanol", and is accepted by the Federal and state authorities for purposes of qualifying for various tax exemptions and producer incentives.

Blending of Ethanol and Gasoline

Federal and state laws require that, in order to qualify for various incentives, fuel ethanol must be blended at the rate of 10 vol% with gasoline. As ethanol has an octane rating in excess of 110 (R + M)/2, it will raise the octane rating of the blend by about 3 numbers when mixed at 10 vol% levels with gasoline of 86 - 88 (R + M)/2 octane. In the Midwest, fuel ethanol is used primarily has a fuel extender, but is sold occasionally for its octane value.

There are a number of ethanol blending facilities in Kansas which practice full-scale, in-line blending of ethanol and gasoline. Several other marketers have "topping-off" or "splash-blending" facilities around the state. "Topping-off" is a process in which a truck is first part-loaded with gasoline at a terminal rack, and then ethanol is added to the tanker to make a 10% blend.

A summary of the Kansas ethanol industry's technical and financial parameters is presented on Table VIII, next page.

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Table VIII

Kansas Fuel Ethanol Industry
Technical and Financial Parameters (1992$)

Capacity (million gpy)	55.6
Capital Cost ($ per annual gallon)	2.00
Plants Capacity Factor (%)	100
Plants Lifetime (yrs.)	20
Operating & Maintenance Costs:	
Variable ($/1000 gallons produced)	234
Fixed ($/1000 gpy capacity)	90
Grain Cost ($/bu) Corn	2.50
Grain Requirement (bu/gal)	0.4
Fuel Cost ($/Mmbtu)	1.90
Co-Product Revenues ($/bu.)	1.12
Insurance Rate (% of Capital Cost)	0.5
General Inflation (%)	3.0
Energy Inflation (%)	1.0 real
Depreciation	5 yr. ACRS (Federal) 10 yr. SL (State)

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Integrated Market, Economic and Financial Analysis

Methodology

Introduction

An integrated market, economic, and financial analysis was used to determine the impact of the ethanol fuel industry on the state of Kansas. The need for this integrated approach stems from the interactive relationships of the various disciplines involved. The market penetration of the ethanol industry is determined by considerations of economic and financial viability, while the direct and indirect economic impacts are a function of the market penetration and financial cash-flow analysis of the individual plants as they come on line. The financial analysis is affected by the incentives determined by the federal government and various state legislatures and by the underlying oil price scenarios. Consequently, the results shown in this report were established by integrally considering these various factors.

The fuel ethanol market was determined from the historical ethanol sales in relationship to the overall motor fuel market in Kansas. Based upon the integrated considerations, the projected penetration to this potential market can be established. These market penetration data were subsequently compared with other forecasts.

The direct economic impacts were determined from the detailed financial cash-flow analyses of ethanol production described in the previous section. The indirect and induced economic impacts were determined using the input-output model for the state of Kansas. All of the economic impacts were determined on a net differential basis, which means that the results measure the net impact of the fuel ethanol industry as the difference between the level of economic activity before and after its inception.

Ethanol and Grain Feedstock Prices

Ethanol Pricing

Since the conclusion of EPA's regulations to eliminate use of lead additive and the increasing need for incremental octane enhancement, ethanol prices increased 8 to 10 cents per gallon relative to unleaded gasoline during the early 1980s. While prices have declined periodically, in 1986 general fall off in the price of crude oil and refined gasoline products.

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Fuel ethanol prices are expected to increase relative to gasoline during the useful life of the existing Kansas facilities. This trend is in large part related to the oxygenate demand that PCA expects will occur as a result of the implementation of fuel requirements of the Clean Air Act Amendments of 1990. These estimates are consistent with other projections of ethanol demand and prices for the balance of the 1990s.

Grain Prices

As discussed previously, the prices for all ethanol feedstocks over the past ten years have fluctuated substantially in Kansas. Of these grains, corn and milo are the feedstocks of choice for the Kansas ethanol fuels industry. The average spot prices for corn, for example, during this period ranged from a low of $2.10/bushel (in 1977) to a high of nearly $5.00/bushel in 1995. Also in 1995, the contract price of corn averaged $3.20 per bushel, plus the cost of transportation.

Potential Market for Ethanol-Blended Fuels

Introduction

Of the roughly 120 billion gallons of gasoline currently sold in the United States, over 8% now contain ethanol. PCA estimates a 15% national market penetration of ethanol blends in the next 10 years, an assumption that takes into account the demand for oxygenated fuels created by the Clean Air Act Amendments of 1990. Such market penetration could consume nearly 2 billion gallons of ethanol and 8% to 10% of the entire U.S. corn crop.

The U.S. Congress enacted the Clean Air Act Amendments of 1990 which requires the use of oxygenates, such as ethanol, in gasoline to reduce emissions of carbon monoxide (CO) in 39 nonattainment areas in the United States starting in November, 1992. Starting in 1995, gasoline sold in at least nine of the largest cities in the U.S. must be reformulated and include significant levels of oxygen. The American Petroleum Institute (API) estimates that by the late 1990s, 75% of the gasoline sold in the U.S. will be reformulated.

For nearly a decade, Colorado, New Mexico, Arizona, Nevada, Texas and other states have undertaken efforts to require the use of oxygenated fuels as an air pollution control strategy. As a result, ethanol-blended fuels have achieved significant levels of market penetration, creating substantial new demand for ethanol. All of these markets are served by Kansas producers.

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Potential Market in Kansas

In 1985, Kansas-produced ethanol-blended fuels accounted for about 22% of the gasoline market in Kansas. Despite the subsequent elimination of the tax exemption, ethanol blends have maintained a market penetration of nearly 10% according to Kansas Department of Revenue and Federal Highway Administration data.

For the purposes of this study, the potential market for ethanol-blended fuels is assumed to be a fixed percentage of the total motor fuel retail market. This assumption applies both nationally and at the regional and state levels. The penetration of this potential market is best described by a logistic diffusion function commensurate with observed market phenomena.

An initial step in the market analysis was to develop a forecast of the total Kansas retail motor fuel market. This was accomplished by fitting a logistic diffusion curve to historical motor fuel sales data.

The fit was done for the total motor fuel market and not just the gasoline market to account for the periodic substitution of diesel fuel for gasoline during periods of high gasoline prices, as was the case in the late 1970s and early 1980s.

Kansas Fuel Ethanol Industry Market Penetration

The next step was to develop a market penetration forecast consistent with the historical ethanol sales data, assuming continuation of the present economic and financial environment for the ethanol fuels industry.

Oil Price and State Ethanol Incentive Scenarios

Under these scenarios it is assumed that oil prices will increase at a rate of 1% above inflation (i.e., 1% real rate) for the period. This is consistent with expected historical oil prices. In constant dollars, the price of oil has been escalating at a real rate of 1% which is consistent with the price growth of depletable resources. However, the price of oil fluctuates, and the rate of escalation can be much more than 1% real in the short-term.

Market Penetration

The best diffusion fit is consistent with a 25% long-term saturation limit for market penetration of ethanol-blended fuels in Kansas, with state-produced fuel ethanol sales projected to be two million gallons beginning in 1996.

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Kansas Fuel Ethanol Industry Financial Analysis

Approach

To facilitate detailed financial analysis of the Kansas ethanol industry, without divulging confidential information regarding the individual plant financial and operational structure, a generic ethanol plant was developed to represent the industry. The plants are designed to achieve an operating lifetime of twenty years, and are marginal in capital and operating requirements of Kansas ethanol plants.

Financial Analysis Data Inputs

For the purpose of this study, it was assumed that the generic plant uses corn as its primary feedstock. It was also assumed that the price of grain used by Kansas ethanol producers will average $2.50 per bushel equivalent. This price is estimated conservatively to escalate at the rate of inflation, even though historically they have increased at rates well below inflation, and have fluctuated over time (see Table VII, page 24).

The price that the ethanol producers receive for sales of other products of dry milling, including distillers dried grains and solubles (DDGS), are averaged in the form of a "coproduct credit." For the base-case, a value of $0.56 per gallon was assumed.

Fuel Ethanol Prices & Values

An important parameter in determining the financial viability of the ethanol fuel industry involves the projection of future ethanol prices to the producers. The plant-gate price for fuel ethanol was estimated using component build-up pricing based upon projected gasoline prices, with a credit for the octane enhancing contribution of the ethanol (up to three octane numbers depending on the composition of the blending stock), federal tax incentives, and debits for the cost of blending and transportation. The octane credit, currently about 2 - 3 cents per gallon at the wholesale level as measured by the differential between sub-octane and 87-octane fuels, or between regular and premium grades of gasoline, is not currently being recovered by the ethanol producers.

It is assumed that the credit will be increasingly captured by ethanol producers, primarily in the late 1990s. The assumption on the price of gasoline was described earlier, consistent with the long-term oil price scenario.

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Fuel Ethanol Incentives and Extended Plant Operation

Lifetime operation of the generic plant, assumed to be 20 years, would be enhanced by an extended state producer incentive which would help maintain positive operating cash flows throughout the operating lifetime of an ethanol production facility in Kansas. However, for the purposes of this analysis, PCA did not assume that the state incentive would exist beyond 1997.

The above conclusions regarding plant financial performance are based upon the generic plant descriptions that have been verified by PCA based upon previous studies of a similar nature including the 1993 Kansas Economic Impact Analysis and similar economic impact studies conducted by PCA's principal investigator for current or prospective ethanol producers in Alabama, New Mexico, Louisiana, Nebraska, and Kentucky.

Impact of Federal Tax Exemption and State Ethanol Incentives

Cash flow analyses show that state and federal incentives available to ethanol-blended fuels, combined with depletion and interest write-offs, result in favorable cash flows initially. Continued operation in the absence of incentives depends on small, exogenous variations in the fuel ethanol industry, such as further development of the octane-enhancer market, expanded ETBE production, use of ethanol as a "neat" fuel, larger co-product sales and the evolution of feedstock (grain) markets.

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Differential Impact Analysis

Approach

The model used to analyze the financial performance of a Kansas fuel ethanol producer is also used to calculate the direct (investment-related) tax implications. The model records the annual obligations for the payment of federal and state income taxes, and state and local sales and property taxes, by the owners of the ethanol producing facilities. These tax obligations are calculated for the annual production of a unit quantity of alcohol fuels.

The annual tax obligations for the production of a unit quantity of fuels is combined with the projections described previously of the annual market for fuel ethanol in the state in order to calculate the annual tax revenue impacts of the ethanol industry in the various categories of taxes (federal and state income taxes, federal highway fund revenues, and state and local sales and property taxes). These impacts are called the direct tax impacts of the industry.

In order to calculate the total tax impacts of the industry, the direct impacts are combined with the indirect impacts. The indirect impacts are determined through standard I/O methods. The indirect impacts include direct, non-investor related impacts, such as tax obligations of the employees of the ethanol production facilities, and the effects of indirect (for example vendor industries) and induced (for example vendor supplier industries) economic activities.

The net differential tax impacts of the Kansas fuel ethanol industry are determined by subtracting from the total (direct, indirect, and induced) impacts the tax obligations that would exist in the absence of the industry (i.e., the tax obligations accruing to the economic activity that would exist if the tax credits did not exist). Performing this calculation, of course, requires making assumptions about what the substitute economic activities would have been. For purposes of this study, it is assumed that funds invested in a fuel ethanol production facility would have otherwise gone into investments of comparable risk.

Ethanol Industry Impact on State Tax Revenues

Appendix E shows the net tax impacts of the Kansas fuel ethanol industry. A table provided therein presents data for the 4-year period of the current extended producer incentive (1993 through 1997), and for market scenarios covering the period until 2015, covering the 20-year useful life of a

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hypothetical Kansas production facility that became operational in 1994. The state incentive has a direct impact on the state's general revenue fund since the 20 cents per gallon producer incentive is paid directly from the Kansas Department of Revenue's Alcohol Producer Incentive Fund which is generated from motor fuel excise tax receipts.

The relative tax impacts are also clearly depicted. For the period of the state incentive, the losses of state revenues made up by the resulting direct, indirect and induced revenue returns to the state and local treasuries. According to this preliminary analysis, fuel ethanol produced in Kansas after the phase-out of the incentive would continue to provide tax revenues of about $122 million over the 20-year useful life of the plant to state and local treasuries.

Table VIII on page 42 shows the estimated sales, franchise, property, and income taxes derived from the direct, indirect and induced economic activity as a result of the fuel ethanol industry. The total state revenue funds foregone for the duration of the incentive would be a maximum of $10 million, assuming a 20 cents per gallon incentive capped at $2.5 million in each of the next four fiscal years. This represents an actual net incentive of $0.045 per gallon, averaged over all gallons produced in the state.

This cost, which is the cost of commercializing the fuel ethanol industry in Kansas, is offset by the revenue enhancement effects of the enterprise (about $750 million, cumulative, by the year 2013), and by the jobs and income provided through industrial operations, and the associated induced economic activity discussed below. Because Kansas wheat, milo, and corn are the primary feedstocks used by producers, these positive impacts would also involve the state's agricultural sector as well.

However, the overall state economic activity is greatly enhanced as a result of the federal and state tax incentives, resulting in a cumulative $750 million of net economic benefit to the state.

Indirect, Induced, and Other Direct Impacts: Approach and Methodology

Introduction

The production, distribution, and sales of fuel ethanol and the installation and maintenance of ethanol-related energy systems result in indirect and induced, or secondary, impacts that benefit the state economy. These effects are in addition to the investor-related and other direct effects of investments in fuel ethanol production facilities. These indirect and induced benefits include increased personal income, corporate income and employment in the Kansas industries supporting the manufacture, distribution and sales of fuel ethanol.

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These benefits were estimated for the period 1993 until 2013 for the construction and operation of the 27 million gallons per year fuel ethanol industry in Kansas. The secondary personal and corporate income generates income taxes and the expenditure of this income generates sales taxes for the state government. These taxes were also estimated for this period.

To evaluate the impacts of the industry, PCA considered scenarios including extension of the Kansas producer incentive (net $0.045 per gallon) for fuel ethanol produced in the state through 2001. The incentive would lower state revenues, resulting in less employment and taxes. Employment and taxes, net of these impacts, have been calculated for the 4-year extended incentive period, and also assumes that current federal tax incentives are not be extended past the year 2000.

