Getting consumers to pay (more) attention to fuel economy

Tom Turrentine,
Director of CEC / PIER funded Plug-in Hybrid Electric Vehicle Research Center
University of California, Davis

Behavior, Energy & Climate Change
November 8-9 Sacramento California

Consumers complain about rising cost of fuel, but how do they respond?

---

Current Prices
Inflation-Adjusted 2002 Prices
When gas prices dropped in 82, OEMs built & consumers bought heavier & more powerful cars & trucks each year.

Index of tons/hp vs MPG

Since gas prices rose in 02, many buyers have switched to fuel economical cars, but most Americans don’t drive less.

- Truck and SUV sales are down while sales of small cars are up. Hybrid vehicle sales & models are increasing steadily.
- But drivers are getting “less” elastic about fuel costs over the last decades; though gas prices increase, they don’t use less fuel- Hughes, Knittel, Sperling, 2007.
But what else is shaping fuel economy choices besides the price?

- How do drivers make decisions about fuel economy when they buy?
  - Many analysts assume buyers know annual fuel costs
  - Car companies & some studies conclude that drivers want their money back (payback) on new fuel economy technology (like hybrid drive trains).
- How does instrumentation impact choices?
- What about social marketing programs?
- What about “green” values?

ITS Davis began a new series of interview studies in 2004 on consumers, fuel economy & advanced technology vehicles.

- 88-04 - Consumer studies focused on diesel, methanol, electric, HEV, CNG, fuel-cell electric, neighborhood electric, city electric, etc…
- 04 - 57 Car buyers & fuel economy
- 05 - 25 “Efficiency” HEV owners
- 06 - 25 Re-contacts with 04 fuel economy households
- 06 - 25 “Performance” & SUV hybrid buyers
- 06/07 - Plug-in Hybrid Vehicle (PHEV) drivers
The 2004 study: Talking to California car buyers about fuel economy.

To explore the variety of decisions, if not necessarily the distribution- 57 households -San Francisco to Truckee

- 3 Pilot interviews with 2 car families
- 6 Graduating college students
- 6 Workers in state resource agencies
- 6 Off-road vehicle enthusiasts
- 6 Farmers / ranchers
- 6 Computer industry
- 6 Military personnel
- 6 Outdoor recreational industry
- 6 Hybrid buyers
- 6 Financial services

Getting the stories & the details.

- Interview at home, when possible, the whole family
- 4-step interviews - 1.5 to 2 hours
  1) Household vehicle history/storytelling
  2) Recent vehicle purchase decisions
  3) Explore next vehicle purchase
  4) Explore knowledge, beliefs, & behaviors around fuel economy & fuel purchase
Listening to household vehicle stories; in 2004, not much said about MPG.

<table>
<thead>
<tr>
<th>Vehicles</th>
<th>Year</th>
<th>Travel</th>
<th>Residence</th>
<th>Household</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995 BMW 528e, used</td>
<td>1995</td>
<td>Dating</td>
<td>Davis, rent</td>
<td>Dating</td>
</tr>
<tr>
<td>1996 Toyota Camry, new, F's car</td>
<td>1996</td>
<td>Auburn, own</td>
<td>Sacramento, F shows property in Weimar and Colfax</td>
<td>Married</td>
</tr>
<tr>
<td>1997</td>
<td>1997</td>
<td>2 adults, 1 young child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>1998</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999 Lexus LS400, used</td>
<td>1999</td>
<td>2 adults, 2 young children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997 Mercury Mountaineer, used</td>
<td>1997</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>2001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>2002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003 Honda Pilot, new</td>
<td>2003</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What did they know about their car’s rate of fuel use?

- About 1/2 of participants knew their MPG within a few points.
- Few willing to venture MPG of other vehicles on road.
- A couple of older owners keep track of MPG to monitor engine wear (& one dutiful daughter).
- Knowledge of MPG from new car sticker remote, some measured MPG in months right after purchase.
What did they know about their fuel expenses?

• Most accurately & commonly recalled is recent cost of tank-fill.
• Next is the price of a gallon of gas.
• A sort-of-weekly sense of costs; for example:
  ▪ “My car costs me $40 for about 10 days of driving”
  ▪ “My car costs about $40 to go to Reno from San Francisco”

What did they not know?

• They did not know or track monthly or annual fuel costs
  ▪ One household had calculated annual fuel costs, to budget for a new cabin.
• They did not know how many gallons of gasoline they use monthly, annually, ect…
• And when they were buying a car, they didn’t think about “payback” on fuel economy.
But drivers lack of knowledge is not surprising given instrumentation

- Most cars still poorly equipped for fuel economy knowledge.

But Prius owners watch their instruments like hawks

- Like to watch fuel economy gauge
- Like to see if their driving can change fuel economy
- But still no cumulative measurements of fuel use or costs over time.
And buyers do pay attention to others on fuel economy.

- News programs are most common mentioned source of knowledge about fuel economy and costs.
- Friend’s vehicles, mechanics, etc.
  - Many Prius buyers influenced by friends and co-workers
- Are able to compare through use of rental cars & loan programs
- 1 of 57 Households had visited gov mpg site (2004)
  - But if sites become more interactive, can be effective.

...the future of alternatives...will more likely be decided as American consumers, one by one, sit down with calculators and payment schedules and weigh out whether making the leap to the future makes sense in the here and now.”

J.B. White, Wall Street Journal, 26 Sept. 2005

Analysts have erroneously focused on fuel cost payback issue.

<table>
<thead>
<tr>
<th>WILL A HYBRID CAR SAVE YOU MONEY?</th>
</tr>
</thead>
<tbody>
<tr>
<td>It can take eight years for the savings on gas to offset up-front costs, depending on how many miles you drive.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>MSRP*</td>
</tr>
<tr>
<td>Tax break</td>
</tr>
<tr>
<td>Yearly gas cost</td>
</tr>
<tr>
<td>MPG city</td>
</tr>
<tr>
<td>Regular gas</td>
</tr>
<tr>
<td>Cost after eight years</td>
</tr>
</tbody>
</table>

NOTE: Figures assume a 28 percent tax bracket, 10,000 miles per year traveled. If gas prices rise or if you drive more than 10,000 miles per year, you would earn back the difference in the vehicle cost faster.

* Manufacturer’s suggested retail price.
If drivers bought a more efficient car; how soon would they want a “payback” on the extra cost?

Car companies (& DOE) were saying in 2004 that the **average buyer**
will want to get money spent on new fuel-economy technology back in less than **3 years**.

What is the distribution behind the average?

“Suppose that the next vehicle you’ve decided to buy offers an option of better fuel economy, but at a higher price. The savings in fuel costs would pay back the higher price over time. How soon, in years, would the fuel savings have to pay back the additional cost to persuade you to buy the higher fuel economy option?”

-Opinion Research Corp. for NREL, 2002. N = 1,000
But what is behind the answers? Answers to OPR question interpreted based on our interviews.

2006 - And talking with hybrid vehicle buyers, we learned we had focused too much on the “practical” side of decisions

- Hybrid buyers not so calculating as we expected: good fuel economy was a value, not a calculation
- Owners said car market not interesting prior to HEVs
  - Purchase was exciting moment for family
  - First time they cared about their car in a long time, even gave their car a name.
- HEV purchase was a message to OEMs & other drivers
- HEV was about the future & personal values
When designing programs to get consumers to change, remember...

- Price important, but details of knowledge, values & motivations important.
- Instrumentation essential to change process.
- Prius & hybrid success demonstrates enduring role of symbols in auto market.
- Hybrids may have initiated a shift in consumer values that are not incremental.