Corn Ethanol as an Alternative Fuel: Technical, Economic and Policy Issues

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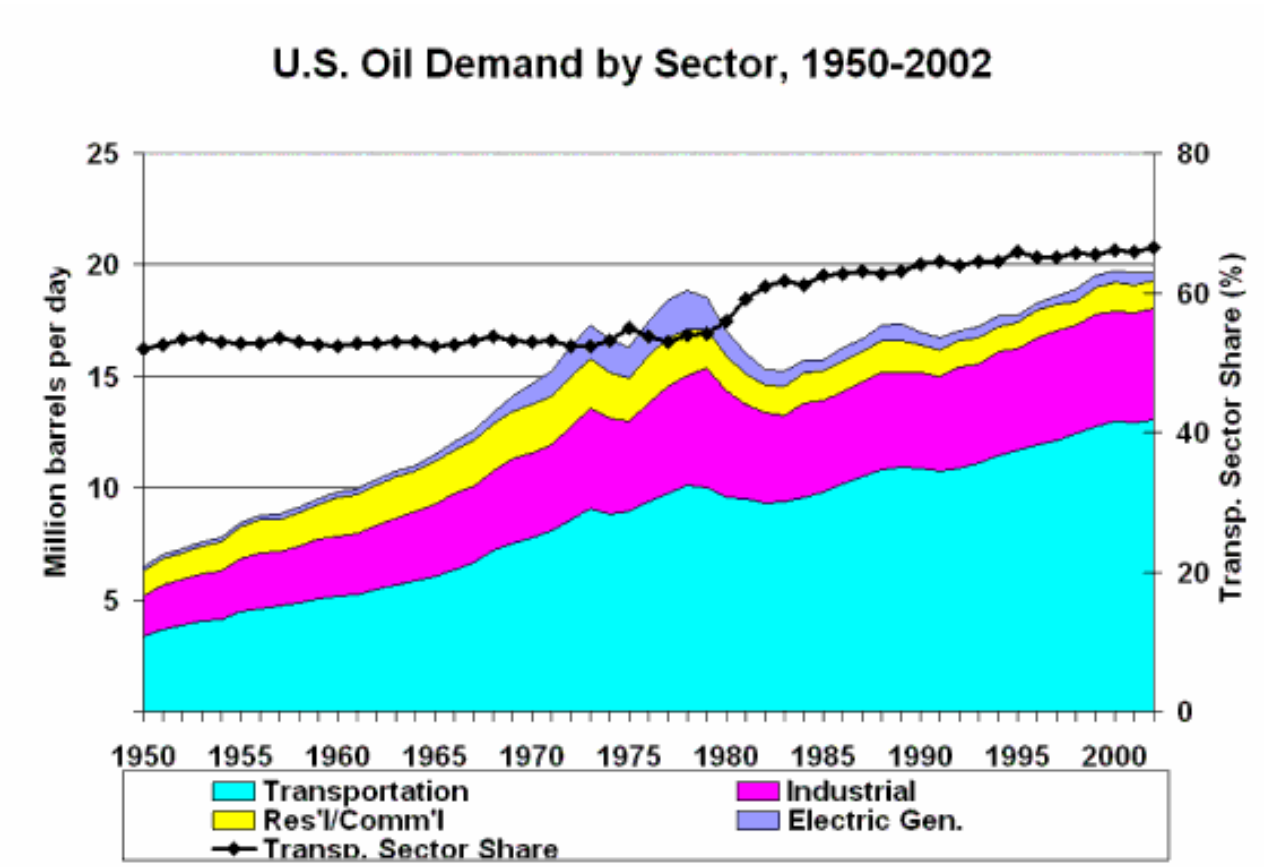
What's the Fuss?

- 75% of the petroleum used in the U.S. is in the transportation sector.



Our Current State…

- The U.S. consumes about 300 billion gallons of gasoline every year.
- Over 30% of the gasoline in the United States contains some percentage of ethanol.
- There are between 3 and 4 million Flexible Fuel Vehicles currently in use in the U.S.
- The U.S. currently produces 3.8 billion gallons of corn ethanol a year.

