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Introduction

In May of 1993 Fleishman-Hillard Research reported to the National SoyDiesel Development Board on the attitudes and awareness of transit company managers with respect to biodiesel fuel. The findings provided a blueprint for promoting this newly developed, alternative fuel over the past 15 months.

This report summarizes current awareness of biodiesel among a similar population of the people at transit companies responsible for fuel decisions. The research findings help evaluate the efforts of the past year to increase awareness of biodiesel as an alternative fuel for transit applications and to promote its benefits. This information can be used to evaluate the progress of the promotion efforts along with data on actual fuel used in trial and production environments.

About the Research

The September 1994 findings are based on 100 telephone interviews with the person within each transit company responsible for specifying the fuel for diesel buses to help meet EPA standards. This is the same procedure followed in the 1993 research. Typically, the respondent was the person responsible for the maintenance or operations of the fleet of diesel buses. Interviews lasted an average of five minutes. Interviewing was completed by Fleishman-Hillard Research executive interviewers.

The sample was based on a list of 372 transit companies known to operate diesel buses. Sampling error is limited to plus or minus 5 percentage points because such a large percent of the universe was interviewed (95% level of confidence for values at or near 50%). Differences between last year's results and this year's results of 11 percentage points or more are considered statistically significant.

Key questions were taken from the 1993 research so that changes in level of awareness and attitudes could be measured. Comparisons to last year's findings are provided in the report.

About This Report

The numbers in the tables of this report represent percentages of respondents. Keep in mind that each percentage point represents a respondent. Some of the tables may not add to 100 percent due to unreported nonresponse or multiple responses to a given question.
Executive Summary

Increased awareness and receptivity to biodiesel documented.

Over the past 15 months, top-of-mind awareness of biodiesel as an alternative fuel increased 350%.

- Now biodiesel is mentioned unaided as an alternative fuel by 35% compared to only 10% last year.

On an aided basis, 92% now recognize biodiesel as an alternative fuel. Last year only half had heard of it (52%).

More importantly, 40% of transit managers are now more receptive to using biodiesel than they were a year ago.

- In fact, 20% rate biodiesel as their number one alternative fuel option for transit buses, second only to CNG.
- Overall, 17% expect to use biodiesel in their operations in the next two years.

The 15% who are less receptive express concern about the cost of biodiesel.

Within this context, most transit managers (82%) are very (45%) or somewhat (37%) satisfied with the information they have received on biodiesel.
Pressure to reduce emissions has increased.

Now two-thirds of transit managers (65%) feel a lot or some pressure to reduce emissions, up from 54% last year. The result has been to replace old equipment with new equipment and to improve maintenance on current equipment.

The perceived strengths of biodiesel focus on how its use does not require engine modifications as well as its ability to reduce particulate emissions. Its vulnerabilities include questions about its price and its availability.
**Action Implications**

Efforts to increase the top-of-mind awareness of biodiesel among transit system managers have been successful. The benchmark research in 1993 demonstrated relatively low levels of awareness and mid-level familiarity with biodiesel. The promotional efforts over the past 15 months have yielded name recognition with almost all of this target audience. This has been done primarily with highly targeted communications.

Awareness is highest in the Midwest where the greatest amount of promotional activities have occurred. There is room for considerably more consciousness raising for biodiesel in the northeastern United States.

The clear challenges identified in the research are to overcome resistance to the cost of biodiesel and to position biodiesel more effectively against or as an alternative to CNG and LNG. More technical documentation is needed on the relative costs of biodiesel to CNG/LNG including figures on infrastructure costs, maintenance and engine life. A need for EPA certification of biodiesel as an alternative fuel clearly is necessary for transit managers to more seriously consider its use beyond trial projects.
Detailed Findings

Biodiesel is now a top-of-mind alternative fuel for 35% of transit managers.

The size of the biodiesel fuel pump has grown 350% in their minds since last year when only 10% mentioned either SoyDiesel or biodiesel on an unaided basis. Either biodiesel or SoyDiesel was counted as a response. In 1994, biodiesel is mentioned more frequently than SoyDiesel (20% vs. 15%). Biodiesel is the name consistently used in the promotion efforts.
Keep in mind that unaided recall provides a measure of top-of-mind awareness. Also, some people familiar with biodiesel may not have mentioned it because it can be considered a fuel additive rather than an alternative fuel.

