



**National Council on Competition
and the Electric Industry
Label Testing:
Results of Mall Intercept Study**

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April 1998

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Forward

The National Council and Its Research Agenda

In November 1996, The National Council on Competition and the Electric Industry initiated its Consumer Information Disclosure Project to assist state regulators and legislators address consumer information needs in a competitive electricity environment. This effort followed on the heels of The National Association of Regulatory Utility Commissioners' November 1996 resolution calling for enforceable, uniform standards that would allow retail consumers to easily compare price, price variability, resource mix, and the environmental characteristics of their electricity purchases.

To implement this resolution, the National Council has initiated a multi-part research agenda. The research agenda is designed to identify and provide state regulators and legislators with technical information, consumer research and policy options. The tasks currently being undertaken are described below. A report, describing the result of the research, will be prepared for each of the tasks. Copies will be made available on the National Council's website as they become available.

Options Identification and Tracking Overview

This task identifies the major disclosure and labeling options for environmental and resource mix. Emphasis for the options focuses on information that is currently available for use in possible labels. The task also identifies the likely mechanisms that could be used to trace transactions from generators through sellers, aggregators, or marketers to retail buyers.

Price and Service Disclosure Generally

This task identifies the major disclosure options for items other than environmental and resource mix — for example, pricing elements, price change formulas, service options, and fixed vs. variable rates. The task focuses on items that might be included in simple labels, (e.g., price) as well as other items such as risk, and important contract terms and conditions that might be provided to consumers in other forms.

Stakeholder Outreach

The National Council has held three regional meetings to collect input from stakeholders on a variety of issues with particular emphasis on suggested label content and format. Other issues included whether label information should be historical or prospective, the required level of accuracy, the treatment of energy efficiency, emission offsets, and allowances, the frequency and location of information, and enforcement.

Customer Focus Groups

This task involves customer focus groups in six states, including focus groups with consumers who have participated in retail competition pilot programs (e.g., New Hampshire). The groups provided feedback on how they perceive competition and on the categories of information consumers want before choosing among electricity suppliers. The groups were also asked for their reactions to different marketing materials.

Baseline Tracking Survey

This task consists of a nationwide telephone survey to collect information about knowledge, attitudes, and practices relevant to consumer decisions about electricity service. This task also establishes national and regional baseline data on the issues.

Disclosure Testing

The purpose of this research is to test labeling options for consumer acceptance, ease of use, comprehensibility, and task performance (i.e., ability to perform label use tasks). Labeling options will be tested in a controlled, experimental setting that simulates realistic use situations to assess label performance quantitatively.

New England Project

This task involves working with PUCs and stakeholders in the six New England states and making recommendations for uniform disclosure requirements.

Large-Scale Pilots

This task involves large-scale testing of disclosure in the context of retail pilot programs to help design and evaluate the testing of different aspects of disclosure. We have had several conversations with Commissions and utilities that are planning retail access pilot programs.

Regional Disclosure Projects

This task applies the experience on the process used in New England to develop proposed uniform disclosure requirements for other regions. In each region, the Council will work with commissions and all other stakeholders to develop uniform disclosure requirements that fit the needs of the regional market.

Consumer Acceptance of Alternative Tracking Approaches

There are two approaches to tracking information used for disclosing information to consumers on fuel mix and emissions. One approach is a contract or settlement approach and the other is tradable tags. Both approaches are described in detail in other National Council reports. A fundamental concern raised about the tradeable tag approach is that it

will suffer from a lack of consumer acceptance. The purpose of this research task is to assess consumer acceptance of alternative tracking approaches and determine whether and to what extent using one approach over the other influences consumer choice.

Executive Summary

This report summarizes the initial results of the disclosure testing phase of the National Council on Competition and The Electric Industry's Consumer Information Disclosure Project.

The primary questions addressed by this research were:

1. Is consumer understanding and performance affected (and how) by whether disclosure is voluntary or mandatory?
2. How does the uniformity of disclosed information affect consumer understanding and performance?
3. What label formats are most effective at conveying information to consumers?
4. What is the relationship between environmental certification and the disclosure of fuel mix and environmental information?

In addition, portions of the research assessed respondents' apparent willingness to make tradeoffs, such as accepting a higher price in order to get lower emissions.

We found that consumer understanding of the information presented and their ability to use the information to make informed choices was substantially improved when all products were labeled in a uniform fashion. We similarly found that some formats conveyed the information much better than other formats.

Research design

This part of our consumer research is very different from the other National Council studies in that it primarily assesses consumers' performance rather than consumer opinions. Instead of simply assessing what consumers say they want or prefer, this study assesses consumers' ability to understand information to do the tasks needed to choose between competitive suppliers. The study recruited 1,001 respondents at shopping malls in eight different cities around the United States. After providing them with information, we asked a number of questions, including: Which product is cheaper? How much will this product cost each month? Which product has lower air emissions? Which product relies more heavily on particular fuel sources? Consumer performance in answering these questions was measured as a function of the content and format of information we gave them.

The study structure consisted of many interrelated and overlapping experiments. The richness of the data and the time needed to analyze the data means that this is the first of several reports. We will issue future reports as the data is analyzed.

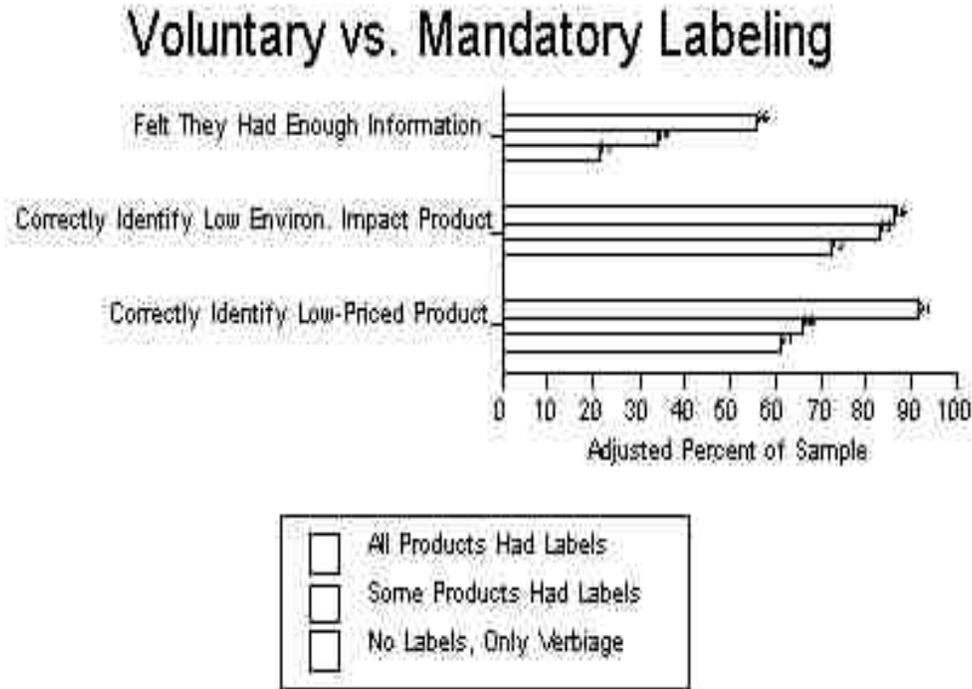
Each participant was asked to take part in five experiments:

1. Respondents were shown marketing claims for three hypothetical electricity products. The products varied in price, fuel mix, and emissions of three air pollutants — sulfur dioxide, oxides of nitrogen, and carbon dioxide. Respondents were divided into 20 groups, with different amounts and types of information disclosed to each group. We looked at how various levels of information affected respondents' ability to accurately compare products on price and environmental grounds.
2. Respondents were shown two hypothetical products that varied in terms of price and environmental characteristics. They were given relatively complete information about the products in an effort to focus on how respondents made tradeoffs, such as accepting a higher price in order to get lower emissions.
3. Respondents were given a disclosure statement for a single product. The format of the disclosure statement, however, differed among respondents. This allowed us to look at which label formats were most effective in conveying information accurately.
4. Respondents were shown marketing claims for a single product and asked to rate it in terms of price and environmental impact. Then they were given varying levels of additional information, such as what they would see on a disclosure label and asked whether this changed their opinions about the product. This was done to determine what added information the label provides.
5. Respondents were given several possible formats for price and environmental information and asked which they preferred. This allowed us to determine respondents' preferences for particular formats and to compare the formats they preferred with the formats that were best able to convey information.

Like all consumer research, this study must be interpreted with caution. Consumers were presented with hypothetical products; they were never asked to spend their own money. Within these constraints, the study attempted to simulate a real market condition. As intuition suggests, when respondents do not face a real budget constraint they are often not as sensitive to price differences as they are in real markets. However, the fact that households with less income showed more sensitivity to price is encouraging and suggests the experimental results reflect patterns that we will see in real markets. How closely real behavior follows behavior in experimental settings is always difficult to gauge. Interpretations of these results should be particularly cautious because, to date, consumers have had almost no real-world experience in choosing among electricity providers.

Summary of Findings

How are consumer understanding and performance affected by whether disclosure is voluntary or mandatory?



We designed several portions of different experiments to examine voluntary disclosure schemes. For all performance tests involving calculating or comparing price, fuel mix, or emissions, consumer performance was substantially improved when all products had labels.

Customer desire for information was also best met when all products were labeled. In most experiments, we asked consumers whether they had enough information to make an informed decision. Full labels on all products were most likely to satisfy respondents' desire for information. Almost 60 percent of consumers said they had enough information to choose between products compared to about 20 percent of respondents who saw no labels. Formats that revealed price information were also among the most likely formats to satisfy respondents' information needs. Members of environmental organizations, Caucasians, those with college education or greater and those who strongly agreed that the government should take action on global warming were most likely to say they needed more information.

