ENERGY POLICY AND CONSUMER REALITY:

THE ROLE OF ENERGY IN THE PURCHASE

OF HOUSEHOLD APPLIANCES IN THE U.S. AND THAILAND

by

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ABSTRACT

The proliferation of household appliances is a global energy problem, and this comparative study of appliance energy labeling in the U.S. and Thailand offers opportunities to learn from the implementation of programs in countries with different income levels and cultural and political climates. In the U.S., I conducted participant observation in an appliance store and interviewed 16 policymakers, 14 salespeople, and 100 consumers. In Thailand, I interviewed 11 policymakers, 53 salespeople, and 62 consumers, and carried out a national survey of 971 consumers. This study is the first time that energy labels have been examined primarily as a problem of consumer cognition in context — that is, how consumers read, interpret, and think about energy labels in the retail environment.

After just three years of implementation, the Thai appliance labeling program is having a significantly greater impact on the consumer appliance market than is the 20-year-old U.S. program. While Thai salespeople report that more than 60% of consumers ask about or look at the label, the corresponding number for the U.S. is just 20%. Energy efficiency was reported among the top-three purchase priorities by 28% of Thai appliance consumers, compared to just 11% of U.S. consumers. In my in-store tests of label cognition, the U.S. EnergyGuide label fared poorly, and the Thai appliance label was more effective at helping consumers to identify efficient models. Yet both labels suffer from the problem of too much detailed product information, which hinders label comprehension.

Salespeople are the missing link in both appliance labeling programs. While they exert a significant influence in at least half of appliance sales, their incentives typically motivate them to sell appliances that have additional features and use more energy. Finally, U.S. and Thai policymakers have defined different purposes for their appliance labeling programs. The objective of the U.S. program is to provide consumers with information to assist in their appliance purchase decisions. In contrast, the objective of the Thai program is more clearly behavioral — to persuade consumers to buy a more efficient appliance that will save money and protect the environment. To support the program, the Thai government has implemented a massive, nationwide advertising campaign.

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DEDICATION

This dissertation is dedicated to my step-father,
Thomas M. Green III, whom I miss terribly, and who
taught me where to look for the white dragon.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

APPLIANCES: CONVENIENCE AT A COST

Chapter Abstract

This chapter traces the evolution of energy-using technologies in U.S. homes during the 20th century, documenting their rapid uptake by consumers. It then describes how, as consumerism spreads to developing countries, appliance production and sales are rapidly increasing in these countries, with significant environmental and economic impacts. It concludes by discussing the scope of this dissertation, which uses case studies from the U.S. and Thailand to explore the elements of an effective labeling policy for home appliances. After just four years of implementation, the Thai appliance energy labeling program appears to be having a much greater impact on the consumer appliance market than the U.S. program, which has been in place since 1980.

Introduction

Electrical appliances are perceived as convenience items, and they have gradually evolved to be considered necessities in most households in industrialized countries. Almost every U.S. home has lamps, a refrigerator, and a stove. And most homes also have air-conditioning systems, dishwashers, clothes washers and clothes dryers. Home appliances account for most of the energy consumed in U.S. homes (if space conditioning is included), and energy use in the U.S. residential sector accounts for about one-fifth (19.8%) of total U.S. energy use (*Statistical Abstract of the U.S.* 1997: 584).

Appliances will also become an increasingly significant contributor to future energy demand worldwide. The trend of appliance uptake is now repeating itself in the developing world, as incomes rise and manufacturers systematically seek out emerging markets. Global sales of "white goods" — refrigerators, dishwashers, clothes washers, clothes dryers, and cooking appliances — are expected to increase by 15% annually during the 1990s, reaching US$77 billion by the year 2000. Roughly 85% of sales of white goods take place in the U.S., Western Europe, and Southeast Asia.[1]

Clearly, energy used to power appliances will become a growing international problem, in terms of the capital required to finance and fuel the power plants, as well as the pollutants they emit. Appliances seem to be a labor-saving commodity, and they provide services for the purchaser. However, as with any commodity, they are often marketed to do more than they actually accomplish. In fact, there are data indicating that, despite the proliferation of appliances in U.S. homes, the amount of housework done by U.S. housewives did not decrease during the period 1920 to 1970, when households became fully mechanized (Cowan 1985: 191). This is because additional tasks were added to the housewife's responsibilities. Additionally, one can question the implicit assumption in appliance advertisements that air conditioners are an indispensable accoutrement of development. Anecdotal and empirical data cited by Agbemabiese, Berko, and du Pont (1996) indicate that people in tropical countries are often not comfortable in air-conditioned buildings. Given the large and growing impact of appliances, it is

[1] *Euromonitor*, cited in Turiel (1997: 3).

necessary to gain a better understanding of when appliances are genuinely helpful, why people buy them, and how they are used in the home.

Evolution of the U.S. Home Appliance Industry

If one compares the household of today to a turn-of-the-century household, one would find very few similarities. This is because of what Cowan (1985) calls the "industrial revolution in the home." Figure Chapter 1 .1 highlights one remarkable trend in the U.S. household since 1900: the almost complete replacement of domestic servants with energy-using (and primarily) electrical appliances. During this period, electrical appliances took over almost all of the duties formerly carried out by domestic servants, and electricity replaced gas, wood, and other fuels as the home's main energy source.

Cowan (1985: 195) poses the question of whether the decline in the number of domestic servants was a cause or an effect of the mechanization of households. She hypothesizes that advertisers — the "ideologues of the 20s" — were the causal link who, by promoting increased mechanization of household tasks, drove the shift away from domestic services to household appliances. While admitting that her hypothesis is not readily provable, she makes it clear that advertisers at least played a major role in perpetuating the myth of the ideal American housewife (1985: 196-197).[2]

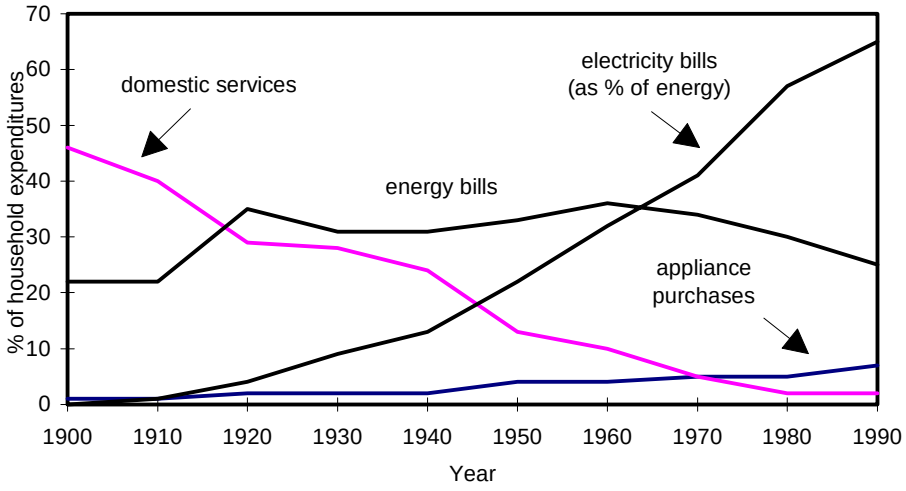

Figure Chapter 1 .1. Replacement of Domestic Servants by Electricity in U.S. Households. (Adapted from Lebergott 1993).

Cowan also concludes that mechanization of the household did not substantially reduce the amount of time that housewives spent on housework, since new jobs were added to the housewife's responsibilities. She conducted a survey of time studies and concluded that the time spent on housework by non-employed housewives remained remarkably constant throughout the period from 1920 to 1970

[2] Cowan carried out her research by surveying back issues of *Ladies Home Journal* during the 1920s. She found — by reviewing the journal and by corroborating her findings with independent statistics — that a "significant change in the structure of the household labor force ... was the disappearance of paid and unpaid servants ... and the imposition of the entire job on the housewife herself."

(1985: 191). However, Lebergott (1993) disputes this conclusion and finds that the amount of time spent on household chores fell dramatically.[3] Clearly, these two views are in contradiction, and without independently assessing the primary sources used by each author, I cannot resolve the issue.

The "Waves" of Appliance Uptake

In the U.S., the development of the appliance industry proceeded in waves — first with the introduction of the electric light in the early 1900s, and then with the widespread adoption of the refrigerator during the 1930s, 40s, and 50s. By 1960, with the market for refrigerators and lighting nearing saturation, and with a continued increase in U.S. disposable incomes, air conditioners became the next wave in the trend toward household mechanization.

Figure Chapter 1 .2 shows the increase in adoption of four of the five main energy-using appliances in U.S. homes.[4] The appliance that most quickly came into all homes was the electric light. Along with motors for factories, the electric light was the first electric end-use device that the electric utilities marketed in the late 1800s in order to provide a market for their power (Clark 1977; Hughes 1983; Marcus and Sega1 1989).

In the absence of an existing electric appliance industry, the electric generating companies had to create one. The marketing of electric end-use devices occurred on several levels. Electric utilities marketed electric lighting and other appliances for the home in an effort to increase their profits by improving their "load factor," a term referring to the extent to which customers use the installed capacity of the generating plant. By "diversifying" their load across the day, utilities could recoup more profits on the fixed costs of operating the plant (Hughes 1983: 220). In 1909, Commonwealth Edison opened an "Electric Shop" in downtown Chicago to show off and sell domestic appliances. In the same building, there was also an "Industrial Power Room," to market motor-driven machines to factory owners and managers (Hughes 1983: 223).

By 1940, the electric light had almost completely replaced the gas light in U.S. homes and mechanical refrigerators had replaced "ice" boxes as the dominant mode of cooling food. The period after World War II, when incomes rose rapidly and more women began to enter the labor force, saw the largest increases in household mechanization, and by 1960 nearly all U.S. houses had electric lighting and refrigeration. The next wave in the evolution of appliances in U.S. homes was the air conditioner.

[3] Lebergott asserts that the increased use of kitchen appliances and other conveniences significantly reduced the amount of time that women spent on housework — "Their weekly hours for household and family chores fell from 70 in 1900 to 30 by 1981 (p. 58)."

[4] A fifth appliance, heating systems, is not included due to the difficulty in comparing the many different types of heating systems, such as wood, coal, gas, oil, electric.

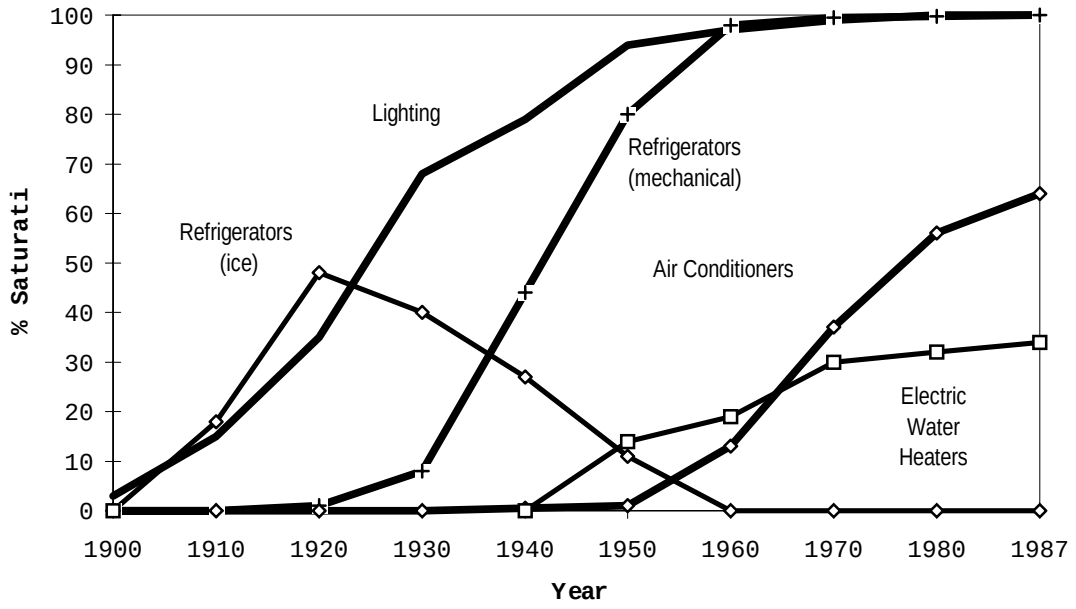

Figure Chapter 1 .2. Increase in Saturation of Electrical Appliances in the U.S., 1900-1987 (% of homes with appliance).

Notes: split for air conditioners in 1987 was 30% room and 34% central; 47% of homes in 1987 had gas water heaters. The use of cool storage via "ice boxes" peaked around 1920 and were quickly replaced by mechanical refrigerators. Gas water heaters are not shown in this figure. The saturation of water heaters overall is split roughly evenly between electric and gas water heaters.
Sources: Data for electric lighting and refrigerators from Lebergott (1993). Data for air conditioners and electric water heaters from *Statistical Abstract of the U.S.* (1940, 1950, 1960, 1970, 1980, 1990).

Technology, Progress, and the Consumer Society

The prevailing view in U.S. society is that progress is linear and that it can be directly related to quantitative indicators of growth and output such as the gross domestic product.[5] It is also generally assumed that economic and technological progress are correlated with increased human happiness (Kempton and Payne 1997). Yet as Basalla and numerous other critics have commented, there is no empirical evidence of a causal connection between advances in technology and the overall betterment of the human race (Basalla 1988: 218; Kempton and Payne 1997). How did a basic assumption of the consumer society — that technologies would have to be continuously upgraded and that the basic "needs" of the consumer would continuously escalate — become so ingrained in American culture? And will these assumptions be transferred wholesale to the developing world?

In light of the rapid U.S adoption of household appliances, it is interesting to compare the uptake of energy-using technologies between U.S. and European homes. Table Chapter 1 .1 shows a comparison

[5] This notion is an intellectual outgrowth of the writings of Bacon and Descartes and later Condorcet and Saint-Simon among others, who equated technological change with the idea of social improvement and progress. A good example of the paradigm associating increased output with progress is Rosenberg (1972).

of household technologies for 1960. In almost all categories, the U.S. had the highest proportion of convenience appliances. The most marked difference is that, while 96% of U.S. homes had refrigerators by 1960, the saturation rates were much lower in European countries. Clearly, the "convenience" technologies such as the refrigerator, hot water systems, and the personal automobile, were slower to take hold in Europe, despite the relative parity of income between Europe and the U.S. Lebergott (1993: 117) attempts to debunk earlier social critics of the "hypnotizing" impact of automatic refrigerators by explaining that U.S. housewives, given the choice of the new technologies were less willing to make daily trips to buy groceries, while "Western Europe continued to uphold the tradition of hard labor for women [implicit in the act of daily shopping for groceries]."

I do not agree with Lebergott's dismissal of the hypnotizing impact of home appliances. My own view is more in line with that of Cowan (1985), who suggests that advertisers were a primary force driving the mechanization of households and the perceived need to buy appliances to increase convenience. I attribute the slower uptake of appliances in Europe to two factors: first, the fact that there was less aggressive marketing of appliances there as compared to the U.S.; and second, the fact that European culture has a longer tradition of social relations and folk traditions, and is thus less susceptible to the escalation of perceived needs that the Lynds and other critics of the consumer society observed in the U.S. (see Horowitz 1985: 148-152).