Methodology

Input-output (I/O) analysis was used to calculate the indirect benefits stemming from the incentives. An I/O model mathematically describes the flow of goods and services among the sectors that comprise a region's economy. Although I/O models can be constructed to show flows in terms of physical quantities of goods, they are usually constructed to show flows in dollar amounts. An I/O model is used to record the purchases by a sector of the economy and its sales to other sectors and to ultimate consumers during a single year. Each purchase from a particular sector by a firm or by a final consumer initiates a series of interactions throughout the economy.

An I/O model traces through the maze of interactions to show what the total increased output of each sector will be, given the initial increase in investment. Input/output models are powerful tools for investigating the secondary benefits to the various sectors of the economy, since they can be readily used to estimate the increase in output resulting from changes in investment. Any commercial activity such as the alcohol fuels industry "ripples" throughout the entire economy; input-output method of analysis is the most practical technique available to economists to analyze in detail this complex set of interactions.

The particular input-output (I/O) methodology used in this study to estimate the direct and indirect effects has been used previously to analyze the potential impacts of the fuel ethanol industries in Alabama, New Mexico, Louisiana, and Kentucky. These previous analyses were used to estimate the differences in statewide economic impacts resulting from alternative state and federal tax credit extension scenarios.

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Estimation of Indirect Impacts of Kansas

Since the late 1950s, input-output tables for the U.S. economy have been constructed by the U.S. Bureau of Economic Analysis (BEA). These tables are revised and updated periodically, incorporating the results of the national economic censuses that are conducted every five years. This study uses the most recent national I/O table reflecting economic data for 1988.

In the analysis reported here, inputs needed from industries that do not exist in Kansas are assumed to be imported from other states, and from abroad, as represented in the national I/O table. Thus, the indirect impacts resulting from activities in Kansas may "leak" to industries located outside the state, resulting in smaller benefits than would otherwise accrue with the state.

The steps used for determining the secondary impacts are to:

- Estimate the sector-specific multipliers for personal income, corporate income and employment using the input-output table.
- Estimate one overall multiplier specific to the operation of ethanol plants, to production of grain, to highway construction, and to each of three demand components used in the analysis.
- Estimate indirect and induced taxes using the tax model. The overall tax is proportional to the projected levels of investment in each activity, reflecting the projected cost and market penetration results of the integrated market and cost analysis.

Multipliers

Multipliers represent the additional personal income, corporate income, and employment that may be attributed to an investment. They are convenient tools to summarize the secondary benefits associated with an investment. Two types of multipliers can be estimated using an input/output table. The Type I multiplier is defined for a specific investment as the ratio of the combined direct plus indirect benefits to the direct benefit.

The direct benefit provides an estimate of increases in economic benefits within an industry resulting from an investment in the goods produced by that industry. The indirect benefit provides a measure of impacts on the entire regional economy due to the investment. For example, a multiplier of 1.5 means that an additional 50 percent benefit would be derived from secondary activity stimulated by the proposed investment.

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This analysis uses what are known as "Type II" multipliers defined as the ratio of direct plus the indirect and induced benefit to the direct benefit. Induced benefits result from re-spending the income generated by the direct and indirect effects.

The Type II coefficients used to estimate the sum of the direct, indirect, and induced benefits were estimated for alcohol plant and grain production under investigation, for highway construction, and two components of final demand -- personal consumption expenditure and capital investment. The income coefficients for alcohol plants are the personal and corporate income generated by expenditure of $1 million on that specific system. Similarly the employment coefficients show the person-years of employment generated by each $1 million of expenditure on the plants.

These coefficients are summarized on page 42. The personal income coefficients vary from $230,000 for gasoline production to $740,000 for highway construction. The employment coefficients range from 12.0 person-years for gasoline production to 56.6 for agriculture. Agricultural production results in the highest secondary impacts per dollar of investment.

Data Base Development

A detailed breakdown of costs was developed by I/O sectors for a generic fuel ethanol plant in Kansas. About 100 different systems and components were identified to define a complete plant. The costs were based on interviews with developers of ethanol plants of various sizes. These costs were scaled to the size of the generic plant, and modified to reflect the anticipated changes in future technology. Labor costs of subcontracted systems were also estimated. The final system cost included a breakdown by SIC Code, and for labor.

Coefficients were estimated for an ethanol plant on the basis of this cost breakdown. These coefficients are sensitive to the breakdown of costs among the I/O sectors, particularly to the breakdown between labor and material and equipment costs. Coefficients for other activities, such as grain production, were derived directly from the input-output table, since these activities corresponded very closely with a single identifiable sector in the table. In order to calculate the various tax implications, the fraction of income going to taxes was estimated based upon the economic and demographic data for the state of Kansas.

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Table VIII

Kansas Ethanol Industry Economic Impact
(Multipliers - Type II Coefficient)

(Direct + Indirect + Induced)

Employment Activity	Personal Income Person-Years/10^6 Demand	10^6 Demand
Agriculture	56.6	590,000
Ethanol plant operation	32.9	610,000
Highway construction	44.9	740,000
Personal consumption	36.0	540,000
Capital investment	37.4	650,000
State Gov't. expenditures	39.8	670,000
Gasoline Production	12.0	230,000

Percentage of Income Going to Taxes	
State Individual Income Tax	7.19%
State Corporate Tax	6.75% (max.)
State Franchise Tax	n/a
State Sales Tax	4.25%
Local Sales Tax	1.00%
Property Tax (County -- per assessed value)	2.85% (wt. avg.)
Taxable Sales	40.00%

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Table IX

Sample Net Calculation of Net Personal Income and Tax For 1993 - 94 Case (with $2.5 million total appropriation)

1. Total Kansas Plant Capacity:	55.6 million gallons
2. Total Fuel Ethanol Production:	55.6 million gallons
INCOME (millions of 1992 dollars)	
3. On-site Operation	3.0
4. State Incentives	2.5
5. Federal Incentives (tax credits)	14.5
SECONDARY INCOME (millions of 1992 dollars)	
6. Operation	8.2
7. Grain Sales	10.4
8. State Producer Incentive	1.6
9. Federal Tax Incentives	9.5
10. Total Positive Income	**73.1**
11. Reduced State Revenue	(0.9)
12. Net Income	**71.3**
INDIRECT & INDUCED TAXES (millions of 1992 dollars)	
13. Sales	1.2
14. Income	3.7
15. Total Taxes	**4.9**

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Explanation of Sample Net Calculation of Net Personal Income and Tax For 1993 Case

Notes: Items below refer to the numerical designations on the previous page. Multipliers used for direct plus indirect plus induced benefits are described on page 45.

Item 1 = Existing Kansas fuel ethanol capacity.

Item 2 = Fuel ethanol produced in Kansas in 1992.

	Calculation	Explanation
Item 3 =	Item 2 * 0.113	(Production) * (Operating income per gal. produced)
Item 4 =	n/a	Limit of $2.5 million appropriated for incentive
Item 5 =	Item 2 * 0.54	(Production) * (Federal tax incentive)
Item 6 =	Item 2 * 0.61 * 0.505	(Production) * (Multiplier) * (Oper. cost)
Item 7 =	Item 2 * 0.59 * 0.655	(Production) * (Multiplier) * (Grain cost)/(Gals./Bu.)
Item 8 =	Item 2 * 0.65 * 0.35	(Production) * (Multiplier) * (State incentive)
Item 9 =	Item 2 * 0.65 * 0.6	(Production) * (Multiplier) * (Fed. tax incentive)
Item 10 =	Sum of Items 3 - 9	**Total Positive Income**
Item 11 =	Item 2 * 1.74 * 0.009	(Production) * (Multiplier) * (Avg. incentive/gal.)
Item 12 =	Item 10 - Item 11	**Net income**
Item 13 =	Item 12 * 0.40 * 0.0675	(Net income) * (Taxable sales) * (State sales tax) (see **Table**, previous page)
Item 14 =	Items (13 - 4 - 5) * [0.0218 + (0.1 * 0.058)]	= Adj. net income * (State income & corp. taxes) (see **Table IX**, previous page)
Item 15 =	Item 13 + Item 14	**Total**

(See next page for detailed discussion of this analysis.)

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Sample Calculation of Indirect Economic Impacts: Explanation

Prior to presenting the time series of results for each scenario, a sample calculation is shown to illustrate the estimation of net tax generated by the construction and operation of Kansas ethanol production facilities for 1993 - 94. Secondary employment is estimated in a similar fashion for the years 1994 to 2013.

- **Item 1** is the annual production capacity of the fuel ethanol industry in Kansas.
- **Item 2** is the amount of ethanol produced in Kansas in 1995. This production generates personal income shown in **Items 4, 5, 6, 8, 10, 11, and 12**, and results in a loss of income from reduced state revenues and gasoline sales.
- **Item 3** shows the income derived by labor and operators of the ethanol plants.
- **Items 4 and 5** show the income derived from the state and federal incentives provided to the producers.
- **Item 6** is the secondary income generated from expenditure of this income in the state economy.
- **Item 7** shows the secondary income derived from expenditure of income shown in **Item 3**.
- **Items 8 and 9** show the secondary income from appropriation of $2.5 million annually obtained through the state producer incentive and federal tax incentives.
- **Item 10** shows the sum of the above items.
- **Item 11** shows lost state income due to the annual appropriation for the incentive.
- **Item 12** shows income, net of the lost state income. It is assumed that 40% of this income is spent on taxable sales.
- **Item 13** shows the estimated sales tax based on a sales tax rate of 6.75%.
- **Item 14** shows the income tax derived from this income using a total of the income and corporate tax rate of 10% shown. Tax on income shown in **Items 5 and 6** is deleted, since this is estimated elsewhere in this report. Corporate income is estimated to be about 10% of the personal income estimated in **Item 15**.
- **Item 15** shows the combined sales and income taxes (indirect and induced).

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Key Assumptions

The state of Kansas is a net importer of gasoline. It was assumed that fuel ethanol displaces gasoline from out of state. The penetration of fuel ethanol thus has no impact on the Kansas jobs and income associated with producing and supplying gasoline to the state.

The calculated employment impacts are high. One reason is that federal dollars for highway construction are not reduced in this analysis, although part of the gasoline taxes collected by the federal government are given to ethanol producers in the form of tax incentives. Thus, while the expenditure of federal tax deductions paid to the developers would continue to generate jobs and income and taxes to the state, the offsetting decline in the federal highway construction fund and in the consequent secondary benefits was not accounted for.

In estimating net taxes, income and employment, it was assumed that investment in ethanol plants increases the total investment in the state by drawing funds from an equivalent amount of investment in gasoline-related industry outside the state. However, if funds are drawn from other investment within the state, estimated secondary impacts would be higher than what might occur. The overestimate would depend on the level of other investment and the type of activity toward which it was directed.

Employment and Economic Impacts of the Kansas Ethanol Industry

Based upon the integrated market and financial analysis, the direct, indirect and induced impacts were determined as a result of the projected market-penetration of the fuel ethanol industry if the incentive is extended. This analysis was conducted on a differential basis in order to establish the net economic effects. The positive impacts in terms of employment and personal income due to increased economic activity of the ethanol industry and indirect and induced components have been compared to the reduced economic activity associated with the losses incurred as a result of reduced highway construction funds collected.

The direct economic and tax impacts associated with the fuel ethanol industry were derived from aggregating the financial cash flows for each market penetration scenarios on an annual basis. The other direct and associated indirect and induced economic impacts were estimated from the input/output analysis corresponding to the Kansas economy. The input/output analysis accounts for the ripple effect within the economy as a result of the increased economic activities associated with the ethanol fuel industry and the shift in terms of personal income related to the federal and state fuel ethanol deductions from the respective treasuries to the private sector.

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The direct, indirect and induced impacts on personal income in Kansas due to the ethanol fuel industry are summarized in the calculation tables in the Appendix. The net benefits to the Kansas state economy are quite positive, reaching nearly $750 million as a result of plant operation activities.

Table X

Kansas Ethanol Industry
Estimated Net Differential Employment Impact for 1993
(Person-Years)

Ethanol Industry Operations	55.6 million gals. per year
On-Site Operations	117[1]
Operations	366[2]
State Incentives	288[2]
Federal Tax Incentives	494[2]
Subtotal	**1275**
State Revenues	(346)[2]
Net Differential Employment (1994 Operations)	**1735**
Net Employment (Total 1993 Impact)	**1567**

[1] Direct impact
[2] Direct + indirect + induced impacts

Note: The above analysis is extrapolated from the impacts of a 6 million gallons per year facility.

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Table XI

Kansas Ethanol Industry
Net Differential Personal Income Impact For 1993
(Millions of 1992 dollars)

Ethanol Industry Operations	55.6 million gals. per year
On-Site Operations	2.5[1]
Operations	6.8[2]
Agriculture	8.5*
Federal Tax Credits	21.8[2]
Subtotal	**39.6**
State Revenue	(13.4)[2]
Net Differential Personal Income (1994 Operations)	**26.2**
Net Personal Income (Total 1994 Impact)	**41.2**

[1] Direct impact
[2] Direct + indirect + induced impacts

* Employment impacts for agriculture based upon usage of Kansas feedgrains.

Note: The above analysis is extrapolated from impacts of a 6 million gallons per year facility.

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Conclusions

Based on this preliminary analysis, it is apparent that on a differential basis, the benefits of the fuel ethanol industry in Kansas are very significant in terms of employment, direct personal income, and a return on the state's total investment in this agriculture-based industry. The relatively small and temporal revenue impacts on the state treasury are significantly overshadowed by the benefits accruing to the state. The principal reasons for these positive impacts is the development of a new industry which provides an incentive and a market for Kansas agriculture and a new option for Kansas's energy "portfolio."

Viewed from the standpoint of an investment in a new and rapidly developing industry, the state of Kansas will stimulate about $750 million in economic activity during the next 20-years. In addition, Kansas would recoup $122 million in direct and indirect tax revenue during the same period, a substantial return on its investment.

For KEA's part, the investment in a 56 million gallons per year fuel ethanol production industry is estimated to be over $90 million. Under a producer incentive strategy, or its equivalent, the producer receives no incentive unless ethanol is actually produced. Thus, the state incurs no liability until the industry has generated jobs and economic activity.