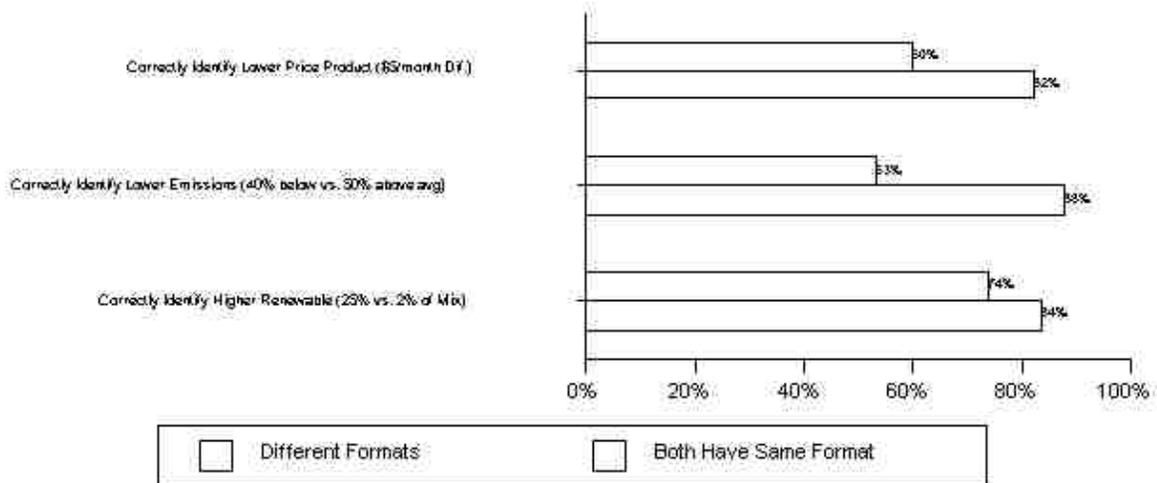
How does the uniformity of disclosed information affect consumer understanding and performance?

Not surprisingly, respondents were better able to compare products when all products disclosed information in the same format. Eighty-two percent of respondents knew which

product was more expensive when they were given information in the same format for both products, compared with 60 percent who saw different formats. Eighty-four of respondents who saw the same fuel mix format correctly identified which had higher renewable energy, while 74 percent of those who saw different formats still identified the correct one. When asked which product created fewer air emissions, 88 percent answered correctly compared with only 53 percent correct when formats differed.

In the three product experiment, nearly all respondents (92 percent) correctly identified the low-price product when all three products had uniformly presented price information. Respondents had substantial difficulty identifying the low-price product where there were no labels or where labels contained only environmental information. Where some products were fully labeled and

Uniform vs. Different Formats



others were not, as might occur if labeling were voluntary, 52 percent correctly identified low-priced option.

We asked respondents to determine which of three products (A, B, and C) was most environmentally sound. Given our product definitions, it is ambiguous whether Product B, (highest renewable sources) or Product C (lowest emissions) was the correct answer. Thus whenever a respondent picked either product we considered their answer correct. We found that the types and consistency of information presented, the extent of difference in environmental attributes, and individual characteristics all impact the respondent’s choice of the most environmentally-friendly product. Usually, respondents identified B as the most environmentally sound product. The one exception was an experiment designed to mimic voluntary disclosure where the individual supplier could show only the most favorable portions of the label. Here, Product A showed price, B showed fuel mix and C showed fuel mix and emissions. In this experiment, respondents were most likely to identify C as the most environmentally friendly.

In general, the greatest percentage of people were unable to pick the most environmentally-friendly product when there was no label. Conversely, consistent environmental disclosure for all products produced the most correct responses. Experiments where only some products carried labels or where Product B and/or C received environmental certification also showed high percentages of incorrect responses.

What label formats are most effective at conveying information to consumers?

The way price information is conveyed has a large impact on consumers’ ability to use price information. We gave consumers labels which showed price information in several different formats, including average prices at stated usage levels, average monthly bill at stated usage levels, flat monthly fee plus usage charge, and actual prices for a simple block price structure.

Price Format Performance

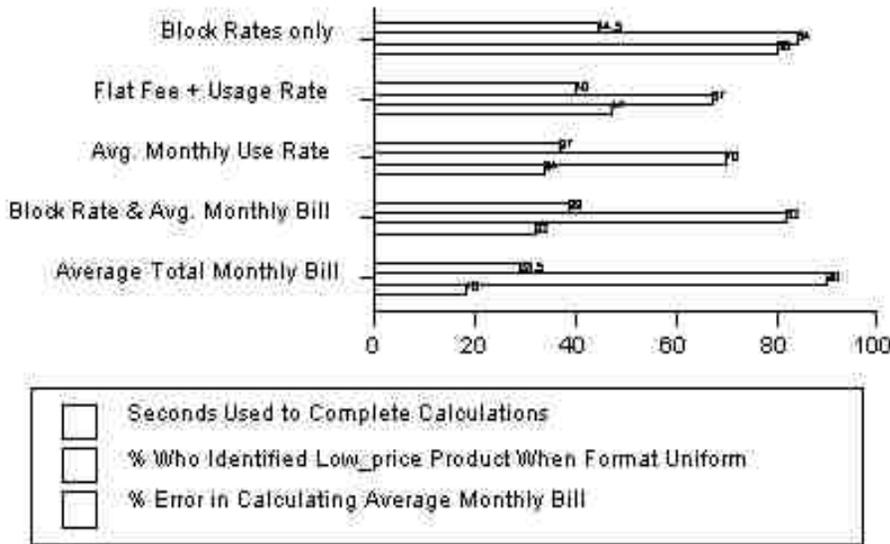


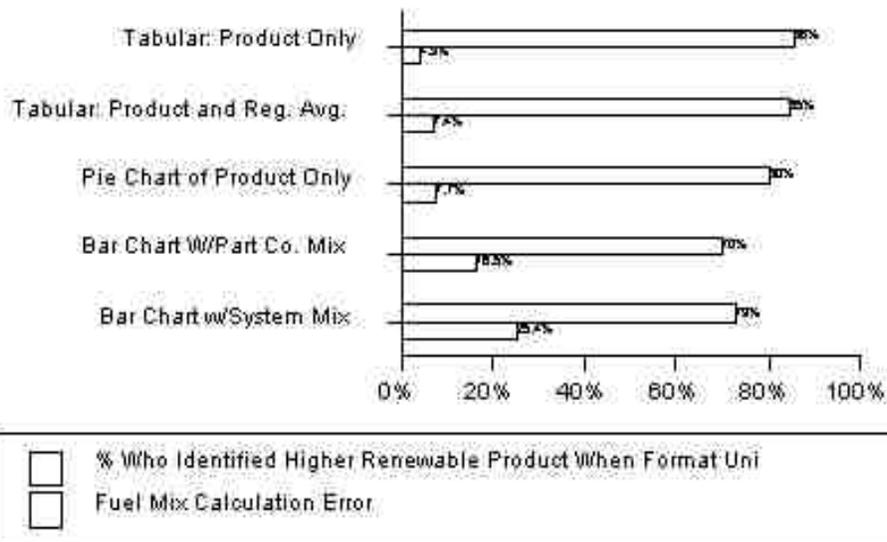
Illustration of Electricity Price Formats	
Format Terminology	Display
Average Monthly Bill	\$45.00/month
Average Price	500 1000 2000 5.5>/kWh 3.5>/kWh 2.5>/kWh
Flat Fee Plus Usage	2.5>/kWh plus \$20.00 flat fee
Block Rate	1-700 750-1500 1500+
(two versions)	5.5>/kWh 3.5>/kWh 2.5>/kWh

We asked that each respondent do two monthly bill calculations assuming 1000 kWh and 2000 kWh. Consumers had the most difficulty calculating monthly bills with block rate structures. (They made errors averaging 47 to 80 percent of the correct answer.) Consumers did best with average monthly bill presentations (18 percent average error) and next best with average effective prices (34 percent average error).

The format also affected how long it took respondents to answer the calculation questions. The average total bill format allowed respondents to answer the questions in less than 30 seconds compared to about 45 seconds when the information was presented as block rates.

We also tested which formats were most effective in providing fuel mix and emissions information to customers. Respondents were presented with information in different formats, including graphical and tabular styles, and then tested on their understanding of the information they had been given. With respect to fuel mix, the simple tabular formats generally allowed respondents to do the best. Pie charts and tabular formats, which included the regional mix for comparison, fared slightly worse. One experiment tested an early California disclosure proposal that showed both a product's fuel mix and the average "system mix". (The proposal has been changed partly due to this research) This format caused respondents to do significantly worse on all tasks. With respect to emissions, we asked consumers to calculate the percentage of emissions of SO₂ or CO₂ and also to compare this percentage to the regional average. Performance was approximately the same for most formats, although when actual raw emission data (lbs/mwhr) was given, performance declined sharply.

Fuel Mix Format Performance



What is the relationship between environmental certification and the disclosure of fuel mix and environmental information?

Green certification, where some products are certified as environmentally friendly by a neutral party, is sometimes put forward as an alternative to environmental and fuel disclosure. In several experiments, consumers were presented with products that bore symbols of environmental approval. The symbol is similar to the “green-e” logo in use in California. When consumers saw the symbol, the moderator also read the following description.

“Before we start the next section, I’d like to tell you about this environmental certification symbol. It was developed by a non-profit group call the Center for Resource Solutions. They look at an electric company’s records and find out how they produce electricity. They measure how much of the company’s electricity is created from renewable resources and how much pollution is created when they make the electricity. If the company meets a set of minimum environmental standards that were established by an independent board of scientists, they grant the company the right to use this seal in their advertising and marketing literature.”



The results were mixed. Certification did not appear to be a viable substitute for environmental disclosure. In the three-product experiment, when there were no environmental disclosure labels, adding environmental certification for B and/or C did not significantly improve respondents’ ability to determine the most environmentally-sound product.

