Understanding Driver Refueling Behavior

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January, 30 2014
Agenda

1. Alternative Fuel use in the Federal fleet

2. Empirical analysis of refueling behavior

3. Survey of Federal fleet drivers

4. Changing driver refueling behavior
Federal fleet Acquisitions & Inventory

Total FY 2013 AFV Acquisitions by covered Federal Agencies

- GAS: 14,757
- E85: 21,317
- DSL: 3,792
- HEV: 1,384
- EV: 274
- PHEV: 258
- CNG: 113
- LPG: 23
- HYD: 2

Total FY 2013 AFV Inventory of covered Federal Agencies

- GAS: 325,657
- E85: 177,892
- DSL: 63,913
- HEV: 15,833
- PHEV: 507
- ELE: 3,608
- CNG: 1,437
- LPG: 204
- HYD: 5
FY13 Petroleum Consumption

**Total Petroleum**
- **292,282,393**

**Diesel**
- **53,487,487**

**B20 Diesel**
- **4,248,008**

**Gasoline**
- **234,546,898**

**E.O. 13514 Requirement**
- **211,396,699**

*Excludes military tactical, law enforcement, and emergency vehicles.*

Includes Diesel portion of Biodiesel B20.
FY13 Alternative Fuel Consumption

*Excludes military tactical, law enforcement, and emergency vehicles.

**Includes all alternative fuels: Biodiesel portion of B20, B100, E85, CNG, LNG, LPG, Hydrogen, and Electricity.
AFV’s comprise 34% of all Federal vehicles, but Alternative Fuel is 5.3% of total Federal fuel use.

FY 2013 Total Fuel Use (GGE)
Consumer Behavior change in the Federal Fleet

- NREL LDRD: $400k over 3 yrs
- Applied behavioral research to increase E85 use in Fed fleet

**Missed Opportunity:** FFV purchases
Gas w/in 5 mi. of E85

**Made Opportunity:** E85 purchase

**Total Opportunities:** Missed + Made

**Non-Opportunities:** FFV purchases
Gas further than 5 miles from E85
Empirical Analysis of Refueling Patterns

State level analysis of missed opportunity trends

• 4 years, 12 Agencies, 4.4M transactions, 68k vehicles

Linear regression of Missed Opportunity rates. They will be lower:

• Over time as infrastructure availability increases
• The closer the vehicle is to it’s garage
• When there is an E85 station w/in 5 miles of garage
• When the vehicles have access to E85 more frequently
• In the Midwest
• In the summer months
• In “established” markets
Regional & E85 Market Designations

Market Scores = Gas Vehicles/Gas Stations : FFV’s/E85 Station

- **Established**
  - > 0.75

- **Emerging**
  - 0.25 – 0.75

- **Developing**
  - 0.10 – 0.25

- **Nascent**
  - < 0.10
Empirical Analysis of Refueling Patterns

No correlation with Missed Opportunities
• Operational variables: GGE/Vehicle, distance from garage
• Seasonal variations are not significant

Positive correlation with Missed Opportunities
• E85 infrastructure growth rates

Significant negative correlation with Missed Opportunities
• Over time: rates are lowest in 2011 & 2012
• When there is an E85 station w/in 5 miles of garage
• When the vehicles have access to E85 more frequently
• In the Midwest & “established” markets
Empirical Analysis of Refueling Patterns

Major Findings

• E85 Growth Rate is positively correlated with Missed Opportunities
• There is a time lag between station growth and actual use
• If you build it... they might come eventually
Empirical Analysis of Refueling Patterns

Major Findings

• Frequency of proximity matters
• EPAct § 701 works, but has unintended consequences
• The Midwest dominates
• Newer markets show potential
• **Strength of the linear models = ~35%**
Survey Description

• Anonymous online survey, 35 questions in length
• Survey distributed via FEMP contact database
  o FEDFLEET & regional workshop attendees, GSA reports carryout contacts
  o 6/11/12 and 7/10/12 delivered to 10,847 contacts
• 3,314 respondents (31% response rate)
• 48 federal organizations
• Broad geographic distribution
• Top five responding agencies:
  o Department of Agriculture
  o Department of Transportation
  o Department of Homeland Security
  o Office of Personnel Management
  o Department of the Interior
Who is the “Federal Fleet Driver”?

70% have been driving a federal vehicle for more than 5 years

How many years have you been driving a federal vehicle?

- 1-5 years: 990
- 6-10 years: 729
- 11-20 years: 744
- 21-30 years: 590
- 31-40 years: 236
- > 40 years: 25

69% Male - 31% Female

61% are 41-60 yrs old
Driver Knowledge

Can your primary federal vehicle use E85 fuel?

1/4 don’t know if they’re driving an FFV
Survey – Specific Findings

What is the likelihood that you would drive the following additional distances/time increments out of your way to purchase E85?
• 0% (I would never...) to 100% (I would always...)

- Purchasers (P)
- Swing Purchasers (SP)
- Non-Purchasers (NP)

TIME
DISTANCE

< 1 mi / < 5 mins
1-3 mi / 5-10 mins
3-5 mi / 10-15 mins
> 5 mi / > 15 mins
Survey – Specific Findings

What (statistically significant) variables contribute to a respondents likelihood to be a “Purchaser”?

1. **Receive feedback from Mgmt**
   - P (28%) → SP (20%) → NP (17%)

2. **Aware of requirement to use Alt Fuel**
   - P (76%) → SP (60%) → NP (42%)

3. **Received training on requirements**
   - P (42%) → SP (30%) → NP (26%)

4. **Info on Availability of Fuel**
   - P (59%) → SP (44%) → NP (30%)
Changing Driver Behavior - Feedback

FleetDASH tracks fuel consumption throughout the year.

Sample Department Leased Fleet Fuel Use

Fuel Used by Type (FY 2012 to Date)

- Petroleum
- GAS 63.0%
- E85 14.9%
- B20 0.65%
- DSL 13.8%
- CNG 0.03%
- Missed Opps 7.6%

Monthly Total Fuel Consumption: FY11 and FY12

https://federalfleets.energy.gov/FleetDASH/
Changing Driver Behavior - Feedback

- Automated monthly performance feedback
- Positive vs. Negative
- Peer to peer vs. Individual comparisons
- Monitor the impact on refueling behavior, and adapt

![Bar chart showing fleet performance](chart1.png)

- **Your fleet's performance:**
  - GREAT
  - GOOD
  - NEEDS IMPROVEMENT

![Line chart showing missed opportunities](chart2.png)

- **Your missed opportunities over the last 12 months was**
  - **115,751 gallons**
  - an average of
  - **16%**
  - of the time when it was available
Changing Driver Behavior - Training

- 15-minute, on-demand training
- EPAct 2005 § 701 requirement to use alternative fuel
- How to identify dual-fuel vehicles
- How to locate alternative fuel stations
Changing Driver Behavior – Find E85

afdc.energy.gov/locator/stations
Changing Driver Behavior – Next Steps

• NPS Driver Behavior, Education & Training Program

• Project Description
  o Establish baseline fleet performance
  o Conduct NPS driver survey
  o Develop targeted driver behavior coaching/training
  o Measure and monitor the results

• Refine a replicable service in Organizational and Individual Behavior Change
Questions?