At the present time, the fuel ethanol industry is not yet capable of supporting itself without the benefit of federal and state incentives for these fuels. However, because of the positive benefits of the ethanol fuel industry upon several sectors of the Kansas economy, the state benefits directly and indirectly from its targeted -- and limited -- incentive.

Nationally, the impact of using corn and other feedstocks such as wheat and milo to make fuel ethanol on the agricultural sector is to increase commodity prices over the long-term. This is, in fact, the case as has been confirmed in studies conducted by Purdue University, USDA, GAO, and the Food and Agricultural Policy Research Institute (FAPRI).

A strong argument can be made that were it not for a fuel ethanol program in the United States, consuming over 300 million bushels of corn, prices would have been severely depressed, absent strong export demand and a poor 1995 harvest. These studies have shown that the existence of the fuel ethanol industry in the United States has increased prices for corn and other feedstock products by $0.10 to $0.20 per bushel, raising the income of Kansas farmers by as much as $22 million.

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In support of that conclusion, the USDA indicated in November, 1993 that if the fuel ethanol industry did not grow to meet the new demand created for oxygenated fuels by the federal reformulated gasoline program, farmers would forego about 10 - 20 cents per bushel of new revenue the program is projected to create. PCA has estimated that the federal RFG program could double fuel ethanol demand in the U.S. over the next decade.

Since the federal and state incentives for ethanol-blended fuels may be viewed as an alternative indirect price support and stabilization program, the needs for additional agricultural financial incentives may be mitigated. Altogether, Kansas ethanol producers consume nearly 24 million bushels per year of ethanol feedstocks, including corn, wheat, and milo. Such demand itself constitutes an agricultural-economic development program that would be unique among the states. Because agriculture and manufacturing provide the greatest level of differential economic impacts, the benefits to the state of Kansas would be even more substantial.

Combining the agricultural, employment, environmental and energy benefits accruing to the state of Kansas, the proposed incentive seems well worth the investment of both the public and private sectors.

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Table of Authorities

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Appendices

- Fuel Ethanol: A Review of Recent Economic Impact Analyses
- U.S. Ethanol Producers/Plant Capacity
- Kansas Department of Revenue/Division of Taxation Data
- Kansas Ethanol Producer Survey
- Analytical Spreadsheets
- Summary of Qualifications -- Peeples Consulting Associates, Inc.

Appendix A

- Fuel Ethanol: A Review of Recent Economic Impact Analyses

Fuel Ethanol:
A Review of Recent Economic Impact Analyses

Overview

This study reviewed a number of recent reports that analyzed the economic impacts of fuel ethanol. These assessments all predicted substantial economic benefits from increased production of fuel ethanol. With regard to employment impacts, for example, a 1993 United States Department of Agriculture (USDA) study estimated that increasing ethanol production to 2 billion gallons would create 28,000 new jobs, including 15,000 jobs in farming and farm-related activities. In addition, the National Corn Growers Association (NCGA) has estimated that currently projected expansion of the ethanol industry through 2000 will create over 273,000 jobs throughout the U.S. As for income creation, the U.S. General Accounting Office (GAO) estimated that an increase of ethanol production to the 2-5 billion gallon level would increase net farm income by 1.3 percent per year or an average of $415 million over the 8-year period of GAO's analysis. Much of this increase would result from a 5-9 percent increase in corn prices. Similar increases in job and income creation have been predicted by state-specific studies in Indiana, Illinois, Nebraska and Iowa. As for impacts on the Federal budget, GAO has estimated that increased ethanol production in the range of 2-3 billion gallons would, even after consideration of ethanol's tax subsidies, result in a net savings to the Federal government of approximately $500-600 million per year.

Job and Income Creation

In many rural areas throughout the United States, the ethanol industry is an integral element of the economy: creating jobs, raising consumer incomes, and generating state revenues. Several analyses have been conducted by industry associations, and by federal and state agencies, in order to estimate current employment opportunities in the ethanol industry and to forecast future job creation that might be associated with expanded ethanol production.

In 1993, the U.S. Department of Agriculture (USDA), Economic Research Service published the results of an analysis that examined some of the national and local economic impacts of two anticipated scenarios for expanded ethanol production: increased production to 2 billion gallons of ethanol by 1995, and to 5 billion gallons by the year 2000.(1) The results of the study indicated that by increasing annual ethanol production to 2 billion gallons by 1995, approximately 28,000 jobs could be created in rural communities throughout the country. These new job opportunities could be categorized as follows:

- 15,000 in farming and farm-related activities;
- 10,000 direct and indirect jobs from ethanol processing (3,500 in plant operations, 6,500 in local retail trade, services,

and supply industry); and

- 3,000 temporary jobs from new plant construction.

NOTE: (1) Petrulis, M., Sommer, J., and Hines, F. "Ethanol Production and Employment. Agricultural Information Bulletin Number 678.

Under the second scenario, producing 5 billion gallons per year by 2000 would create almost 108,000 jobs nationwide including: 34,000 direct and indirect ethanol jobs from ethanol processing, 14,000 temporary construction jobs, and 60,000 jobs from additional crop production.(2) (These results are further summarized in Table 1). The researchers also concluded that, on a local level, a new 100-million-gallon ethanol facility will generate about 370 temporary jobs during the construction phase and about 840 permanent jobs during the operational phase.(3)

NOTES:
(2) Petrulis, p.1
(3) Ibid, pp.4-6

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Table 1
Employment Prospects for An Expanded U.S. Ethanol Industry

Item	Ethanol Production Capacity, U.S.	Production Phase: Construction Phase	Ethanol Plant Operation: Direct	Ethanol Plant Operation: Indirect	Ethanol Plant Operation: Total	Agriculture	All
	Million Gallons	Number of Jobs					
Current Production	920						
U.S. Ethanol Production of 2 Billion Gallons Per Year (1995)							
Excess Capacity in Operating Plants	210	--	630	1,130	1,760	2,820	4,580
Capacity of Idled Plants	183	--	550	990	1,540	2,460	4,000
Proposed Expansion of Operating Plants	385	1,430	1,160	2,090	3,250	5,180	9,860
Proposed New Plants	360	1,340	1,080	1,940	3,020	4,840	9,200
Total	2,058	2,770	3,420	6,150	9,570	15,300	27,640
U.S. Ethanol Production of 5 Billion Gallons Per Year (2000)							
Excess Capacity in Operating Plants	210	--	630	1,130	1,760	3,130	4,890
Capacity of Idled Plants	183	--	550	990	1,540	2,720	4,260
Proposed Expansion of Operating Plants	385	1,430	1,160	2,090	3,250	5,730	10,410
Proposed New Plants	360	1,340	1,080	1,940	3,020	5,360	9,720
Required New Plants	2,900	10,790	8,700	15,660	24,360	43,160	78,310
Total	4,958	13,560	12,120	21,810	33,930	60,100	107,590

Source: USDA (1993)

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Additional studies have reached similar results; increased demand for ethanol will spawn expanded agricultural output and capital investment into the ethanol industry, thus generating more jobs and higher incomes. According to a 1990 analysis performed by the NCGA projected expansion of the ethanol industry between 1992-2000 will create over 273,000 jobs nationwide and will increase consumer income by $3.8 billion.(4) These statistics incorporate projected impacts throughout the local economy including the agricultural, transportation and retail sectors.

NOTE: (4) Corn 2000 The Future of Ethanol cited in Bryan, "Ethanol Situation Analysis" National Corn Growers Association 1990, p 27

The NCGA report also discusses the importance of the ethanol industry to "dying rural communities" and estimates that for every person employed in an ethanol plant at least two jobs in related industries are created. A typical 10 million gallon ethanol plant will generate in excess of 7 million dollars annually within the local economy. The end result of increased productivity on a local level will have implications on the national economy as agricultural output is multiplied throughout the economy.(5)

NOTE: (5) Ibid, p 44

At a regional level, several Midwestern states have conducted independent studies to determine the economic impacts of the ethanol industry within their respective states. In brief, these analyses can be summarized as follows:

In Indiana, the state government estimated that a wet milling plant employing 122 persons and costing $117 million to construct would generate a total of 5,600 jobs and $418 million in income during the construction phase. The operational phase would create 4,131 jobs per year in addition to almost $91 million in annual earnings.

As of 1991, investment by the Illinois ethanol industry exceeds $1 billion, directly generating 800 plant operation jobs and 4,000 additional jobs in industry-related services. For every 100 million bushels of corn used for ethanol production, 2,250 new rural jobs are created.(6)

In 1991, the Nebraska ethanol industry had the capacity annually to produce 63 million gallons of fuel grade ethanol, employ 154 workers, have an estimated payroll of $5.7 million, create 541 jobs in other Nebraska industries, and provide $819,000 of Nebraska's personal income and sales taxes. By 1995, it is expected that the ethanol industry in Nebraska will have the capacity annually to produce 213 million gallons of fuel, employ 455 people with a payroll of $16.8 million, create 1,599 jobs in other areas, and generate $2.4 million in state income and sales tax revenues.

Moreover, the economic impacts of ethanol production generate (a) $0.63 of additional Nebraska output per $1 of ethanol industry output (b) 3.5 additional Nebraska jobs for every job in the

ethanol industry; and (c) $2.29 of additional personal income for every $1 of income generated by the ethanol industry.(7)

The wet corn milling industry in Iowa employs approximately 2,550 people at an average wage of $37,000 while the dry milling industry employs approximately 620 people at an average salary of $27,000. Furthermore, over 12,000 jobs are affected by the production of ethanol in Iowa.(8)

NOTES:
(6) "Benefits to Illinois in Developing and Utilizing Ethanol Fuel." March 28, 1992, p.3
(7) Nebraska Department of Economic Development. "Nebraska's Ethanol Industry" October, 1993 pp.5-8.
(8) D. Otto, M. Imerman and L. Kolmer, "Iowa's Ethanol and Corn Milling Industries Economic and Employment Impacts", Staff Paper #238, Department of Economics/Iowa State University December, 1991 pp 2-3.

Impact of Increased Ethanol Production on Agricultural Economics

In 1990, GAO utilized the Wharton Econometric Forecasting Association model of U.S. agriculture to estimate, among other things, the effect of production increases on the agricultural sector and consumer food prices.(9) This analysis has become the standard for interpreting the agricultural impacts of increased ethanol production and is often cited in other related literature.

NOTE: (9) U.S. General Accounting Office, Report to the Chairman, Subcommittee on Energy and Power, Committee on Energy and Commerce, House of Representatives. "Alcohol Fuels Impacts From Increased Use of Ethanol Blended Fuels" GAO/RCED-90-156, July, 1990.

In conducting their study, GAO developed two scenarios for evaluating increased ethanol production: doubling current ethanol production to 2.2 billion gallons within an 8-year time period, and tripling production to 3.3 billion gallons by the 8-year time frame. The results of the study can be summarized as follows:

Corn producers would benefit the most because of increased demand for corn to make ethanol;

Soybean processors and producers would face lower demand and prices for their products because ethanol generates protein rich feed and corn oil by-products that compete with soybean meal and oil;

Increased corn prices would raise feed costs and hurt cattle producers, but the lower costs of high protein feed could benefit poultry producers; and

Net farm income would increase, thus there would be a slight increase in consumer food prices.

The researchers determined that, in general, corn farmers could expect greater incomes due to increased prices and demand for their product. To support this, the model results showed that corn prices would increase over baseline projections by 32 cents a bushel (15%) and 19 cents per bushel (9%) under high and low growth scenarios. Furthermore, the overall price of other feed grains (such as sorghum) increased by about 2 cents per bushel. In response to the greater demand for corn, by 1997, about 4.2 million acres of idle land or other crop acreage would be placed into corn production. However, the model demonstrated several negative impacts. The higher corn prices would raise livestock-feed costs, thus reducing the amount of corn purchased for animal feed. Export markets for corn would also be negatively affected, as higher prices would be likely to reduce the foreign demand for American-grown corn by 5 percent (high scenario) and 2 percent (low scenario).(10)

NOTE: (10) U.S. GAO, pp.19-20

According to the GAO analysis, soybean producers and processors would be adversely affected by the lower demand for, and price of, soybeans. Expanded ethanol production would increase the supply of protein-rich feed and corn oil by-products, which directly compete with soybean meal and soybean oil. In support of this conclusion, the Wharton model predicted that at the end of the 8 year low-growth simulation period, the average price of soybeans would decrease about 35 cents per bushel from the baseline (6%). The high-growth scenario predicted a decrease of 66 cents per bushel since increasing ethanol production would increase the supply of competing, high-protein feed by-products by about 5.1 million tons. Another result of this significant decrease in soybean prices would be that farmers would shift approximately 1.4 million acres from soybean production to corn production.(11)

The GAO analysis also concluded that higher prices for corn as the result of expanded ethanol production would lead to a 10-percent increase in feed costs by the end of the 8 year period, thus causing ranchers to reduce the number of cattle by 4 percent--from 105 million to 101 million head by 1997. Also, producers of poultry would respond to the lower prices for high-protein feed and would likely increase production of turkeys and chickens.(12)

NOTE:
(11) Ibid, pp 21 22
(12) Ibid, p 22

GAO researchers also examined the economic impacts of higher prices and production on farm income. Despite a reduction in the cash crop income of soybean farmers, the model predicted that an expansion of ethanol production would result in an overall average increase in net farm cash income by approximately $415 million over the 8-year simulation period, which corresponds to, an annual average increase of 1.3 percent over the 8 year time period.(13)

NOTE: (13) U.S. GAO, pp.22-23

One final element the GAO analysis examined included the resultant impact of increased ethanol production on the consumer price index and determined an average increase of 0.1 percent (10 cents per $100 food purchase). The consumer price index for meat, poultry and fish product would increase 0.28 percent, and 0.21 percent for cereal and bakery products.(14)