On the other hand, certification appeared to be useful as a supplement to the label. In the two-product experiment, we asked consumers to rank products in terms of price and environmental impact. When products were certified, there was a separate and significant

impact on the environmental rating and on the reported likelihood of purchase. In this experiment, certification did not have a significant effect on the perceived cost of the product.

Respondents also appeared to use the label to verify certification. In one portion of the two-product experiment, a product was promoted as both low cost and environmentally certified. Initially, when respondents saw persuasive bullet points that featured price verbiage and an environmental seal, they rated this product above other price-promoted products both in terms of environmental impact and in terms of likelihood of purchase. When respondents were given a disclosure label, which indicated that the product had relatively high emissions and few renewable resources, they substantially downgraded their rating of the product on both scales. Hence, respondents correctly updated their attitude toward the product once specific information was available.

Price/Environment Trade Off

The data collected in the study allowed an analysis of respondents' tradeoff of price and environmental attributes. We found that when Product X cost five percent less than Product Y, that Product Y needed to emit an average of 28 percent fewer pollutants to maintain an equal market share. When Product X costs five percent more, the fuel mix needed about 18 percentage points more renewable sources to maintain a market share equal to Product Y. A product having ten percent more emissions needed to contain eight percentage points more renewable sources in its fuel mix to maintain an equal market share with its competitor.

These findings were sensitive to the respondents' income. For consumers with household annual incomes above \$35,000, a product costing five percent more needed to have 11 percent fewer emissions to keep even with its competitor. If the market featured only households with household incomes of \$35,000 or less, it would require much greater reductions in emissions (43 percent less) to maintain a similar appeal with consumers.

Conclusion

Electricity Facts																			
Generation Cost <small>Average bill based on big 10 state average Cost includes regulated charges for delivery service</small>	Average Monthly Use	250 kWh	500 kWh	1000 kWh	2000 kWh														
	Average Monthly Generation Bill	\$12.50	\$22.50	\$40.00	\$70.00														
	<small>Your average bill may vary according to your use and local electricity rates. See your monthly bill for your average monthly use and the Terms of Service on your bill for the actual price.</small>																		
Contract <small>See your contract Terms of Service for more information</small>	Minimum Length: 12 Years		Price Changes: Fixed over contract period																
Supply Mix <small>We use these sources of electricity to supply all power consumed in our state</small>	<table border="1"> <tr><td>Coal</td><td>30%</td></tr> <tr><td>Natural Gas</td><td>20%</td></tr> <tr><td>Nuclear</td><td>15%</td></tr> <tr><td>Hydro</td><td>10%</td></tr> <tr><td>Solar, Wind, Biomass</td><td>20%</td></tr> <tr><td>Waste Incineration</td><td>5%</td></tr> <tr><td>Total</td><td>100%</td></tr> </table>					Coal	30%	Natural Gas	20%	Nuclear	15%	Hydro	10%	Solar, Wind, Biomass	20%	Waste Incineration	5%	Total	100%
Coal	30%																		
Natural Gas	20%																		
Nuclear	15%																		
Hydro	10%																		
Solar, Wind, Biomass	20%																		
Waste Incineration	5%																		
Total	100%																		
Air Emissions <small>Intergovernmental Panel on Climate Change (IPCC) emissions factors for CO₂, CH₄, N₂O, HFC, PFC, and SF₆ relative to regional average</small>																			

The research shows that consumer understanding of the information presented and their ability to use the information to make informed choices was substantially improved when all products were labeled in a uniform fashion. The research also shows that some formats conveyed the information much better than other formats. The following label yielded the best consumer performance. Other variations including price per kWh instead of monthly bill displays, pie chart graphics instead of the fuel mix table, and tables listing emissions as a percentage of regional average emissions instead of bar charts all performed reasonably well.

Section I

Respondent Characteristics

Mall intercept studies are typically not statistically representative of the U.S. population at large; the samples drawn at malls typically under-represent those from the highest and lowest socio-economic classes. The malls and locations chosen for this study do provide a sample that represents a variety of social and economic circumstances (see Table 1 for a summary of the sample's demographic characteristics). Nearly all respondents regularly dealt with the household bills and, therefore, should be familiar with dealing with things such as electric bills. Less than one in five say they belong to or have recently made a donation to an environmental organization. The sample involved an equal number of respondents intercepted at malls in the following cities: Cincinnati, Ohio; Holyoke, Massachusetts; Houston, Texas; Jacksonville, Florida; Riverside, California; Philadelphia, Pennsylvania; Portland, Oregon; Salt Lake City, Utah.

Table 1. Sample Demographics.

Variable	Response
<i>Education</i>	
High School or Less	42%
Some College or Technical Training	35%
College Degree or More	23%
<i>Annual Household Income</i>	
\$20,000 or Less	23%
\$20,000 - 40,000	33%
\$40,000 - 65,000	21%
\$65,000 or More	12%
Refused/DK	10%
<i>Race/Ethnicity</i>	
White, Not Hispanic	67%
Black, Not Hispanic	21%
Other/Multiple/Refused	12%
<i>Age</i>	
Average	37
Median	35
18 - 30	39%
31-55	49%
> 55	12%
<i>% Female</i>	51%
<i>% Who Declared Membership/Donation to an Environmental Organization</i>	16%
<i>% Who are Primary Handler of Household Bills</i>	88%

Table 2 summarizes the sample's views on several issues. More than four out of five respondents viewed their current electricity service in a favorable light but thought electricity bills were too high. About the same percent thought the government should take some role in reducing the risk of global warming. Less than half had heard anything about the possible deregulation of retail electricity. These responses are generally consistent with findings from the National Tracking Survey on Electricity Deregulation that was conducted several months earlier via telephone interviews.

Table 2. Sample Response to Knowledge and Attitude Questions.

Variable	Response
<i>How Satisfied Are You With Your Current Electricity Service?</i>	
Very Satisfied	49%
Somewhat Satisfied	40%
Somewhat Unsatisfied	7%
Very Unsatisfied	4%
<i>% Who Have Heard Anything About Deregulation</i>	48%
<i>The Prices We Pay for Electricity Are Too High</i>	
Strongly Agree	46%
Somewhat Agree	33%
Somewhat Disagree	14%
Strongly Disagree	4%
Don't Know/No Answer	3%
<i>The Government Should Take Action to Reduce the Risk of Global Warming</i>	
Strongly Agree	60%
Somewhat Agree	24%
Somewhat Disagree	6%
Strongly Disagree	6%
Don't Know/No Answer	4%

Section II

Experiment 1: How Information Affects Respondent Choice Among Three Electricity Products

Description of Experiment 1

Procedure and Question Sequence. After answering several introductory questions, respondents were presented three sheets of paper that represented three distinct electricity products generically labeled A, B and C. (See Appendix A for an example of front and back panels from the information sheet for Product A; full text of the questionnaire is included in Appendix C.) Each sheet contained product-specific information. The amount and format of information on each product and the consistency of informational format among the three products were subject to the experimental manipulations described in detail below. The degree of differentiation among the products in terms of price and environmental attributes was also subject to experimental manipulation and will be described in detail below.

Respondents were reminded that information might also appear on the back of each sheet and then asked, “Which of the companies would you buy your electricity from?” Interviewers timed how long it took each respondent to formulate the answer and observed whether the respondent looked at the front, back or both parts of each product's information sheet while formulating the answer.

After choosing the most preferred product, the respondent was asked why the product was chosen. Next interviewers asked which product was least preferred and inquired as to why that product was deemed the worst. Next the interviewer asked respondents to name the product with the lowest price and the product that offered the most environmentally-friendly service. In addition, the respondent was probed as to why the named product was most environmentally friendly.

Finally, the respondents were asked if they had enough information to make an informed choice and then to rate, on a scale from 1 to 10, the amount of information they were given with 1 corresponding to too little information and 10 corresponding to too much.

Experimental Conditions. We manipulated three key elements of the product grouping that each respondent viewed: 1) the amount and format of information available on each product, 2) the consistency of information provided on the three products and 3) the degree to which the three products differed in terms of price and environmental attributes. The experiment included the 20 conditions outlined in Table 3.

Some conditions featured only information on the front of each sheet (groups 1, 2, 7, 8, 9, 10). Groups 2, 8, 9 and 10 featured one or more products that carry a environmental certification seal (see Figure 1) on the front of the sheet. If a respondent was exposed to this condition, they were first read the explanation paragraph that appears at the bottom of Figure 1. All other conditions featured at least one product that contained some type of labeling.

A full label is featured on one or more products in groups 3 and 11-16. An example appears in Figure A2 (Appendix A). A full label featured an average monthly price for the product, calculated for a usage level of 1,000 kWh; contract terms summarizing the length of the contract and whether prices were fixed or variable; a tabular, numeric presentation of the product's generation fuel mix; and a tabular presentation of the amounts of three key air emissions produced during generation relative to a regional average. Other label formats used in Experiment I were similar to the full label in graphic layout but had one or more blocks of information removed (e.g., Figure A3, Appendix A features the label for Product A in group 19).

Groups 3-6 and groups 11-20 had some type of label on at least one product. Groups 3-6, 11 and 18-20 featured the same format of label on all three products. These experiments might represent policy scenarios which create mandatory, uniform labeling. (All products carry a label and the label format is consistent across all products.) For groups 12-16, only one or two of the products featured a label, but when two labels did appear they were in the same format. This might represent a policy scenario in which label disclosure

is voluntary, but there is a uniform format mandated for those who do disclose. Group 17 featured three different formats of labels. This might correspond to a policy scenario where disclosure is mandatory, but the disclosure format is left up to the individual company.

Table 3. Label and Product Conditions for Experiment 1.

