



Choosing Sustainability: A Case Study of Service Stations

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Introduction & Background

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- Biofuels (primarily ethanol and biodiesel) hailed as the road to a sustainable economic future in Michigan in 2006-2007; considered by some to be a step towards more “sustainable” transportation*
- Increase – nationally and in Michigan – in biofuel incentives for fuel manufacturing & auto manufacturing, and a small pilot program focused on “infrastructure”

*e.g., Farrell et al., 2006; Shapouri et al., 2004

Introduction & Background

Governor Jennifer Granholm, in 2006, says:

“The state that put the world on wheels will be the state that makes those wheels independent of foreign oil.”



Introduction & Background

But...there were a few problems with this plan...

One of these problems is the focus of this study: for biofuels to be successful, they need to be available, which means there is a massive need for infrastructure upgrades at service stations.



Introduction & Background

In Michigan, 95% of service stations are locally owned & operated, and served by small oil companies; these companies are “SMEs.”

Each station had to decide whether to install biofuel infrastructure (e.g., a dispenser, a separate tank, new hoses, etc.), and *these decisions characterize this study.*

Though biofuels are no longer eco-heroes, these infrastructure questions are relevant for future fueling upgrades, including electric vehicles.



Introduction & Background: A Word on Decisions

Common characteristics of strategic decisions:

- Infrequent
- Fraught with uncertainty
- Require significant commitment of resources
- Difficult for orgs because of a lack of data

My lens in this work was to examine biofuel infrastructure decisions as strategic decisions; biofuel infrastructure cost participants up to \$100,000 (U.S.)

Viewed decisions from behavioral decision science literature, which describes biases and heuristics that can characterize decision processes.



Study Design & Methodology

Study Design & Methodology

In-depth interviews with 32 total participants – 22 service station and small oil company owners in Michigan. Remaining interviews were with industry association leaders, industry experts, and biofuel producers.

Purposive sampling based on biofuel service station listings via the U.S. DOE's Alternative Fuels & Advanced Vehicles Data Center.

61 unique biofuel entities in Michigan (some participants own multiple stations).

Interviews took place from 2007-2010; all were in Michigan.





Research Questions

Research Questions

Two parts: (1) & (2) focused on traditional decision objectives; (3) & (4) focused on behavioral decision biases & heuristics.

(1) What are the most important objectives decision makers consider when deciding whether or not to install biofuel infrastructure?

(2) What are the barriers that decision makers face when considering the adoption of biofuel infrastructure?

(3) What role do the personal values of the decision maker, relative to sustainability, play in the decision to add (or not) biofuel infrastructure?

(4) What role do judgmental heuristics & biases play in the decision to add (or not) biofuel infrastructure?



Results

Results, RQ 1 – Objectives Considered

Table 5

Objectives considered in the decision to install (or not) biofuel infrastructure

Objectives considered	Percentage
Competitive Advantage	45.45%
Biofuels Support Community & Farmers	36.36%
Ability to Use Existing Infrastructure	31.82%
Biofuels' Role in Weaning the U.S. from Foreign Oil	27.27%
Customer Request	27.27%
Partnership / Mentoring Role Within the Industry	22.72%
Availability of Incentives (including equipment and fuel)	22.72%
Public Relations Benefits	18.18%
Ability of Biofuels to Attract New Customers	18.18%
ROI	18.18%
Service Station Owner Wishes to Appear Innovative	18.18%
Environmental Benefits of Biofuels	18.18%
Ease of Procurement	4.54%
Biofuels Less Expensive (than Gasoline)	4.54%
	n=22

Results – RQ2 – Barriers

Table 6

Barriers to installation of biofuel infrastructure

Barriers	Percentage
Expense of Infrastructure	63.63%
Industry Brand Resistance	22.73%
Uncertain Regulatory Environment	13.63%
Fuel Quality Issues (biodiesel)	9.09%
Questionable Long-Term Fuel Availability	9.09%
Service Station Owner Attributes	9.09%
Available Space (for Infrastructure)	9.09%
Length of Time to Payoff	4.54%
Public Awareness	4.54%
Risk (as a small company compared to larger retailers)	4.54%
Lack of Analytical Resources (for market analysis)	4.54%
	n=22

Results – Role of Judgmental Heuristics & Biases

- Representativeness Heuristic – evident through overgeneralizations based on small sample size
- Availability Heuristic – mix of influential industry partners and industry messages makes biofuels most available choice to meet stated objectives
- Overconfidence Bias – literature indicates small business owners more likely to be overconfident; suggested here by overlooking potentially negative outcomes





Conclusions & Moving Forward

Conclusions

- In light of potential electric quick charge infrastructure grants, service stations are sensitive to other issues beyond infrastructure cost, and grants must be commensurate with actual cost.
- Is infrastructure the best way to go about changing the way we drive?
- A goal of behavioral decision science is helping individuals & organizations to make better decisions:

How can prescriptive decision science aids be useful for SME decision support?

Next Steps

- Continued work on SME sustainability innovations in traditional industries.
- Continued work on decision processes in SMEs with an eye toward decision support tools.





Questions?

Continue the conversation...

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