Technical Issues

Automotive

Fuels

Agriculture

Automotive

- Ethanol fuels causes corrosion of soft metals and decomposition of several polymers used in automobiles.
- $200-$300 per vehicle in manufacturer's cost to convert to flexible fuel technology.
- Maintenance is very similar, if not identical, to that of conventionally fueled vehicles.
- Gasohol is approved under the manufacturer's warranty for all major auto manufacturers.

Fuel Utilization

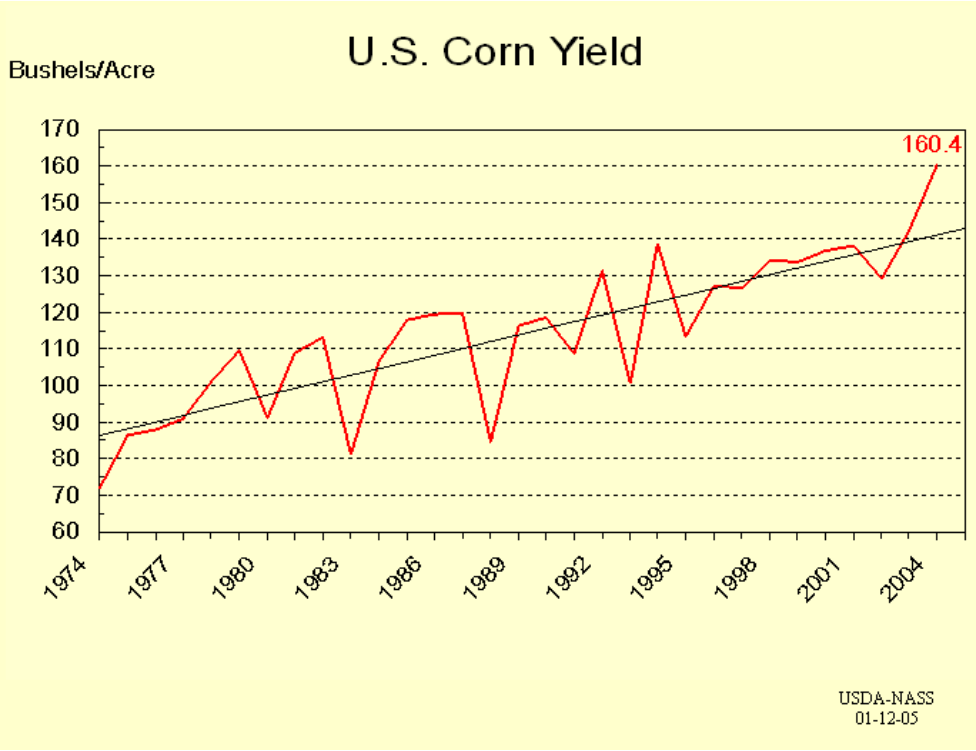
- Ethanol is a high-octane fuel which has approximately 80% of the energy content of gasoline.
- Vehicles operating on E10 show no evidence of lost fuel economy.
- Vehicles operating on E85 show no change in power, acceleration, payload, or cruise speed.

Agricultural Feasibility

- A NEV calculates the energy utilized by adding the energy used in growing, harvesting, transporting and distilling of corn feedstock.
- A significant portion of the total energy consumed in the production of renewable fuels is renewable energy.
- The production of corn ethanol is energy efficient, in that it yields 34% more energy than it takes to produce it.

