

Action Plan
to Promote
the Development and Use of E85
as an Alternative Transportation Fuel

DRAFT 4
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MISSION – PURPOSE

The E85 Strategic Action Plan is intended to be a document to guide the infrastructure development, marketing and public awareness efforts of E85 advocates nationally. The purpose of the plan is to effectively and efficiently increase the sale and use of 85% ethanol (E85) as an alternative fuel.

This draft strategic plan is intended to generate additional discussion and insight among the many stakeholders with an interest in this area.

Stakeholders that have participated in the development of this document include:

| | |
|--|-----------------------------------|
| <i>Governors' Ethanol Coalition</i> | <i>U.S. Department of Energy</i> |
| <i>National Corn Growers Association</i> | <i>Chrysler Corporation</i> |
| <i>Ford Motor Company</i> | <i>General Motors Corporation</i> |

Summary of preliminary action items

- 1. The ethanol industry and E85 fuel providers must change/improve and adopt this action plan and demonstrate commitment to carry forward with implementation. The proposed plan should be shared with a wide variety of stakeholders with an interest in ethanol as a transportation fuel.*
- 2. The Department of Energy should be asked to serve as a facilitator, helping bring stakeholders together, especially through the Clean Cities program. Furthermore, the Department should be encouraged to provide funds for analytical work, workshops, public education, and market development activities.*
- 3. The industry should identify and prioritize the metropolitan areas that will be the focus of the first year's efforts, and designate industry members or contractors who can implement. The industry should identify/accept success factors that are significant yet achievable.*
- 4. Federal and state fleet operators in or adjacent to areas where fuel ethanol is available, should continue to be priority target audiences because they are "covered" by the Energy Policy Act requirements. Given the economic advantages offered by E85 FFV over other forms of alternative fuel vehicles, these fleets should be very interested in E85 FFVs. However, as the number of FFVs available in the next several years will dwarf the demands of covered fleets, additional non-covered markets should be addressed.*

MOTIVATION

Recent announcements by the major auto makers revealed plans for large-scale production of ethanol flexible-fuel vehicles. As a result of these production plans our nation faces a truly unique opportunity to demonstrate the viability of alternative fuel vehicles by earning a greater share of the transportation market.

To take advantage of this opportunity, supporters of increased ethanol use are working cooperatively to develop objectives and plans to significantly expand the availability of ethanol fueling stations and persuade motorists to fuel with ethanol.

SITUATION ANALYSIS

Ethanol as an oxygenate -- The use of ethanol as an oxygenate in fuel has grown tremendously over the last 15 years. Ethanol blending in all types of gasoline for light-duty vehicles accounts for about 1.2 - 1.3 billion gallons of ethanol annually (1996 sales of fuel ethanol).

Changes in gasoline formulation, especially the development of mandates for the use of reformulated gasoline (RFG), have changed the dynamics of ethanol blended with gasoline. Ethanol can now be blended into RFG in two ways. Under certain conditions it can be blended directly with gasoline, or it can be added to gasoline in its converted form, Ethyl Tertiary Butyl Ether (ETBE). Current use of ethanol in RFG amounts to the use of 300-400 million gallons of ethanol annually. ETBE production uses less than 10,000 gallons of ethanol per year.

High-blend ethanol -- Ethanol used as a neat fuel (nearly 100% ethanol) has been growing since 1991 when General Motors and Ford introduced flexible fuel vehicles (FFV) in demonstration projects. These FFVs could burn up to 85% denatured ethanol and 15% gasoline or other approved hydrocarbons/aliphatic ethers -- dubbed E85. E85 is a designated alternative fuel under the Energy Policy Act of 1992.