NOTE: (14) Ibid, p.23

An analysis performed by the USDA, Economic Research Service in 1993 predicted similar but somewhat less pronounced impacts on agricultural markets as the result of expanded ethanol production. Projecting ethanol production to increase to 2 billion gallons by 1995, USDA concluded that the base level price of corn would increase 1 cent per bushel and that corn production and acreage would expand by about 3.4 percent. If production efforts are increased to 5 billion gallons by 2000, corn prices could conceivably rise 19 cents per bushel and acreage could expand by 12 percent. USDA also determined impacts on soybean production similar to those of GAO. Soybean prices would fall 6 cents per bushel and output would drop nearly 1 percent for the 2 billion gallon scenario. For the 5 billion gallon scenario, soybean prices would fall 31 cents and production would drop 5.5 percent.(15)

NOTE: (15) Petrulis, p.4

In about the same timeframe as the preceding analysis, another group of USDA researchers looked at the same 2 billion gallon/5 billion gallon scenarios with regard to income creation. In the 2 billion scenario this analysis concluded that net income (i.e., the value of production plus deficiency and conservation payments less variable costs) from the production of 10 major crops would rise $153 million per year. Income benefits varied according to individual regions with the Corn Belt, the Northern Plains and the Lake States benefiting most. Under the 5 billion gallon scenario USDA estimated that net crop income would increase by $1.6 billion per year with the geographic distribution of income similar to that in the 2 billion gallon scenarios.(16)

NOTE: (16) House, R., M. Peters, H. Baumes and W.T. Disney. "Ethanol and Agriculture: Effect of Increased Production on Crop and Livestock Sectors." USDA, Economic Research Service, Agricultural Economic Report No. 667. May, 1993

Impacts on the Federal Budget

Currently about 1 billion gallons of ethanol are produced each year. In 1990, GAO examined the impact on the Federal budget of increasing ethanol production to 2.2 or 3.3 billion gallons by 1998. In both scenarios, the results indicated that expenditures for Federal farm programs would decrease. For the low-growth study the decrease would be around $930 million, and for the high-growth study approximately $1.421 billion.(17) The study concludes "that reductions in farm program outlays would exceed the additional tax

revenue losses, on average, by about $488 million and $608 million per year...."(18) (see Figure 1). The higher demand for ethanol will increase corn production and prices, resulting in a reduction of the Federal outlays to cover loan defaults and deficiency payments of farmers. The study suggests that as grain prices increase, the incentives for farmers to participate in Federal agricultural support programs decrease, and thus, Federal deficiency payments to farmers would be reduced.

NOTES:
(17) U.S. GAO, p.30.
(18) Ibid, pp.30-31.

Deficiency payments are the difference between the average seasonal price for a crop and its target price. If the seasonal average is below the target price, deficiency payments are given to farmers.(19) According to the July 1993 USDA report, "Ethanol Production and Employment," if the amount of ethanol produced is doubled, the deficiency payment for grains would be reduced by approximately $7 million, or by just 0.2 percent. The USDA estimates that there will be a per bushel increase in the seasonal price of corn of at least 3-5 cents per bushel for every 100 million bushels of increased demand. These increased prices bring the seasonal and target price closer to one another, thereby reducing the deficiency payment per bushel.(20)

NOTES:
(19) U.S. Department of Agriculture, "Comments Concerning the Environmental Protection Agency's Regulation of Fuels and Fuel Additives: Renewable Oxygenate Requirement for Reformed Gasoline Proposed Rule." February 14, 1994, p.9
(20) Ibid, p.9

In addition to the reduction in the costs of Federal programs to supplement farmers, the expanded production of ethanol will reduce Federal motor fuel tax revenues.(21) The GAO study estimated that continued use of the excise tax at both the low- and high-growth simulations would reduce tax revenues by an annual average of $442 million and $813 million, respectively. However, as noted previously, the GAO also concluded that this reduction in tax revenues would be more than offset by the reduced farm subsidies in the land diversion, acreage control, and loan programs.

NOTE: (21) U.S. GAO, pp.30-31.

Appendix A:
Summaries of Fuel Ethanol Economic Impact Analyses

U.S. General Accounting Office, Report to the Chairman, Subcommittee on Energy and Power, Committee on Energy and Commerce, House of Representatives. "Alcohol Fuels: Impacts From Increased Use of Ethanol Blended Fuels." GAO/RCED-90-156. July 1990.

Overview:

GAO developed two scenarios (doubling ethanol production to 2.2 billion gallons in an 8-year time period, and tripling production to 3.3 billion gallons in the next 8 years) in evaluating increased ethanol production. GAO used the Wharton Econometric Forecasting Association model of U.S. agriculture in estimating the effect of production increases on the agricultural sector, federal farm program costs, and consumer food prices.

Agricultural Impacts:

Corn producers would benefit the most because of increased demand for corn to make ethanol. Soybean processors and producers would face lower demand and prices for their products because ethanol generates protein rich feed and corn oil by-products that compete With soybean meal and oil. Increased corn prices would raise feed costs and hurt cattle producers, but the lower costs of high protein feed could benefit poultry producers. Net farm income would increase, and there would be a slight increase in consumer food prices.

The model results showed that corn prices would increase over baseline projections by 32 cents a bushel (15%) and 19 cents per bushel (9%)-under high and low growth scenarios. By 1997, about 4.2 million acres of idle land or other crop acreage would be placed into corn production. The higher corn prices would raise livestock-feed costs and reduce the amount of corn purchased for animal feed. Export markets for corn would also be negatively affected, as higher prices would reduce the foreign demand for American-grown corn by 5 percent (high scenario) and 2 percent (low scenario). The overall price of other feed grains would increase by about 2 cents per bushel.

The expanded ethanol production would increase the supply of protein-rich feed and corn oil by-products, which compete with soybean meal and soybean oil. The result is a decrease in soybean processors' profit margins, and lower demand for and lower price of soybeans. The model showed that at the end of the 8 year low growth model simulation period, the average price of soybeans would decrease about 35 cents per bushel from the baseline (6 percent) - high growth results in a decrease of 66 cent per bushel.

Increasing ethanol production to 3.3 billion gallons per year would increase the supply of high-protein feed by-products by about 5.1 million tons. The model showed that farmers would shift nearly 1.4 million acres out of soybeans by the end of the simulation period.

Higher prices for corn would lead to a 10-percent increase in feed costs by the end of the 8 year period, thus leading producers to reduce the number of cattle by 4 percent- from 105 million to 101 million heads by 1997. Producers of poultry would respond to the lower prices for high protein feed and would increase their production of turkeys and chicken.

Higher prices coupled with higher production would increase farm

income from the sale of Ash corn crops. Soybean farmers would experience reduced cash crop income. The model showed that an expansion of ethanol production would result in an overall average increase in net farm cash income by about $415 million, or an annual average increase of 1.3 percent over the 8 year time period ($814 average net cash receipts - $399 increased farm expenditures).

Increased ethanol production will raise the consumer price index by an average of 0.1 percent (10 cent per $100 food purchase).The consumer price index for meat, poultry and fish products would increase 0.28 percent, and 0.21 percent for cereal and bakery products.

Tax Revenue Impacts and Effects on the Federal Budget:

Increased ethanol production will raise the demand for, and the price of, corn, thus increasing farm income. As a result, there will be decreased federal farm programs outlays (deficiency payments and acreage diversion programs), fewer farmers participating in these support programs, and fewer farmers defaulting on commodity loans. Reductions in federal outlays from farm support programs would average about $900 million and $1.4 billion per year, respectively, under the low and high growth scenario. The cumulative outlay reductions over the 8 year period would total about $7.4 billion and $11.4 billion.

The study ran a separate simulation of the high-growth model, however, using target prices fixed at their 1990 level. That scenario showed farm program reductions averaging about $3.5 billion per year with cumulative reductions totaling more than $28 million.

The study also calculated projected losses to the government resulting from reduced gasoline excise tax revenues. GAO estimated that the low-growth and high-growth simulations would reduce tax revenues by an annual average of $40 million and $813 million, respectively.

The analysis concluded that the net impact to the federal government resulting from the federal ethanol program would be a savings of between $488 million to $608 million. Over the 8-year period, the government would save between $3.7 billion to $4.7 billion.

Petrulis, M., Sommer J., and Hines, F. Ethanol Production and Employment. U.S. Department of Agriculture, Economic Research Service. Agricultural Information Bulletin Number 678. July 1993.

Overview:

This analysis examined some of the national and local economic impacts of two varying scenarios for expanded ethanol production: the increased production of 2 billion gallons of ethanol by 1995

and 5 billion gallons by the year 2000. This study also describes some of the economic implications of constructing a 100 million gallon per year ethanol plant in three prototypical Corn Belt locations.

Job Creation:

Increasing annual ethanol production to 2 billion gallons by 1995 could create almost 28,000 jobs: 15,000 in farming and farm-related activities, 10,000 direct and indirect jobs from ethanol processing (3,500 in plant operations, 6,500 in local retail trade, services, and supply industry), and 3,000 temporary jobs from new plant construction. A majority of these jobs will be in the Midwest corn growing areas and many of the farm and farm-related jobs will go to rural residents. Under a second scenario, producing 5 billion gallons per year by 2000 would create an estimated 108,000 jobs nationwide: 34,000 direct and indirect ethanol jobs from ethanol processing, 14,000 temporary construction jobs, and 60,000 jobs from additional crop production.

Agricultural Implications:

Increased annual production to 2 billion gallons by 1995 would increase the base level price of corn 1 cent per bushel and increase corn production and acreage about 3.4 percent. Producing 5 billion gallons by 2000 would raise corn prices 19 cents per bushel and increase acreage and output by 12 percent. Furthermore, with more ethanol production comes more corn gluten feed causing a decline in soybean demand. Soybean prices would fall 6 cents per bushel and output would drop nearly 1 percent for the 2 billion gallon scenario. For the 5 billion gallon scenario, soybean prices would fall 31 cents and production would drop 5.5 percent.

Tax Revenue Impacts and Effects on the Federal Budget:

Increased ethanol production would strengthen market orientation in the farm sector as prices for corn and other grains move higher and government deficiency payments decline. The total deficiency payments for grains would drop $7 million or 0.2 percent from baseline in 1995. If production reaches 5 billion gallons in 2000, deficiency payments could decrease by $870 million or 22 percent.

House, R., M. Peters, H. Baumes, and W.T. Disney "Ethanol and Agriculture: Effect of Increased Production on Crop and Livestock Sectors." USDA, Economic Research Service. Agricultural Economic Report Number 667. May 1993.

Overview:

This analysis looks at consequences for agriculture to two possible demand alternatives: producing 2 billion gallons of ethanol per year by 1995 (a 0.8-billion gallon increase over expected production) and 5 billion gallons by 2000 (a 3.8 billion gallon increase).

In general, the report concluded the following: expanded ethanol production could increase U.S. farm income by as much as $1 billion (1.4 percent) by 2000; the Corn Belt would benefit most from improved ethanol technology and heightened demand; coproducts from the conversion process (corn gluten meal, corn gluten feed and others) compete with soybean meal, so soybean growers in the South may see revenues decline. The U.S. balance of trade would improve With increased ethanol production as oil import needs decline.

This analysis utilized a mathematical programming model of the U.S. agricultural sector (USMP) to carry out the scenario analysis.

Agricultural Impacts:

Increasing ethanol production from the expected 1.2 billion gallons to 2 billion gallons in 1995 requires an additional 0.3 billion bushels of corn, 3.5 percent of projected corn production. Of the amount, 95 percent comes from increased corn production; the remainder comes from reduced domestic feed and export use. Corn production rises 3.4 percent, but the corn price prices only 0.5 percent (Table A-1). Effects on corn prices and other crops are modest due to the extra 2.4 million acres made available by relaxing the corn ARP.

Increasing ethanol production from 1.2 to 5 billion gallons in the year 2000 amplifies the crop sector effects shown in the 1995 scenario. This scenario assumes enhanced ethanol production technology, but still requires 1.3 billion additional bushels of corn for ethanol production, 1 billion bushels more than scenario 1. About 86 percent of the added corn comes from increased production and the remainder comes from reduced domestic feed and export use. Corn output rises 11.8 percent, and the corn price increases 7.6 percent (Table A-1).

Table A-1
Change in Price, Production, Domestic Use, and Exports of Crops Due to Increased Ethanol Production in 1995 and 2000

Crop	Price	Production	Domestic Use	Total Exports
1995 (Base: 1.2 billion gallons; Scenario: 2 billion gallons) Percent Change				
Corn	0.5	3.4	4.4	-0.2
Other feedgrains(2)	0.3	-0.2	-0.1	-0.6
Wheat	0.3	-0.6	-1.3	-0.2
Rice	--	--	--	--
Soybeans	-1.1	-0.9	-1.4	0.3
Cotton	-2.8	0.5	0.4	0.7
2000 (Base 1.2 billlon gallons; Scenario: 5 blllon gallons)				
Corn	7.6	11.8	16.7	-3.1
Other feedgrains(2)	5.5	6.0	9.5	-3.7
Wheat(3)	-2.0	0.8	0.2	1.3
Rice	0.1	--	--	--
Soybeans	-4.8	-5.5	-8.7	1.2
Cotton	-0.2	--	--	0.1

Note: -- indicates a change of less than 0.05 percent

(1) Includes food, seed, livestock feed, and industrial uses
(2) Sorghum, barley, and oats
(3) Wheat effects in this scenario result from eliminating its ARP rate, not from expanded ethanol production

Extra land is made available by eliminating the corn, sorghum, barley, and wheat ARP requirements, which are otherwise projected to exist in year 2000. This relaxation frees up 6.2 million acres, moderating price increases for corn and other feedgrains to about half of what they would otherwise be. Feedgrain prices are projected to remain under target price levels.

Additional coproduct supply due to ethanol expansion (to 2 billion gallons) causes the price of corn gluten meal to fall 6.7 percent, and the price of corn gluten feed to fall 5.3 percent. The price of distillers' dried grains, down 0.3 percent, is virtually unchanged.

Producing 5 billion gallons of ethanol in the year 2000 yields an even greater supply of corn coproducts than under scenario 1. Again, coproduct prices decline: corn gluten meal 7 percent, corn gluten feed 12.3 percent, and distillers' dried grains 4 percent.