Agricultural Feasibility

For every 1 percent increase in yield, the NEV of ethanol increases about 0.37%



Economic Issues

Incentives

Agricultural Benefits

Fuel Production

Infrastructure

Economic Incentives

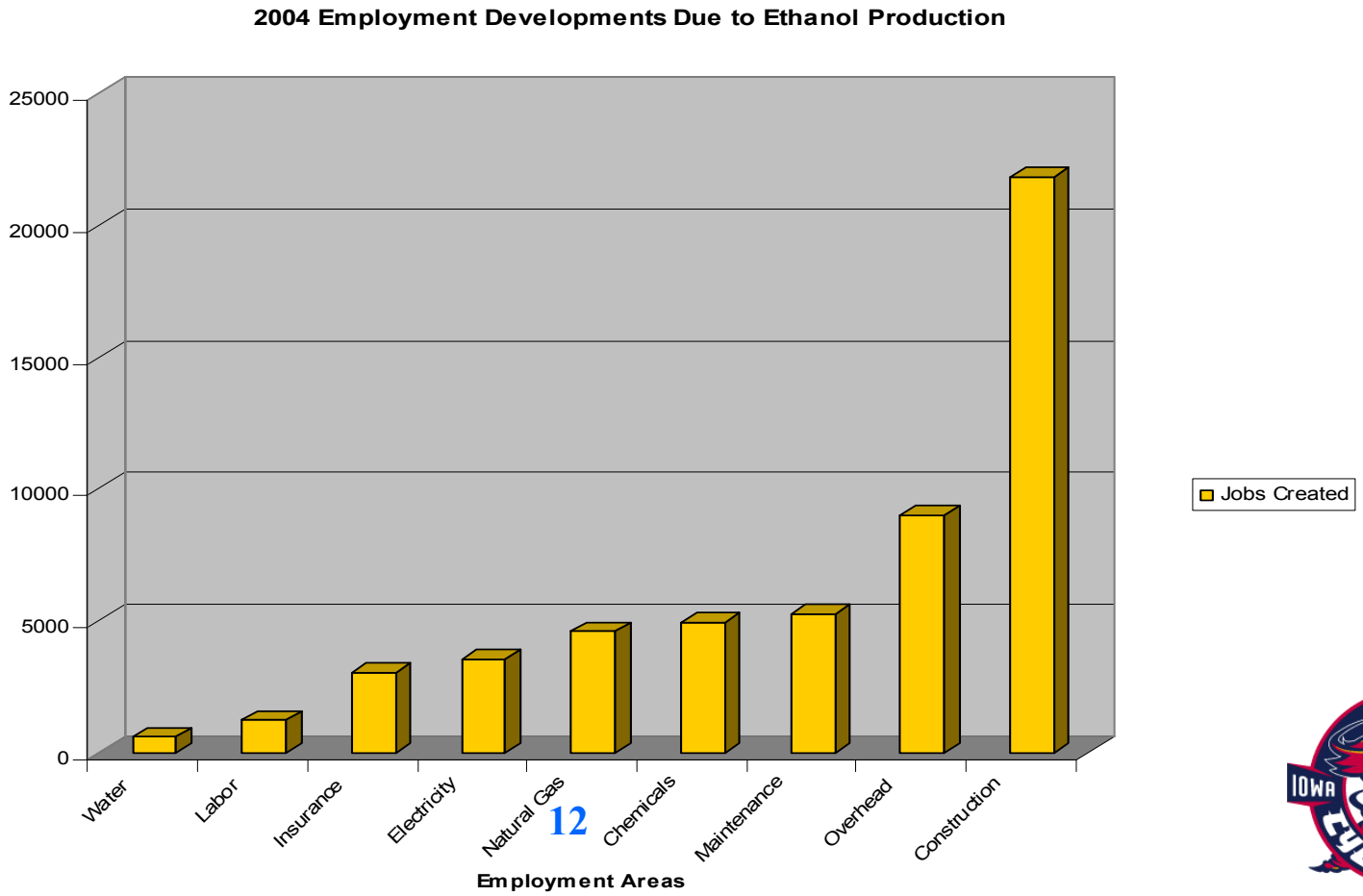
- Consumer incentives are provided with cash incentive for the purchase of advanced technology vehicles, between $600 and $4,000 per vehicle.
- The Federal Alcohol Tax Credit is 54 cents per gallon of E100 (pure ethanol).
- The alternative fuel CAFE credit incentives were developed to encourage manufacturers to produce dual-fuel vehicles.