Awareness is greatest among transit managers in the Midwest region of the United States and lowest in the Northeast region.

Respondents were evenly distributed across the four regions. The level of unaided recall roughly corresponds to the distribution of the 158 biodiesel demos conducted over the past year and a half.

<table>
<thead>
<tr>
<th>Region</th>
<th>Survey Respondents</th>
<th>Unaided Mentions</th>
<th>Number of Demos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest</td>
<td>29%</td>
<td>59%</td>
<td>76</td>
</tr>
<tr>
<td>South</td>
<td>26%</td>
<td>31%</td>
<td>30</td>
</tr>
<tr>
<td>West</td>
<td>23%</td>
<td>26%</td>
<td>40</td>
</tr>
<tr>
<td>Northeast</td>
<td>22%</td>
<td>18%</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>35%</td>
<td>158</td>
</tr>
</tbody>
</table>
Biodiesel now receives more unaided mentions as an alternative fuel than ethanol and propane.

Not only do more transit managers now mention biodiesel or SoyDiesel than 15 months ago, it has passed up some of the more established fuels in top-of-mind mentions. Ethanol has been around as a fuel additive for a number of years. On this survey, it was mentioned by about one-fourth of the respondents each year. Biodiesel moved past it. And while mentions of propane have increased significantly over the past year, biodiesel is now mentioned more often than propane by transit managers.

Electricity, solar cells and batteries also showed a meaningful gain in top-of-mind awareness over the past 15 months.
Last year, liquid natural gas was coded as part of the compressed natural gas category. This year, a separate count was made of LNG mentions; 45% specifically mentioned LNG as an alternative fuel.

A few other alternative fuels were mentioned unaided:

- 3 people mentioned hydrogen.
- 2 people mentioned fuel cells.
- 1 person mentioned butane.
- 1 person mentioned highly oxygenated gasoline.
Aided recall of biodiesel has almost doubled over the past 15 months.

It rose to 92% from 52%. This includes both the volunteered responses on the unaided question and the responses to "Have you ever heard of biodiesel?" Only 8 of the 100 respondents in 1994 had not heard of biodiesel.
Over last year, receptivity to biodiesel has increased among two-fifths (40%) of transit managers.

Only 15% are less receptive. Price was most commonly mentioned as the factor holding back greater acceptance.
Biodiesel is one of the top three alternative fuel options for 46% of transit managers.

LNG also ranks as one of the most popular alternatives; half mention LNG as one of their top three alternatives even though LNG was not included in the question wording.

Ranking of Alternative Fuel Options

Alternative fuels for transit buses include compressed natural gas, propane, ethanol, methanol, electricity and biodiesel. Which of these do you rank as the number one, number two and number three alternative fuel options for transit buses?
Biodiesel is one of the top three alternative fuel options for 46% of transit managers.

LNG also ranks as one of the most popular alternatives; half mention LNG as one of their top three alternatives even though LNG was not included in the question wording.

### Ranking of Alternative Fuel Options

Alternative fuels for transit buses include compressed natural gas, propane, ethanol, methanol, electricity and biodiesel. Which of these do you rank as the number one, number two and number three alternative fuel options for transit buses?

- **CNG**: 83%
- **LNG**: 49%
- **Biodiesel**: 46%
- **Propane**: 24%
- **Electricity**: 23%
- **Ethanol**: 13%
- **Methanol**: 11%
In the Midwest, 59% of transit managers list biodiesel as one of their top three alternative fuel options.

<table>
<thead>
<tr>
<th></th>
<th>Biodiesel is One of Top Three Alternative Fuel Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest</td>
<td>59%</td>
</tr>
<tr>
<td>South</td>
<td>46%</td>
</tr>
<tr>
<td>Northeast</td>
<td>41%</td>
</tr>
<tr>
<td>West</td>
<td>35%</td>
</tr>
</tbody>
</table>

A few transit fleet managers expanded on their choices.

_Biodiesel is my first choice because all fuels other than biodiesel require major modifications to our operation. Propane and LNG are not technologically safe._

_Our most recent studies show economy of use for biodiesel._

_Electricity is the final answer, but the technology is not ready yet. Biodiesel is the only one that can immediately get a fleet up and running._

_Electricity would be best, but it's not available yet._
In evaluating the cost of alternative fuels, the cost of modifying the infrastructure is more important than the price of the fuel.