Table Chapter 1 .1 demonstrates the relatively slower uptake of appliances in European households. This fact, combined with data from the tropics showing that the implementation of air conditioning using "Western" design practices is often inappropriate (see below: Busch, 1990; Agbemabiese, Berko, and du Pont 1996), suggest that in developing countries, the adoption of electrical household appliances need not occur the same trajectory as in the U.S.

Table Chapter 1 .1. International Comparison of Household Technologies, 1960.

Percent households with technology	U.S.	Great Britain	France	West Germany	Netherlands
Refrigerator (elec/gas)	96	30	23	52	23
Hot running water	93	77	41	34	67
Washing machine	55	45	32	36	69
Stove (coal/wood)	na	34	42	50	55
Electric sewing machine	45	12	14	10	24
Hand/foot powered sewing machine	<1	34	42	50	55
Car	77	35	40	26	26

Source: Lebergott 1993
na = not available

Implications of Consumerism for Developing Countries

If developing countries follow in the pathway of Western-style development, and repeat the pattern of uptake of household appliances, the air conditioner will follow the electric light and the refrigerator

into the majority of homes in these countries. A simple thought experiment can illustrate the importance of understanding the driving forces behind the dynamic baseline of the U.S. "standard of living" and the rapid electrification of the U.S. household, which — along with increased energy use in the transport, commercial and industrial sectors — has led to an unsustainable level of energy use.

Figure Chapter 1 .3 shows a conceptual graph of the distribution of energy use in the residential sector of a less-developed country, a newly industrializing country, and a developed country. The distribution of energy use in homes in the less-developed country is represented by curve A. Most of the country's primary energy demand is biomass for cooking, and very few of the people can afford to purchase electric appliances such as refrigerators and air conditioners. Curve B represents the distribution of energy use in a rapidly industrializing country (such as Thailand) in which energy use has increased substantially, largely through the process of national electrification and the uptake of electric appliances following the Western, "mass consumer" model.

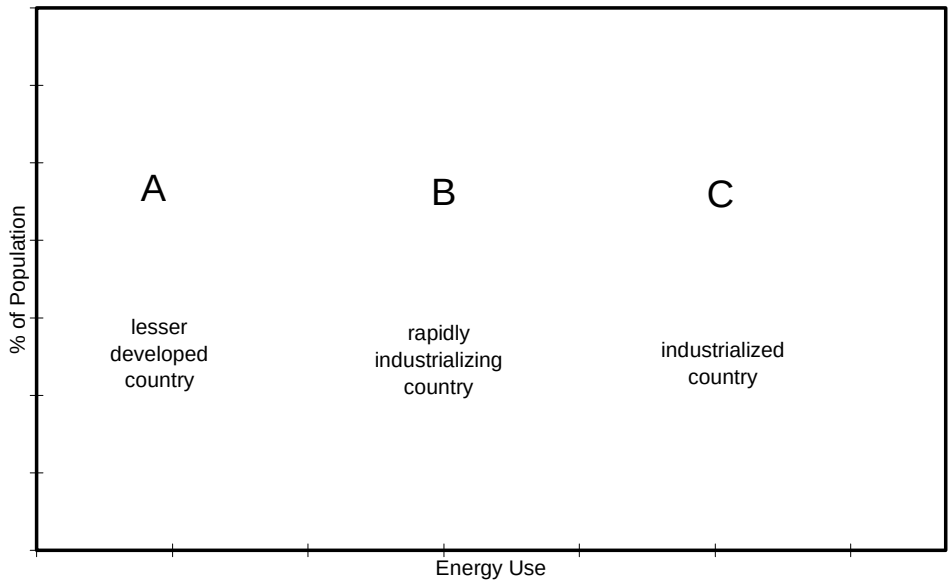

Figure Chapter 1 .3. Distribution of Energy Use in Hypothetical Developed and Developing Countries.

The real environmental dilemma that our society faces is in the shift from B to C, which will occur over the next 40-50 years for many developing countries as they follow the Western path of "modernization" and development. This shift will occur in many countries as rising incomes translate into increasing demand for the major energy-using home appliances — mainly refrigerators and air conditioners.[6]

While average per capita energy use in the U.S. is 9 kW, the average in developing countries is just one-tenth this amount — about 0.9 kW per person. Average world energy demand in 1980 was about 2

[6] This is happening in Thailand, where the saturation of refrigerators and air conditioners is rapidly increasing. In Bangkok, 40% of houses have air conditioners and more than 90% have refrigerators. Outside of Bangkok, appliance saturations are much lower — just 4% for air conditioners and 50% for refrigerators. But Thai energy planners expect saturations for both of these appliances to reach nearly 100% in the next 40 to 50 years.

kW per person, or a total of about 9 terrawats (Goldemberg et al. 1988: 296-302). If all developing countries make the shift from curve A or B to curve C, then global energy production would have to increase by roughly five-fold, to about 50 TW. Given our current reliance on the combustion of fossil fuels to provide energy, this would have catastrophic environmental consequences, including local air and water pollution from power production as well as the global impacts associated with global warming and climate change.

The solution to this dilemma will first require a commitment by developed countries to radically reduce their energy demand by shifting their energy use patterns from curve C back toward B.[7] There is reason for optimism that this can happen. Over the past two decades, for example, the average energy use of new U.S. refrigerators has decreased by nearly two thirds (from 1,726 kWh/year in 1972 to 649 kWh in 1995).[8] However, such large efficiency increases are not enough; the shift from C to B cannot be accomplished through efficiency improvements alone. Consumption of goods and services will have to decrease as well, and this will eventually require changes in lifestyle and the acceptance, especially by Americans, of what we might now term a "lower standard of living."

Thailand: Appliance Uptake in an Industrializing Economy

Thailand is representative of a number of newly industrializing economies (represented by curve B in Figure Chapter 1 .3), whose large annual increases in energy demand mean that its energy requirements are doubling roughly every decade. With a population of 58 million (Mahidol University 1993), it is located in the center of the booming Southeast Asia region. Nearly all of the country is electrified, and more than 80% of dwellings throughout the country have electrical service (TLFS 1993B). Until the recent slide in the Southeast Asian currencies, Thailand's economy had been growing in the range of 7-10 percent annually,[9] and this economic growth was accompanied by equally rapid increases in primary energy demand.

Figure Chapter 1 .4 shows the projected increase in saturation of two major household appliances, refrigerators and air conditioners, which is driving demand in the residential sector. Over the next nine years (1997-2005), the saturation rate of refrigerators is expected to increase from 65% to 92%. During the same time period, the saturation rate of air conditioners will increase from 14% to 26%. But despite their lower level of saturation, it is air conditioners that will really drive energy demand in the residential sector.

During the early 1990s, air conditioner sales in Thailand increased at an average rate of more than 15% annually, and total production increased at an even greater rate, as exports of air conditioners tripled over a five-year period (IIEC 1995). According to the most recent end-use electricity load forecast for Thailand, the stock of residential air conditioners is expected to increase nearly five-fold between 1991 and 2006, reaching 4.8 million units. And although refrigerators are currently the largest residential load,

[7] Goldemberg et al. (1988) proposed a "1 kW per capita" thought experiment. They argued that developing countries can obtain a "standard of living" of a typical Western European during the late 1970s with much lower levels of energy use. They contend that such activity levels are adequate to meet the basic needs of the population and that, using technologically feasible improvements in equipment energy efficiency, such a society could exist using an average of just 1 kW per capita.

[8] Data from the Association of Home Appliance Manufacturers, 1996.

[9] As a result of the Asian economic crisis, the Finance Ministry revised its estimates of economic growth in November 1997 to 0.6% growth in 1997 and 0-1% in 1998, compared with 6.4% in 1996 (*Bangkok Post Year-End Economic Review*, January 14, 1998).

they will be surpassed by air conditioners before the end of the century. By 2007, consumption of electricity for air conditioning will be nearly twice as high as that for refrigerators (TLFS 1993B: 2-19).

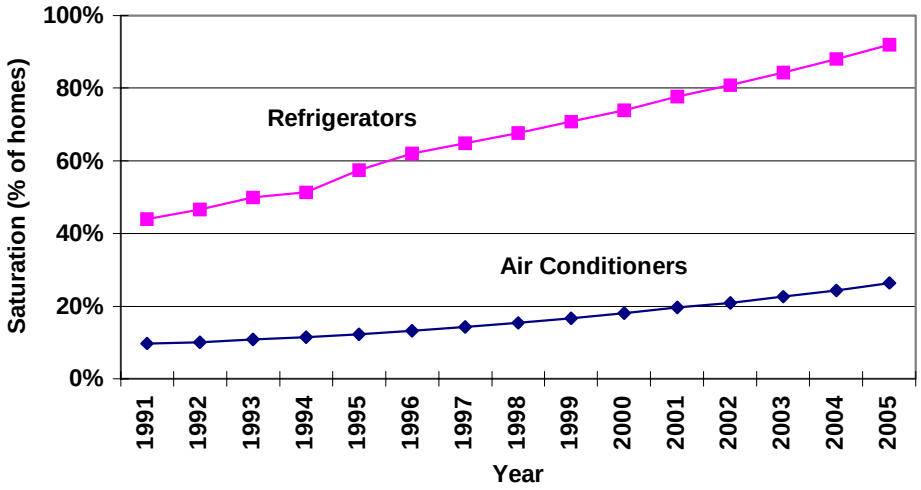

Figure Chapter 1 .4. Forecast Increases in Saturation Rates of Thai Refrigerators and A/Cs. Source: TLFS 1993B

Indeed, compared to refrigerators, air conditioners will account for three times as much new electricity demand in the Thai residential sector over the next decade — 38 percent of new residential demand for air conditioners, versus just 11 percent for refrigerators. The cost of adding new capacity for air conditioners through the year 2006 could exceed US$2 billion, and it will cost Thai consumers nearly US$700 million in annual energy bills to operate these air conditioners.[10]

The rapid increase in demand for residential appliances in Thailand exemplifies what is occurring in developing countries around the world, as they adopt technologies that were originally developed in the U.S. and were adopted by the masses in the early and middle part of this century. What is happening in Thailand and other developing countries in fact mirrors the uptake of appliances that occurred in the U.S.; but it will happen in a much more compressed time period, and it will have enormous environmental and economic consequences for the planet.

Scope of the Dissertation

The purpose of this dissertation is to explore the elements of an effective energy labeling policy for home appliances. I have chosen the U.S. and Thailand as the two case studies because of the range of contrasts they pose.

In the mid-1980s, threatened by a developing patchwork quilt of minimum appliance efficiency standards in different states, U.S. manufacturers agreed to a sweeping national law that set minimum efficiency standards for a range of household appliances. To date, appliance and lighting standards have

[10] Calculations based on data from Thai load forecast (TLFS 1993: 2-20)

saved more than 3% of U.S. annual residential energy consumption (McMahon et al. 1996). The U.S. also has one of the world's longest-running national appliance energy labeling programs, initiated in 1979. Yet despite the longevity of this national program, it has not been evaluated for more than 15 years. The U.S. EnergyGuide label has played an important role in providing information on appliance energy usage for many utility-sponsored rebate programs across the country. However, the labeling program itself remains relatively obscure; it has not been accompanied by any large-scale promotion or consumer education, and there is no evidence that the label has had a significant influence on consumer decision-making in the purchase of household appliances.

Thailand is typical of many rapidly industrializing nations whose consumers are adopting the same range of household appliances that were developed and mass-marketed in the U.S. during the first three-quarters of this century. Thailand began implementing a nationwide demand-side management (DSM) program in late 1993. The Thai DSM office initiated a voluntary energy labeling program for refrigerators in early 1995 and a similar program for air conditioners the following year. It has supported the labeling program with a massive, nationwide advertising campaign to promote energy conservation in general, and in particular to educate consumers about the appliance energy labels. In just three years, the appliance energy label has had a modest but significant impact on the efficiency of appliances in that country: the average efficiency of refrigerators and air conditioners participating in the voluntary labeling program has steadily increased since the program's inception.

There appears to be something going on here; the Thai appliance labeling program has dramatically increased the salience of energy efficiency in the appliance sales transaction. After just four years of implementation, why does the Thai labeling program appear to be having a much greater impact on the consumer appliance market than the U.S. labeling program? Why has the U.S. program remained relatively obscure, while the Thai program is supported by a high-profile, national advertising campaign? Four years ago, Thai consumers had no idea about the energy efficiency of appliances because there was no labeling or information available in the stores. Yet now, energy efficiency plays an important role in the appliance sales transaction in Thailand.

Because the proliferation of household appliances is a global energy problem, a comparative study of appliance labeling policy in the U.S. and Thailand offers opportunities to learn from the implementation of labeling programs by different types of agencies in countries with different income levels and different cultural and political climates.

Figure Chapter 1 .5 shows the multitude of factors that affect the appliance purchase decision. These include policymakers who design labeling and rebate programs, retailers and manufacturers, the mass media, and other influences on behavior such as friends, family, values, and beliefs. This dissertation focuses on the behavior of the individual who is at the center of the diagram, the consumer who is shopping for, buying, and ultimately using the appliance. It views the problem of choosing an appliance as one of cognition in context — in other words, what does the individual consumer think about when she purchases an appliance; how does she gather information and frame her decision; what sort of advertising or promotional materials affect her; to what extent is she influenced by the salesperson; and what, if any, linkages does she make between her purchase and the ultimate environmental and energy-related impacts of using the appliance?

The theoretical inspiration for my methodology for understanding consumer cognition in context is Rogoff (1984). The methodology used is similar to research with grocery shoppers reported by Lave, Murtaugh and de la Rocha (1984). In this study, the authors observed and tape recorded shoppers as they walked through the store comparing items, performing price calculations, and making trade-offs. In a similar vein, I have chosen to view appliance consumers by observing them in a retail environment, interviewing consumers and salespeople, and testing consumer cognition of the appliance energy label.

All of this research was conducted in the appliance store environment, in order to assess consumer behavior and cognition in a context as similar as possible to that of the actual purchase.

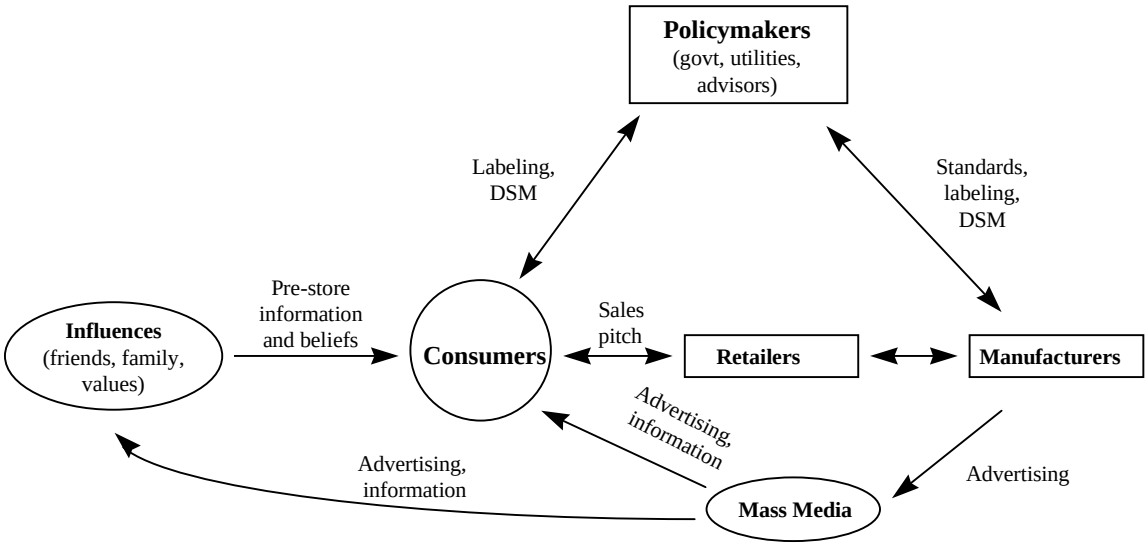

Figure Chapter 1 .5. Factors Affecting the Consumer Appliance Purchase Decision.