Agricultural Economic Incentives

- In 2004/2005 12.6% of the corn bushels utilized in that marketing year was to produce ethanol.
- A demand for an additional 100 million bushels of corn sold equates to an increase in average price of about 4 cents per bushel.
- Corn subsidies totaled about $2.8 billion in 2003.

Fuel Production Incentives

- Ongoing production and construction has created more than 143,350 jobs in 2004.
- Over $15.3 billion has been added to the gross output in the American economy due to ethanol demand.



Developing Infrastructure

- There are 26 states in the U.S. with E85 refueling stations.
- Creating or converting existing stations to E85 fueling stations costs on average between $20,000 and $60,000.
- E85 fueling infrastructure is predominantly developed in the Midwest due to ethanol transportation costs and the availability of ethanol.

Policy Issues

CAFE

CAFE Incentives

Clean Air Act

Corporate Average Fuel Economy

The CAFE program based on four basic criteria:

- Technological feasibility
- Economic practicality
- The effects of other federal standards on fuel economy
- The need to conserve our nation's energy supply

The current CAFE standards:

- The passenger car fleet has been set at 27.5 mpg since 1990
- The light truck fleet has been set at 21.0 mpg for MY 2005 and will rise to 22.2 mpg for MY 2007.

Calculating CAFE Penalties and Credits

- Penalties cost $5.50 per tenth of a mpg for each tenth of a mpg under the target value times the total volume of those vehicles manufactured for a given model year.

Example:
(27.5 - Average Fuel Economy)*10.0 * $5.50* Production Volume = Total Fine
(27.5- 19.27) *10.0* $5.50 * 350,000 = $27,527,500

- Dual fuel incentive credits are calculated by dividing a FFVs fuel economy in equivalent miles per gallon of gasoline or diesel fuel by 0.15.

Example:
15 mpg/0.15 = 100 mpg

Clean Air Act and Ethanol

- Metropolitan areas that don't meet National Ambient Air Quality Standards for ground level ozone are required to use RFG.
- RFG contain oxygen – 2% by weight.
- MTBE and ethanol are two of the most commonly used oxygenates.
- Currently portions of 17 states and the District of Columbia use RFG.

Conclusions and Recommendations

Conclusions and Recommendations

The CAFE incentives program has increased the number of dual fuel vehicles on the road.

The CAFE incentives program has had, if any, a negative effect on fuel economy, petroleum consumption, and greenhouse gas emissions.

>Therefore CAFE incentives program should be phased out of the CAFE program in a time frame that will not be detrimental to the automotive industry.

Conclusions and Recommendations

- Fuel economy standards in the absence of dual fuel vehicle CAFE incentives will force some automotive manufacturers to sacrifice a degree of performance and size
- Therefore incentives must be created to develop a greater consumer demand for vehicles with higher fuel economy.

  >In order to create an even spread demand nationwide it would be most effective to increase the gasoline tax incrementally over the next ten years

Conclusions and Recommendations

- The production of corn ethanol creates thousands of American jobs, stimulates economic growth and displaces billions of gallons of foreign oil every year.

  >Government agencies must increase partnerships with the private industry to continue developing improvements in efficiency and the cost effective production of corn ethanol and ethanol co-products.

Conclusions and Recommendations

Higher concentration ethanol-blended fuels are currently the closest alternative to conventional fuels in performance, systems, storage and distribution.

>Further grant funding for storage and dispensing system conversion in Midwestern states **as demand increases** will enable the spread of the existing E85 infrastructure.

Conclusions and Recommendations

Other alternatives to petroleum fuels, such as, bio-diesel and hybrid technology, must be utilized especially in regions outside of the Midwest.

Long term viable replacements for petroleum must continually be researched and invested in.

>The federal government, industry and academia must continue to pursue independence from petroleum based fuels through research and innovation.

THANK YOU
&
QUESTIONS

Conclusions

Corn ethanol fuel is one of many alternatives to petroleum based fuels that must be utilized in the United States' transition to a renewable energy based economy.

Corn ethanol alone is not a viable replacement for the future of our current petroleum based industry.