In recent years, the number and types of E85 FFVs increased significantly and by 1997 there were more than 10,000 E85 vehicles on the road. The situation has changed dramatically, however, in June, 1997, when both Ford and Chrysler announced plans to manufacture massive numbers of flexible fuel vehicles. Chrysler plans to manufacture over 200,000 E85 mini-vans in model year 1998 for introduction nationwide*. All 3.3 liter Chrysler mini-vans will come with E85 capability standard at no additional cost. Ford announced plans to manufacture all model year 1999 Ford Ranger pickup trucks with E85 capability standard, plus several other models of vehicles that will total about 250,000 over the next three years. Based on currently announced production plans, by the year 2000 there

will be more than a half a million E85 flexible fuel vehicles traveling the nations highways.

*excludes CA, NY, MA & CT

E85 fueling stations -- The number of existing E85 fueling stations is inadequate to serve this tremendous increase in the number of E85 vehicles. As of July, 1997, there were 38 public E85 fueling stations and 29 private stations, spread out over 16 states, primarily in the Midwest. The amount of E85 used in these stations is about 1 million gallons annually. There are no ethanol stations in most major metropolitan areas, and none in the Northeast and Southern States, and only one in California.

If all the planned production of Chrysler mini-vans for model year 1998 were able to use E85 100% of the time, the demand for E85 would increase by about 150 million gallons per year. By the year 2002, demand for ethanol could increase from 1.2 to 1.3 billion gallons annually to 2.25 billion gallons or more.

Greenhouse gas benefits -- The announcement of large-scale introduction of E85 vehicles highlights the tremendous potential for ethanol as a transportation fuel. Simultaneously, the search for fuels and vehicle technologies to help reduce greenhouse gas emissions from transportation has identified ethanol as a strong candidate for a low-carbon, renewable fuel.

Biomass to ethanol -- Research funded by the U.S. Department of Energy shows tremendous potential to produce renewable ethanol from cellulosic biomass at competitive cost. These new ethanol feedstocks and technologies could complement and supplement existing ethanol production to meet a potential future demand.

| TABLE 1: ESTIMATES OF VOLUMETRIC ETHANOL USE - 1997 | | |
|--|---------------------------------------|-------------------------------|
| Ethanol Blend | Ethanol Use (million gallons/year) | Number of Fueling Stations |
| E10 | 900 | 15,000-20,000 |
| Ethanol in RFG | 300-400 | 5,000-10,000 |
| E85 | .2 - 1.0 | 67 |

Will they use E85? -- Members of the environmental community have expressed concern that without a corresponding increase in the availability of ethanol fueling

stations most of the new E85 FFVs will be running on gasoline. This would be unsatisfactory because FFVs were designed to operate on 85% ethanol so that the benefits of using a clean, renewable, domestic energy source could be realized. Using gasoline in these vehicles defeats the purpose.

Automaker motivation -- It is doubtful that automakers would continue to engineer and manufacture vehicles with E85 capability over the long-term unless a significant fraction were in fact using E85. Furthermore, the CAFE credit currently received by automakers for the introduction of FFVs, will come under increasing criticism if the vehicles consume only gasoline. Critics of the CAFE credit have noted that automakers can use the CAFE credit for FFVs to support continued production of lower fuel economy vehicles in the fleet, actually increasing fuel consumption throughout the fleet. Although the total magnitude of any increases in fuel consumption is likely to be small, those concerned with decreasing U.S. reliance on imported oil and decreasing emissions of greenhouse gases have identified a legitimate issue. Indeed, the whole concept of flexible-fuel vehicles that can run on gasoline or alternative fuels will be called into question if the E85 FFVs do not use a significant volume of E85.

Economics, price vs. value -- Another concern is that the economics of ethanol will make it unattractive for E85 users. Current pump prices for E85 in the Midwest are about \$1.28 per gallon. Assuming drivers need about 1.2 gallons of E85 to drive the same miles as a gasoline vehicle, the users equivalent cost will be about \$1.50 per gallon. Long-term DOE funded research could bring the cost of ethanol down significantly, using biomass feedstocks, but that would not help in the short term. Additional work needs to be done to lower user costs or demonstrate the added value of using E85 fuels.