Group #	Product Attributes	Label Treatment
1	similar	No labels (front contains bullet points of relative product strengths)
2	similar	No labels; B and C also carry environmental certification seal on front
3	similar	Full label on all products
4	similar	Full label without price on all products
5	similar	Only contact terms and fuel mix on all products
6	similar	Only contract terms and emissions on all products
7	different	No labels (front contains persuasive bullet points of relative product strengths)
8	different	No labels-all products also carry environmental certification seal on front
9	different	No labels; B also carries environmental certification seal on front
10	different	No labels; B and C also carry environmental certification seal on front
11	different	Full label on all products
12	different	Full label on A; B and C have no labels
13	different	Full label on B; A and C have no labels
14	different	Full label on C; A and B have no labels
15	different	Full label on A and B; C has no label
16	different	Full label on B and C; A has no label
17	different	Contract terms and price on A; contract terms and fuel mix on B; contract terms, fuel mix and emissions on C.
18	different	Full label without price on all products
19	different	Only contact terms and fuel mix on all products
20	different	Only contract terms and emissions on all products

Figure 1. Environmental Certification Seal



Low Environmental Impact Electricity
 as certified by the Center for Resource Solutions
 a non-profit organization 1-888-555-5555

Interview reads to respondent:

Before we start the next section, I’d like to tell you about this environmental certification symbol. It was developed by a non-profit group called the Center for Resource Solutions. They look at an electric company’s records and find out how they produce electricity. They measure how much of the company’s electricity is created from renewable resources and how much pollution is created when they make the electricity. If the company meets a set of minimum environmental standards that were established by an independent board of scientists, they grant the company the right to use this seal in their advertising and marketing literature.

The Three Competing Products. For all conditions and all respondents in Experiment 1, Product A always had the lowest price, Product B always had the greatest percentage of fuel mix attributable to renewable energy sources, and Product C always had the lowest emissions. The degree to which each product exceeded its competitors on its respective strength was one of the manipulated conditions. Groups 1-6 featured products that were very similar for both price and environmental attributes, while groups 7-20 featured products with attributes that were more differentiated (See Table 4 for a summary of the three products attributes by condition).

Table 4. Price and Environmental Attributes for each Product by Group in Experiment 1.

	Groups 1-6: Similar Attributes			Groups 7-20: Different Attribute		
Product	Average Monthly Bill	Renewable Content	Emissions Relative to Region	Average Monthly Bill	Renewable Content	Emissions Relative to Region
A	\$73.25	25%	+10%	\$67.25	2%	+125%
B	\$75.00	40%	-5%	\$75.00	50%	-5%
C	\$76.75	30%	-10%	\$80.75	20%	-65%

Variables Analyzed in Experiment I

The content of the bullet points on the front of the sheets varied. For groups 1-6, each sheet contained four bullet points, with the first bullet point highlighting its relative strength, and the other three containing generic claims concerning product quality, service and reliability that were designed to be virtually indistinguishable from the other products' claims.

For groups 7-20, each sheet also contained four bullet points, but three of the four highlighted the product's relative strength. (See Table 5 for the exact wording.) These bullet points were meant to mimic persuasive marketing text of the type that might appear in flyers or other marketing materials. Groups 1 and 7 featured only the bullet points and, therefore, served as a base by which we could measure the relative persuasiveness of this information alone.

Table 5. Bullet Points Appearing on Front Panel of Products A, B and C by Group.

Bullet Points Appearing on Front of Information Sheets		
Product	Groups 1-6	Groups 7-20
A	<ul style="list-style-type: none"> • We have some of the lowest prices around. • We've been serving thousands of customers a day since 1970. • We've received a rating of 'excellent' for customer service from the Public Utilities commission. • We have a solid environmental record. 	<ul style="list-style-type: none"> • We have some of the lowest rates available in the region • We have three different ways to save – depending on how much and when you use the most electricity • We're rated as one of this region's 'best buys' in electric service by USA Today. • We've been bringing customers reliable service since 1965.
B	<ul style="list-style-type: none"> • We rely heavily on renewable energy sources like hydroelectric power. • We've been in business since 1958. • We've received a four star rating for customer service from the Consumer Advocate's commission. • We have competitive rates. 	<ul style="list-style-type: none"> • We rely heavily on renewable energy sources like hydroelectric, solar and wind power. • Renewable energy sources don't rely on foreign sources of energy. • Renewable energy sources are much cleaner than burning fossil fuels like coal and oil. • We've been bringing customers quality service since 1955.

C	<ul style="list-style-type: none"> • We use energy sources that create very few toxic emissions. • We've been in business since 1965. • We've received a five diamond rating for customer service from the Better Business Bureau. • We have competitive prices. 	<ul style="list-style-type: none"> • We make some of the cleanest electricity around. • With some of the newest technology in America, we can create all the electricity you need while minimizing harmful air emissions. • Rated as one of this region's 'cleanest buys' by USA Today. • We've been bringing customers dependable service since 1965.
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Results

When is the Low Price Product Correctly Identified? The availability of price, the magnitude of price differences among products, the consistency of price information across products and individual demographic differences affected whether A was correctly identified as the low price product. Table 6 partitions the sample into five different groups, by the type of price information provided during the decision. When price information was presented on all products, nearly all respondents correctly identified the low-price product. The condition featuring no label of any sort (therefore no specific price information) did not perform so well. However, respondents had the most difficult time identifying the low-price product when the label contained only environmental information or when A was unlabeled and either B and/or C displayed a full label. Finally, with respect to whether labeling should be voluntary or mandatory, Table 6 shows that consumers' ability to correctly respond to the question suffers substantially when labeling is voluntary.

Table 6. Identification of Low Price Product by Information Provision Condition.

Price Information Available to Respondent	Adjusted Percent* Who Correctly Identified A as Low Price Product	Adjusted Percent* Who Didn't Know or Refused to Name the Low Price Product
No product displays any type of label (groups 1,2,7,8,9,10)	61 ^{A**}	25 ^A
All products display price (groups 3, 11)	92 ^B	1 ^B
Product A displays price, B and/or C do not (groups 12,15,17)	79 ^C	12 ^C
Products B and/or C display(s) price, A does not (groups 13, 14, 16)	52 ^D	26 ^A
All products have uniform labels, but price never shown (groups 4-6, 18-20)	53 ^D	24 ^A

* Percents are adjusted for differences in prices as well as individual demographic and attitude variables such as age, education, income, city, dissatisfaction with current prices and environmental attitudes.

** Numbers in the same column that feature the same letter superscripts are not significantly different from one another at the five percent level. E.g., in the first column, the last two entries, 52 and 53 percent, each display the superscript D and are not statistically different from one another.

What Affects Identification of the Most Environmentally -Sound Product? Given the environmental information provided for the three products, A could be considered the least environmentally-sound because it had the smallest percent of its fuel mix derived from renewable sources, and it had higher emissions for each type of pollution. Determining whether B or C was the most environmentally-sound product was more difficult. B had a higher percentage of fuel mix from renewable sources while C had uniformly lower emissions. It should also be noted that all three products had a similar percentage of fuel mix derived from nuclear sources;. Hence this potentially divisive criterion for determining environmental friendliness should not have been an issue.

The types and consistency of information presented, the degree of difference in environmental attributes and individual characteristics all impacted the respondent's

choice of the most environmentally-friendly product. Table 7 summarizes average responses by information condition.

Table 7. Adjusted Choice of Most Environmentally Friendly Product by Information Condition.

Adjusted Percent* Who Chose . .

Information Condition	A or DK [†]	B	C
No Labels, No Certification (groups 1,7)	28	50	22
No Label: B and/or C Certified (groups 2, 9, 10)	20	53	27
No Label: All Products Certified (group 8)	8**	61	31
Consistent Label, No Price Info. (groups 4-6, 18-20)	14**	47	39**
Consistent Full Label (groups 3, 11)	14**	44	42**
Full Label on One or Two Products (groups 12-16)	21	45	34**
A-Price, B-Fuel Mix, C- Fuel Mix and Emissions (group 17)	9**	35	56**

* Percents are adjusted for differences in prices as well as differences in group profiles with respect to individual demographic and attitude variables such as age, education, income, city, dissatisfaction with current prices and environmental attitudes.

[†] DK represents those who said they didn't know or didn't have enough information to answer the question or refused to answer the question.

** Adjusted percent is significantly different from the No Label, No Certification group at the five percent level.

In general, respondents identified B as the most environmentally-sound product. The one exception was respondents in group 17 — the condition that was designed to mimic voluntary disclosure — where the individual supplier could disclose only the portions of the label it deemed most favorable. In this case Product A disclosed price, B disclosed fuel mix, and C disclosed fuel mix and emissions. Within this group, respondents were most likely to identify C as the most environmentally friendly. One conjecture that would explain this pattern is that respondents assumed the supplier did not provide a particular type of information when the product ranked poorly on that attribute. For example, when respondents saw Product B failed to disclose emissions but Product C did, they might assume B emitted more pollutants than C. A similar pattern held for respondents' judgment of the low-price product.

For the most part, circumstances that featured no label or certification resulted in the greatest percent of people who either called A the most environmentally-friendly product or did not know which product was best for the environment. Situations with full labeling on one or two products and situations where B and/or C received environmental

certification created a similar percent of respondents who judged A to be the most environmentally sound.

Notice that, in general, when Product B and/or Product C received certification there was no significant effect relative to the no label/no certification scenarios. Only when all three products met certification did the percent of those declaring A as the most environmentally friendly decrease. Adding certification to Product A when both the other products already contained certification diminished people's view of A's environmental impact..

One possible reason for this result stems from the disconnect between the persuasive bullet points that appeared on each product and the appearance of the certification seal. Both Products B and C featured environmental verbiage in their persuasive bullet points while Product A's bullet points focused mainly on price considerations. Respondents may have not believed that a product that did not feature environmental descriptions in its persuasive literature actually deserved such a seal. That is, respondents might not have 'bought' the seal. Instead it might have created suspicion about Product A's intent and integrity which caused fewer positive environmental judgments.