This dissertation addresses both the formulation of appliance energy policy as well as the consumer decision-making process. Policymakers in the U.S., Thailand, and elsewhere have designed a range of programs to reduce or control electricity demand from appliances — either through legislation requiring minimum efficiency levels, rebates and incentives for consumers or manufacturers, or through labeling and educational programs designed to influence consumer behavior. Most of these programs — with the exception of mandatory minimum efficiency standards — require a reaction on the part of the consumer, since it is at the individual level that the retail purchase decision ultimately occurs. Yet the individual consumer has a multitude of concerns and priorities in mind besides the efficiency or environmental impact of the appliance. And the marketers of appliances are constantly bombarding the consumer with messages on diverse selling points, of which energy and the environment are the least tangible and often the least touted. This dissertation explores questions such as, How do policymakers gather data about consumer behavior in order to design effective programs?, and What sort of feedback loops are there between the design of policy and the retail appliance store? Because of the critical importance of these questions, I included policymakers, as well as consumers and retailers, in this study.

For the reasons cited above, I performed parallel studies in the U.S. and Thailand, focusing on three target groups: policymakers, retailers, and consumers. (This research did not specifically include manufacturers due to limitations of time and available budget.) I used a mixture of social science research techniques in order to gain the best perspective possible on the consumer decision-making environment. These include qualitative techniques such as unstructured, and semi-structured interviewing, and quantitative techniques such as a large-scale questionnaire survey. An essential part of my research was a two-week period of participant observation, during which I worked as a sales trainee at a regional appliance store in New Jersey. The richness of the data derived from these complementary research techniques allowed me to develop a textured understanding of the role that energy efficiency

plays, or can potentially play, in the appliance purchase decision. And by helping define the boundaries and limitations of energy efficiency as a salient factor in the purchase decision, it is hoped that this research may contribute to the formulation of improved appliance labeling policies.

I have chosen to study specifically the role of energy efficiency in the retail appliance purchase. This is the route by which the majority of home appliances are sold in both the U.S. and Thailand. Admittedly, there are other important problems which are beyond the scope of this research. These include the issue of bulk purchases by apartment managers and builders of tract homes who have no incentive to buy energy-efficient equipment; what people think they are getting when they purchase an appliance (i.e. modernity, status, relief from drudgery[11]); how appliances are used (i.e. efficiently or not); whether consumers buy more than they need (i.e. oversized refrigerator or air conditioner, air conditioner instead of a fan, etc.); and whether marketers influence consumers to "overbuy."

Organization of the Dissertation

The remaining chapters of this dissertation are organized as follows: Chapter 2 provides the theoretical and academic background for this research by reviewing previous research on consumer behavior and energy use as well as previous studies that have examined the relationship between consumer behavior and appliance purchases. Chapter 3 describes the study design and methodology used for the research on policymakers, retailers, and consumers in the two countries. Chapters 4 through 6 describe, respectively, the results of the research on policymakers, retailers, and consumers. Chapter 7 describes the results of the in-store tests with consumers of label cognition. Finally, Chapter 8 analyzes the policy implications of this study's findings and makes recommendations for subsequent research to improve the design, implementation, and evaluation of appliance labeling policy.

Additional resources and information can also be found in the appendices. These include background analysis of the appliance efficiency policies in the U.S. (Appendix A) and Thailand (Appendix B); copies of the interview protocols for the U.S. (Appendix C) and Thailand (Appendix D); copies of the survey questionnaires used in Thailand (Appendix E); a discussion of survey analysis and quality control (Appendix F); reproductions of appliance energy labels from around the world (Appendix G); an annotated bibliography of past evaluations of energy labeling programs (Appendix H); and samples of improved energy labels for the U.S. and Thailand based on the results of the consumer cognition tests (Appendix I).

[11] Some of my interview questions with rural Thai consumers addressed the associations that villagers have with the ability to buy or own an air conditioner. These data are not discussed in this dissertation and will be reported in a separate, forthcoming publication.

CHAPTER 2

RESEARCH ON CONSUMER BEHAVIOR AND ENERGY LABELING

Chapter Abstract

This chapter reviews the literature on consumer energy behavior and energy labeling. Studies in the retail environment underline both the importance of the salesperson in the decision-making process and the current lack of incentives for salespeople to "push" energy-efficient products. A review of past evaluations of energy labeling programs indicates the need to redirect research efforts toward in-store research in order to better understand consumer priorities, decision-making, and comprehension. Research in the field of information processing has shown that government policymakers who design information programs typically overestimate the amount of time and effort that consumers will put into processing the message on a label.

Introduction

This chapter lays the groundwork for my own field work on this topic by reviewing past research on consumer energy behavior. The first half of the chapter reviews a number of topics related to consumer energy behavior: economic and behavioral frameworks, the salience of energy efficiency, consumer attitudes toward energy and the environment, and consumer priorities and search patterns. The second half of the chapter focuses on consumer responses to energy labels and describes what we know about the effectiveness of energy labeling programs. It highlights the need for field research and provides an extensive overview of past evaluations of energy labeling programs. A related, annotated bibliography of these past evaluations can be found in Appendix G.

Prior Research on Consumer Energy Behavior

Over the past decade, few studies in the field of marketing and consumer behavior have focused on the role and salience of energy in consumer purchases. Much of the ground-breaking research in consumer energy behavior was stimulated by the oil crises of the 1970s and was conducted in the late 1970s and early 1980s, but has subsequently declined. Figure 0.1 shows the drop-off in consumer energy research as reflected by the decrease in the number of energy-related articles in the *Journal of Consumer Research*. I tabulated the 20-year period from 1974 to 1994, during which 31 energy-related articles appeared in the journal. Twenty-eight of these appeared between 1974 to 1985, three appeared between 1986 and 1989 and no energy-related articles appeared between 1990 and 1994. The actual fall-off is not nearly so steep, because behavioral articles now appear regularly in energy journals, such as *Energy Policy* and *Energy and Buildings*.

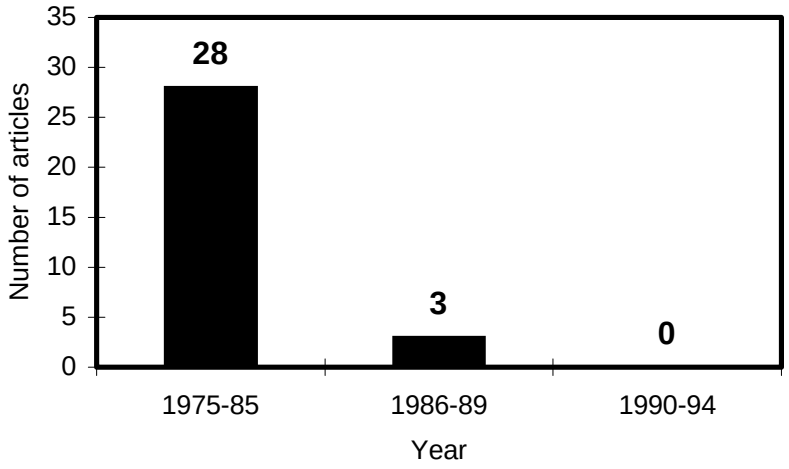

Figure 0.1. Decline in Consumer Energy Research. The figure shows the number of energy-related articles that appeared in the *Journal of Consumer Research* over a 20-year period, from 1975 through 1994.

Economic and Behavioral Frameworks

Over the past 20 years, the field of consumer energy analysis has maintained a dichotomy between explanations using economic versus behavioral frameworks in the analysis of energy behavior. Economists either consider current energy consumption as optimal, or view the barriers to energy efficiency as being primarily due to imperfect markets, and assume that these can be addressed primarily through financial incentives. Behavioral scientists and market researchers tend to view the problem from a different perspective, focusing on the factors that increase awareness, improve information, and lead to action on the part of the individual. Comparing the approaches, Stern argues that the economic approach has the advantage of being systematic, but it has blind spots in its ability to accurately predict human behavior. And while the behavioral approach has the benefit of having fewer blind spots, it lacks the systematic rigor of the economic approach (Stern et al. 1986: 220).

My own approach to this dichotomy has been to use a variety of research methods (participant observation, semi-structured interviews, survey research) and to avoid relying on any single approach. In my view, the prevalence of the economic paradigm in energy policy analysis has led to a sort of myopia, in which consumers are viewed by policymakers as rational economic actors, and it is assumed that economics will be a primary motivating factor when they make energy-related decisions (such as purchasing an appliance). It follows that if a higher initial cost is a barrier to the purchase of energy-efficient equipment, then rebates or incentives are the solution. However, empirical data from evaluations of U.S. residential energy-efficiency programs show that non-financial factors have often had the greatest impact on program participation rates. Stern et al. found a weak correlation between the size of program financial incentives and participation rates. They concluded that marketing and implementation were responsible for widely varying participation rates (by a factor or 10 or more) in programs that offered identical financial incentives (Stern et al. 1986).

Sanstad and Howarth use a modified economic framework to analyze consumer energy behavior, concluding that consumers do the best that they can with the information available to them. They explain the lack of consumer investment in energy efficiency as the result of what Simon called “bounded

rationality." Simon was a strong critic of the rational economic actor paradigm (also called the rational-choice school) and also argued that consumers do the best they can with the information they have. In practice, said Simon, consumers cannot make what economists would term "rational" decisions, since they lack complete information and the time-cost to acquire and process full information is prohibitively expensive. Thus, the best consumers can do is "muddle through with imperfect results" (Sanstad and Howarth 1992: 1.178).

Sanstad and Howarth also contend that it does not make for good policy to design energy efficiency programs that rely on rationality in consumer purchase decisions. If consumers cannot, on average, make correct calculations regarding energy efficiency, as may be implied by the findings of high-implicit discount rates, then efficiency standards may serve to replicate the correct calculations on a centralized, cost-efficient basis. They argue that it may be more effective to bypass the consumer and achieve efficiency gains through the use of minimum efficiency standards. Thus direct regulation may, in some cases, bypass the problem of bounded rationality altogether by enacting laws that entirely eliminate the worst choices from the market, thus making consumer behavior less important (Sanstad and Howarth 1994: 1.181)

I disagree with this view, since it negates the role of the consumer and ignores the vast potential for a pro-active consumer role on environmental issues, which has been witnessed for certain activities such as recycling and buying spray cans with non-CFC propellants (Kempton 1993). It also does not address the fact that energy efficiency is a virtually invisible issue to most consumers, since they lack information and feedback on energy use. Kempton and Montgomery used a vivid analogy: consumers making energy decisions in the home are forced to use crude estimates, and their use of monthly energy bills to make decisions is akin to customers who shop in a store without prices on the items and who receive only one bill at the checkout counter. Yet the researchers demonstrated through semi-structured interviews that consumers adapt the information available to them and develop fairly sophisticated folk methods to quantify and compare their energy bills (Kempton and Montgomery 1982: 824). This model could also be applied to consumers in the retail appliance environment; one can argue that, given clear and understandable information on the dollar cost of operating appliances, consumers would use appliance energy labels as an important decision tool.

When consumers are asked about their intentions, they *appear* willing to pay a premium for an energy-efficient product. In one experiment, consumers were asked to explicitly trade off between first cost and savings. The researchers mailed a survey to 3,000 residential customers in Indiana, asking, "If an energy-saving device with a very long useful life could be purchased and installed in your home for $100, approximately how much would you have to save in energy costs each year before you would install the device?" The researchers calculated a mean discount rate of 22.5% which did not vary significantly with income (Houston 1983). In a similar experiment in Australia, researchers derived an average payback time of 9.5 years (SEC Victoria 1991). If consumers purchased efficiency at rates consistent with these results — especially the 9.5-year payback — there would be far more efficiency purchased in appliance markets than is actually the case.

The fact that these above data are hypothetical is troublesome. If one examines empirical data on price and efficiency levels, consumer actions are not in fact predicted by the "rational economic" models used by economists (e.g., Sanstad and Howarth 1994, Hassett and Metcalf 1993). Indeed, consumers do not tend to optimize their appliance purchases by paying more for energy-efficient models that cost less to operate. Ruderman et al. calculated "implicit discount rates" for consumers based on aggregate national data on appliance price and efficiency. They concluded that the high discount rates, which ranged from 16% to more than 200%, were the result of market imperfections that prevented consumers from "making economically optimal decisions" (Ruderman, Levine, and McMahon 1987: 48).

Studies such as this one, which indicate the existence of significant lost economic opportunities, are commonly used to marshal support for government and utility intervention to overcome "market barriers" to increased energy efficiency. Such studies demonstrate that consumers do not typically act by trading off between just two variables — price and operating cost — when they purchase an appliance. Any model that assumes consumers act in this manner does not take into account the myriad non-economic and non-energy factors considered by consumers in their actual purchase decision.

Attitudes Toward Energy and the Environment

Another aspect of consumer energy behavior relates to environmental attitudes. U.S. consumer attitudes have remained favorable to the environment throughout the 1980s and into the early 1990s (Dunlap 1991, Kempton, Boster, and Hartley 1995). The results presented by Dunlap in a survey of environmental polling demonstrate widespread support for environmental issues. In a 1989 Harris poll, 97% of the public said that they felt the country should be doing more to curb environmental pollution. In a 1990 New York Times/CBS poll, three-quarters of the public agreed with the statement that "Protecting the environment is so important that the requirements and standards cannot be too high, and continuing environmental improvements must be made regardless of cost." Dunlap concludes that the environment seems to be gaining in importance as an electoral issue (Dunlap 1991).

Surveys have also shown continuing widespread support for energy efficiency in the U.S.. In one recent national survey, 55% of the respondents said that energy efficiency or renewable energy should be the government's highest energy research priority, compared to just 18% for fossil fuels and 9% for nuclear power. In the same survey, three-quarters of the respondents said they would be willing to pay more for electricity generated from "cleaner renewable sources" (Sustainable Energy Budget Coalition 1996).

A major question for the energy policy analyst is, How much of this widespread U.S. public support — this favorable "attitude" — translates into behavior and actions? Dunlap describes this as an area of contention, with some groups predicting a potential "sea change" in the market toward environmental consumerism, but little solid evidence being presented that actual behavior has changed much. He also describes one factor that may be limiting consumer action on environmental issues: the perception that environmental problems are caused primarily by business and industry, rather than by individuals (Dunlap 1991: 33-34). In fact, there are a number of barriers to consumer action on environmental issues, including lack of consumer control over the problem, lack of knowledge on how to respond, and lack of association of environmental problems with an appropriate solution (Kempton 1993).