Unlike CNG and LNG, biodiesel does not require changes to storage facilities or modifications to diesel engines to reduce particulate emissions from transit buses. This was an important message in the promotion of biodiesel.

By a 47% to 13% margin, modifications to the physical plant is considered more of a factor than the price of fuel in evaluating the cost of alternative fuels. Another one-fifth (19%) deem that both factors are key.

Some people focused on other factors such as overall cost per mile of operation, fuel availability, safety and federal regulations.
EPA pressure to reduce emissions has increased.

This year 65% are feeling a lot or some pressure to reduce emissions to help attain EPA standards. This is up from 54% last year.
EPA certification is a fundamental issue.

*It all depends on what the EPA certifies. We won't touch anything new until then.*

**Transit companies are updating their fleets with equipment that helps them attain EPA air quality standards.**

As was the case last year, new equipment leads the list of steps taken to reduce air pollution.

Seven percent (7%) mention using biodiesel, up from only 3% last year. Note that the use of CNG has also increased significantly to 25%.

<table>
<thead>
<tr>
<th>What steps has your organization taken to help attain EPA air quality standards?</th>
<th>1994</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased new equipment, engines</td>
<td>39%</td>
<td>42%</td>
</tr>
<tr>
<td>Improved maintenance</td>
<td>30%</td>
<td>28%</td>
</tr>
<tr>
<td>Converted buses to CNG</td>
<td>25%</td>
<td>14%</td>
</tr>
<tr>
<td>Using other alternative fuel</td>
<td>17%</td>
<td>48%</td>
</tr>
<tr>
<td>Done research, studied options</td>
<td>11%</td>
<td>--</td>
</tr>
<tr>
<td>Using biodiesel</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>Added particulate traps, catalytic converters</td>
<td>4%</td>
<td>22%</td>
</tr>
<tr>
<td>Staying aware of regulations</td>
<td>1%</td>
<td>--</td>
</tr>
<tr>
<td>Other measure</td>
<td>--</td>
<td>16%</td>
</tr>
<tr>
<td>Nothing in particular</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>
One in six transit managers (17%) expect to be using biodiesel in their operation over the next two years.

Biodiesel is mentioned second after CNG. Clearly, both of these alternative fuels have made inroads over the past year. Note that 37% did not indicate any alternative fuels in their plans.

<table>
<thead>
<tr>
<th>What, if any, alternative fuels do you expect will be used in your operation over the next two years?**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed</td>
</tr>
<tr>
<td>Biodiesel, SoyDiesel</td>
</tr>
<tr>
<td>Electricity, battery, solar cell</td>
</tr>
<tr>
<td>Propane gas</td>
</tr>
<tr>
<td>&quot;Clean&quot; diesel, low-sulfur diesel</td>
</tr>
<tr>
<td>Ethanol, alcohol</td>
</tr>
<tr>
<td>LNG</td>
</tr>
<tr>
<td>Methanol</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>None mentioned, don't know</td>
</tr>
</tbody>
</table>

Transit managers show increased appreciation of how the use of biodiesel requires no engine modifications.

Last year smoke reduction claims led the way on this question on the primary advantages of biodiesel. Only 2% responded with more than one advantage.

This year the lack of modifications leads the list, followed closely by smoke reduction. Two-fifths mention more than one advantage.

Curiously, one-fifth (22%) were unwilling to select any particular advantage for biodiesel. One person explained that he was waiting to hear from other communities that are now trying biodiesel. Several comments indicated that the price for biodiesel is high and is its primary disadvantage.

**Totals to more than 100% due to multiple response.
Following are some characteristics of biodiesel. You can help us identify the most important information for key people to understand about biodiesel. Briefly, biodiesel:

- Mixes easily with petroleum diesel,
- Requires no alterations or modifications to bus engines,
- Mileage and performance are similar to regular diesel,
- Reduces smoke pollution by up to 85 percent,
- Prices for blended biodiesel are projected to be about $2.00 per gallon,
- It is considered environmentally friendly, and
- Is made from a renewable resource.

From what you've heard or read and the little I've mentioned, what do you see as the primary advantages, if any, of biodiesel?