In short, the opportunity presented by large numbers of E85 vehicles is also a challenge. Ethanol supporters must carefully balance and integrate the immediate demands for a major increase in the use of E85 (i.e., in the next two to three years) and the longer term requirements to lay a foundation for the expanded use of ethanol blends and vehicles that can operate on high blends of ethanol in the transportation sector far into the future.

OBJECTIVES

1. Increase the awareness of E85 as an alternative fuel among the general public and owners/operators of E85 vehicles.
2. Increase the sale of ethanol in selected cities to a “successful level” .
3. Increase the number of E85 fueling stations to 20-100 sites per selected metropolitan area.
4. Increase the sale of E85 vehicles

STRATEGIES

1. Place infrastructure in locations with predictable demand for E85

To achieve sufficient throughput of E85 at a given E85 station, fuel retailers need to be certain that the station is located conveniently near sufficient FFV vehicles, and that the vehicles will be using the E85 fuel.

- Locations that house federal and state government fleets.
- U.S. DOE Clean Cities. These fleets can be readily identified and given the excellent cost of the E85 vehicles in comparison with other forms of light duty AFVs, these are the fleets which we may wish to concentrate on in the near term.
- Locations that house private fleets.

2. Place infrastructure in areas where fuel ethanol is currently available

- traditional mid western locations where ethanol is produced and readily available
- non-traditional markets outside the midwest. While most of the production of fuel ethanol takes place in the Midwest, ethanol is a national commodity. Large amounts of ethanol are currently being used in “non-traditional markets” including:
 - Pacific Northwest states of Oregon and Washington
 - Southwest states of Arizona, Nevada, and New Mexico
 - Lower New England states of Rhode Island, Connecticut, New York, New Jersey, and eastern Pennsylvania.

These non-traditional markets offer existing tankage of fuel ethanol, large scale federal and state fleet operations; include Clean Cities communities, and; are each experiencing significant air pollution problems associated in part with the use of motor vehicles. Introduction of E85 programs into these areas would differ little from those underway in Denver, St. Louis, Kansas City, etc.

3. Concentrate infrastructure, vehicles and marketing efforts in two or three selected metropolitan areas; add more each year

Selected cities should meet criteria of high-priority, including availability of E85 FFVs and fuel, non-attainment status, availability of incentives, EPACT and Clean Air Act coverage, and other criteria. Successful efforts in the first year could be followed by expansion of the efforts to additional metropolitan areas in subsequent years. (See Appendix 1 - Criteria) Efforts should focus on both fleets and the general public.

4. Develop partnerships with traditional fuel retailers

Fuel retailers will be key as the number of E85 stations grows. In order to create the tremendous growth of E85 sites that is identified it will be impossible to personally cite new E85 locations. E85 providers must make a business case for partnership with existing fuel retailers who have the property, location, and facilities. In some areas, given the proper incentive, E85 supply could be introduced at minimal cost to existing stations that already have proper tankage. If possible, metro-wide retailers should be sought as partners to allow true synergy between the E85 provider and retailers interests.

5. Undertake public outreach and education efforts

- **Value issue – E85 vs. premium**

In order to compete for and win customer loyalty, E85 vehicles and fuel must deliver value. To achieve widespread E85 use, the fuel must be reasonably competitive (on a miles traveled basis) with gasoline. The message of the value of a gallon of E85 should be distributed “broadcast” to fleets and the public. However, E85 promotion will be a tough sell. In order to do so in the near-term, E85 supporters will need to lower costs or properly articulate the value to the consumer.

- **Clean air/Global warming benefits**

The E85 program should capitalizing on a growing interest in greenhouse gases, urban air-pollution, and alternative fuels and aim messages on these benefits to all of the target audiences.