Income and Expense Effects

Due to increased ethanol production of 2 billions gallons in 1995 net income (value of production plus deficiency and conservation payments less variable costs) from production of 10 major crops (corn, sorghum, barley, oats, wheat, soybean, rice, hay, and silage) rises $153 million. Revenues rise S407 million from increased feedgrain prices and output while farmers experience a 57-million decline in deficiency payments and a $246-million rise in variable costs. Observed income increases vary throughout the U.S. with the most significant increases occurring in the Corn Belt ($102 million), the Northern Plains ($39 million), and the Lake States ($37 million). Furthermore, a $19 million (0.1 percent) gain in livestock occurs with ethanol production expanded to 2 billion gallons by 1995. Although price and output adjustments of livestock leads to a $22 million decline in value of production, livestock producers' income nonetheless increases as the result of a $42 million decline in variable costs (primary from a decrease in high-protein feed costs).

If ethanol production increases to 5 billion gallons by the year 2000, crop net income will rise 51.6 billion (value of production increase to $3.6 billion due to a rise in price [by 6-8 percent] and output, while deficiency payments decline $0.9 billion due to higher crop prices and variable production costs, increase by $1.1 billion). Income gains are greatest in regions growing the most corn: $531 million in the Corn Belt, $367 million in the Northern Plains, and $192 million in the Lake States. The 2000 scenario leads to a $555 million decline in livestock net income as the result of $640-million increase in variable costs (primarily from increases in grain price). This expense is partially offset by price and production changes, which raise livestock production value $85 million. In conclusion, the net income for the crop and livestock products examined by this study rises $1.05 billion. The increase in feedgrain income exceeds declines in deficiency payments, soybean revenues, and livestock incomes.

Bryan, M. (National Corn Growers Association). "Ethanol Situation Analysis." 1990.

Overview:

This resource performs a comprehensive analysis of increased ethanol demand on air quality, the petroleum industry, the automotive industry, national/state policy (including budget and tax revenue concerns), associated technologies, and agriculture.

Background Information:

Clean air standards, oxygenated fuels, air toxic reductions, reformulated gasoline - ethanol is the most effective method of adding oxygen to gasoline. A fifty percent marketshare for ethanol is expected in the 44 nonattainment cities--demand could reach 2 billion gallons by 1995. In 1990, the ethanol industry distilled approximately 940 million gallons of pure grain ethanol utilizing 400 million bushels of corn.

Federal Budget Impacts:

Each year the Federal government pays farmers not to farm a certain percentage of their land, creating billions of dollars in farm subsidies that could be saved by the development of domestic markets such as ethanol.

Job Creations and Personal Income:

Increased demand leads to increased aggregate output, higher consumer incomes, and more jobs. The resultant impacts will increase the GNP by $13.4 billion between 1992-2000. During the same period over 273,000 jobs will be generated and consumer income will increase by $3.8 billion. These gains are expected to come from two major areas: increased agricultural output and the capital investment required to expand current ethanol facilities and build new plants. The effects of activity are multiplied throughout the rest of the economy as spending increases in rural areas on everything from clothing to farm equipment. Add 2.6 billion of agricultural output to economy X a 3 time multiplier = add 6 billion to the economy.

It is estimated that for every person employed in an ethanol plant at least two jobs in related industries are created. A 10-million-gallon ethanol plant will generate in excess of 7 million dollars annually within the local economy.

The USDA predicts increased U.S. production could create 28,000-108,000 new jobs by the year 2000. Job gains will be concentrated in the rural Midwest, where most of the Nation's corn is grown. Small communities elsewhere can benefit through new biomass.html technology that can distill ethanol from energy crops, agricultural residues, and organic municipal waste.

<u>"Benefits to Illinois In Developing and Utilizing Ethanol Fuels." March 28, 1992.</u>

Overview:

The article generally summarizes some of the major impacts (not necessarily economic) of ethanol production in the state of Illinois.

Job Creation:

Investment by the Illinois ethanol industry exceeds $1 billion generating 800 plant operation jobs and 4,000 additional jobs in industry-related services. Under current circumstances for every 100 million bushels of corn used for ethanol production, 2,250 new rural jobs will be created.

Agricultural Impacts:

It has been estimated that every 100 million bushels of corn utilized for ethanol production increases the national market for corn by about 5 cents per bushel. Illinois ethanol production alone has increased the national market price of corn by 8 to 10 cents a bushel.

Nebraska Department of Economic Development. "Nebraska's Ethanol Industry." October 1993.

Overview:

This analysis used an input/output economic model to provide information on the ethanol industry in Nebraska and its linkages to other industries within the state.

Job Creation/Personal and Business Income:

The Nebraska ethanol industry has the annual capacity to produce 63 million gallons of fuel grade ethanol and currently employs 154 workers. This production generates an estimated payroll of $5.7 million, affects 541 jobs in other Nebraska industries, and annually affects $819,000 of NE personal income and sales taxes.

By 1995, the Nebraska ethanol industry is expected to have the capacity to annually produce 213 million gallons, employ 455, have a payroll of approximately $16.8 million, affect 1,599 jobs in other areas, and annually create $2.4 million in personal income and sales taxes within the state.

The impacts of the expansion of Nebraska's annual ethanol production capacity to 213 million gallons by 1995 are summarized in the following. The estimated construction and equipment costs will be about $325 million, with the majority of those funds directed to local construction companies and their suppliers. Approximately $109 million will be spent within Nebraska for the construction and expansion of ethanol plants between January 1993 and December 1995. This will generate approximately 1,496 person-years of employment and $27 million of payroll. Another 1,376 person-years of employment and $23 million of payroll will be affected in other Nebraska firms. The additional income generated during the construction will increase state personal income and sales tax collections by approximately $2.1 million.

When planned plant construction and expansions are completed in 1995, annual production capacity levels will increase to 213

million gallons of ethanol and the total value of annual ethanol output will increase to $263 million, average annual employment will increase to 455 workers, and annual total payroll will increase to $16.8 million. Affected industries will witness an increase to 1,599 workers. Altogether estimated annual impacts will total 2,054 jobs, and $2.4 million in state annual income and sales taxes.

Otto, D., Imerman, M., Kolmer, L. "Iowa's Ethanol and Corn Milling Industries: Economic and Employment Impacts." Iowa State University Department of Economics, Staff Paper #238. December 1991.

Overview:

Researchers in the Department of Economics at Iowa State University discuss their analysis efforts in determining the economic and employment impacts within the State of increased corn production as the result of increased ethanol demand.

Job Creation and Impacts on Personal Income:

The corn milling industry in Iowa is a significant employer of skilled labor. The wet corn milling industry employs approximately 2,550 people at an average wage of $37,000. The dry milling industry employs approximately 620 people at an average wage of $27,000. Over 12,000 jobs are affected by the production of ethanol in Iowa including the 2,550 in wet milling tied into the ethanol industry. Reduced disposable income resulting from the removal of the current fuel tax abatement causes a projected loss of 96 jobs and $3 million in personal income. The impact of attracting facilities with 75-100 million bushel per year capacity and 300 employees is a projected Iowa-wide increase of 1,400 jobs and $68 million in personal income ($48,570/job).

Agricultural Impacts:

At current stock levels, corn utilization by the Iowa corn processing industry provides a 15-20 cent per bushel support to the national average price of corn.

Additional State Benefits:

Corn milling and ethanol production is a value-added export oriented industry for the state of Iowa. A total of $2.4 billion of products and $1.09 billion in value-added product processing is related to Iowa ethanol production.

U.S. Department of Agriculture, "Comments Concerning the Environmental Protection Agency's regulations of Fuels and Fuel Additives: Renewable Oxygenate Requirements for Reformed Gasoline Proposed Rule." February 14,1994.

Overview:

This resource is comprised of the USDA comments to EPA concerning the Notice of Proposed Rulemaking, Regulation of Fuels and Fuel Additives: Renewable Oxygenate Requirement for Reformulated Gasoline. The comments address the energy, environmental, and economic impacts of expanded ethanol consumption.

Agricultural Impacts:

Implementation of this proposal will require approximately 680 million gallons of ethanol as oxygenate for reformulated gasoline, about 500 million gallons of this must come from new production. Producing ethanol from corn increases corn demand and raises corn prices. USDA estimates a 3-5 cent per bushel increase in the seasonal average price of corn for every 100 million bushels of increased corn demand.

Federal Budget Implications:

A USDA analysis presented in a letter to Senator Kerrey of Nebraska projected increases in corn demand resulting from a policy that provides ethanol a "meaningful role in the RFG program of 550 million bushels in 1994-95, rise to 800 million bushels by the year 2000. This amounts to a cumulative increase in corn production of 1.5 billion bushels over the period. If this production were not to be undertaken because there is no meaningful role for ethanol in the RFG program, deficiency payments would increase by $200 million for the 1994 crop year. Larger effects on corn and related program crops would follow with deficiency payments reaching $580 million in 1998 and $740 million by the year 2000.

<u>Wisconsin Energy Bureau, Department of Administration, Division of Energy and Intergovernmental Relations. The Economic Impacts of Renewable Energy Use in Wisconsin. April 1994.</u>

Overview:

This report discusses the economic impacts of increased ethanol production within the state of Wisconsin. In general, employment and income are generated in Wisconsin from ethanol production as expenditures to build and operate ethanol facilities, grow corn, and transport and pretreat corn and (cheese) whey are spent in the state's economy.

Job Creation:

The analysis provided stated that loss of federal highway tax revenues will lead to a decrease in the number of roadway construction jobs. "The impacts caused by this loss of revenue would result in a decrease of 3.84 (MMS) and 186 job years."

Tax Revenue Impacts and Effects on the Federal Budget:

The 54 cent per gallon federal excise tax exemption for ethanol reduces the amount of money going to the Federal Highway Trust Fund, which provides states with money to build and maintain roads and bridges. Every gallon of ethanol consumed in the state that receives a 54 cent per gallon subsidy would reduce state highway funds by 1.1 cents. The impacts caused by this loss of revenue would result in a decrease of 3.84 (MMS) and 186 job years. In a 1990 report on ethanol subsidies, the U.S. GAO estimated that increased ethanol production at the national level from 1.2 billion gallons to 3.3 billion gallons could result in a net average annual savings to the federal budget of about $608 million. A report by the National Corn Growers Association (1990) indicated that increased ethanol production to 3 billion gallons will generate a net savings of $590 million per year.

Personal/Business Income:

(Analysis was performed by the Wisconsin RIM II multipliers associated with the petroleum and natural gas extraction sector.) Of the $1.10 average retail cost (1992) cost for one gallon in Wisconsin, about 31 cents per gallon stay in the state and generates economic impacts (8 cents for transportation and retail markup and 23 cents for state taxes). Ethanol-gasoline blends will not generate any loss of income or employment from the displacement of gasoline. Byproduct revenues are essential for recovering operating and corn costs from ethanol production. Additional economic activity may be generated in Wisconsin if the by-products (such as animal feed) can be sold at prices below those of competing products (soybean feed).

Agricultural Impacts:

The increased value of the corn crop to Wisconsin farmers from potentially higher corn prices and savings in transportation costs could stimulate economic growth in the agricultural sector. Higher prices for corn could also raise the cost of producing ethanol, which would have offsetting impacts. The National Corn Growers Association (1990) projected that corn prices will increase 8 percent above current levels from utilizing 1.2 billion bushels of corn for ethanol production by 2000. In general, higher corn prices from increased ethanol production will have the following economic impacts on the Wisconsin agricultural sector: (1) lower demand and price for soybean (feeds and oil), (2) benefits to cattle and poultry producers due to additional supply and lower price of high-protein feeds (partially offset by higher corn feed prices), (3) overall increases in net farm cash income, and (4) slight increase in food prices.

Littlepage, L. (Indiana Department of Commerce). "Estimating the Economic Impacts of an Ethanol Plant." April 1992.

Overview:

This study examines the economic impacts of ethanol production by

estimating the effects of an actual plant planned in South Dakota and to show the range of revenues generated. The methodology details total earnings, and estimates sales tax, income and property tax revenues.

Job Creation/Personal-Business Income/State Revenue:

The direct expenditure of $117 million in the construction of a wet corn milling facility could create total output impacts of $418.2 million in earnings, and 5,604 jobs annually. State revenues associated with the construction phase could be as high as $20 million.

A wet corn milling facility with an annual output of $132.8 million would create total output impacts of $449.6 million, $90.8 million in earnings and 4131 jobs annually. The annual state revenues associated with the operation phase could be as high as $13.5 million. Local revenues could be $100,000 to $3 million.

The ethanol industry consists of a few large industrial-scale plants providing over half of the production and a number of smaller plants providing the balance. Construction and startup costs, which will employ 122 workers, are estimated to be $117.3 million. Sales at full production are estimated to be $132.8 million.