Conditions that featured consistent environmental disclosure for all products were more beneficial for Product C than for A or B. Compared to the no label/no certification scenario, it appears that consistent disclosure caused more to choose the low-emissions product C and fewer to choose A (though the decline was not statistically significant). The percent who chose B as the most environmentally friendly was relatively unaffected by information condition.

Given that C had lower emissions than B, one might expect that the consistent provision of emissions information instead of fuel mix information might alter respondent choice of the most environmentally-friendly product. A comparison of groups 5 and 19 (which consistently disclosed fuel mix only) to groups 6 and 20 (which consistently disclosed emissions only) suggests that C was more likely to be judged the more environmentally-friendly when only emissions data was provided, but only when the differences in environmental attributes were relatively large.

When the differences in environmental attributes were large, respondents were more likely to designate B as the most environmentally-friendly product and less likely to designate A as such. Those who strongly agreed that the government should take action against global warming were more likely to designate C and less likely to designate B. Those who strongly agreed that electricity prices were too high were more likely to not know which to choose as environmentally friendly and were less likely to designate B as the environmentally-friendly product.

What Conditions Constitute Enough Information? Both individual characteristics and experimental information conditions affected whether or not a respondent claimed to have enough information to make an informed decision. The degree of differentiation between the products in terms of price and environmental attributes did not have the same

effect. Individuals with the following characteristics were less likely to feel as if they had enough information: members of environmental organizations, white, college education or greater and those who strongly agreed that the government should take action on global warming. Table 8 summarizes the adjusted percentages who felt they had enough information, broken out by the price and environmental label format conditions used in the previous two sections. Full labels on all products did the most to satisfy respondents' desire for information. Formats which revealed price information about Product A were also among the most likely formats to satisfy respondents' information needs.

Table 8. Adjusted Percent Who Claim to Have Enough Information by Group.

Information Condition	Adjusted Percent Who Claimed to Have Enough Information
<i>Price Formats</i>	
No product displays any type of label (groups 1,2,7,8,9,10)	22
All products display price (groups 3, 11)	56*
Product A displays price, B and/or C do not (groups 15,17)	37*
Products B and/or C display(s) price, A does not (groups 13, 14, 16)	29
All products have uniform labels, but price never shown (groups 4-6, 18-20)	33*
<i>Environmental Formats</i>	
No Labels, No Certification (groups 1,7)	21
No Label: B and/or C Certified (groups 2, 9, 10)	23
No Label: All Products Certified (group 8)	22
Consistent Label, No Price Info. (groups 4-6, 18-20)	33**
Consistent Full Label (groups 3, 11)	56**
Full Label on One or Two Products (groups 12-16)	30
A-Price, B-Fuel Mix, C- Fuel Mix and Emissions (group 17)	51**

* Significantly different from first price format (No product displays any type of label) at the 5% level.

** Significantly different from the first environmental format (No labels, no certification) at the 5% level.

What Affects the Stated Reason For Favoring One Product? After stating their favorite product, respondents were probed as to the reason for choosing the product. More than 83 percent of the responses mentioned either price or environmental reasons. The most popular reason other than price and environment involved service and reliability issues (about 16 percent). Both information format conditions, as well as individual differences, affected the reasons provided by respondents.

The following individual characteristics were associated with the listing of an environmental reason: environmental organization participation; white; believe government should take action to slow global warming; do not believe prices for electricity are too high; and residence in Riverside, CA or Portland, OR. Information formats that consistently featured environmental attributes but failed to list price also increased the likelihood of listing an environmental reason for product choice.

Individuals who felt electricity prices were too high and were not white were more likely to state that price was a reason for their product choice. Respondents who viewed products without any labeling or who viewed labels that did not reveal any price information were less likely to state price as a reason.

Section III

Experiment 2 - Conjoint Analysis of Product Attributes.

Description of Experiment 2

Questions and Procedure. After completing Experiment I, respondents were given only the labels of two products generically named Product X and Product Y. No persuasive bullet points were provided. All respondents saw the same format for both products, and the format did not vary among respondents. The format featured a full label that revealed price, contract terms, fuel mix and emissions information. The visual presentation of the data was the same as that for Electric Service A pictured in Appendix A. Respondents were first asked to identify which product was more environmentally friendly and probed as to why that product was better for the environment. They were then asked which offered the lower price and which they would choose, again followed by a probe of why that product was better.

Variables Analyzed in Experiment 2

Experimental Conditions. While format was not altered across individuals, the price and environmental attributes for each product did vary. Specifically, average monthly bill, fuel mix and emissions data were randomly generated and assigned to the two products each respondent viewed. This created a situation in which the respondent had relatively complete information for two goods which varied in terms of price and environmental attributes. This allowed respondents to focus on the combination of price and environmental amenities that was preferred. This was different from the first experiment in that there were different gradations of trade-offs that different respondents viewed. In

Experiment I, only two gradations existed across all individuals. (Generically called big differences or small differences in the previous section.)

The three main sets of attributes (price, fuel mix and emissions) were varied independently from one another. This allowed us to look at how individuals might approach novel trade-offs that might not always be available in real purchase situations. For example, in real retail electricity markets, these attributes will often be correlated because products with lower emissions and greater dependence on renewable energy may cost more to produce. Also, products with greater dependence on renewable sources and nuclear will often discharge fewer air pollutants. This experiment provided variation in the conditions and thus allowed us to assess how consumers might trade-off emissions for renewable content and price for environmental attributes.

Results

What Affects Product Choice? Price, fuel mix and emissions were all significant determinants of the average respondent's choice between Products X and Y. Respondents preferred cheaper products with greater renewable content and lower emissions. The sensitivity of respondent's choice to changes in the products' respective prices was conditional on the household income of the respondent. Higher income households were less sensitive to the price charged for the product.

To statistically capture what affected respondents' choice, we modeled the probability that the respondent chose Product X as a function of the difference in the two products' prices, emissions and fuel mix using probit regression methods. Table 9 presents several twosomes of products between which the average respondent is indifferent. Stated another way, Table 9 presents several twosomes of products that would capture equal shares in this hypothetical market of two products.

For example, the first set of two products in Table 9 have identical fuel mix but differ in price and emissions. When Product X costs five percent less than Product Y, the data suggests that Product Y would need to emit an average of 28 percent fewer pollutants to maintain an equal market share.

Product set 2 from Table 9 represents a trade-off between price and fuel mix. When Product X costs five percent more, the fuel mix would need to contain about 18 percent points more of renewable sources to maintain a market share equal to Product Y's.

Product set 3 contained two products with the same price but different emissions and fuel mixes. Analysis of the data suggests that a product that creates an average of ten percent more of the three key emissions would need to contain eight percentage points more renewable sources in its fuel mix to maintain an equal market share with its competitor.

Table 13 highlights the sensitivity of respondents' willingness to choose more environmentally-sound products to their available income. The first scenario featured only households with annual incomes above \$35,000. Here a company with a price five

percent higher than its competitor would need to provide a product that creates 11 percent fewer emissions in order to keep even with its competitor. If the market featured only households with household incomes of \$35,000 or less, it would require substantially greater reductions in emissions (43 percent less) to maintain a similar appeal with consumers.

While interpreting these results, we should be mindful of the hypothetical nature of the experiment. As intuition would suggest and as externally validated experiments often confirm, when respondents do not face a real budget constraint, they often are not as sensitive to price differences as they are in real markets. However, the fact that in this experiment households with less income showed more sensitivity to price is encouraging and suggests the experimental results do mimic to some extent patterns seen in real markets. How closely real behavior follows behavior in experimental settings is always difficult to gauge. Interpretations of these results should be viewed with caution because, to date, consumers have no real-world experience in choosing among electricity providers. Therefore the deviation between responses to experimental and real situations could be quite large.

Table 9. How Average Respondents Trade-Off Price and Environmental Attributes During Choice.

For All Respondents - Two Products That Would Capture Equal Market Shares

	Product X	Product Y
<i>Set 1</i>		
Ave. Monthly Bill	\$105	\$100
%Renewables	10%	10%
% Fossil Fuel + % Nuclear	90%	90%
Deviation of Average Emissions from Regional Average ^A	-28%	0%
<i>Set 2</i>		
Ave. Monthly Bill	\$105	\$100
%Renewables	28%	10%
% Fossil Fuel + % Nuclear	72%	90%
Deviation of Average Emissions from Regional Average ^A	0%	0%
<i>Set 3</i>		
Ave. Monthly Bill	\$100	\$100
%Renewables	18%	10%
% Fossil Fuel + % Nuclear	82%	90%
Deviation of Average Emissions from Regional Average ^A	+10%	0%

A - A product with CO₂, SO₂ and NO_x all equal to the regional average would have a number of 0.0.

Table 10. How Respondents from Different Income Groups Trade-Off Price and Environmental Attributes During Choice.

Price vs. Emissions Trade-Off Two Products That Would Capture Equal Market Shares

	Product X	Product Y
<i>Households with Annual Income ≤ \$35,000^A</i>		
Ave. Monthly Bill	\$105	\$100
%Renewables	10%	10%
% Fossil Fuel + % Nuclear	90%	90%
Deviation of Average Emissions from Regional Average ^B	-43%	0%
<i>Households with Annual Income > \$35,000</i>		
Ave. Monthly Bill	\$105	\$100
%Renewables	10%	10%
% Fossil Fuel + % Nuclear	90%	90%
Deviation of Average Emissions from Regional Average ^B	-11%	0%

A - Also includes respondents who failed to report income.

B - A product with CO₂, SO₂ and NO_x all equal to the regional average would have a number of 0.0.