Energy as a Consumer Priority?

A very revealing demonstration of the low salience of energy efficiency in Thailand was made in early 1993 by a distributor of Sanyo refrigerators in Bangkok. When he was asked whether consumers would be swayed by marketing placards showing that the new Sanyo "Energy Saver" refrigerator would pay for itself in roughly two years. The salesman shook his head and pounded on top of the refrigerator (which has much thicker insulation than the standard model) saying, in Thai, "No, but they will buy it because it is a lot sturdier and stronger-looking than the standard model."

This anecdotal claim is, unfortunately, well supported by past research, which has shown that despite years of campaigns and nearly two decades during which energy labels have been prominently displayed

on U.S. appliances, energy use is not a high priority during the consumer's decision-making process (Dyer and Maronick 1988; BPA 1987; Brown and Whiting 1996; du Pont and Lord 1996).

However, little research has been conducted to ascertain the salience of energy efficiency in the appliance purchase decision and to determine how energy efficiency might be used as an effective selling tool. A few studies have found that simply training salespeople and providing point-of-purchase information on energy efficiency can increase the priority that consumers place on energy efficiency as a purchase criterion (BPA 1987; DTI 1994; DOE 1995; Bodner 1997). In a 1983 national survey of 575 U.S. homes, energy use and yearly energy costs ranked fifth on a list of important attributes in the purchase of a refrigerator or washer (Dyer and Maronick 1988).

In a more recent U.S. survey of 323 consumers in four U.S. cities, "low operating cost" ranked seventh on a list of factors that would influence a consumer's decision to buy a new appliance. This survey was conducted with consumers at appliance stores; most of the respondents were shopping for an appliance, but they had not necessarily recently purchased one (Brown and Whiting 1996).

Even on a high-energy-use item such as an automobile, the evidence shows that energy efficiency plays a role in only a small percentage of the purchases. In 1978-1979, at the height of the second oil crisis of the 1970s, fuel economy was ranked as the most important vehicle characteristic at the time of purchase. This ranking had fallen to third by 1981 (Pirkey et al. 1982). In a 1990 study, fuel economy had fallen even further, and ranked "below numerous other features in the purchasing decision" (Hill and Larsen 1990).

Methodology must be evaluated to determine the validity of conclusions about consumer priorities. For example, data that reflect hypothetical intentions are not reliable indicators of consumer preferences, and must thus be viewed with caution. In a national survey of 1,039 Finnish households, the most important feature mentioned by all respondents in the choice of refrigerators and freezers was energy consumption. When only decision-makers (i.e. those who make the appliance purchase decision) were asked (568 people) what were the most important selection criteria, energy consumption ranked third, after guarantee/warranty and inside volume. These data reflect attitudes and intentions only, since the researchers studied a random sample of households and did not focus on recent appliance purchasers (Kuusela 1996).

Response bias has the potential to skew results in favor of energy efficiency. In several studies, energy researchers have signaled their intentions to respondents, yielding results that must be viewed with some skepticism (SEC Victoria 1991; DOE 1995; Strang 1996). For example, in a 1991 Australian study, the researchers introduced themselves as energy researchers conducting a study for the local utility on energy efficiency and energy labeling schemes. Energy efficiency and operating costs ranked second in importance after unit capacity. In addition, running costs and efficiency were reported as the most important attributes in the choice of a dishwasher (SEC Victoria 1991). These results should be viewed with skepticism, however, due to the possibility of response bias in favor of energy efficiency generated by the interviewer's introduction.

Another Australian study found that when recent and prospective appliance buyers were asked an unprompted question about their most important purchase criteria, the star label was ranked eleventh. When the consumers were reminded about energy efficiency, it shifted to fourth in the ranking. Wilkenfeld argues that this "prompting" stimulates the way in which a label in an appliance showroom would remind them about energy efficiency (GWA 1993). However, this prompting does introduce the potential for response bias, since it is easy for respondents to shift their stated intention to please the interviewer.

A British study claimed that energy consumption ranked third — after cost and reliability — in a list of important criteria when purchasing a refrigerator or freezer. However, this study was prone to the same sort of bias as the previous study. The self-completion questionnaire began with a full-page

reproduction of the EU refrigerator energy label. On the following page, the respondents were asked to list the three most important factors in their choice of refrigerator (Strang 1996). Again, the prompting (in this case the reproduction of the energy label) may account for the high ranking of energy as a purchase factor.

Consumer Search Patterns

The manner and extent to which appliance consumers gather information prior to purchasing an appliance is a critical policy issue. Early research identified three basic patterns of information gathering: *non-thorough*, in which consumers visited few stores and relied on few out-of-store information sources; *store intense*, in which consumers visit many stores but seek little other information; and *thorough and balanced*, in which consumers visit many stores and rely on many outside sources of information (Claxton, Fry and Portis 1974).

Building on this earlier work, Westbrook and Fornell found that major appliance buyers could be classified according to two underlying dimensions of information usage: (1) the extent of physical shopping and (2) the use of neutral sources vs. personal sources. They were able to segment the appliance buyers according to these two information source categories and came up with four segments: *objective shoppers* who visit a high number of stores and rely on neutral, as opposed to personal information sources; *store intense shoppers*; who visit more stores and rely more on personal, than neutral, information sources; *personal advice seekers*, who visit few stores and rely primarily on advice from friends, neighbors, or relatives; and *moderate shoppers*, who visit the fewest stores and rely primarily neither on personal nor neutral sources. They concluded that the different types of shoppers may require different kinds of retail selling approaches. They also hypothesized about the cause of the limited reliance on neutral information for certain segments of shoppers: either lack of search ability and high perceived cost, or lack of perceived information need (Westbrook and Fornell 1979).

Beales et al. also noted the limited reliance on "objective" information such as that disseminated by government programs. They reviewed empirical studies on information search and found that the amount of external information search (i.e. information from third parties, salespeople, and their own personal inspection) that most buyers do is limited for all but the most expensive durable goods. Instead, consumers tend to rely on passively acquired information from prior personal experience, previous external searches, or low-involvement activities like advertising or word of mouth (Beales et al. 1981). This means that at the time of the purchase salespeople have the potential to exert a major influence on the consumers' decision criteria. Beales et al. concluded that government agencies must develop marketing expertise in order to compete with retailers for the consumers' attention.

> Sellers are skillful providers of information using both verbal and non-verbal methods of communication. Consequently, government agencies interested in altering consumer behavior must acknowledge that they are in competition with sellers for the attention of the consumer. These agencies must either develop an expertise in communication skills or rely on performance standards and let the seller determine the best way to meet these standards (Beales et. al 1991: 21).

Research on consumer search patterns can indicate the most effective media and timing for influencing consumer decisions and marketing the benefits of energy-efficient models. For example,

studies of automobile purchase patterns found that since the vast majority (80-90%) of new car buyers have decided what type (and size) of car they want to buy prior to visiting a dealer, it is important for consumers to have access to information about fuel economy *before* they visit the dealer (Pirkey et. al. 1982, Hill and Larsen 1990).

In the area of appliances, information search is a two-stage process: initially consumers compare (i.e. screen) all alternatives on just one or a few attributes. When the search continues, they select a smaller number of alternatives and compare these on all available attributes (Bettman 1979; Verplanken 1990 cited in de Loor 1991). Commenting on this, de Loor emphasized the critical role of energy labeling in making energy efficiency a salient attribute during the early stages of the consumer search process:

> The function of an energy label is to present the factor "energy consumption" such that it will be included in the first stage: the preliminary scanning of alternatives. If the label, for some reason, fails to communicate this factor in the first stage of the information search, it is possible that all energy-efficient appliances are excluded from the second stage: the comparison on all attributes (de Loor and Zeelenberg 1991).

The Role of the Salesperson

Given the limited external search that most buyers perform, as well as the need to make energy efficiency a salient attribute, it is important to carefully examine the interaction between the salesperson and the consumer in the retail environment. As noted above, prior research has shown that the salesperson is an essential and often -- from the policy perspective -- overlooked part of the consumer decision-making process.

In-depth observation of the interaction between the customer and the salesperson can yield much more textured information than can be obtained from surveys. Such data are also more reliable than information gained from focus groups because they represent the actual dynamics of a transaction. Olshavsky taped and transcribed 40 complete transactions involving the purchase of either a refrigerator or a television. He categorized typical sales transactions into three phases: an *orientation phase*, during which the salesperson determines the customer's desires and requirements; an *evaluation phase*, which involves exchange of information about specific alternatives; and a *consummation phase*, which involves exchange of information about non-product attributes (e.g., delivery, availability, trade-in, service, return policy, etc.) He concluded that the salesperson often dominated the search process in the store and controlled the extent and evaluation of alternatives:

> In spite of his very sketchy initial information on the customer's desires, the salesman typically selects the order and the number of alternatives evaluated. The salesman also seems to dominate the evaluation of each alternative in that his semi-prepared presentations guide the customer's attention to various product attributes (Olshavsky 1973: 211-212).

The prominent influence of the salesperson was also underlined by Anderson and Claxton, who conducted a field study of 720 refrigerator sales in 18 stores in Western Canada. They found that the lack of in-store support hampered sales of energy-efficient models (sales staff initiated a discussion of

energy use in only 17% of interactions). They recommended "in-store" shopping aids in order to help consumers compare energy performance between models (Anderson and Claxton 1982). A similar recommendation has been made for nutrition labels: that for the label to be effective, it must be accompanied by a continuous, coordinated outreach effort to educate consumers (Byrd-Bredbenner 1994).

At least one study has found what I will call the "paradox of salesperson influence." In a simulated experiment in which 123 people "shopped" for a refrigerator at a White-Westinghouse showroom, salespeople appeared to have a large impact on the efficiency of the refrigerator selection. However, consumers when surveyed tended to indicate that the salesperson had very little influence on their product selection (Redinger and Staelin 1981). This may reflect the "art" of being an effective salesman – the ability to listen carefully and to guide, but not overtly push, a consumer toward a specific product. Redinger and Staelin concluded that salespeople will be an essential component in making the EnergyGuide labels effective. They recommended that enlisting salespeople to "sell" energy efficiency will require not only education but financial incentives for taking the time to show the consumers how to make the tradeoff.

Ling and Wilhite (1992) used ethnographic interviews to assess consumer decision-making in Scandinavian appliances stores. They examined the emphasis on energy use in transactions between appliance customers and salespeople at 54 different household appliance stores in four Nordic countries. They found that energy efficiency played only a small role in the sales process – for both the salesperson and the consumer – and that compared to other factors such as size, convenience, color, features, energy use was considered a minor technical detail. It appeared that the "norm" was for salespeople to play little if any role in pushing energy efficiency in their sales pitch (Ling and Wilhite (1992).

Some electric utilities implementing demand-side management (DSM) programs have focused on the role of the salesperson in influencing the purchase of energy-efficient appliances. A study by the Bonneville Power Administration found that refrigerator purchasers relied heavily on the salesperson for product information and recommendations. However, few of the dealers surveyed in the study initiated a discussion of energy efficiency (BPA 1988).

In 1994 and 1995, the Danish Energy Agency tested the extent to which training, information, and sales aids could increase the effectiveness of salespeople in using the new European Union labels as a selling tool for energy efficiency. In a pilot project, the labeling and training had a large apparent impact: 95% of the salespeople and 74% of the consumers surveyed replied that the label had an impact on the purchase decision, although it was not possible to quantify the extent of the effect. Seventy-one percent of respondents said the label was easy to understand. The researchers also compared sales of energy-efficient refrigerators and freezers between the 32 stores which had the sales training and energy labels, and another chain of stores, which had energy labels but no training. They found that sales of energy-efficient units increased in both chains and concluded that manufacturers were pushing more energy-efficient units in response to the newly initiated labeling program (DTI Energy 1994).

Recognizing the crucial link played by the appliance retailer, the U.S. Department of Energy has also initiated a pilot project called the Energy Star Retail Labeling Program (DOE 1995). The program consists of promotional activities with utilities, sales training[1], regional and point-of-purchase advertising and promotion, and labeling of products that meet pre-specified criteria. The label is a separate endorsement label with an "Energy Star" logo, which is placed on qualifying appliances. To qualify, appliances must exceed the U.S. minimum efficiency standards by a specified amount. Thus far, the

[1] The initial pilot phase of the program in four cities included sales training. In the expanded program, there is no sales training component. Rather, a training manual is sent to participating stores, and there are plans for a training video to be developed in 1998 (Hazard 1998).

program has developed qualifying criteria for four types of appliances – refrigerators, dishwashers, room air conditioners, and clothes washers. After a two-year pilot phase, during which the concept was tested at a number of stores in four U.S. cities and the results assessed using focus groups, the program has expanded to include more than 1,000 participating and 11 utility partners nationwide (Hazard 1998). Preliminary data from 30 stores over a three-month period indicate that overall sales of qualified Energy Star products increased by 27 % (Bodner 1997).

Both the Danish and the U.S. Energy Star Retail Labeling programs move beyond the prescriptions made by Anderson and Claxton (1982) and Redinger and Staelin (1981). These programs have demonstrated that the retailer has an effect on the energy efficiency of the purchased appliance. Furthermore, they demonstrate an ability to influence the retailer, and thus the ultimate consumer decision, through public policy.

Consumer Response to Energy Labels

This section begins with a typology of energy labels, in order to compare the different ways of communicating energy information to the consumer. It then provides a brief overview of the different types of appliance energy labels currently being used internationally. This is followed by a discussion of the need for field research and, finally, a review of prior evaluations of energy labeling programs.

A Typology of Labels

Casey-McCabe and Harris surveyed a range of energy and environmental product labels and make the following typology distinctions: endorsement vs. comparison labels; by sponsor (government, manufacturing association, or third party); and energy-only vs. environmental criteria (Casey-McCabe and Harris 1995; Harris and McCabe 1996). Below I expand on their distinction between endorsement and comparison labels.

Endorsement labels. These labels offer essentially a "seal of approval" that a product meets certain pre-specified criteria. They generally are based on a "yes-no" cutoff, and offer little additional information. Examples of endorsement labels for energy efficiency are the Energy Star label, which is applied to heating, ventilation, and air-conditioning equipment and office equipment, and has recently begun to be adopted for four types of appliances as part of a national pilot project[2]; and the Power Smart label developed for a range of electrical products by a Canadian utility.[3] Generally, these endorsement labels are applied to the top-tier of products in a market (e.g., the top 20%, or products that exceed a target by a certain fixed percentage).

Comparative with categories. This type of label allows consumers to compare energy use between models. These labels use a categorical rating or ranking system that allows consumers to tell how energy-efficient it is compared to other models in the market. They may or may not also contain detailed information on the operating characteristics, costs, and energy use of the models. The main emphasis is on establishing clear categories, so that the consumer can tell, by looking at a single label, how energy-efficient it is relative to others in the market. Examples are the European Union's refrigerator labels,

[2] This program, the Energy Star Retail Labeling Program, was discussed earlier in this chapter.