Table A-2
U.S. Totals and Averages for the Wet Corn Milling Industry*

	U.S. Totals	U.S. Averages
# of establishments	60	--
# of employees	8600	143
Payroll	$298,900,000	$4,981,667
Value of shipments	$4,788,900,000	$79,815,000

* Source: U.S. Department of Commerce, "1987 Census of Manufacturers"

Appendix B

- U.S. Ethanol Producers/Plant Capacity

U.S. Ethanol Producers/Plant Capacity (million gallons per year)

as of January, 1996

Information provided by the Renewable Fuels Association

Company	Location	MGY
Archer Daniels Midland P.O.Box 1470 Decatur, IL 62525 (217) 424-2550 Carla Miller X6182	Decatur, IL Peoria, IL Cedar Rapids, IA Clinton, IA	750
Minnesota Corn Processors 400 W. Main St., Ste. 201 Marshall, MN 56258-1236 (507) 537-0577 Richard Jurgenson	Columbus, NE (80 mgy) Marshall, MN (40 mgy)	120
Cargill 1 Cargill Dr. Eddyville, IA 52553 (515) 969-3671 Thomas Geiger (612) 742-7268 Paris Tsobanakis (612) 742-4211 650 Industrial Rd. Blair, NE (402) 533-4150 Pat Bowe	Blair, NE (75 mgy) Eddyville, IA (30 mgy)	105
Pekin Energy Company P.O. Box 10 Pekin, Il 61555 (309) 347-9200 Jack Huggins Jim Redding X9310	Pekin, IL	100
New Energy Company of Indiana 3201 W. Calvert South Bend, IN 46680 (219) 234-3495 Larry Russo Nate Kimpel (219) 233-3116 X302	South Bend, IN	88

High Plains Corporation 200 West Douglas, Suite 820 Wichita, KS 67202 Ray Friend (316)269-4310 Greg Heuer ("Higher") (316) 796-1234 York, NE (402) 362-2285	York, NE (30 mgy) Colwich, KS (20 mgy)	50
A.E. Staley Mfg. Co. 198 Blair Bend Dr. Loudon, TN (615) 458-5681 Dain Baker x479 Greg Wenndt x392	Loudon, TN	42
Midwest Grain Products 1301 South Front St. Pekin, Il 61554 (309) 353-3990 Jim Schneider	Pekin, IL (12 mgy) Atchison, KS (26 bgy)	38
Ag Processing, Inc. P.O. Box 49 Hastings, NE 68902 (402) 463-5290 John Campbell	Omaha, NE	30
Nebraska Energy, L.L.C. P.O. Box 226 Aurora, NE 68818 (402) 694-3635 Tom Kell	Aurora, NE	30
Chief Ethanol Fuels East Highway 6 Box 488 Hastings, NE 68901 (402) 463-6885 Roger Burken	Hastings, NE	28
Corn Plus 711 6th Ave. Southeast Winnebago, MN 56098 (507) 893-4747 Steve Core	Winnebago, MN	15

Roquette America 1417 Exchange St. Keokuk, IA 52632 (319) 524-5757 Kathy Gammon * Getting out of ethanol business	Keokuk, IA	14.5
Heartland Corn Products P.O. Box A Hwy. 19 East Winthrop, MN 55396 (507) 647-5000 Bill Adcock	Winthrop, MN	14
Alchem Ltd. P.O. Box 32 35 Division St. Grafton, ND 58237 (701) 352-0602 DuWayne Glende Bob Scott	Grafton, ND	12
Broin Enterprises 900 Washington St. Scotland, SD 57059 (605) 583-2258 Jeff Broin	Scotland, SD	10
Reeve Agri-Energy P.O. Box 1036 Garden City, KS 67846 (316) 275-7541 Dennis Conway	Garden City, KS	9
J.R. Simplot P.O. Box 1059 Caldwell, ID 83606 (208) 459-0071 Reggie Pederson	Caldwell, ID (4 mgy) Burley, ID (4 mgy)	8
Burns-Philip Food Kingstree, SC (803) 382-5131 * No answer	Kingstree, SC	6

Manildra 100 George St. Hamburg, IA 51640 (712) 382-2265 Roger Gill	Hamburg, IA	6
Morris Ag Energy P.O. Box 111 Morris, MN 56267 (612) 589-2931 Gerald Bachmeier	Morris, MN	5
Heartland Grain Fuels LP 38469 133rd St. Aberdeen, SD 57401-8406 (605) 225-0520 Frank Moore	Aberdeen, SD	4
Wyoming Ethanol * No listing	Torrington, WY	4
Georgia-Pacific Corporation Bellingham Operations 300 West Laurel St. Bellingham, WA 98225 (360) 733-4410 Jim Cunningham	Bellingham, WA	3.2
Parallel Products 12281 Arrow Route Rancho Cucamonga, CA 91739 (909) 980-1200 Neil Koehler	Rancho Cucamonga, CA	3
Golden Cheese of California 1138 West Rincon St. Corona, CA 91720 (909) 737-9260 Dermot O'Rien	Corona, CA	2.7
Reyncor Industrial 10845 LA Hwy. 1 Shreveport, LA 71115 (318) 797-0087 Roger Reynolds	Shreveport, LA	2.5

Kraft, Inc. Glenville, IL (708) 646-3946 Cathy Pernu	Glenville, IL	1.5
Permeate Refining 205 Locust St. Hopkinton, IA 52237 (319) 362-0844 Mike Nesslage	Hopkinton, IA	1.5
Ag Power of Colorado 4845 Forest St. Denver, CO 80227 (303) 329-6424 Travis Bagher * Will stop producing ethanol in June '96	Golden, CO	1.4
Minnesota Clean Fuels P.O. Box 188 312 Railway St. Dundas, MN 55019 (507) 663-7704 Steve Walker	Dundas, MN	1
Pabst Brewing P.O. Box 947 Schmidt Place 100 Custer Way Tumwater, WA (360) 754-5000 Roger Haag	Olympia, WA	.7
ESE Alcohol P.O. Box 848 Leoti, KS 67861 (316) 375-4904 Todd Long	Leoti, KS	.6
Jonton Alcohol Route 3 Box 151-E Edinburg, TX 78539 (210) 842-3378 Rick Ramirez	Edinburg, TX	.6

Vienna Correctional P.O. Box 200 Hwy. 146 East Vienna, IL 62995 (618) 658-2211 Randy McClellan	Vienna, IL	.5
TOTAL	**44 Plants**	**1,475**

File posted: February 8, 1996; File modified October 22, 1996

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Appendix C

- Kansas Department of Revenue/Division of Taxation Data

Division of Taxation

The Division of Taxation is responsible for the administration and enforcement of virtually all Kansas taxes: individual income; corporate income; privilege; inheritance; retail sales and use; minerals; motor fuels; liquor excise; liquor enforcement; the excise taxes on cigarettes, tobacco, bingo, tires, controlled substances, water, and vehicle rental; and sand royalty. In addition, the Division administers the local sales and transient guest taxes enacted by other units of Kansas government. The Director of Taxation is responsible for administrative appeals and hearings, available to taxpayers. The Division is administered by the Director of Taxation and is divided into four major bureaus: Business Tax; Income and Inheritance Tax; Audit Services; and Taxpayer Assistance.

The Business Tax Bureau administers and implements procedures that affect Department taxes, except those handled by the Individual Income and Inheritance Tax Bureau, through the registration of businesses, account examination and office audits; technical assistance and advice to taxpayers, tax practitioners and governmental officials; and issuance of exemption certificates.

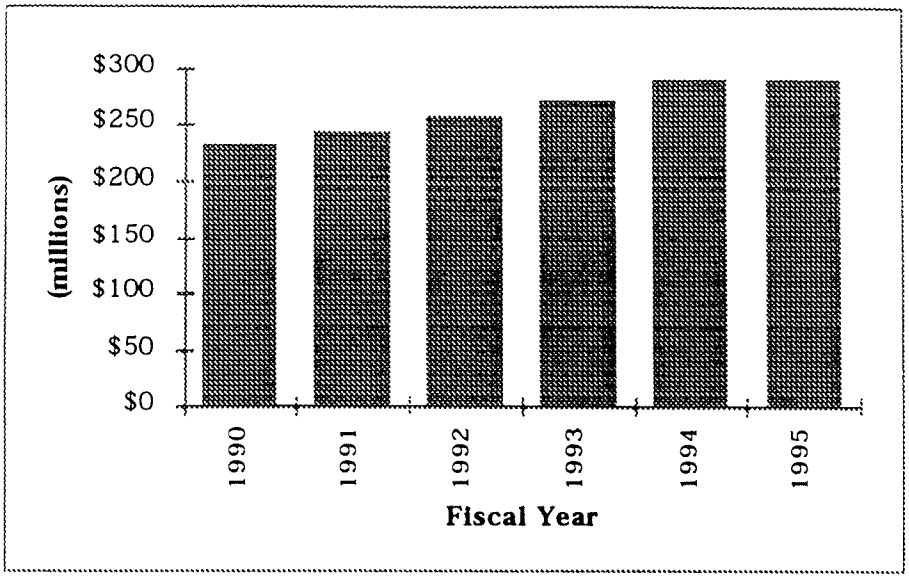
The Income and Inheritance Tax Bureau administers the State inheritance tax, individual and individual estimated income taxes, private car company taxes, and homestead and food sales refunds, all through verification of information on returns, correspondence, desk audits, adjustments, and cooperation with the federal Internal Revenue Service.

The Audit Services Bureau conducts all field audits of the taxes and fees administered by the Department. The Bureau's responsibility is to affect a high level of voluntary compliance with Kansas tax law and to determine tax liability, through examination of taxpayers' books, records, and business transactions.

The Taxpayer Assistance Bureau is responsible for answering general information and consolidated bill inquiries from taxpayers, mostly by telephone; providing direct assistance to taxpayers; and the design, printing, and distribution of tax forms.

Motor Fuel Tax Gross Collections

Kansas motor fuel tax rates increased $0.04 a gallon on July 1, 1989, (Fiscal Year 1990), and increased $0.01 a gallon each year for three years. The rate has not changed since Fiscal Year 1993. Between Fiscal Years 1990 and 1995, figures include Trip Permit amounts collected by the Kansas Highway Patrol.



Fiscal Year	Gross Collections	Percent Change
1990	$232,047,535	30.5%
1991	$243,291,249	4.8%
1992	$257,385,346	5.8%
1993	$271,709,823	5.6%
1994	$289,021,917	6.4%
1995	$290,618,527	0.6%

Gross Motor Fuel Tax Collections by Fuel Type and by Distribution Fund

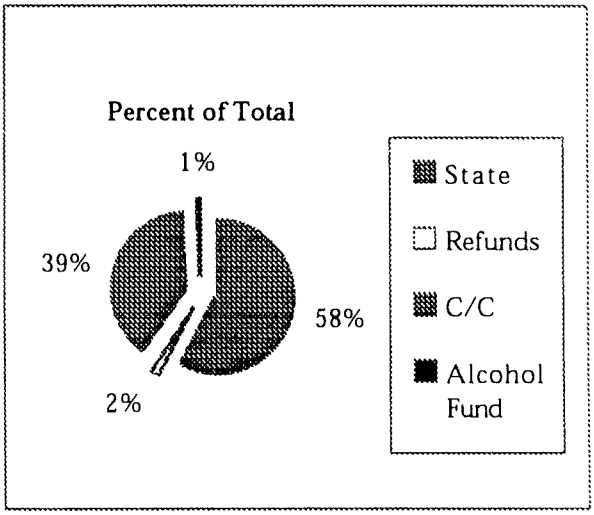
Motor Fuel by Fuel Type

	Fiscal Year 1994	Fiscal Year 1995	Percent Change
Regular (Gasoline and Gasohol)	$220,943,945	$222,374,401	0.6%
Special (Diesel) Fuel	$62,090,679	$62,443,532	0.6%
LP Gas Fuel	$528,288	$500,586	(5.2%)
Interstate Motor Fuel	$5,231,632	$5,121,969	(2.1%)
Motor Carrier Trip Permits	$227,373	$178,039	(21.7%)
Total (Gross)	$289,021,917	$290,618,527	0.6%

Motor Carrier Trip Permit amount includes Permits issued by Kansas Highway Patrol.
Tax rates increased 1¢/gallon on fuel and 50¢/each Trip Permit on July 1, 1990 and 1991.

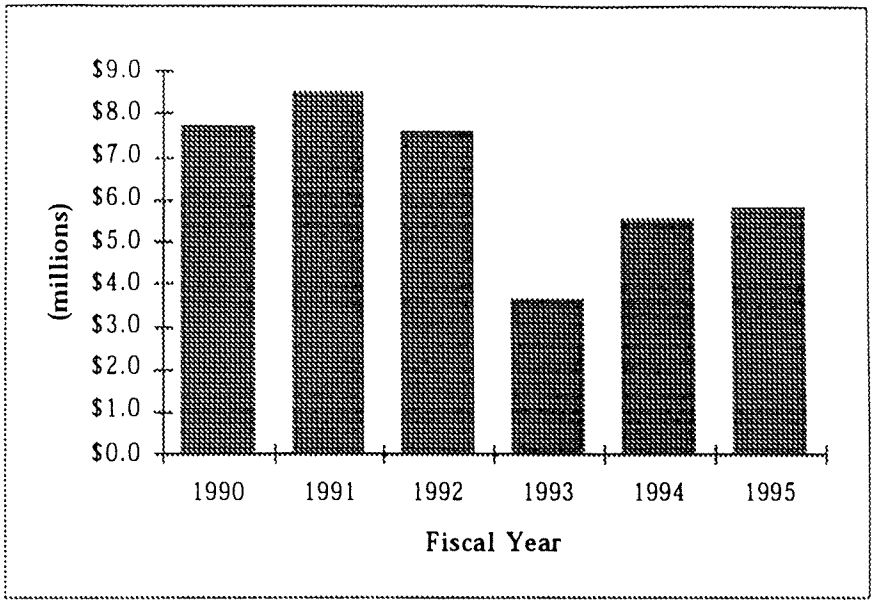
Motor Fuel Distribution to Funds, Fiscal Year 1995

State Highway Fund	$167,987,785
Special City/County Highway Fund	$114,344,627
Alcohol Producers' Incentive Fund	$2,500,000
Refund Fund	$5,786,115
Total	$290,618,527



Motor Fuel Refund Amounts

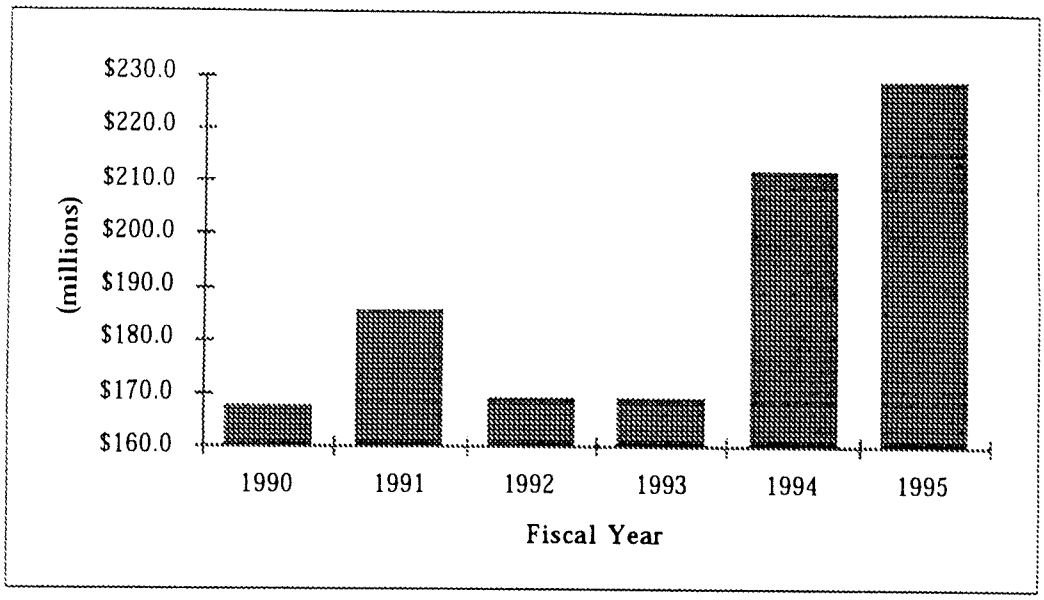
Motor fuel taxes are levied to defray in whole or in part the cost of public highways. Motor fuel refunds are made for non-highway use; and for other statutory reasons.