Section IV

Experiment 3: Effect of Different Formats on Single Product Evaluation Performance

Description of Experiment 3

Procedure and Question Sequence. After completing Experiment 2 and returning all materials, respondents were given a sheet of paper representing the label for an electricity product called Company G. (See Appendix B for an example of this label.) The label provided four sections of information about this product: price, contract terms, fuel mix and air emissions. The format of this information varied across groups and was the main manipulation in this experiment. Table 11 outlines the different groups and the format in which they were presented the information.

Respondents were assured that some of the questions they were going to be asked could be difficult. Then they were asked to calculate how much their electricity bill would be each month if their home used 1,000 kilowatt hours of electricity per month. Interviewers timed how long it took each respondent to calculate the answer.

Next the respondents were asked about fuel mix: “About what percent of this product’s energy comes from coal, oil, and natural gas combined?” After the respondent formulated an answer, the interviewer asked if they could tell from the information if this percentage was high, low or just average for this area.

Respondents were then asked about air emissions, specifically about sulfur dioxide. They were asked if they could tell if this electricity company created a lot more, a little more, about the same, a little less or a lot less SO₂ relative to other electricity companies in this area.

Finally, the respondent was asked to rate, on a scale from 1 to 10, how good a job they thought the label did at presenting the important information about this product.

After completing the questions for Product G, the respondent returned that label and was given another label, now for Product H. Product H’s label was set up with four sections of information (same as Product G), but the format for the information and the information itself could be different. (See Table 11 for the full outline of formats for these two products.)

The questions for Product H were the same format, but the calculations were different. They calculated the bill for 2,000 kilowatt hours of electricity; calculated the percent from hydro-electric, solar, wind and bio-mass, and compared the emission of carbon dioxide. After completing the same questions for Product H, the respondents were asked: “Is there any information that you think should be added or left off this label to make it more useful?” and the interviewer wrote their full verbatim response.

After this, the respondent was given the label for Product G again and were asked some comparison questions between the two products. First, they were asked which product had the higher percent of renewable energy. (Renewables were defined for them as hydro-electric, solar, wind and bio-mass.) Next, they were asked to compare the air emissions and name which product created fewer. They were then asked which product was more expensive and which contract more desirable. Respondents were asked why they chose the kind of contract they did, and the interviewer recorded their verbatim response. Finally, respondents were asked to choose which company they would buy their electricity from.

Experimental Conditions. We manipulated three key elements of the products for each group: 1) the information and format of information for the four parts of the label — price, fuel mix, air emissions and contract terms, 2) whether the two products had the same formats or different formats; 3) which product was “green” and which product was “low price.” The experiment included the 10 conditions outlined in Table 11.

A full label was given for each of the products. Both labels were broken up into four key parts: price, contract terms, fuel mix, and air emissions. The formats for each varied in five ways.

Price: Five formats were used in this experiment: average use rates, block rates, average total bill, flat + usage rates, and block rates with average total bill.

The average use rate format picked three typical levels of monthly use (500, 1000 and 2000 kilowatt hours) and displayed the average per kilowatt price at each level. Correctly calculating the average monthly bill for a certain usage level required the respondent to perform one multiplication task — the average per kilowatt charge times the usage amount (e.g., 2,000 kWh/month times \$.035/kWh equals \$70/month).

Table 11. Label and Product Conditions for Experiment 3

	Product G (variable price)				Product H (fixed price)			
Group #’s	price format	fuel mix format	emissions format	product type**	price format	fuel mix format	emissions format	Different Formats?
1-2	ave. use rates	pie chart	bar chart	low price	flat + usage rate	tabular	raw numbers	yes
3-4	block rates	bar chart w/parent co.	bar chart	green	block rates w/ ave. total bill	tabular w/regional mix	raw with regional ave.	yes
5-6	ave. total bill	bar chart w/system mix	relative %’s tabular	low price	ave. use rates	pie chart	bar chart	yes
7-8	flat + usage rate	tabular	raw numbers	low price	block rates	bar chart w/parent co.	bar chart	yes
9-10	block rates w/ave. total bill	tabular w/regional mix	raw with regional ave.	green	ave. total bill	bar chart w/system mix	relative %’s tabular	yes
11-12	ave. use rates	pie chart	bar chart	green	ave. use rates	pie chart	bar chart	no
13-14	block rates	bar chart w/parent co.	bar chart	low price	block rates	bar chart w/parent co.	bar chart	no
15-16	ave. total bill	bar chart w/system mix	relative %’s tabular	green	ave. total bill	bar chart w/system mix	relative %’s tabular	no
17-18	flat + usage rate	tabular	raw numbers	green	flat + usage rate	tabular	raw numbers	no
19-20	block rates w/ave. total bill	tabular w/regional mix	raw with regional ave.	low price	block rates w/ ave. total bill	tabular w/regional mix	raw with regional ave.	no

**If Products G and H are never of the same type (e.g., if G is green then H is low price).

The block rate format lists the cost per kilowatt hour of electricity for three different levels of use: 0-750 kilowatts, 751-1500 kilowatts and >1500 kilowatts. Calculating a monthly bill requires the respondent to multiply at least twice and then add up the resulting products (e.g., 750 kWh times \$.05/kWh plus 250 kWh times \$.03/kWh = \$45 for 1,000 kilowatt hours used per month).

The average total bill lists the bill that would need to be paid if the respondent used 1,000 kWh/month. It requires, at most, one multiplication task to answer the question posed (e.g., multiply the average monthly bill at 1,000 kWh by two to estimate the average monthly bill at 2,000 kWh/month).

The flat + usage rate lists a per kWh charge that applies regardless of total use and a flat fee charged regardless of use. This format always requires the respondent to perform one multiplication and one addition (e.g., 1,000 kWh/month time \$.03/kWh plus flat charge of \$20/month = \$50/month).

The block rates with average total bill provides both the information from the block rate format as well as the corresponding average total bill calculated at 1,000 kWh/month. Though the format may be more difficult to read because there is more 'small print', respondents can use either the more complicated or the less complicated information in determining their answer.

Fuel Mix. Five formats were used in this experiment when explaining fuel mix: pie chart, bar chart with parent company information, bar chart with system mix, tabular, and tabular with regional mix.

Emissions. Four formats are used to display emissions information in this experiment: bar chart, relative percents tabular, raw numbers, and raw numbers with regional average.

Two Competing Products. In the conditions for Groups 1/2, 5/6, 7/8, 13/14, and 19/20, Product G had the lower price, and Product H was “green.” In conditions 3/4, 9/10, 11/12, 15/16, and 17/18, the opposite was the case, Product G was “green”, and Product H had the low price. Thus the product that was “green” had the higher renewable energy, and lower emissions but was also more expensive.

Products G and H always had different price formats. Product G was always a variable price, and Product H was always a fixed price. Table 12 shows the comparison of attributes for the two products.

Table 12. Price and Environmental Attributes for each Product Group in Experiment 3.

	Product G			Product H			
Group #	Price for 1,000 KWH	% coal/oil/natural gas	SO2 emissions	Price for 1,000 KWH*	Price for 2,000 KWH	% renewable	CO2 emissions
Group 1/2	\$45	80%	more	\$50	\$80	25%	Can't tell
Group 3/4	\$50	50%	less	\$45	\$70	2%	more
Group 5/6	\$45	80%	more	\$50	\$80	25%	less
Group 7/8	\$45	80%	Can't tell	\$50	\$80	25%	less
Group 9/10	\$50	50%	less	\$45	\$90	2%	more
Group 11/12	\$50	50%	less	\$45	\$70	2%	more
Group 13/14	\$45	80%	more	\$50	\$80	25%	less
Group 15/16	\$50	50%	less	\$45	\$90	2%	more
Group 17/18	\$50	50%	Can't tell	\$45	\$70	2%	Can't tell
Group 19/20	\$45	80%	more	\$50	\$80	25%	less

*Respondents were asked about 2,000 KWH, but this was adjusted for comparison between groups.

Variables Analyzed in Experiment 3

Experimental Conditions. We manipulated three key elements of the products for each group: 1) the information and format of information for the four parts of the label: — price, fuel mix, air emissions and contract terms; 2) whether the two products had the same formats or different formats; 3) which product was “green” and which product was “low price.” The experiment included the 10 conditions outlined in Table 11.

A full label was included for each of the products. Both labels were broken up into four key parts — price, contract terms, fuel mix, and air emissions. The formats for each varied in five ways.

Price: Five formats were used in this experiment: average use rates, block rates, average total bill, flat + usage rates, and block rates with average total bill.

The average use rate format picked three typical levels of monthly use (500, 1000 and 2000 kilowatt hours) and displayed the average per kilowatt price at each level. Correctly calculating the average monthly bill for a certain usage level required the respondent to perform one multiplication task —the average per kilowatt charge times the usage amount (e.g., 2,000 kWh/month times \$.035/kWh equals \$70/month).

Fuel Mix. Five formats were used in this experiment when explaining fuel mix: pie chart, bar chart with parent company information, bar chart with system mix, tabular, and tabular with regional mix.

The *pie chart* and *tabular* formats were similar in that both only revealed information about the product the respondent was viewing. The tabular format featured a column of six numbers representing the percent of the total fuel mix derived from coal, oil, hydroelectric, gas, nuclear and non-hydroelectric renewables (solar, wind and biomass). The pie chart format featured these same numbers next to the slices of the pie that represented each of these six different types of fuel.

The *tabular display with regional mix* was similar to the above-mentioned tabular format except that it featured two columns of fuel mix numbers side by side. The second column featured numbers representing the average regional fuel mix. Such a display may be particularly useful if consumers see products in isolation and have incorrect ideas about the types of fuel used to create electricity in a given region. For example, consider a consumer who believes that 50 percent of the fuel used to create electricity comes from renewable resources. Suppose instead that the regional average is truly only 10 percent. If they view a product with a 25 percent renewable fuel mix in isolation from other products and with no reference information, they might believe the product was below average in terms of renewable resource usage when it was actually above average.