[3] Power Smart was initially developed by British Columbia Hydro as an endorsement label for its DSM programs. It has now been spun off as an international membership organization with more than 30 utility members around the world.

which have a rating scheme from A to G; the Korean and Thai appliance energy labels, which have a rating scheme from 1 to 5; and the Australian appliance labels, which have a rating scheme from 1 to 6 stars.

Comparative with continuous scale. This type of label provides detailed information on the energy performance of the product. It may also provide information that forms the basis of a comparison with other models, but does not use specific categories to accomplish this. Examples are the U.S. EnergyGuide and Canadian Energuide labels, which show a dollar or kWh amount of annual energy usage as well as a scale that shows relative energy use compared to other products.

Labels from Around the World

A review of appliance energy labels from around the world shows that most countries have decided to adopt a label that is comparative with categories (see Table Chapter 2 .1). The European Union, Australia, South Korea, and Thailand all have energy labels with categories. In the case of the EU, the categories range from A to G; in Australia, they range from one to six stars; and in South Korea and Thailand, they range from 1 to 5 -- although in South Korea, 1 is the top ranking, while in Thailand, 5 is the top ranking. The Canadian and U.S. labels are based on a similar design, and have a comparative label with a continuous scale showing the range of models in a particular size category and an arrow indicating where the particular model falls within the range. The Philippines label for air conditioners is a text-only label that provides much detailed product information and the energy-efficiency ratio (EER) of the model in large bold font. Sample reproductions of these labels are shown (in black and white) in Appendix H.

Table Chapter 2 .1. Comparison of Label Types from around the World.

Country	Type of label	Comments
Canada	comparison with continuous scale	Scale shows range of models in size class. Energy use is the scale metric.
United States	comparison with continuous scale	Scale shows range of models in size class. On old label, dollars was metric. On new label, energy use is metric.
Australia	comparison with categories	Categories range from 1 to 6 stars; 6 stars is most energy-efficient).
South Korea	comparison with categories	Categories range from 5 to 1; 1 is most efficient.
European Union	comparison with categories	Categories range from G to A; A is most efficient.
Thailand	comparison with categories	Categories range from 5 to 1; 5 is most efficient.
Philippines	text only label	Labels only for air conditioner; shows EER of air conditioner.

The Pressing Need for Field Research

Policymakers tend to wrongly assume that consumers will overtly search for objective information (such as that disseminated via government programs) and incorporate this into their decision process (Beales et al. 1991). As a result, governments have typically not conducted careful market research on the design of new labeling programs. In the U.S., little research was conducted prior to the introduction of either the Fuel Economy Label for automobiles in 1977, the EnergyGuide label for home appliances in 1980, or the nutrition label on foods in the early 1990s (Pirkey et al. 1982, Dyer and Maronick 1988, Byrd-Bredbenner 1994).

Governments have also been slow and less than thorough in their evaluations of the impact of energy labeling programs. In the U.S., there has been no serious effort to evaluate the EnergyGuide program since 1983. In Europe, the European Union's energy labeling program for refrigerators was initiated in 1994, and an evaluation is just now getting under way. In Australia, an evaluation was conducted in 1991, five years after the initiation of the program. In Thailand, research that forms part of this dissertation, and which was funded by the Thailand National Energy Policy Office, will form the first evaluation of the impact of the appliance labeling program on consumers. The following section describes a framework that policymakers can use to evaluate labeling programs and to think about how a labeling scheme would affect consumer purchases.

A Framework for Studying Label Impacts

A useful framework for thinking about the impact of energy labeling on consumers is the hierarchy of effects model. This is a classic marketing framework outlining a series of steps during which the consumer moves from exposure to an information or advertising campaign up to the point where she makes a purchase (Wilkie 1994: 177). Behavioral theorists break the hierarchy down into three major dimensions: a (1) *cognitive* stage, during which the individual develops knowledge or beliefs about an object; (2) an *affective* stage, during which the individual develops positive or negative feelings about the object; and (3) a *conative* stage, during which the individual decides to take action (Wilkie 1994: 282).

These three stages can be described in slightly less academic language by asking three basic questions about labeling effectiveness:

- Are consumers aware of the label?
- Do they like it?
- Do they change their behavior because of it?

Awareness is fairly easy to measure through surveys. The second stage, the affective stage (i.e. do consumers like it?) is less important for an energy label than it is for selling a product. For an energy label, the second, crucial step after awareness is understanding. Do consumers *understand* the label?

Understanding is more difficult to measure than awareness, and it requires a mixture of research techniques, including semi-structured interviews and surveys. Wherever possible, it is preferable to conduct such research on cognition in a field environment under actual purchase conditions, rather than in a laboratory removed from the retail environment. The important variables to measure are salience and appeal of the label, clarity of understanding of the label's message as well as its individual elements, response time (to understand label), and recall of label elements.

The most neglected measurement is the conative stage — that is, the linkage of the label to an actual behavior, to a purchase impact. As noted earlier, this can be done by correlating individual awareness of the label with the efficiency rating of the appliance they purchased. It can also be done, at the macro level, by tracing the shipment-weighted average efficiencies in the market and attempting to correlate them with the introduction of a labeling program. The former technique provides a better, more textured understanding of consumer behavior and the impact of the label. It requires developing a sample frame of recent refrigerator buyers, usually through either an appliance retail store or a manufacturer.[4]

Review of Past Label Evaluations

While a number of studies have examined consumer preferences and understanding of labels, most of these studies have been conducted in laboratory situations, or via phone or mail surveys. Few have assessed consumer understanding of labels directly in the store environment and in person. Most prior evaluations of energy labeling programs have show a high level of awareness (Pirkey et al. 1982; Dyer and Maronick 1988; Hill and Larsen 1990; SEC Victoria 1991). Generally, awareness tends to increase over the life of the labeling program, and the vast majority of shoppers are aware of labels after they have visited the store to make a purchase. The following sections focus on consumer understanding, or cognition; and the extent to which labels have been linked to changes in consumer purchasing. An annotated bibliography of label evaluations can be found in Appendix G. It includes not only evaluations of appliance energy labels, but also the U.S. fuel economy label for automobiles and the U.S. food nutrition label.

Understanding the Label

A few evaluations have addressed the understandability of the label. Past evaluations have found that simple and non-cluttered label designs are the most effective way of conveying information about energy efficiency (Pirkey et al. 1982, BPA 1987, Carswell, Langel, and Borison 1989, Patterson 1991, de Loor and Zeelenberg 1991, Daamen, Weenig, and Zeelenberg 1992). These evaluations have used focus groups with consumers and salespeople, interviews with consumers and salespeople, and laboratory tests with consumers designed to measure consumer cognition of different label designs.

Research on label cognition in a laboratory setting by de Loor and Zeelenberg found that information not essential to the primary message of the label often has the effect of "masking" the primary information and reducing, or slowing, consumer understanding. The researchers found that consumers conduct a first scan of available purchase options on only a few dimensions (e.g., price and size for refrigerators), and that it is important to make the energy information as salient as possible, so that it becomes one of these dimensions. One of the labels they tested failed to convey the concept of energy efficiency because it was a purely informational label with text and numbers, but no indication of relative energy use and no graphic element (de Loor and Zeelenberg 1991).

De Loor et al. also recommended that conceptual elements of the label be grouped together to increase cognitive efficiency. They found that product-specific information often masks the energy

[4] In the Oxford study mentioned earlier, the sample frame was customers who purchased appliances at Oxford appliance stores over a several month period. The retailers passed out flyers to all purchasers of cold appliances inviting them to fill out a brief survey form. Respondents were given 5 British pounds as an incentive. The final 100 respondents were chosen from this first group of respondents.

thrust of the label, and they suggested that detailed product information could actually be presented on another label so as not to obscure the meaning of the energy label. They recommended that policymakers distinguish between product information labels and energy information labels (de Loor and Zeelenberg 1991).

Although the EnergyGuide labeling program has been a centerpiece of U.S. appliance efficiency policy, there has not been a definitive study to demonstrate the labels' effectiveness. Several studies have raised questions about the effectiveness of the label and consumers' ability to accurately comprehend its content. A California utility conducted group interviews and found out that about half of the participants "severely misunderstood" the information presented on the federal EnergyGuide appliance labels (Carswell, Langel, and Borison 1989: 37). A study by the Bonneville Power Administration concluded that the EnergyGuide labels are not a very convenient way for consumers to identify energy-efficient models and that the labels are therefore "not particularly effective in specific purchase decisions." (BPA 1988)

Redinger and Staelin found that the EnergyGuide labels had little impact without additional information and a "sales push". They conducted an experiment with 123 people to estimate the effects of three market variables: government energy labels, energy communications, and an energy sales push. They concluded that "it is unlikely that the presence of government energy labels will have a significant effect on expanding the market for energy-efficient appliances unless this information is supplemented with a heuristic on how to use the information to trade off price differences" (Redinger and Staelin 1981).

Pirkey et al. studied the design of the original U.S. Fuel Economy Label for automobiles and discovered that consumers found the label confusing. Based on their interviews with consumers, they decided that it was important to clearly convey the concept of "fuel economy information" to consumers using a large logo that would be visible from across the car showroom floor. They designed two alternative labels with logos – a gas can and a gas pump – and also incorporated two fuel economy ratings, one for city mileage and one for highway gas mileage. They tested the two alternative labels and the existing label in focus groups, and found that the label with the gas pump logo was favored by consumers (Pirkey et al. 1982). It is interesting to note that in the most recent evaluation of the Fuel Economy Label, which was completed in 1990, both consumers and salespeople commented that the label (which was revised as a result of the 1982 study by Pirkey et al. to include the gas pump logo) contained too much information and was confusing (Hill and Larsen 1990).

Scales and Metrics

There is some controversy over what is the most effective and appropriate scale for conveying information on energy labels. A Canadian study found that "efficiency" or "energy factor" was not an effective way of conveying comparative information about energy efficiency. Consumers shown labels in a series of focus groups were confused by the fact that the right end of the scale represented lower energy use and lower operating costs (Patterson 1991). An additional source of confusion may be the fact that "efficiency" is a second order concept, which is harder for people to immediately grasp than first-order measures such as dollars or energy use.

Another area of controversy is whether dollars (currency units) or energy use (kWh) is a better metric for displaying relative comparisons on the energy label. Patterson concluded that "a scale based on energy consumption was the least confusing of all alternative measures" (Patterson 1991: 18) The Federal Trade Commission, in a 1994 rule announcement cited the Patterson study as supporting

evidence for the its decision to switch from dollar units to kilowatt-hours as the primary unit of energy disclosure on the EnergyGuide labels (FTC 1994: 34027).

However, a close examination of the Patterson study does not support the conclusion that kWh units are easier for consumers to understand on an energy label than are dollar units. In the second phase of the Patterson study, consumers in two focus groups were shown three alternative scales: one using efficiency as a metric, one using dollars, and one using energy units. The scales had no explanatory text on them, just symbols on either end of the scale (lightning bolts in the case of energy consumption). The focus group participants found that "the notion of 'kWh' is unfamiliar and/or obscure to the majority of participants, although it is generally understood as a measure of energy consumption" (Patterson 1991: 27).

The participants also experienced some confusion with the use of dollars on the scale: the scale had a greater potential to be confusing because it was not clear whether the dollars referred to either costs or savings. Another concern was that, since average energy rates vary from year to year, the operating cost on the label would become quickly outdated. This last concern was actually the major reason that the U.S. Federal Trade Commission decided to switch from dollars to kilowatt-hours as the primary unit of energy disclosure on the EnergyGuide labels (FTC 1994, Mills 1997).

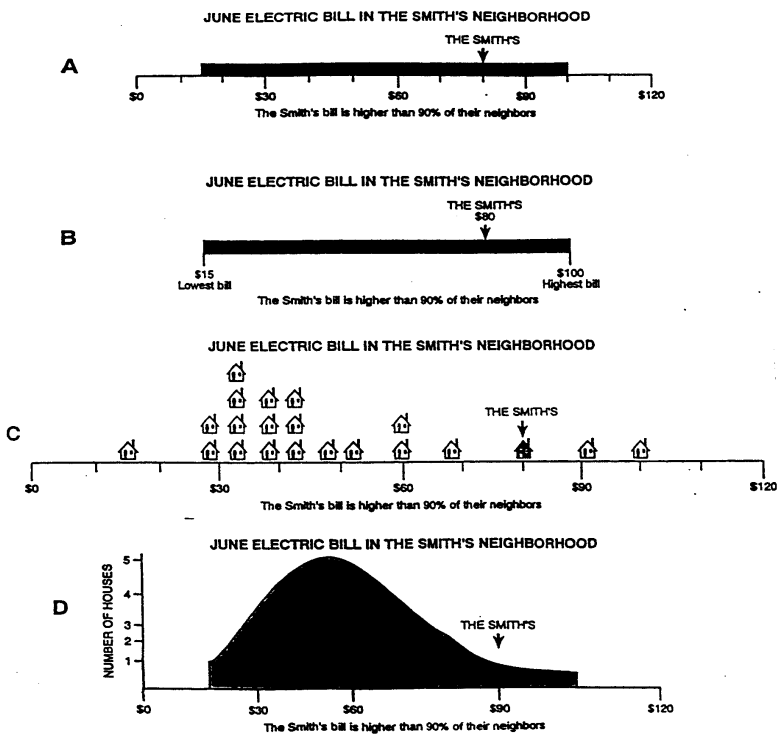

Figure 0.2. Graphical Displays Tested for Energy Star Billing Project (Egan 1997).

Patterson's discussion of the relative strengths and weaknesses of the two metrics is inadequate. In discussing the weaknesses of using dollars, he states that "unless clearly specified as a matter of operating cost, the measure is as easily understood as a matter of energy savings, or, as a matter of the

relative purchase price of the appliance itself" (Patterson 1991: 34). In any event, this objection can easily be overcome by labeling the scale with the words "annual operating cost" or "annual energy savings" in large, easy-to-read font in order to clarify its meaning. In his discussion of the merits of both efficiency and cost as metrics, Patterson has parallel commentaries about the strengths and weaknesses of each. However, in the section on energy as a metric, he discusses the strengths of using energy consumption without any parallel discussion of weaknesses. He concludes with the statement that, "As these findings clearly support, the obvious recommendation is to use 'energy consumption' as the basis of measurement and to depict the measure with the lighting bolt symbol" (Patterson 1991: 34). In my view, using a measure which is "unfamiliar and/or obscure" to the majority of subjects is not a sound recommendation.

In another study, a laboratory study of label comprehension, Verplanken found that showing the annual operating cost is easier for consumers to understand, since the general public is not familiar with kWh. However, he also noted problems with the use of operating cost that need to be overcome: the price of energy fluctuates over time, and it often varies within a country (Verplanken 1990 cited in de Loor and Zeelenberg 1991).

Egan surveyed 257 utility bill payers in Delaware and asked them to compare four different graphical displays (see Figure 0.2). The purpose of this study was to gather data to assist in designing an optimal format for conveying comparative energy billing information for the U.S. Energy Star Billing Project[5] (Egan 1997, Lord et al. 1996). The results are surprising: the highest percentage of respondents rated the distribution curve with houses as easy to understand and the rate of comprehension of the distribution graphs (C and D) was significantly higher than for the bar graphs (A and B). This finding suggests that the bar graph scale used on the U.S. EnergyGuide label may not be ideal.