6. Identify target audiences. Develop appropriate messages and methods to influence their use of E85.

- **Federal, state and local units of government fleets**

- Government fleets, properly identified and given the proper incentives, can provide predictable fuel demand for E85 refueling stations. In many metropolitan areas, however, the number of government fleets that will purchase FFVs in the first two years is small and may not be conveniently located.
- Government fleet vehicle represent only a small portion of the registered automobiles in the U.S.

- Government fleet vehicles represent only a small portion of the fuel used in the U.S.
- **Private Fleets**
 - Image and environmentally conscious private companies.
 - Agribusiness organizations
 - Fleet leasing companies, rental car companies.
- **General Public**
 - Members of environmental organizations
 - Members of health related organizations
 - Members of agricultural organizations
 - Members of other special interest groups
 - Other “un-interested” parties.
 - the bulk of the future sales of E85 FFVs will be non-fleet vehicles;

7. Develop a plan for infrastructure development in areas where efforts are underway to establish biomass to ethanol production facilities.

Several projects are currently underway to develop biomass to ethanol conversion facilities throughout the U.S. While the current production and use of ethanol is concentrated in the mid-west, plans should be implemented to develop infrastructure and increase public awareness in these other areas. These projects have the potential to generate a significant amount of positive press creating an opportunity for successful introduction of infrastructure and use of that infrastructure.

SUCCESS MEASURES

All of the objective outlined in this document should and are interrelated. Achieving one objectives should mean that all another has also been achieved. Therefore some of the measures of success are overlapping in their area of objective. For instance – it is our plan to have reached, at a particular time a goal of awareness that is listed below on the awareness continuum, on that same continuum when 20 percent of the general public are aware of E85, we expect .5 percent of them to be buying E85 fuel.

| TABLE 2 E85 AWARENESS CONTINUUM | | | | |
|--|-------|----------|-------|-------------|
| % General Public | 20% | 10% | 1% | .5% |
| | AWARE | INFORMED | TRIAL | REGULAR USE |
| % E85 Owners/Op. | 90% | 90% | 75% | 50% |

For each major metropolitan area that is targeted for E85 investment, the refueling stations must be built to serve the number of vehicles that will be located in the area and can demand a volume of fuel sufficient to keep the station profitable. Potential retailers of E85 must have sufficient volume and incentive to justify offering the E85 fuel. This means both recapture of investment and gross profits that meet or exceed any product that could have been offered in place of E85.

**TABLE 3
SUCCESS MEASURES FOR INCREASED E85 USE
(SAMPLE METROPOLITAN AREA)**

| Objective | No. of FFVs using E85 | Percent of Time User Uses E85 | Volume of E85 Demanded (E85 gals) |
|-----------------------|-----------------------|-------------------------------|-----------------------------------|
| Long-term Vision | 100,000 | 75% | 52,500,000 |
| Highly Successful | 50,000 | 75% | 26,250,000 |
| Successful | 50,000 | 50% | 17,500,000 |
| Moderately Successful | 10,000 | 25% | 1,750,000 |

Notes:

- Assumes the major metropolitan area has 100,000 of the 2 million FFVs on the road by the end of 2002
- Each FFV consumes 500 gasoline gallons equivalent annually (mini-vans may consume more).
- One gasoline gallon equivalent is about 1.4 gallons of E85, not counting any vehicle fuel economy changes.
- The number of vehicles per station and the number of refueling stations to meet these various demands is the subject for future analysis.

BUDGET

Private industry must provide a minimum of 75% of the infrastructure costs

The NEVC, GEC, NCGA, state corn checkoff programs, federal and state governments have all been supporting the E85 infrastructure development program. Long term success, however, for the establishment of E85 fueling must be the responsibility of the private sector. The NEVC and its partners are planting the seed, that is, financial assistance to support a limited number of stations. Continued growth in the program must be achieved and will be achieved when the private sector recognizes the profit potential associated with the sale of E85. Describing such profit potential, and more importantly pointing out where it is occurring, must be a major goal of the E85 program.