The other two displays featured fuel mix information in bar chart format. In the format *'bar chart with parent information'*, two bars of equal length featured six component blocks whose size represented the percent of fuel mix for the particular product and parent company that came from the six fuel mix categories mentioned above. As with the pie chart, actual numerical percentages for each fuel mix component were listed by the graphical representation. This format was tested because some consumers may want to know both about the attributes of the product they are buying as well as about the overall attributes of the parent company offering the product.

The format *'bar chart with system mix'* also featured two bar graphics of equal length. The top bar represented the individual product and was broken into seven different

component blocks. Six of the blocks represented the types of fuels mentioned above and the seventh category represented the percent of the fuel purchased by the company that comes from the general system mix of electricity. The top bar captured the possibility that an individual product may be created by electricity from two different general sources. One source was made up of contracts with specific generator. The attributes of these specific contracts was disclosed in the six categories listed above. Another source was from the spot electricity market whose attribute mix may not be known at the time of purchase, but can be verified at a later date. The percent of fuel mix coming from these spot market purchases was captured by the seventh block in the top bar entitled 'from system mix'. The bottom bar broke the fuel mix which created the system mix into the six components listed above. This format was chosen because it resembled a legislatively-required disclosure format for the California retail electricity markets.

Emissions. Four formats were used to display emissions information in this experiment: bar chart, relative percents tabular, raw numbers, and raw numbers with regional average.

In each case, the format related the amount of three major airborne pollutants (sulfur dioxide, nitrogen oxides, and carbon dioxide) created by the product being viewed. The bar chart featured one horizontal bar for each of the three pollutants, with one vertical reference line marking intersecting all three bars to represent the regional average emissions for each pollutant. The relative percents tabular format listed a column of three numbers that represented the percent above or below the regional average the product was in terms of each pollutant (e.g., 25 percent below). The raw numbers format listed in a tabular presentation the amount of each pollutant the creation of the product caused. The raw numbers with regional averages format provides was similar but also provided an additional column that listed the average amount of each type of pollutant produced by electricity generators in the region.

Two Competing Products. In the conditions for Groups 1/2, 5/6, 7/8, 13/14, and 19/20, Product G had the lower price and Product H was “green.” In the other conditions, 3/4, 9/10, 11/12, 15/16, and 17/18, the opposite was the case. Product G was “green” and Product H had the low price. Thus the product that was “green” had the higher renewable energy, and lower emissions, but was also more expensive.

Products G and H always had different price formats. Product G was always a variable price and Product H was always a fixed price. Table 12 shows the comparison of attributes for the two products.

Results

Calculating Monthly Bill for a Given Usage Level Each respondent was asked to calculate what a monthly bill would be given the information from the label. For Q30 the level was 1000 kWh, and for Q35 it was 2000 kWh. We calculated the correct monthly bill and calculated how badly the respondent missed. Overall about 43 percent and 29 percent answered Q30 and Q35 with the exact answer, respectively. Table 13 shows the

percent correct overall for the different formats, and Table 14 lists, by format, the average percent by which answers differed from the correct answer.

Table 13. Unadjusted Percent of Correct Responses by Format

Format	Percent Correct for Q.30 (variable price)	Percent Correct for Q.35 (fixed price)
Average Total Monthly Bill	69%	69%
Block Rates + Ave. Tot. Monthly Bill	50%	2%
Average Monthly Use Rates	53%	44%
Flat Fee + Usage Rate	37%	25%
Block Rates	3%	3%

Table 14. Unadjusted Percent by Which Respondents Missed Bill Calculation Question by Format.

Format	% Off @ 1000 kWh	% Off @ 2000 kWh	% Correct Comparisons*
Average Total Monthly Bill	18 A**	18 A	90 A
Block Rates + Ave. Tot. Monthly Bill	26 B	38 C	82 A,B
Average Monthly Use Rates	31 B	36 B	70 B,C
Flat Fee + Usage Rate	38 C	55 C	67 B,C
Block Rates	67 D	92 D	84 A,B***

* These numbers are calculated for only those respondents who saw the same label format on products G and H.

** If two answers within the same column have the same letter, they are not statistically different (e.g., Block Rates and Flat Fee both have the letter B, so they are not statistically different).

*** All of the block rate examples had the same block structure making this comparison substantially easier.

Calculating Fuel Mix. Respondents were asked to calculate the percent of fuel mix from various sources. Table 15 shows overall how the respondents did with each type of format. Table 16 lists how respondents performed when calculating the percent of the fuel mix that came from certain types of fuels and how well they could determine which product had more of a certain type of fuel when the format was consistently presented on the two products. In general, the tabular format allowed respondents to perform best with the pie chart and tabular formats, with regional mix formats placing a close second.

Inclusion of information concerning a parent company’s mix, and particularly the inclusion of information concerning system mix, caused respondents to perform significantly worse on all tasks.

Table 15. Unadjusted Percent of Correct Responses by Format

Format	Percent Correct for Q.31	Percent Correct for Q.36
Tabular of Product Only	75%	79%
Pie Chart of Product Only	73%	71%
Tabular of Product and Regional Ave.	66%	66%
Bar Chart of Product and Parent Co.	44%	27%
Bar Chart of Product and System Mix	5%	2%

Table 16. Unadjusted Percent by Which Respondents Missed Fuel Mix Calculation Question by Format.

Format	% Off for Q31	% Off for Q36	% Correct Comparisons*
Tabular of Product Only	5 A**	4 A	86 A
Pie Chart of Product Only	7 B	8 B	85 A
Tabular of Product and Regional Ave.	7 B	8 B	80 A
Bar Chart of Product and Parent Co.	12 C	21 C	70 B
Bar Chart of Product and System Mix	26 D	24 C	73 A,B

* These numbers are calculated for only those respondents who saw the same label format on products G and H.

** If two answers within the same column have the same letter, they are not statistically different

The format also affected how long it took respondents to answer the calculation questions. Table 17 lists the average time in seconds by format. The average total bill format allowed respondents to formulate not only the most accurate responses but also to formulate them in the shortest time. Block rates took the longest time.

Table 17. Average Time in Seconds to Complete Bill Calculation Questions by Format.

Average Number of Seconds Respondents Used to Answer		
Format	Q30	Q35
Average Total Monthly Bill	26 A	31 A
Block Rates + Ave. Tot. Monthly Bill	36 B	42 A, B
Average Monthly Use Rates	41 B,C	33 A, B, C
Flat Fee + Usage Rate	40 B,C	40 B,C
Block Rates	46 C	43 C

* If two answers within the same column have the same letter, they are not statistically different.

Calculating Emissions The respondents were asked to calculate the percentage of emissions from SO₂ or CO₂ and also to compare this percentage to the regional average. In some cases, they would not be able to tell. (See Table 12.) Table 18 looks at the percentage of correct responses, based on the format that the respondents saw.

Table 18. Unadjusted Percent of Correct Responses by Format

Format	Percent Correct for Q.33	Percent Correct for Q.38
Bar Chart	72%	70%
Relative %'s Tabular	68%	77%
Raw numbers	32%	48%
Raw with Regional Ave.	82%	87%

Comparisons Between Products

After answering questions about each of these products individually, respondents were asked to compare the two products on price, fuel mix and emissions. Seventy-eight percent of respondents knew which product was more expensive when they saw the same format for both products, compared to 56 percent who saw different formats for G and H. Seventy-nine percent of respondents who had the same fuel mix format correctly identified which had higher renewable energy, while 69 percent of those who saw different formats still identified the correct one. When determining which product created fewer air emissions, 84 percent with the same format correctly figured this out, whereas only 49 percent with differing formats could distinguish between them, and 19 percent said they did not have enough information.

Finally, respondents were asked to choose which of the two contract terms was more desirable. The majority (54 percent) chose Product H , which always had the fixed price.

Section V

Experiment 4: What Added Information Does the Label Provide Respondents

Description of Experiment 4

Questions and Procedure. After completing Experiment 3, respondents were given written information about another electricity product, Product Q. (See Appendix C for an example.) The respondent was then asked to rate Product Q, on a scale from 1 to 10, in terms of how expensive they thought it was. Then they rated how good it was for the environment and how likely they were to buy it.

The respondent was then given a second sheet of paper for Product Q — the product label. The information included on the label was subject to the manipulation of this experiment. With more information on Product Q, the respondent was then asked to rate the same items again. Next the respondent was asked what they learned from the label.

In some cases, the label may have had the certification seal, in which case the interviewer would have read certification description.

Treatments. Ten different treatments were considered for this experiment. (See Table 19 for a summary.) The front of the product had four variations. Half the products contained verbiage that highlighted the potential cost savings associated with the product (price) while the other half highlighted the product's good environmental attributes (green). In addition, one of the price treatments and one of the green treatments also contained an environmental certification seal identical to that used in Experiment 1. The explanation from Figure 1 was read to the respondent if they had a treatment containing the certification seal.

Table 19. Information Treatments for Task 3 by Group.

Treatment	Front Verbiage	Certification Used?	Label Condition	Price and Environmental Profile
1	Price	No	Full Label	Lowest Price
2	Environment	No	Fuel Mix*	Light Green
3	Environment	No	Emissions*	Light Green
4	Environment	No	Full Label	Dark Green
5	Environment	No	Full, No Prices	Dark Green
6	Price	No	Fuel Mix*	Medium Price
7	Price	No	Emissions*	Medium Price
8	Price	Yes	Full Label	Medium Price
9	Environment	Yes	Full Label	Light Green
10	Price	No	Full, No Prices	Lowest Price

*Like all label formats, this label also contains contract terms.

Four different label formats, which all appeared in Experiment I as well, were used. These included a full label, full label with price information removed, contract terms and fuel mix, and contract terms with emissions.