In sum, the sparse literature on scales and metrics does not support the Federal Trade Commission's action to replace dollars as the metric on the scale with energy units (kWh). In addition, research on consumer cognition by Egan suggests that the bar graph scale used on the EnergyGuide label may not be ideal.

Optimizing for Cognition

In the early stages of the development of the European label[6], several studies by Dutch researchers compared consumer cognition of different label designs (de Loor and Zeelenberg 1991; Daamen, Weenig, and Zeelenberg 1992; Weenig and Maarleveld 1993). Much of the research focused on optimizing the label to facilitate consumer comprehension of the appliance's relative energy efficiency. One study concluded that a vertical scale was more effective than a horizontal scale at conveying information on relative energy efficiency. In another study, it was found that a label with vertical scale divided into four categories (1, 2, 3, and 4) was slightly superior than either a label with a continuous vertical scale, or pure-text label.

[5] This project is supported by the U.S. Environmental Protection Agency.

[6] The discussion of whether to use operating costs as a metric was not an issue in the development and design of the European Union's energy label for refrigerators. The main reason that operating cost is inappropriate for Europe has to do with the logistical difficulty of using one currency when each European country has its own unique currency.

Figure 1: Text format of energy consumption information

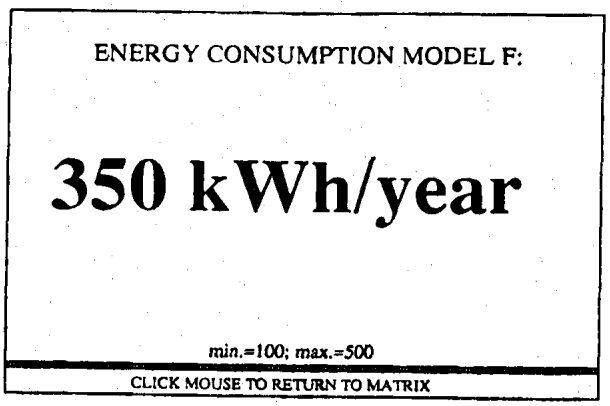

Figure 2: Continuous label format of energy consumption information

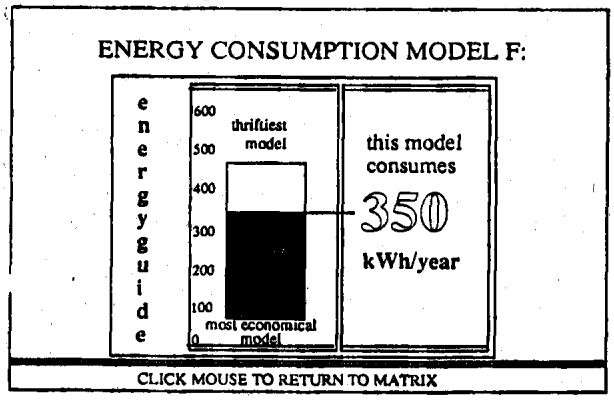

Figure 3: Categorical label format of energy consumption information

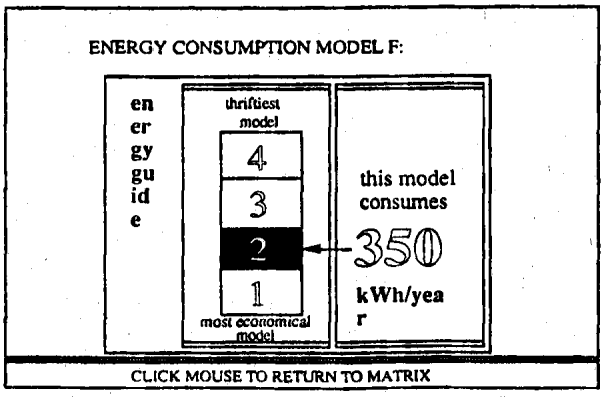

Figure 0.3. Labels used by Weenig and Maarleveld in Their Study of Consumer Cognition. From top: pure-text label, continuous-scale label, categorical-scale label.

> The categorical label evoked significantly more cognitive responses on energy consumption than the continuous label did, attracted more of the subjects' attention, made it significantly easier for respondents to remember the information they had watched on the screen, and made choices a bit easier (although not significantly) than both other formats (Weenig and Maarleveld 1993: ii).

The three labels that Weenig and Maarleveld tested are shown in Figure 0.3. The results of this study influenced the eventual decision by the European Community to develop an appliance energy labels that uses categories, rather than a continuous scale, or a pure-text label. The European label also has a vertical orientation and has a descending scale from A (most efficient) to G (least efficient).

In a related study, researchers consulted five experts in graphic design, marketing, and cognition to optimize an energy label with a vertical scale that had earlier been tested by de Loor et al. (Daamen, Weenig, and Zeelenberg 1992). The experts liked idea of using a vertically oriented thermometer as a visual representation of relative energy use, related explicitly (possibly using an arrow) to a kWh value in a second column.

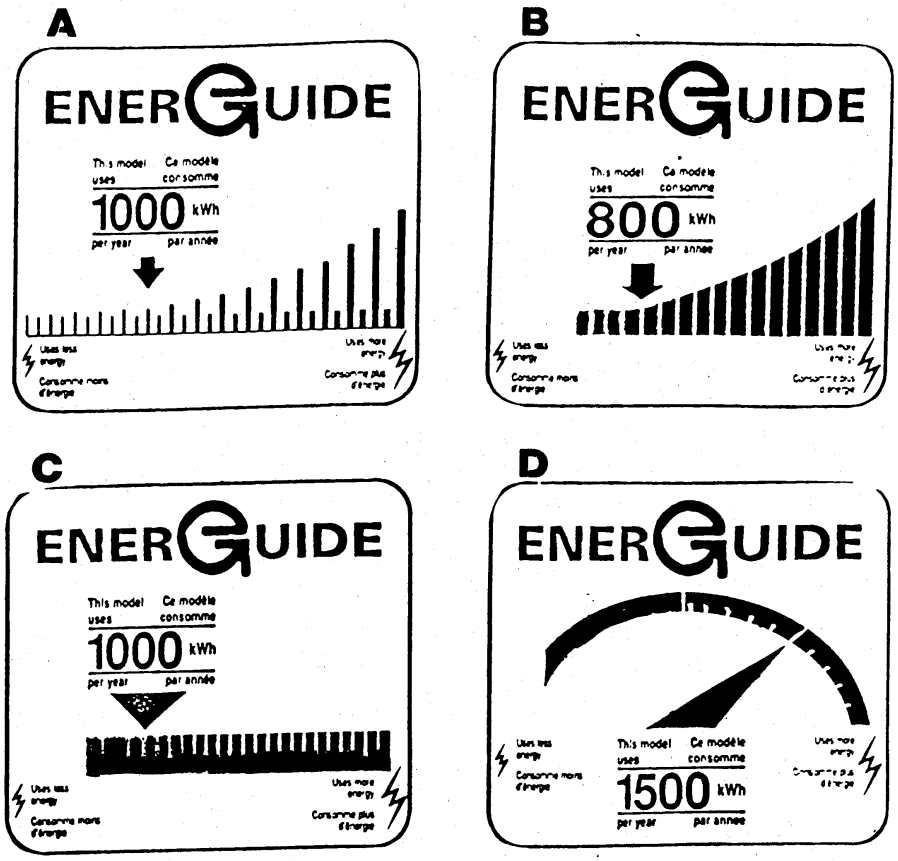

Figure 0.4. Labels Used by Patterson in His Test of Consumer Label Preferences. Consumers preferred the label at lower right, which resembles a speedometer.

In the Canadian study by Patterson, the preferred format for conveying the idea of relative energy use was a speedometer. (The four labels considered in the final round of focus group tests are shown in Figure 0.4.) This label format was seen as being familiar, simple, clear and easy to understand. Patterson concluded that, since the label evokes a familiar symbol, it was the one most likely to be understood (Patterson 1991: 19).

Linking the Label to Consumer Action

The limitation of many past evaluations of labeling is that they have focused on consumer awareness of the label and stated intentions, and they have not explicitly linked the label to actual behavior (i.e. to the efficiency of the purchased appliance). The studies conducted in the late 1970s to evaluate the federal Fuel Economy Information Program for automobiles are an exception. In these studies, the U.S. Department of Energy found that roughly 5-7% of car buyers used its Gas Mileage Guide, and 25% used the Fuel Economy Label in their purchase decisions. These car buyers selected vehicles that were on average 1.7 to 2.7 mpg more fuel-efficient than the vehicles purchased by buyers who were unaware of the label or the guide. If one makes the very conservative assumption that only 2% of car buyers buy a more energy-efficient car because of the labels, then the federal Fuel Economy Information Program is saving U.S. consumers more than $200 million/year in gas bills.[7] Unfortunately, the most recent study of the label and guide, completed in 1990, did not collect similar comparative data on the actual fuel efficiency of vehicles purchased by respondents.

One of the few evaluations of appliance energy labels that has linked label awareness to appliance efficiency was carried out with a sample of 100 recent refrigerator buyers in Oxford, England. While this sample is not generalizable to the UK population as a whole, it does indicate a significant impact of the label on appliance efficiency. Roughly half the sample (52) had noticed the label, and a 35 said their choice of refrigerator had been influenced by the label. Models purchased by these 35 were 20% more efficient than the models bought by the 17 label-aware consumers who said they had not been influenced by the label.

Another approach to estimating the impact of a labeling program is to look at trends in average shipment-weighted efficiencies over time and to impute some percentage of the efficiency gain to the labeling program. When using this approach, the label itself is an invaluable tool for tracking efficiency trends in the market and can be used as an indirect measure of its own effectiveness. In Australia, a labeling program began for refrigerators and freezers in 1986. It has been estimated that the program resulted in increased appliance efficiency levels for two reasons: manufacturers started to market more efficient models as early as 1984 in anticipation of, and later after the introduction of, the labeling program; and consumers exerted a market pull by selecting more efficient models. The labeling program has reduced the electricity consumption of new appliances by an estimated 11% on average. The biggest estimated gains were for refrigerator and freezers (12%) and dishwashers (16%); smaller gains were estimated for air conditioners (6%) and clothes dryers (1%) (Wilkenfeld 1997).

A similar approach to estimating the impact of labeling has been taken in the European Union. In 1992, the EU issued a directive granting the European Commission the authority to issue energy labeling directives for cold-appliances, washing machines, clothes-dryers, dishwashers, ovens, water-heaters,

[7] This estimate was used by a Department of Energy analyst to demonstrate the large impact of the labeling program (Patterson 1997). I have reproduced this calculation using the following assumptions: 175 million cars and light trucks on U.S. roads, traveling an average of 10,000 miles per year, a gasoline price of US$ 1.30/gallon, a baseline fuel economy of 20 miles per gallon, and 10% savings due to the label (a 2 mpg improvement).

lighting sources, and air-conditioning appliances. Labels began appearing on appliances in 1994 in Denmark and in other EU countries in 1995. Analysis of sales data indicates that manufacturers began to increase the efficiency of units starting in 1992, in anticipation of the labeling requirement taking effect. In Germany, France, the UK, and the Netherlands, the average efficiency of cold appliances increased by a range of 7% to 16% between 1992 and 1996 (Waide 1997).

Another method for evaluating the impact of labeling is to compare the efficiency of units being sold in the marketplace to the efficiency of units being produced and offered by the manufacturers, to determine if there is any "market pull" effect from consumers. Waide compared the proportions of actual refrigerator sales by efficiency class (i.e., A, B, C, etc.) to the proportion of models offered in manufacturer catalogues. In Germany it appears that consumers have been "pulling" the market toward higher efficiency, by selecting more of the high-efficiency models (rated B, and C) and fewer of the lower efficiency models (rated E and F). In Italy, however, consumers have been selecting models that are, on average, less efficient that the models being offered by the manufacturers in their catalogues. Waide hypothesizes that this difference is due in part to the fact that German consumers are more sensitized to energy and environmental issues than average EU consumers, while Italian consumers are perhaps less so (Waide 1997).

Policymaker Assumptions about Consumers

Thus far, this chapter has focused on the behavior of consumers and the impact of energy labeling programs. This section discusses policymakers. It briefly describes the apparent disconnect between policymaker assumptions about consumer information processing and such information processing as measured empirically through consumer research.

Eulau and Prewitt (1973) used the term "mental map" to refer to the expectations and preferences of local government officials in the U.S., as well as how they perceive their environment. One of the main elements of the mental map is the "schema," which was defined by Axelrod:

> A schema is a pre-existing assumption about the way the world is organized. When new information becomes available, a person tries to fit the new information into the pattern he has used in the past to interpret information about the same situation (Axelrod 1973, cited in Wolman 1992).

Understanding the schema or mental map of policymakers is an important element in the ability to explain the behavior of policymakers and the development of policy. It has been shown that the preferences of policymakers are often not aligned with the preferences of citizens (or with what policymakers perceive to be citizen preferences). Wolman (1992) describes international research that has been conducted to compare the assumptions and preferences of mayors and their citizens. While mayors tend to believe they accurately perceive public preferences in different areas (e.g., education, public health, etc.), the mayors' perceptions are often inaccurate (Baldassare 1986 cited in Wolman 1992). In other studies, it was shown that the mayor's preferences (and often their policy decisions) differed from what they thought citizens favored (Clark 1991 and Balme 1992 cited in Wolman 1992).

One goal of this dissertation is to compare policymakers' mental maps of consumer behavior with actual behavior as observed through participant observation and interviews. In the area of information processing, research has shown that government policymakers who design information programs

typically overestimate the amount of time and effort that consumers will put into processing the message on a label.

Table Chapter 2 .2. Consumer Information Processing, as Assumed by Policymakers and Revealed through Research

Policymaker assumptions about consumers	Consumer capacity as revealed in research
• high information-processing capacity	• limited information-processing capacity
• great deal of time to review label	• limited time to review label
•	• consumers simplify, use heuristics
• more information always better	• if too much information, consumers may ignore most of it
• price important in most decisions	• price only one among many factors; decision is multi-stage process

(Based on Bettman 1979)

Table Chapter 2 .2 shows the disconnect between policymakers' assumptions about consumer information processing and consumer information processing as it actually occurs, as measured through cognitive research. The data in this table indicate the importance of developing consumer information programs that are well aligned with the way consumers actually process information and of evaluating these programs through in-store research.

Conclusions

Past research on consumer energy behavior has shown that consumers do not appear to be optimizing their economic utility when they purchase energy-using equipment such as appliances. It is more likely that they exercise what Simon called "bounded rationality" — that is, "satisficing," or doing reasonably well while not expending the information effort to reach optimum, given the information they have available. One problem is that energy is not as salient as other appliance characteristics such as price, brand name, size, volume, color, etc. Only a small percentage of consumers may actually look at the label and use it as an information tool. Another problem is that energy costs and return on investment for higher-efficiency units are often not labeled or are difficult to compute. Studies in the retail environment support these assertions and underline both the importance of the salesperson in the decision-making process and the current lack of incentives for salespeople to "push" energy-efficient products.