<table>
<thead>
<tr>
<th></th>
<th>1994</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires no alterations or modifications to bus engines.</td>
<td>44%</td>
<td>14%</td>
</tr>
<tr>
<td>Reduces smoke pollution by up to 85 percent.</td>
<td>38%</td>
<td>32%</td>
</tr>
<tr>
<td>Is made from a renewable resource.</td>
<td>15%</td>
<td>9%</td>
</tr>
<tr>
<td>Is considered environmentally friendly.</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td>Mixes easily with petroleum diesel.</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>Mileage and performance are similar to regular fuel.</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Prices are projected to be about $2.00 per gallon.</td>
<td>6%</td>
<td>--</td>
</tr>
<tr>
<td>Other mention</td>
<td>7%</td>
<td>14%</td>
</tr>
<tr>
<td>Nothing in particular, don't know.</td>
<td>22%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Totals to more than 100% due to multiple response.**
One comment indicates how biodiesel is perceived as a fuel additive rather than as an alternative fuel. The increase in the "no advantages" response seem to be based on lack of availability, high cost, perceived lack of performance, lack of EPA certification, and the inability of biodiesel to reduce ozone levels.

Some selected comments follow:

- Biodiesel is not any better than regular diesel, and it costs more.
- It hasn't been on the market long enough. More R&D is needed.
- Our market is non-attainment for ozone, and biodiesel does nothing to reduce ozone.
- I don't see why more effort isn't being put into the production of biodiesel. It seems to be a cost-effective approach to meeting air quality standards.
- It is not EPA certified yet.
- It burns clean and doesn't harm the engines.
- My only question is how it will perform in subzero temperatures. If the price comes down, it should be usable.
- I don't know if it can be manufactured in large quantities, and it might not meet future EPA standards.
- With biodiesel, engine performance is unchanged. You pay more per gallon, but overall costs are lower because there are no capital costs for modification.
- State law does not provide for us to be able to use biodiesel. The state doesn't recognize it as an alternative fuel.
Over 82% are satisfied with the information available on biodiesel.

Last year most transit managers expressed interest in being informed about biodiesel (53% felt they could use information on biodiesel in the next couple of months or sooner). The follow-up question on satisfaction with the information made available indicates that the promotion program responded to the needs of most transit managers (45% very satisfied and 37% somewhat satisfied). Those who are less satisfied indicate they have received little information about biodiesel. This includes the people who have never heard of biodiesel.

Satisfaction with Biodiesel Information

How satisfied are you with the information that has been made available to you on biodiesel? Would you say you are very, somewhat, not very, or not at all satisfied with the information?

![Pie chart showing satisfaction levels with biodiesel information]

- Very: 45%
- Somewhat: 37%
- Not Very: 6%
- Not At All: 9%
- Don't Know: 3%
Appendix
Hello. This is ______________ with Fleishman-Hillard Research. We are conducting a survey on opinions of alternative fuels for transit buses.

A. Are you the person responsible for specifying the fuel for your fleet of diesel buses to help them meet EPA standards?

1    YES -- CONTINUE INTERVIEWING
2    NO -- Who would that be? RECORD NAMES, THANK RESPONDENT AND TERMINATE.

AS NECESSARY: This is a research study. Its purpose is to monitor awareness of alternative fuels. We have nothing to sell. Your responses will be treated confidentially and summarized along with the answers of others.

INTERVIEWER: THROUGHOUT THE INTERVIEW ADD RESPONDENT COMMENTS IN THE MARGINS.

1. When I mention alternative fuels, what specific fuels come to mind?  
   PROBE: Any others?**

   14% "CLEAN" DIESEL, LOW-SULFUR DIESEL
   90 COMPRESSED NATURAL GAS
   22 ELECTRICITY, BATTERY, SOLAR CELL
   27 ETHANOL, ALCOHOL
   53 METHANOL
   30 PROPANE GAS
   16 SOYDIESEL
   20 BIODIESEL
   45 LNG
   7 OTHER

**TOTALS TO MORE THAN 100% DUE TO MULTIPLE RESPONSE.
IF NEITHER SOYDIESEL NOR BIODIESEL ARE MENTIONED ON QUESTION 1, ASK:

2. Have you ever heard of biodiesel?

57%  YES
8    No
35   NOT SURE

3. Alternative fuels for transit buses include compressed natural gas, propane, ethanol, methanol, electricity and biodiesel. Which of these do you rank as the number one, number two and number three alternative fuel options for transit buses?