Fiscal Year	Amount Refunded	Percent Change
1990	$7,726,070	14.4%
1991	$8,498,264	10.0%
1992	$7,591,501	-10.7%
1993	$3,666,296	-51.7%
1994	$5,584,686	52.3%
1995	$5,786,115	3.6%

Corporate Income Tax Amount to the State General Fund after Refunds

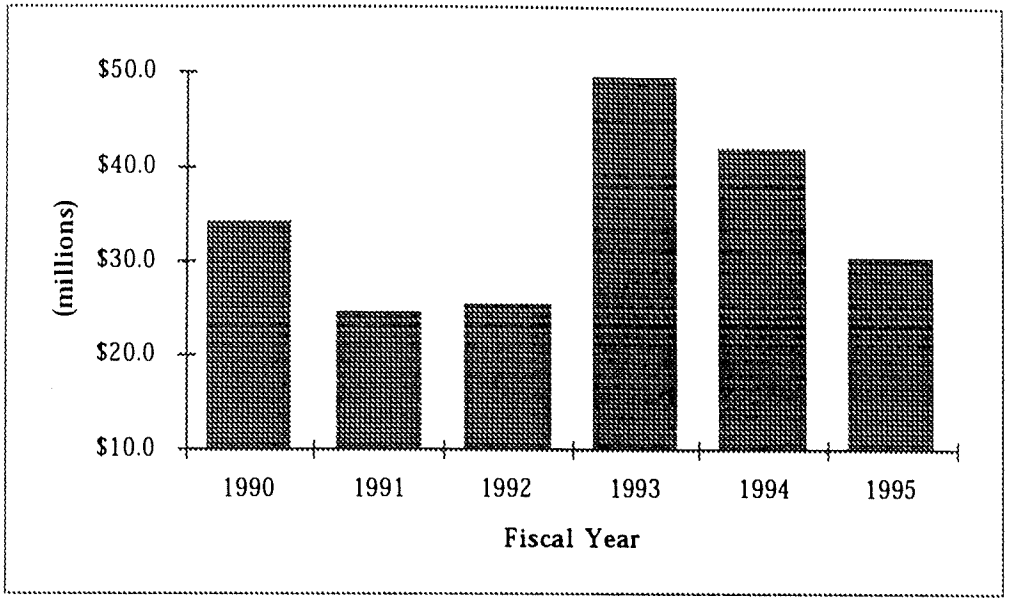
Prior to July 1, 1992, the corporation income tax rate was 4.5% plus a 2.25% surtax on taxable income over $25,000. On July 1, 1992, the rate became 4% plus a 3.35% surtax on taxable income over $50,000. The tax is levied on the portion of a corporation's adjusted federal taxable income allocated to Kansas.



Fiscal Year	Amount Collected	Percent Change
1990	$167,600,876	-3.1%
1991	$185,319,680	10.6%
1992	$169,118,247	-8.7%
1993	$169,118,153	0.0%
1994	$211,953,103	25.3%
1995	$229,421,376	8.2%

Financial Institution Privilege Tax Amount to the State General Fund after Refunds

The privilege tax is imposed on financial institutions doing business in Kansas. The tax is levied on an institution's taxable income for the preceding year; the surtax on taxable income over $25,000. The rate for banks is 4.25% plus a 2.125% surtax. The rate for savings and loan associations is 4.5% plus a 2.25% surtax. The FY 1993 increase reflects estimated payments by these institutions, begun January 1, 1993.



Fiscal Year	Amount Collected	Percent Change
1990	$34,086,634	74.2%
1991	$24,496,595	-28.1%
1992	$25,171,311	2.9%
1993	$49,504,048	96.4%
1994	$41,991,146	-15.2%
1995	$30,437,792	-27.5%

Corporate Income and Financial Institution Tax Liabilities by Bracket

Tax Year 1993 Returns Filed In Calendar Year 1994

Corporate Income Tax Liability By Taxable Income Bracket

Taxable Income Brackets	Number Returns	Percent of Total Returns	Tax Liability	Percent of Total Liability
No Taxable Income	18,327	57.4%	$0	0.0%
$0 - $25,000	7,971	24.9%	$2,308,604	1.6%
$25,000 - $50,000	2,143	6.7%	$3,127,569	2.2%
$50,000 - $75,000	1,114	3.5%	$3,108,780	2.2%
$75,000 - $100,000	537	1.7%	$2,483,759	1.8%
$100,000 - $500,000	1,324	4.1%	$17,687,242	12.6%
$500,000 - Over	538	1.7%	$112,118,226	79.6%
Total	31,954	100.0%	$140,834,180	100.0%

Bank Tax Liability By Taxable Income Bracket

Taxable Income Brackets	Number Returns	Percent of Total Returns	Tax Liability	Percent of Total Liability
No Taxable Income	64	10.8%	$0	0.0%
$0 - $500,000	330	55.5%	$3,302,766	11.9%
$500,000 - $1,000,000	106	17.8%	$4,875,006	17.5%
$1,000,000 - Over	95	16.0%	$19,628,688	70.6%
Total	595	100.0%	$27,806,460	100.0%

Savings and Loan Tax Liability By Taxable Income Bracket

Taxable Income Brackets	Number Returns	Percent of Total Returns	Tax Liability	Percent of Total Liability
No Taxable Income	56	38.6%	$0	0.0%
$0 - $500,000	69	47.6%	$205,758	1.7%
$500,000 - $1,000,000	4	2.8%	$220,740	1.8%
$1,000,000 - Over	16	11.0%	$11,709,609	96.5%
Total	145	100.0%	$12,136,107	100.0%

Appendix D

- Kansas Ethanol Producer Survey (Preliminary Results)

Appendix D

Preliminary Kansas Ethanol Producer Survey Results

	1993 (partial)	1994	1995	1996 (partial)
Gallons of ethanol produced	28,428,126	55,834,770	55,741,129	27,318,759
Gallons of fuel ethanol sold	7,394,993	32,891,182	32,152,834	22,538,355
Gallons of ethanol sold in Kansas	880,888	1,159,582	1,449,295	1,594,166
Ethanol sales price ($/gal., avg.)	$1.16	$1.22	$1.22	$1.41
Total ethanol sales	$32,976,626	$68,118,419	$68,004,177	$38,519,450
Coproduct sales CO_2, DDGS (gross income)	$10,257,973	$22,024,154	$24,084,175	$13,206,076
Total estimated sales (all sources)	**$43,234,599**	**$90,142,573**	**$92,088,352**	**$51,725,526**
Kansas corn used in production (no. bu.)	46,994	1,293,626	1,161,032	538,128
Kansas corn purchased (avg., $/bu)	$1.279	$2.285	$2.658	$3.954
Kansas milo used in production (no. bu.)	7,112,560	7,707,465	15,706,237	8,529,155
Kansas milo purchased (avg., $/bu)	$1.937	$2.52	$2.823	$3.529
Total cost of grain purchased (all sources)	**$24,199,236**	**$36,824,645**	**$49,157,556**	**$31,866,340**
Total cost of other inputs (yeast, etc.)	$740,702	$2,592,528	$3,609,433	$2,419,523
Cost of water	$315,106	$364,034	$301,063	$58,476
Total cost of denaturant(s)	$351,764	$900,187	$804,425	$486,560

Appendix D (continued)

Kansas Ethanol Producer Survey Results

	1993 (partial)	1994	1995	1996 (partial)
Total cost of energy inputs (fuel, elec.)	$6,636,691	$12,481,348	$10,964,546	$4,449,921
Cost of transportation & storage	$172,766	$3,101,351	$3,084,912	$2,154,388
Other fuel ethanol production expenses	$2,275,713	$5,805,904	$4,472,287	$4,579,502
Insurance costs (total)	$92,530	$486,938	$415,046	$299,878
Total operating expenses (estimated)	$2,497,751	$17,318,481	$16,626,125	$12,791,810
Plant expansion capital cost	**$1,921,834**	**$1,893,736**	**$1,128,475**	**$660,577**
No. of full-time employees (avg.)	148	188	incomplete	incomplete
Total personnel cost (salary, FICA, benefits)	$4,938,537	$7,360,673	$6,891,894	$4,468,921
Total Kansas payroll taxes paid	$145,511	$160,189	$143,642	$39,957
Total Federal payroll taxes paid	$585,055	$818,625	$699,846	$303,751
Total Kansas income taxes paid	$82,610	$112,256	$105,092	$35,630
Total Kansas sales, excise & other taxes	$233,147 (partial)	$235,718 (partial)	$187,427 (partial)	$26,700 (partial)
Total Local taxes paid (property, etc.)	$309,895	$284,321	$564,270	$374,008
Total Federal corp. income taxes paid	$525,358 (partial)	$726,445	$736,961	$508,215
Total Federal, State & Local taxes paid (est.)	**$1,881,576**	**$2,337,554**	**$2,437,238**	**$1,288,261**
Total ethanol producer payments received	$450,426 (partial)	$2,500,000	$2,500,000	$1,834,154

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Appendix E

- Analytical Spreadsheets (Preliminary Findings)

Appendix E-1

Average Kansas Fuel Ethanol Production Costs -- Preliminary Estimates
(1993 - 96)

	Per Gallon	Annual
Total Kansas production capacity (gals.)		56,000,000
$/gallon investment	1.50	84,000,000
Grain ($/Bu.)	2.50	56,000,000
Coproducts ($/Bu.)	1.69	94,640,000
Net Grain ($/Bu.)	0.86	19,264,000
Itemized Costs		
Net Grain	0.35	19,600,000
Energy	0.17	9,520,000
Supplies	0.08	4,480,000
Water, Miscellaneous	0.02	1,120,000
Personnel	0.07	3,920,000
Maintenance	0.04	2,240,000
Tax & Insurance	0.02	1,120,000
Cash Cost	0.75	42,000,000
Depreciation (10 yr., straight line)	0.15	8,400,000
Total Production Cost	**0.90**	**50,400,000**

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Appendix E-2

Indirect Economic Stimulation

(FY1995 Preliminary Analysis)

Item	Formula Explanation	Annual Stimulation
Item 1 = Total Kansas plant capacity		56,000,000
Item 2 = Fuel ethanol produced in Kansas (1995)		32,000,000
Item 3 = Item 2 * 0.113	(Production) * (Operating income per gal. produced)	3,616,000
Item 4 = n/a	State incentive	2,500,000
Item 5 = Item 2 * 0.54	(Production * (Federal tax incentive)	17,280,000
Item 6 = Item 2 * 0.61 * 0.505	(Production) * (Multiplier) * (Operating Cost)	9,857,600
Item 7 = Item 2 * 0.59 * 0.655	(Production) * (Multiplier) * (Grain cost) / (Gal. per bushel)	12,366,400
Item 8 = 0.65 * 2,500,000	(Multiplier) * (State Incentive)	1,625,000
Item 9 = Item 2 * 0.65 * 0.54	(Production) * (Multiplier) * (Federal tax incentive)	11,232,000
Item 10 = Sum of Items 3 through 9	**Total Positive Income**	**58,477,000**
Item 11 = Item 2 * 1.74 * 0.045	(Production) * (Multiplier) * (Avg. state incentive/gal.)	2,505,600
Item 12 = Item 10 - Item 11	**Net Income**	**55,971,400**
Item 13 = Item 12 * 0.40 * 0.0675	(Net income) * (Taxable sales) * (State sales tax)	1,511,228
Item 14 = Items (13 - 5 - 6) * (0.1)	Adj. net income * (State income & corp. taxes)	3,700,000
Item 15 = Item 13 + Item 14	**Total Taxes**	**5,211,228**

Appendix E-3

Indirect Economic Stimulation - Preliminary Analysis

(FY1996 - 99 Without State Producer Incentive)

Item	Formula Explanation	Annual Stimulation
Item 1 = Total Kansas plant capacity		
Item 2 = Fuel ethanol produced in Kansas		
Item 3 = Item 2 * 0.113	(Production) * (Operating income per gal. produced)	3,000,000
Item 4 = n/a	State incentive	2,500,000
Item 5 = Item 2 * 0.54	(Production * (Federal tax incentive)	14,500,000
Item 6 = Item 2 * 0.61 * 0.505	(Production) * (Multiplier) * (Operating Cost)	8,317,000
Item 7 = Item 2 * 0.59 * 0.655	(Production) * (Multiplier) * (Grain cost) / (Gal. per bushel)	10,434,000
Item 8 = 0.65 * 2,500,000	(Multiplier) * (State Incentive)	1,625,000
Item 9 = Item 2 * 0.65 * 0.54	(Production) * (Multiplier) * (Federal tax incentive)	9,477,000
Item 10 = Sum of Items 3 through 9	Total Positive Income	49,853,000
Item 11 = Item 2 * 1.74 * 0.009	(Production) * (Multiplier) * (Avg. state incentive/gal.)	422,820
Item 12 = Item 10 - Item 11	Net Income	49,430,180
Item 13 = Item 12 * 0.40 * 0.0675	(Net income) * (Taxable sales) * (State sales tax)	1,200,000
Item 14 = Items (13 - 5 - 6) * (0.1)	Adj. net income * (State income & corp. taxes)	3,700,000
Item 15 = Item 13 + Item 14	Total Taxes	4,900,000

Appendix E-4

Indirect Economic Stimulation - Preliminary Analysis

(FY 2000 - 12 Without Federal Incentives)