A review of past evaluations of energy labeling programs indicates the need to redirect research efforts in three areas: First, there is a need for field studies that assess consumer preferences and understanding of labels directly in the store environment. Such research can provide a more accurate indicator of consumer preferences since it more closely simulates the environment a consumer is in when she actually makes the appliance purchase decision. Second, there is a need for more in-depth interviews and participant observation to assess consumer decision-making, both in the retail environment and elsewhere. Such research can help improve policy by identifying the factors necessary for a successful program impact. For example, consumer research performed for the U.S. Fuel Economy Information Program revealed that most consumers narrow down their search of automobile models to a few models

within a certain size (and therefore efficiency) range before they go to the store. As a result of this research, policymakers realized that it was important for consumers to have access to information on fuel economy *before* they go to the store, since once they are in the store they have typically already narrowed down their list of options. Such in-depth interviews also can aid in the interpretation of the results of large-scale surveys. Finally, there is a need to link the label to actual behavior and to quantify the extent to which the label influences consumers to purchase more energy-efficient models. The example of the calculation of the impact of the U.S. Fuel Economy Label is revealing: DOE analysts conservatively assume that if only 2% of consumers rely on the label to purchase a car that is 2 miles-per-gallon more efficient, the program is saving consumers more than US$200 million a year. Unfortunately, research that links appliance energy labels to the actual efficiency of purchased appliances has been the exception rather than the rule.

Finally, this chapter has outlined past research into cognition of different energy label formats and how to optimize label design. Research in the field of information processing has shown that government policymakers who design information programs typically overestimate the amount of time and effort that consumers will put into processing the message on a label. This leads to the question of whether the appliance energy labels in the U.S. and Thailand are optimally designed, given the strategies that consumers use to process and understand information.

CHAPTER 3

METHODOLOGY FOR STUDYING APPLIANCES

Chapter Abstract

This chapter describes the research techniques I used to study policymakers, retailers, and consumers in both the U.S. and Thailand. These techniques include participant observation at a retail appliance store in the U.S., unstructured and semistructured interviews in both countries, and a national survey-questionnaire in Thailand. The methodology is robust because it comprises a set of complementary and mutually reinforcing techniques. It also avoids the problem of response bias that has plagued other studies by energy researchers of consumer priorities in the appliance purchase. As a result, it should provide an accurate picture of the both the policymaker and retail environments.

Overview of Research

Since my doctoral research addressed both the formulation of appliance energy policy as well as consumer decision-making in the U.S. and Thailand, I interviewed policymakers, retailers, and consumers in both countries. In each country, I interviewed a cross-section of *policymakers* responsible for developing and/or implementing appliance energy policies. A second set of interviews involved *consumers* and *retailers* of appliances. Table 0.1 and Table 0.2 summarize my data collection and sampling strategy for each country. Figure Chapter 3 .1 is a schematic overview of the study design. It shows how the various segments of my research fit together.

I used several complementary social science research techniques in order to gain the best perspective possible on the consumer decision-making environment. These included qualitative techniques such as participant observation, unstructured and semistructured interviewing, and quantitative techniques such as a large-scale questionnaire survey (Bernard 1994: 136-164, 208-236, 256-288). The mixture of techniques provides multiple, complementary perspectives. The approach is well suited for understanding the cognitive environment of consumers who make purchases and policymakers who conceive, design, and implement policies intended to influence those purchases. These techniques could also shed light on the important public policy issue of how such policies can be redesigned to be more effective.

Participant observation allows the observer to gain a feel for the social situation being studied and reduces the problem of "reactivity" and response bias inherent in survey research. It also allows the observer to develop an intuitive understanding of a culture and to make confident assertions about the underlying meaning of the data (Bernard 1994: 140-141). In the U.S., I became a participant observer by working for two weeks as a sales trainee at a New Jersey appliance store. In Thailand, where I was unable to conduct extensive participant observation, I used an initial set of unstructured interviews with consumers to gain a broad understanding of how appliances are used and perceived in Thai homes.

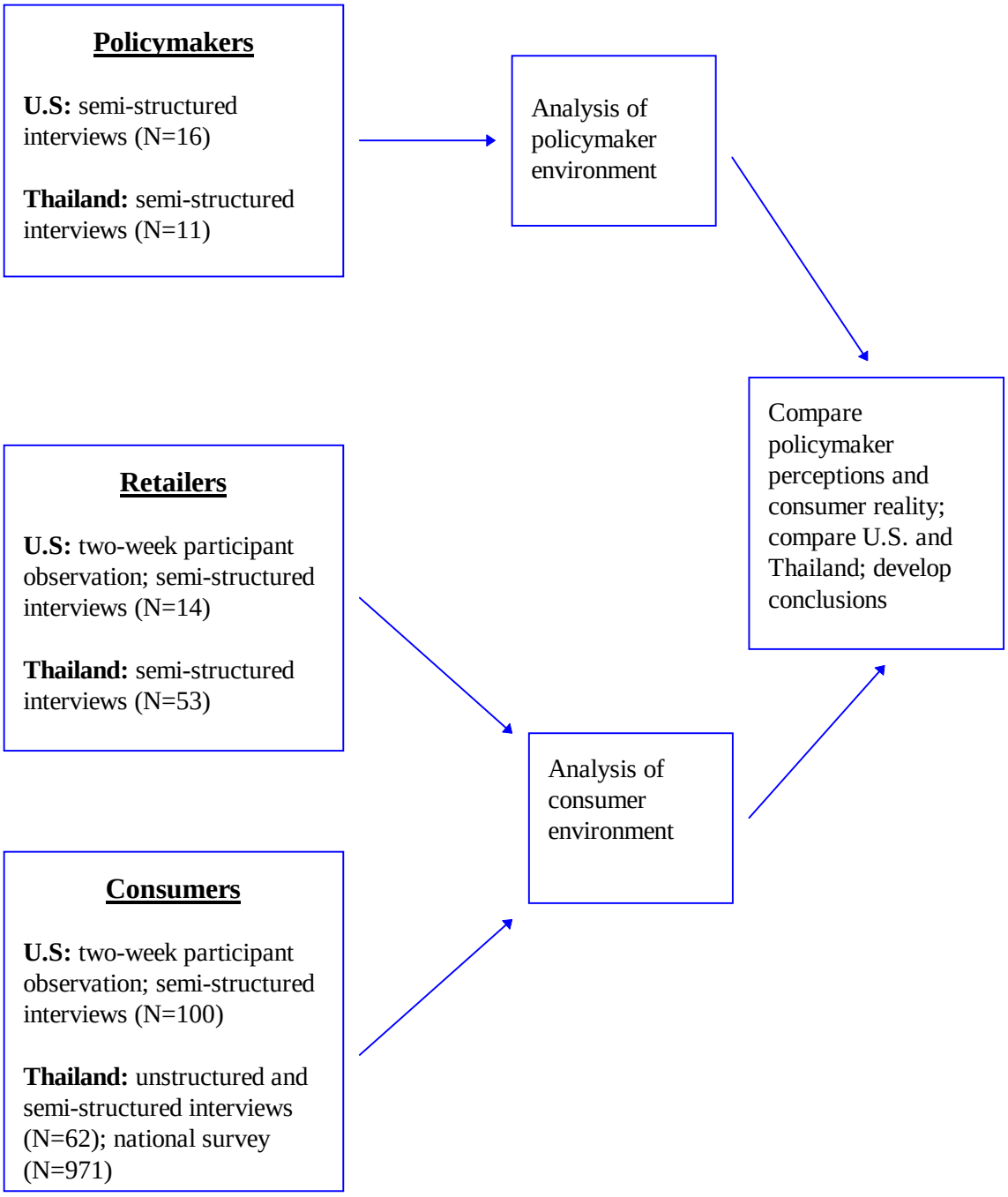

Figure Chapter 3 .1. Schematic Overview of Study Design and Methodology.

In a semistructured interview, there is a pre-determined set of "main" questions, yet the format allows for follow-up questions and in-depth probing of the answers to each of the main questions. The semistructured interview format can generate more focused responses than an unstructured interview, and, if carried out consistently, can yield data that can be used for quantitative statistical comparisons

between respondents. At the same time, a semistructured interview allows for the collection of more in-depth data and responses than one gets from a structured interview, such as a survey questionnaire with closed-ended questions. The use of semistructured interviews thus allows the researcher to answer the many "why" questions that one encounters when interpreting the results of a questionnaire survey. I used a semistructured interview protocol, modified for the different target groups (i.e. policymakers, retailers, consumers) in both the U.S. and Thailand.

Finally, in Thailand I conducted a survey of consumers in three Thai cities in order to be able to gather quantitative data and make statistical inferences about consumer preferences and the success of a national appliance labeling program. I was then able to compare the results from this survey with the tabulated results of a smaller number of U.S. consumer interviews, to make comparisons and draw contrasts between consumer purchase behavior in the two countries.

The next section of this chapter describes in detail the methodology used in my research on policymakers, retailers, and consumers in the northeastern U.S. This is followed, in a parallel fashion, by a description of the methodology used to study the same target groups in Thailand. The chapter concludes by discussing methodological issues that arose during my research.

Research in the U.S.

Policymakers

In January 1996, Deirdre Lord — a graduate student in Urban Affairs and Public Policy at the University of Delaware — and I conducted semistructured interviews with 16 officials responsible for developing and implementing U.S. energy-efficiency policy (duPont and Lord 1996). To ensure that all views and roles in the policy cycle were well represented, we defined "policymaker" broadly, to include those involved in both the design and implementation of policy: congresspeople and their staff, federal agency staff working on the implementation of energy policy, and advocates in non-profit organizations.

We chose our sample by contacting energy-efficiency advocates and asking them to recommend key contacts at each point in the policy cycle. The interviews were conducted in person in Washington, D.C. and by phone from Newark, Delaware in January, 1996. The interview protocol for U.S. policymakers can be found in Appendix C.

Congressional staff. To achieve a diversity of views among congressional staff, we interviewed aides working for congresspeople who had both supported and opposed cuts for energy-efficiency funding in the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) during 1995. Our sample included five congressional staff — two of whom favored and three of whom opposed cuts in federal energy-efficiency programs.

Implementers at federal agencies. We interviewed six federal government employees involved in policy implementation at the U.S. DOE, the U.S. EPA, and the Federal Trade Commission. Since the role of these professionals is to implement energy-efficiency programs and rules, none of these people were opposed to energy-efficiency programs.

Advocates for non-profit groups. We also interviewed five members of non-profit organizations: three work for organizations advocating energy efficiency; one works for a non-profit group that implements national, market-based, efficiency programs; and one works for an advocacy group that opposes federal funding for energy-efficiency programs.

Table 0.1. Summary of Data Collection and Sampling Strategy for U.S. Interviews

Sample Category	Research Technique	Sample Size	Dates	Description of people interviewed	Sampling strategy
Policymakers	Semi-structured interviews	16	Jan 1996	Congressional staff, implementers at Federal agencies, and advocates with non-profit groups.	For congressional staff and advocates: discretionary sample of policymakers who both supported and opposed continued funding for energy efficiency. For implementers: staff responsible for a range of programs, including standards, voluntary programs, and labeling/education.
Retailers	Semi-structured interviews	14	Oct 1996 - Jan 1997	Salespeople and managers at each of 2 stores at 2 different retail chains in Delaware and New Jersey.	Selected one national appliance and electronics superstore chain and one regional chain in the Mid-Atlantic that primarily sells appliances. Selected two store from each chain in New Jersey and Delaware. Supplemented interviews of salespeople with interviews of store management.
Retailers	Participant observation	25[a]	Dec 1996	Worked as sales trainee for two weeks in a regional appliance store in New Jersey. Worked closely with salespeople, observed sales, and interacted extensively with customers.	Developed close relationship with store manager, who supported my two-week work stint at store. Interacted on regular basis with customers coming into store. Took turns working the floor with different salesmen, who explained to customers that I was a "sales trainee."
Consumers	Semi-structured interviews	100	Feb-Mar 1996 Nov 1996 - Jan 1997	15 consumers at each of 2 stores at 2 different retail chains.	Sampled customers at random as they exited the four appliance stores in New Jersey and Delaware. Primarily interviewed people who had purchased a refrigerator, range, clothes washer, or clothes dryer within the past year.

[a] I made detailed observations on 25 complete sales transactions over the two-week period

Retailers and Consumers

I used a two-pronged approach in order to better understand the appliance purchase from the perspective of both the retailer and the consumer. I conducted participant observation by working for two weeks as a sales trainee at a regional appliance store in New Jersey. I also conducted semistructured interviews with both salespeople and consumers at four appliance stores in New Jersey and Delaware.

Table 0.2. Summary of Data Collection and Sampling Strategy for Thailand Interviews

Sample Category	Research Technique	Sample Size	Dates	Description of people interviewed	Sampling strategy
Policymakers	Semi-structured interviews	11	Jul-Aug 1996	Policymakers and program implementers at government agencies and electric utilities.	Selected one or two representative policymakers from each key organization and energy agency responsible for developing policy and designing and implementing programs to improve appliance efficiency.
Retailers	Semi-structured interviews	53	Mar-Apr 1997	Salespeople and managers at 45 different stores in three Thai cities, including stores in rural districts outside the cities.	Targeted a mixture of large department stores and small "shophouse" stores in geographically dispersed areas in the three cities.
Consumers	Unstructured and semi-structured interviews	62	Mar-Apr 1997	Consumers at department stores and "shophouse" stores in the three cities, and consumers in four rural districts.	In cities, conducted mall- and store-intercept interviews with shoppers at random. In rural areas, was introduced to local villagers by the village headman or district chief.
Consumers	Surveys	971	Mar-Apr 1997	Consumers in 14 department stores and one outdoor night bazaar in the three cities, and in the central market areas in four rural villages.	In cities, conducted mall- and store-intercept surveys with shoppers at random. In rural areas, surveyed villagers at random in central market area. Interviewed two groups of consumers: those who had bought an appliance within the past year (~2/3 of sample) and those who had not (~1/3 of sample).

Sampling Strategy in the U.S.

Dealt the hand of a typical graduate student who is long on time and short on funding, I decided to study appliance stores close to home in the Mid-Atlantic region. I initiated contacts at two appliance store chains: one, which I will refer to as Electric World, is a national appliance and electronics equipment "superstore;" the other, which I will refer to as Acme Appliance, is a regional appliance chain serving the northeastern U.S. I developed a contact at Electric World through a colleague who knew the head of purchasing, from his company's participation in a national pilot program to promote the sale of energy-efficient appliances.[1]

I gained the cooperation of Acme Appliance by looking in the yellow pages and calling the manager of a local store in Delaware. When I asked for permission to conduct exit interviews with customers, I was referred to the company's corporate office and given a toll-free telephone number. The contact that I initiated with a vice-president at Acme Appliance proved especially fruitful; I was later able to gain the

[1] This was one of several contacts I made through this program, the Energy Star Retail Labeling program, which was described in Chapter 2.

confidence of a local store manager for the chain and to work for two weeks as a sales trainee to observe the retail environment.