Four different sets of product attributes were also considered and varied independently with label format used. If the product's front stressed environmental attributes (green), the price and environmental attributes took one of two profiles. (See Table 20 for complete summary.) The most expensive of the two (dark green back) contained more renewable content and created fewer emissions than the other product (light green back). If the front stressed low price aspects of the product, the back took one of two different price/environment profiles. The cheapest product (lowest price back) created more emissions with the less renewable content than the other price variant (medium price back).

Table 20. Price and Environmental Attributes for the Four Treatments Used in Task 3.

Attribute	Dark Green	Light Green	Medium Price	Lowest Price
Price*	\$100	\$75	\$60	\$45
% Renewable	70	45	12	2
Average Emissions**	-85%	-40%	+110%	+210%

* Presented as average monthly bill for customer using 1,000 kWh/month.

** Percent difference from regional average emissions for the three types of pollutants listed.

Results

Table 21 summarizes how each treatment fared on the three ratings scales. Treatments stressing the environment were viewed as being significantly more expensive, better for the environment and more likely to be purchased. Regression analysis (not reported) also revealed that certification had a separate, significant effect on the environmental rating and the reported likelihood of purchase, but not on the perceived cost of the product.

One key result centers around the treatment condition that featured price verbiage and an environmental seal on the front. The ‘back’ of this condition featured a full label with a medium price attribute profile (Table 20). After looking only at the front, respondents rated this above other price-promoted products both in terms of environmental impact and in terms of likelihood of purchase. Once respondents viewed the full label they substantially downgraded their rating of the product on both scales. Hence, it appears the respondents correctly updated their attitude toward the product once attribute-specific information was available.

Table 21. Unadjusted Ratings Based on Viewing Front Only by Treatment.

Front Treatment	How Expensive 10 = very expensive 1 = very inexpensive	How Good for the Environment 10 = very good 1 = not very good	How Likely to Buy This Service 10 = very <u>un</u> likely 1 = very likely
Environmental	6.3	7.7	5.1
<i>With Certification*</i>	6.0	8.0	4.9
<i>No Certification</i>	6.4	7.6	5.2
Price	5.8	5.4	6.4
<i>With Certification*</i>	5.7	6.4	5.7
<i>No Certification</i>	5.8	5.0	6.6

Table 22. Unadjusted Ratings After Viewing Front and Label by Treatment.

Price and Envir. Profile	Label Condition	How Expensive 10 = very expensive 1 = very inexpensive	How Good for Environment 10 = very good 1 = not very good	How Likely to Buy Service 10 = very <u>un</u> likely 1 = very likely
<i>All Low Price</i>		5.6	3.3	7.1
Low Price	Full	5.1	3.3	6.9
Low Price	Full, No Prices	6.2	3.2	7.3
<i>All Med. Price</i>		5.9	3.9	7.3
Med. Price	Fuel Mix*	5.7	5.0	6.8
Med. Price	Emissions*	6.1	3.2	7.4
Med. Price	Full Label, Cert**	6.0	3.6	7.6
<i>All Light Green</i>		5.8	7.3	5.1
Light Green	Emissions*	6.1	7.2	5.6
Light Green	Fuel Mix*	6.1	7.0	5.5
Light Green	Full Label, Cert**	5.3	7.7	4.2
<i>All Dark Green</i>		6.7	7.6	5.4
Dark Green	Full, No Prices	6.3	7.8	5.4
Dark Green	Full Label	7.1	7.5	5.5

*Like all label formats, this label also contains contract terms.

Table 23. Unadjusted Differences in Ratings, Front Only vs. Front and Label by Treatment.

Treatment	Label Condition	Expensiveness positive: decreased perceived expense	Environment positive: decreased perceived environ. friendliness	How Likely to Buy Service positive: more likely to purchase
Low Price	Full	0.8***	0.2	-0.3
Low Price	Full, No Prices	-0.6	0.7	-0.4
Med. Price	Fuel Mix*	-0.2	-0.4	-0.3
Med. Price	Emissions*	0.2	1.3***	-0.6
Med. Price	Full Label, Cert**	-0.4	2.8***	-1.9***
Light Green	Emissions*	0.4	0.3	0.2
Light Green	Fuel Mix*	0.4	0.5***	-0.9***
Light Green	Full Label, Cert**	0.7***	0.3	0.6***
Dark Green	Full, No Prices	-0.1	0.1	-0.2
Dark Green	Full Label	-0.7***	0.1	-0.4
All	Full Labels	0.05	0.1	-0.4
All	Full Label, Cert.	0.2	1.5***	-0.7***
All	Fuel Mix	0.1	0.2	-0.6***
All	Emissions	0.3	0.7***	-0.2
All	Full, No Prices	-0.3	0.3	-0.3
Low Price	All	0.9***	0.2	-0.3
Med. Price	All	-0.2	-0.4	-0.3
Light Green	All	0.4***	0.4***	-0.3***
Dark Green	All	-0.01	0.1	-0.2

*Like all label formats, this label also contains contract terms.

** Front verbiage contained environmental certification seal.

*** Change in ratings was significantly different from zero at the 5% level.

Section VI

Experiment 5: Choosing Formats

Description of Experiment 5

Questions and Procedure. After completing experiment 4, the respondents were handed a sheet of paper labeled “Price Formats.” On this sheet were the five different price formats that were tested in the previous experiments marked A through E. (See Appendix D for an example sheet.) The respondent was asked to choose which format would be most useful when making a decision between companies, if only one format would appear on all products. The respondent then returned the sheet.

Next, the respondent was handed two sheets of paper marked “Environment Formats.” On these sheets were four formats of how to display environmental information marked A through D. The respondent was asked to choose which would be most useful when making a decision between companies, if only one format appeared on all products.

Experimental Conditions. All of the respondents saw the same sheets for this experiment. On the Price Formats sheet, the choices were: average use rates, block rates, flat + usage rate, block rates with average total bill and average total bill. On the Environment Formats sheet, the choices were: tabular fuel mix percentages, pie chart of fuel mix information and a bar chart with regional average for air emissions, bar chart with regional average for air emissions, or tabular fuel mix with regional mix and tabular air emissions with relative percentages.

Results

Price Formats. Overall, the price format that was chosen most often was the flat + usage rates (25 percent) closely followed by the average total bill (24 percent). The other three formats were almost equally chosen — average use rates (17 percent), block rates (16 percent), and block rates with average total bill (16 percent).

Interestingly, the format that ranked first in terms of consumer preference (block rates) performed worst in the actual performance testing by a large margin.

Environment Formats. Overall, the environment format had much clearer top-two choices, both with more information than the other two choices. Forty-three percent of respondents chose the tabular fuel mix with regional mix and tabular air emissions with relative percentages. Almost as many respondents (36 percent) chose the pie chart of fuel

mix information and a bar chart with regional average for air emissions. In the two choices where the respondent was shown only one part of the information, the tabular fuel mix and a bar chart with regional averages for air emissions were not preferred. They were chosen by nine and eight percent of respondents respectively.

The relationship between consumer preference of different formats to performance again showed a mismatch, although not nearly as stark as the price formats. Experiment 2 showed that formats showing the product mix and the regional mix performed less well than the product mix alone, although the difference was not large.

Appendix A

Examples of Materials from the Study

Figure A1. Example of Front Panel from Product A - Different Attributes Condition from Experiment I.

Electric Company A

- We have some of the lowest rates available in the region.
- We have three different ways to save – depending on how much and when you use the most electricity
- We're rated as one of this region's 'best buys' in electric service by USA Today.
- We've been bringing customers reliable service since 1965.

Figure A2. Example of Back Panel from Product A - Full Label Condition from Experiment 1.

Electric Service A

ELECTRICITY FACTS PANEL

Price	<p>Average Monthly Bill* : \$ 67.25</p> <p>* For a consumer using 1000 kilowatt hours (kWh) per month.</p> <p>Actual bill will vary according to how much electricity you use.</p> <p>See contract for complete details.</p>
Contract Terms	<ul style="list-style-type: none"> • Minimum contract length: 2 years • Fixed price over contract period
Fuel Mix	<p>Coal60%</p> <p>Oil 15%</p> <p>Gas 15%</p> <p>Nuclear 18%</p> <p>Hydro-electric 2%</p> <p>Solar and Wind 0%</p>
Air Emissions	<p>Amount created</p> <p>Type of as compared to</p> <p><u>Air Emission regional average</u></p> <p>Nitrogen Oxides (NO_x) 100% higher</p> <p>Sulfur Dioxide (SO₂) 150% higher</p> <p>Carbon Dioxide (CO₂) 125% higher</p>

Figure A3. Example of Label with Contract Terms and Fuel Mix Only Used in Group 19 from Experiment 1.

Electric Service A

ELECTRICITY FACTS PANEL

Contract Terms	<ul style="list-style-type: none"> • Minimum contract length: 2 years • Fixed price over contract period 												
Fuel Mix	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Coal</td> <td style="text-align: right;">60%</td> </tr> <tr> <td style="padding-right: 20px;">Oil</td> <td style="text-align: right;">15%</td> </tr> <tr> <td style="padding-right: 20px;">Gas</td> <td style="text-align: right;">15%</td> </tr> <tr> <td style="padding-right: 20px;">Nuclear</td> <td style="text-align: right;">18%</td> </tr> <tr> <td style="padding-right: 20px;">Hydro-electric</td> <td style="text-align: right;">2%</td> </tr> <tr> <td style="padding-right: 20px;">Solar and Wind</td> <td style="text-align: right;">0%</td> </tr> </table>	Coal	60%	Oil	15%	Gas	15%	Nuclear	18%	Hydro-electric	2%	Solar and Wind	0%
Coal	60%												
Oil	15%												
Gas	15%												
Nuclear	18%												
Hydro-electric	2%												
Solar and Wind	0%												

Appendix B

Not available at this time