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Number One</th>
<th>Number Two</th>
<th>Number Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed natural gas</td>
<td>44%</td>
<td>29%</td>
<td>10%</td>
</tr>
<tr>
<td>Propane gas</td>
<td>4</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Ethanol</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Methanol</td>
<td>--</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Electricity</td>
<td>4</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Biodiesel</td>
<td>20</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>LNG</td>
<td>15</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Don't Know, Can't Say</td>
<td>6</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Not Asked</td>
<td>--</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

4. What factor makes the most difference in evaluating the cost of using alternative fuels? Is it the price charged for the fuel, the requirements for storage facilities and vehicle modifications, or is it some other factor?

13%  Price charged for the fuel
47   Requirements for storage facilities and vehicle modifications
20   Some other factor
1    Don't Know
19   Both of these
5. To what extent are your diesel bus operations being pressured to reduce emissions to help attain EPA air quality standards for your metropolitan area? Do you feel there is a lot, some, little, or no pressure?

41% A lot
24 Some
13 Little
22 No pressure

6. What steps has your organization taken to help attain EPA air quality standards?**

17% Using alternative fuel
39 Purchased new equipment
30 Improved maintenance
4 Added traps
25 Converted to CNG
7 Using biodiesel
11 Done research
1 Aware of legislation
5 Nothing/don't know

7. What, if any, alternative fuels do you expect will be used in your operation over the next two years?**

7% "CLEAN" DIESEL, LOW-SULFUR DIESEL
38 COMPRESSED NATURAL GAS
9 ELECTRICITY, BATTERY, SOLAR CELL
5 ETHANOL, ALCOHOL
3 METHANOL
8 PROPANE GAS
2 SOYDIESEL
15 BIODIESEL
4 LNG
2 OTHER
37 NONE MENTIONED, DON'T KNOW

**TOTALS TO MORE THAN 100% DUE TO MULTIPLE RESPONSE.
8. Following are some characteristics of biodiesel. You can help us identify the most important information for key people to understand about biodiesel. Briefly, biodiesel:

- Mixes easily with petroleum diesel,
- Requires no alterations or modifications to bus engines,
- Mileage and performance are similar to regular diesel,
- Reduces smoke pollution by up to 85 percent,
- Prices for blended biodiesel are projected to be about $2.00 per gallon,
- It is considered environmentally friendly, and
- Is made from a renewable resource.

From what you've heard or read and the little I've mentioned, what do you see as the primary advantages, if any, of biodiesel?**

- 9% Mixes easily with petroleum diesel.
- 44 Requires no alterations or modifications to bus engines.
- 6 Mileage and performance are similar to regular fuel.
- 38 Reduces smoke pollution by up to 85 percent.
- 6 Prices are projected to be about $2.00 per gallon.
- 14 Is considered environmentally friendly.
- 15 Is made from a renewable resource.
- 7 OTHER MENTION.
- 22 NOTHING IN PARTICULAR, DON'T KNOW.

9. How satisfied are you with the information that has been made available to you on biodiesel? Would you say you are very, somewhat, not very, or not at all satisfied with the information?

- 45% Very
- 37 Somewhat
- 6 Not very
- 9 Not at all satisfied
- 3 DON'T KNOW

**TOTALS TO MORE THAN 100% DUE TO MULTIPLE RESPONSE.
10. Are you more receptive, just as receptive, or less receptive to using biodiesel than you were a year ago?

   40% More receptive
   41 Just as receptive
   15 Less receptive
   4 DON'T KNOW, NO OPINION

Thank you very much for your assistance. Have a good day.

11. RESPONDENT NAME: ___________________________________________

12. TITLE: _______________________________________________________

13. COMPANY: ___________________________________________________

14. CITY: ___________________ STATE: _____ ZIP: _________________

15. PHONE #: __________________________________________________

16. INTERVIEWER: _____________________________________________

17. LENGTH OF INTERVIEW: MEAN = 5 MINUTES

From FH RECORDS

18. NUMBER OF BUSES IN FLEET: _________________________________

19. USER OF BIODIESEL? YES NO NOT SURE