Item	Formula Explanation	Annual Stimulation
Item 1 = Total Kansas plant capacity		
Item 2 = Fuel ethanol produced in Kansas		
Item 3 = Item 2 * 0.113	(Production) * (Operating income per gal. produced)	3,000,000
Item 4 = n/a	State incentive	0
Item 5 = Item 2 * 0.54	(Production * (Federal tax incentive)	0
Item 6 = Item 2 * 0.61 * 0.505	(Production) * (Multiplier) * (Operating Cost)	8,317,000
Item 7 = Item 2 * 0.59 * 0.655	(Production) * (Multiplier) * (Grain cost) / (Gal. per bushel)	10,434,000
Item 8 = 0.65 * 2,500,000	(Multiplier) * (State Incentive)	1,625,000
Item 9 = Item 2 * 0.65 * 0.54	(Production) * (Multiplier) * (Federal tax incentive)	9,477,000
Item 10 = Sum of Items 3 through 9	Total Positive Income	32,853,000
Item 11 = Item 2 * 1.74 * 0.009	(Production) * (Multiplier) * (Avg. state incentive/gal.)	0
Item 12 = Item 10 - Item 11	Net Income	32,853,000
Item 13 = Item 12 * 0.40 * 0.0675	(Net income) * (Taxable sales) * (State sales tax)	1,200,000
Item 14 = Items (13 - 5 - 6) * (0.1)	Adj. net income * (State income & corp. taxes)	3,700,000
Item 15 = Item 13 + Item 14	Total Taxes	4,900,000

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Appendix E-5

Preliminary Summary of Economic Benefits: 1993 - 2013

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Gasoline (3% inflation)	0.65	0.67	0.69	0.71	0.73	0.75	0.78	0.80	0.82	0.85	0.87	0.90	0.93	0.95	0.98	1.01	1.04	1.07	1.11	1.14
Federal Tax Incentive (per gal.)	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
State Incentive (per gal.)	0.20	0.20	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol Value (per gal.)	1.39	1.41	1.43	1.45	1.27	1.29	1.32	1.00	1.02	1.05	1.07	1.10	1.13	1.15	1.18	1.21	1.24	1.27	1.31	1.34
Grain (1% inflation)	2.50	2.53	2.55	2.58	2.60	2.63	2.65	2.68	2.71	2.73	2.76	2.79	2.82	2.85	2.87	2.90	2.93	2.96	2.99	3.02
Transportation (per gal.)	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Total Grain Cost (per bu.)	2.80	2.83	2.85	2.88	2.90	2.93	2.95	2.98	3.01	3.03	3.06	3.09	3.12	3.15	3.17	3.20	3.23	3.26	3.29	3.32
Grain Purchases ($ mil.)	34	34	34	35	35	35	35	36	36	36	37	37	37	38	38	38	39	39	39	40
Production Cost (per gal.)	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Grain Cost (bu./2.5 gal.)	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.24	1.25	1.26	1.27	1.28	1.29	1.30	1.32	1.33
Total Production Cost (per gal.)	1.67	1.68	1.69	1.70	1.71	1.72	1.73	1.74	1.75	1.76	1.62	1.64	1.65	1.66	1.67	1.68	1.69	1.70	1.72	1.73
Coproduct Credit (per gal.)	0.56	0.57	0.57	0.58	0.58	0.59	0.59	0.60	0.60	0.61	0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.65	0.66	0.66
Net Production Cost (per gal.)	1.11	1.12	1.12	1.13	1.13	1.14	1.14	1.15	1.15	1.16	1.01	1.02	1.02	1.03	1.03	1.04	1.05	1.05	1.06	1.06
Annual Costs ($ mil.)	33	33	34	34	34	34	34	34	35	35	30	31	31	31	31	31	31	32	32	32
Ethanol Revenue ($ mil.)	43	43	44	44	45	40	40	41	31	31	32	33	34	35	35	36	37	38	39	40
Gross Profit ($ mil.)	9	10	10	11	11	6	6	7	4	-3	2	2	3	4	4	5	6	7	7	8
Economic Activity ($ million)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Direct																				
Direct Tax Benefit	1.0	1.1	1.1	1.2	1.2	0.7	0.7	0.8	0.1	0.1	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.7
Grain Purchases (mil. bu.)	34	34	34	35	35	35	35	36	36	36	37	37	37	38	38	38	39	39	39	40
Production Costs	17	17	17	17	17	17	17	17	17	17	12	12	12	12	12	12	12	12	12	12
Total Indirect	111	63	63	63	63	63	63	35	35	35	35	35	35	35	35	35	35	35	35	35
Indirect Tax Effect	11	6	6	6	6	7	7	4	4	4	4	4	4	4	4	4	4	4	4	

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Appendix F

- Summary of Qualifications -- Peeples Consulting Associates, Inc.

James E. Peeples, Esq.
5894 South 6th Street
Falls Church, Virginia U.S.A. 22041
(703) 578-3655
(703) 578-3230 (fax)
Peeples95@aol.com (e-mail)

The principle investigator for this economic impact analysis, James Peeples is a long-standing and active participant in the worldwide motor fuel industry since 1983 as a legal and economic analyst, journalist, and industry consultant.

Starting in the early 1980s, Mr. Peeples has worked for a wide range of U.S. interests seeking to develop markets in the Americas for biomass-derived fuel ethanol and biodiesel for use as enhancements to or replacements for gasoline. This has included active participation in industry efforts to enact the U.S. Alternative Motor Fuels Act of 1988, the Clean Air Act Amendments of 1990, and the Energy Policy Act of 1992.

Among other responsibilities, Mr. Peeples served as principle investigator for scores of studies of all kinds for Herman & Associates and Information Resources, Inc. (IRI) from 1983 - 95. This included econometric analyses of the impact of fuel ethanol incentives for the states of New Mexico, Kentucky, Alabama, Kansas, and Nebraska. He participated in IRI multiclient studies involving oxygenated fuels, reformulated gasoline, alternative fuels, and cleaner diesel fuels.

In 1991, he began working closely with U.S. and international interests in developing markets for biodiesel (methyl/ethyl esters) derived from oilseeds (palm oil, rapeseed, soybeans, etc.), recycled vegetable oils, and animal fats (tallow). He is currently working with several clients interested in worldwide expansion of biodiesel technologies and markets, including the National Renewable Energy Laboratory.

Presently, Mr. Peeples is president of Peeples Consulting Associates, Inc., consultants to fuel additive manufacturers and the biofuels industry. Mr. Peeples continues to serve the United States and international motor fuels industries as they make the transition to cleaner-burning, sustainable transportation fuels and technologies.

JAMES E. PEEPLES, ESQ.
5894 S. 6th Street
Falls Church, Virginia 22041

1995 - Present	President Peeples Consulting Associates, Inc. Falls Church, Virginia
Responsibilities:	Legislative & regulatory counsel Government & private consulting on motor fuels (gasoline, diesel, oxygenates, and alternative fuels) Market/economic assessments
Clients: (partial list)	National Renewable Energy Laboratory Polar Molecular Corporation Alltech, Inc. Kansas Ethanol Association High Plains Corporation National Biodiesel Board Fats & Proteins Research Foundation, Inc.
1985 - 1995	Director, Legislative & Regulatory Affairs Information Resources, Inc. Arlington, Virginia
Responsibilities:	Legislative & regulatory analysis Multiclient studies Government & private consulting on motor fuels Economic impact assessments Legal & technical issues regarding air quality Publications, including Fuel Reformulation, Octane Week, Oxy-Fuel News, and Alcohol Outlook Editor, U.S. Motor Fuel Legislative & Regulatory Service
Clients: (partial list)	Clean Fuels Development Coalition National Biodiesel Board Oxygenated Fuels Association Renewable Fuels Association
1983 - 1985	General Counsel Herman & Associates Washington, D.C.
Responsibilities:	Legislative & regulatory analysis Private consulting on motor fuels Industry surveys

Education

Juris Doctor, Antioch School of Law, Washington, D.C.

Bachelor of Arts, Florida State University, Tallahassee, Florida (International Affairs & Economics).

Memberships & Activities

District of Columbia Bar Association

- Member (since 1983)

American Society for Testing & Materials (ASTM)

- Member, D-2 Committee on Petroleum Products & Lubricants
- Member, Subcommittee A on Gasoline
- Chairman, Biodiesel Specification Task Force
- Member, Reformulated Gasoline Task Group
- Member, Leaded Gasoline Definition Task Group

National Conference on Weights & Measures (NCWM)

- Member (since 1985)
- Member, Petroleum Subcommittee
- Member, Premium Diesel Work Group

American Society of Agricultural Engineers (ASAE)

- Member
- Biodiesel Liaison (to ASTM and NCWM)

Society of Automotive Engineers (SAE)

- Member

Personal

Married for 21 years to Deborah K. Peeples, a professional fund raising consultant to not-for-profit organizations. They have two sons (ages 5 and 11). Active in the community, youth athletics, etc.

Testimony on SB 2
Senate Transportation Committee
January 21, 1997
Prepared by Joe Lieber
Kansas Cooperative Council

Mr. Chairman and members of the committee, I'm Joe Lieber, Executive Vice President of the Kansas Cooperative Council. The Council has a membership of over 200 cooperative businesses; with nearly 130 of them being local farm supply cooperatives. Most of these farm supply members sell petroleum products. Three of our regional cooperatives, CENEX, Farmland Industries and the National Cooperative Refinery Association, refine fuel.

The Kansas Cooperative Council feels that with the volatile world markets, it is important to continue the agricultural ethanol alcohol incentive program.

We encourage you to support SB 2.

Thank you.

SPECIAL COMMITTEE ON TRANSPORTATION

STUDY TOPIC: Continuation of the Agricultural Ethyl Alcohol Incentive Program*

SUMMARY: The purpose of this study was to determine whether the current Agricultural Ethyl Alcohol Incentive Program should be continued beyond its expiration date of July 1, 1997. The Committee conducted hearings on this matter and has determined that economic and environment benefits of the Agricultural Ethyl Alcohol Incentive Program warrant continuation of the program. The Committee recommends that the current program be extended to July 1, 2001.

BACKGROUND

In 1979 the Kansas Legislature passed legislation to provide a tax incentive for the use of gasohol. Over the ensuing years the subsidy was modified by scheduled increases or ad hoc legislative freezes. In 1987, the tax incentive was eliminated and replaced with the Kansas Qualified Agricultural Ethyl Alcohol Producer Incentive Fund. The incentive fund receives $625,000 each quarter from the State Highway Fund for producer incentives for agricultural ethyl alcohol. The production incentive is limited to $.20 per gallon of agricultural ethyl alcohol sold to an alcohol blender.

Currently, there are four qualified producers of ethanol located in Atchison, Colwich, Garden City, and Leoti. The most recent incentive payment was made at a rate of 17 cents per gallon for 3,711,415 gallons. According to the Department of Revenue, 1996 quarterly gallonage production dropped from 8.5 million to 3.7 million gallons reportedly due to increases in grain prices. Over the life of the program, the total dollar cost will have been $24.375 million. The estimated fiscal impact is $14.503 million to the State Highway Fund and $9.872 million to the Special City and County Highway Fund. This program, as noted above, is scheduled to sunset on July 1, 1997.

COMMITTEE ACTIVITY

The following presented testimony in support of continuation of the incentive program: the Secretary of Agriculture; Kansas Ethanol Association; Kansas Grain Sorghum Association and Kansas Corn Growers Association; and Kansas Farm Bureau. A representative of the Kansas Department of Revenue also appeared to explain the administration of the program.

The Secretary of the State Board of Agriculture stressed the importance of the program to the state. She stated, among other things; that:

- In 1996, ethanol producers purchased approximately 22 million bushels of corn and milo from Kansas farmers and suppliers to produce the product.
- The four Kansas ethanol plants have a production capacity of approximately 55 million gallons of alcohol annually.
- Since 1987 ethanol production has increased nearly 450 percent.

Testimony of the representative of the Kansas Ethanol Association focused on the preliminary findings of a report entitled "An Economic Impact Analysis of Fuel Ethanol Production In Kansas: 1996," prepared by Peeples Consulting Associates, Inc, of Falls Church, Virginia for the Kansas Ethanol Association. Major findings of the report include the following:

- At $2.5 million per year, the current incentive program provides a net of $0.045 per gallon of ethanol produced in Kansas, lowest among states with ethanol incentive programs.
- Since 1993, Kansas fuel ethanol production has expanded from 27 million to 56 million gallons per year.
- From 1993 to the present, the Kansas fuel ethanol industry estimates that producers have paid more than $20 million in federal, state, and local taxes.
- The Kansas fuel ethanol industry employs in excess of 100 full-time professionals. In times of plant expansion, additional business activity also leads to the employment of part-time employees and construction workers. Indirect benefits provided by the industry include

* S.B. 2 accompanies the Committee's reports.

employment in other sectors of the economy such as transportation, motor fuel marketing, and material suppliers.

- Based on preliminary estimates, the Kansas fuel ethanol industry generates about $50 million of personal income annually.
- Ethanol is environmentally friendly and can reduce carbon monoxide emissions 27 percent better than conventional gasoline.

The representative of the Kansas Grain Sorghum Producers Association and the Kansas Corn Growers Association provided the Committee with examples of gasohol related activity initiated in the state. In Garnett, Kansas, a motor car dealer offers daily rentals of vehicles that use ethanol produced by Midwest Grain Products, Atchison, Kansas. Similar initiatives have been undertaken by the Anderson County Extension Office, the school district in Anderson County, and the Satanta Co-op Grain Company. It was also pointed out that the first fueling station site in the state has been established in Topeka.

The spokesman for Kansas Farm Bureau, informed the Committee that at its annual meeting Farm Bureau delegates voted to support tax credits and other appropriate measures that promote the production and sale of crop-based alternative fuels. Farm Bureau also supports ethanol related programs at the federal level.

CONCLUSIONS AND RECOMMENDATIONS

The Committee concludes that the state's agricultural ethyl alcohol incentive program contributes in varied and significant ways to the Kansas economy and is an environmentally friendly fuel. Therefore, the Committee recommends the introduction of legislation that would extend the agricultural ethyl alcohol incentive program through June 30, 2001. The Committee notes that the expiration date of the federal ethanol program is September 30, 2000. Federal action on this program prior to the expiration date of Kansas' program will permit the Legislature to assess the potential impact on the state's program. ■

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