I conducted interviews with retailers and consumers at four stores dispersed throughout the region — two at Electric World and two at Acme Appliance. One store was located on busy highway in a fairly affluent area between Wilmington, Delaware and Philadelphia, Pennsylvania. Two stores were located in on a major highway and business corridor just north of Trenton, New Jersey, and one was located in a less affluent, rural area of southern New Jersey.

I also made abortive attempts at interviewing consumers and retailers at two other store chains. In the first attempt, Lord and I entered a large department store and began to interview consumers as they were leaving the appliance section of the store. After the first interview, we were approached by a security agent employed by the store who asked what we were doing. When we explained that we were students from the University of Delaware conducting a survey, we were told that soliciting was not allowed in the store and were asked to leave. We then attempted to meet with the store manager, who was not available. At this point, we realized that a more formal approach would be required in order to gain permission to do research in the store. We thus wrote a letter to the store manager requesting permission to interview salespeople and consumers. A few weeks later, we received a message from an official at the store requesting that we call back. However, over the course of the next two weeks, we were unable to establish contact and decided not to pursue the issue further.

In a second abortive attempt, I contacted the head refrigerator buyer for another national chain of appliance superstores. This company is also participating in the Energy Star Retail Labeling Program. I first conducted an hour-long telephone interview with the buyer, who was supportive of my research. He told me that, under new company procedures, I could not conduct research at his company's stores until the project was pre-approved by their communications department. Several weeks later, I received a formal letter from the Director of Corporate Communications, Training & Development politely stating that they were "unable to participate" in my research. I decided not to pursue the issue further.

From these experiences, I learned (a) that it is essential to request approval from store management before attempting to interview consumers and retailers;[2] (b) that direct contact with top store management — or the corporate office in the case of a chain store — is usually the best approach; and (c) that perseverance pays off, since I was able to establish strong contacts at two appliance store chains, one of which permitted me to actually wear the sales uniform and work the sales floor during a two-week period of participant observation.

Participant Observation

In November 1996, after interviewing the manager of a local Acme Appliance store, I realized that I would be much more qualified to assess the interaction between salespeople and consumers if I could arrange to spend more time in the store. On a whim, I volunteered my services and asked the manager if he could use any help around the store. To my surprise and delight, he said that with the Christmas rush approaching, he could use a helping hand. We later arranged for me to spend two weeks as a "sales trainee" at the store. My uniform consisted of the standard gray flannel slacks, blue blazer, white shirt, and red, white, and blue polyester tie of the store salesman.

I had two main objectives while working at the store: (a) to spend as much time as possible interacting with the customers, and (b) not to make a nuisance of myself or wear out my welcome. At

[2] While it is possible to conduct exit interviews outside of the store premises, this is inconvenient and less effective, especially in cold and inclement weather.

first, Ed (the store manager) suggested that I could work as a "greeter." Some appliance stores use a greeter to establish first contact with the customer in a low-pressure manner as they come in the door. Typically, a greeter will say "Hello, welcome to Acme Appliance. How are you today?" This allows the customer to ask a specific question (such as "Where are the refrigerators?") or to just say hello and go about their business unperturbed, but feeling welcomed by the store. The vice-president of Acme Appliance told me that he preferred that all customers be greeted within no more than one minute (and preferably fewer than 30 seconds) after they enter the store.

My role as a greeter did not work out, however, mainly because it was not the custom to have a greeter at this particular store. So I continued to play the versatile role of "go-fer," junior salesman, and sales trainee. In the morning, I would join the daily sales meeting, which was typically a two or three minute stand-up meeting during which the manager would tell the salesman the sales figures for the previous day, compare these to their weekly goals, and talk about things around the store that needed to be done (such as updating the price tags in a certain area of the store, or setting up a new display).

I would then accompany one of the salesmen on the bank and coffee run. This was an excellent time to learn about the inside politics and maneuvering within the store, as well as to get the know the salesmen and ask questions about their work. By the end of the two-week stint, the store manager trusted me enough to give me the bank bag, which was filled with about $5,000 in cash, and ask me to make the bank run by myself!

Upon returning to the store with coffee and donuts for the salesmen, I would assume my position at the back of the store or behind the counter. During slow periods, I was able to listen to and join the banter between the salesmen and the store manager. In this way, I was able to learn much of the sales vocabulary and to observe the day-to-day concerns that preoccupy and motivate the salesmen. Salesmen would take turns assisting new customers as they entered the store. In their parlance, each of these encounters was referred to as an "up." For example, one salesman might ask, "Whose up is it now?" And another might reply, "It's John's turn, Tony just had an up."

Most of my interaction with the consumers would occur when I accompanied a salesman during an "up." Typically, the salesman would walk to the department in which the customer was interested and begin to "qualify" the customer by asking them what type of appliance they were looking for. I would walk along behind the salesman and listen attentively. At some point, the salesman would turn and say, "This is Pete. He's a sales trainee, and he's just learning the ropes around here."

In some cases, when other salesmen were busy or were not on the floor, I would play the role of greeter and say, "Hello, welcome to Acme Appliance, my name is Pete. How are you today?" If a customer asked a question about a specific type of product, I would reply, "I'm a sales trainee and just started out a few days ago. Let me get a salesman who can help you out with that." While at times I felt embarrassed spouting this lame reply, it provided enough "cover" to legitimize my role as a budding salesman and to interact with the customer without interfering with the sales process.

During a typical sales interaction, there is a lull during which the salesman says, "Would you like me to go check and see if this model is in stock?" or "Would you like me to check the computer and see if we can have that delivered to you tomorrow?" This is one strategy for "closing" a deal. I found it an excellent time to converse with the customer and to probe about the factors in their purchase decision. These three to five minutes of time with the customer allowed me to gain a different perspective on their decision than I would have if I had only witnessed the give-and-take between them and the salesman. I generally used these interludes to ask about and clarify customers' top priorities in the purchase decision.

Avoiding Threats to Validity

Lord and I developed our initial interview protocol with an eye toward avoiding some of the potential bias introduced in surveys of appliance decision-making behavior conducted by other energy researchers. Below I provide three examples of biased interview formats used by energy researchers — one in Australia, one in the United States, and one in the United Kingdom.

In a 1991 survey of consumers evaluating the Australian energy label for electric appliances, the researchers introduced themselves with the following statement:

> Good afternoon. My name is _____ and I'm from Quadrant Research Service. We're doing a survey on behalf of the Gas & Fuel Corporation and the SEC concerning Energy Efficiency and Energy Labeling schemes. May I please ask you a few questions? (SEC Victoria 1991: Appendix, p. 1)

In the first two rounds of consumer interviews for the U.S. Energy Star Retail Labeling program, the protocol begins with a question asking, on a scale of 1 to 10, "how important is energy efficiency in your appliance purchase decision?" The respondent is then told that the U.S. Department of Energy is conducting a pilot program in the store, and is asked to continue the interview. In the subsequent question, the respondent is asked to rate which are the most important criteria (from a list of 10 options) in the purchase of a new refrigerator (US DOE 1995: 34, 36).

Finally, in a 1996 study of response to the European Union's appliance energy label, more than 200 Britons responded to a self-completion questionnaire. The questionnaire began with a full-page picture of the European appliance energy label. The respondent then turned the page and was faced with a question asking him/her to select the three most important factors (from a list of nine) in the purchase of a refrigerator (Strang 1996).

The three studies above all exhibited a significant internal threat to the validity of their findings: the possibility of *instrument reactivity* and the *Hawthorne effect*. The problem is that if people know that the interviewer is an advocate of energy efficiency, or is studying energy efficiency *per se*, they may tend to respond in a way that suggests that they are very concerned about energy efficiency, leading the interviewer to infer that energy efficiency plays a larger role in their decision-making process than it actually does. All of the interview protocols above began by signaling to the respondent that the study focused on energy labels, thus increasing the possibility that the respondents would bias their answers in favor of energy efficiency. This source of potential bias has also been called the deference effect, which occurs "when informants tell you what they think you want to know, in order not to offend you" (Bernard 1994: 231).

Lord and I avoided this bias by representing ourselves as students in public policy who were conducting basic market research. Our interview protocol began with questions about why the respondent was in the market for an appliance, how they gather information, and what were the most important criteria in their purchase decision. Only after the respondents named their criteria, which may or may not have included energy efficiency, did we move on to ask them detailed questions about energy efficiency and the appliance labels.

Semistructured Interview Protocols

In February and March 1996, Lord and I conducted semistructured interviews with a sample of 13 consumers at an Acme Appliance store in Delaware. The interviews with consumers were short (typically five to 10 minutes) and were conducted as the customers were leaving the store. We only completed interviews with customers who had purchased a major appliance (refrigerator, air conditioner, dishwasher, clothes washer, clothes dryer, combined oven-range, water heater, or furnace) within the past year. That first consumer interview protocol was the prototype for an interview protocol I later used with consumers and salespeople at four appliance stores in New Jersey in Delaware, and with consumers and salespeople in Thailand.

I expanded on the preliminary consumer research with 13 consumers by interviewing an additional 87 consumers at the four appliance stores in New Jersey and Delaware from November 1996 through January 1997. I also interviewed salesmen at the same stores. In the U.S., I interviewed a total of 100 consumers and 14 salesmen. The results of my interviews with salespeople and consumers are reported in Chapters 5 and 6, respectively. The interview protocols for U.S. consumers and salespeople can be found in Appendix C.

As I began the second round of U.S. consumer interviews in November 1996, I realized that few consumers appeared to fully grasp the meaning of the yellow EnergyGuide labels, which are required by law to be posted on the front of most major household appliances. In order to test consumer cognition of the label, I added a short section to the interview protocol — on a pilot basis — in which I asked them to describe, in their own words, the meaning of a sample EnergyGuide appliance label.

Although adding these questions on label cognition lengthened the typical interview from 5-10 minutes to as long as 10-15 minutes, the preliminary results were startling, and I decided retain the questions. Later, when I transcribed the interviews, I was able to measure the length of time it took the consumer to understand the label as well as the extent to which they were able to accurately interpret five different aspects of information presented on the label (operating cost, efficiency, scale of energy use, and the table showing operating costs at different energy prices). The results of the label cognition study are reported in Chapter 7.

Research in Thailand

Normally, it would take at least a year or two to be able to effectively carry out a research study of this magnitude in a foreign country. However, since I had previously worked in Thailand for six years (1989-1994), four of those in the field of energy policy, and since I speak Thai fluently, I had much of the knowledge infrastructure needed to plan and carry out the study. Nonetheless, I felt it necessary to assemble a Thai research team for the following reasons:

(a) Since it is unusual for foreigners to speak Thai fluently, especially in rural areas, there would be less possibility of some sort of response bias if Thai researchers were to conduct the surveys and to lead the interviews of consumers and salespeople.

(b) I obtained funding from Thailand's National Energy Policy Office to conduct a process evaluation of the appliance energy labeling program. This funding allowed me to assemble a team with experience in field survey research.

(c) By working closely with this team, I could leverage my own knowledge and efforts, while gaining the benefits of the team's survey experience in Thailand.

I began by approaching a professor of economics at Thammasat University, one of Thailand's two most respected universities. Prof. Tagud Sreecomporn has years of experience doing surveys and research in the fields of education, business, energy, the environment, and agricultural development. I

then hired three students from Ramkamhaeng University who had experience doing survey research in the energy sector.

The division of responsibilities among the Thai team members was as follows: I was the team coordinator and provided continuity with the U.S. interview protocols; Prof. Tagud, the most experienced member of the team, helped me plan the research and led the semistructured interviews with consumers and salespeople; and the survey researchers, under guidance from Prof. Tagud and myself, conducted the questionnaire surveys with consumers.

Prof. Tagud and I conducted unstructured and semistructured interviews with more than 62 consumers and 53 salespeople in the three cities. All these interviews were tape recorded and later transcribed and analyzed. Our funding allowed us to supplement the results of the semistructured interviews with a national questionnaire survey. The survey, which included 971 consumers in three major Thai cities (Bangkok in the Central Region, Chiang Mai in the North, and Khorat in the Northeast) allowed us to gain a broader understanding of the effectiveness of the labeling program nationally. The results of the survey were used to evaluate consumer awareness of energy efficiency, as well as the overall effectiveness of the appliance labeling program and associated advertising campaign.

Developing the Thai Consumer Survey

The survey questionnaire was developed through the following process. Prof. Tagud and I conducted a number of in-depth, semistructured interviews with Thai consumers, using the format Lord and I developed in our work with U.S. consumers (du Pont and Lord 1996). The questions and wording of the Thai translation were adapted to be as effective as possible in the Thai context. The English-Thai translation was carried out by Prof. Tagud; I then closely checked the Thai wording with him and discussed the meaning of alternative Thai phrasing, to ensure that the Thai translation matched the English as closely as possible, but was still appropriate for the Thai context. These questions were then developed into a longer, more detailed set of closed-ended (rather than open-ended) questions — a survey questionnaire.

We tested the draft survey questionnaire over several days at a number of different stores before agreeing on a finalized version of the questionnaire. We also received very helpful suggestions and comments on the draft survey questionnaire from Dr. Paktrawimol Phienlumplert of the Institute for Environmental Research at Chulalongkorn University, who has extensive experience in conducting consumer research on environmental issues in urban and rural Thailand.

As with the semistructured interview protocol, the Thai consumer survey was designed to first gather basic information about the appliance purchase and to determine which factors were most important in the consumer's decision. These questions were followed by questions about awareness of the Thai energy conservation programs and more specific questions about the energy label and how and whether it influenced the consumer's decision. A final set of questions dealt with consumer interest in and awareness of environmental issues related to the purchase and use of appliances. At the end of each interview, the survey researchers would then ask for demographic data — the consumer's age, level of education, occupation, family size, and income.

While the survey was directed at people who had recently purchased either an air conditioner or refrigerator, we also decided to develop a similar, but shorter, survey questionnaire for people who had *not* recently purchased an appliance. Having two groups of consumers allowed us to compare the awareness of general Thai consumers with that of recent appliance purchasers. English translations of the Thai survey forms can be found in Appendix D.

Unstructured Interviews

We conducted a set of unstructured interviews with a handful of consumers in each of the three cities. An unstructured interview allows the subjects to speak in their own words without being guided by a pre-conceived set of questions. In the unstructured interviews, we explored personal motivations for buying an air conditioner or refrigerator, how consumers think about these appliances, and how they use them to store food or stay cool. The objective was to gain insight into the underlying roots of demand for these appliances. The interview protocol for the unstructured interviews is in Appendix D.

Semistructured Interviews

We conducted semistructured interviews with 62 Thai consumers in the three cities. By using a similar interview format in the U.S. and Thailand, it was possible to compare responses between U.S. and Thai consumers across a range of questions, such as "What were your most important criteria in selecting this appliance?", "Did you look at the energy label before you purchased your appliance?", and "Do you know how much energy this appliance costs to operate each month?" The interview protocol for the semistructured interviews of Thai consumers is in Appendix D.

We also conducted semistructured interviews with a total of 53 salespeople in the three cities. Salespeople play an important role in the appliance purchase decision (by providing information, displaying certain models and features, and explaining the meaning of the energy labels), and these interviews helped us to understand the sales process. The results of these interviews were compared with the results of the interviews and surveys of consumers to gain a holistic evaluation of the success of the Thai appliance energy labeling programs. The interview protocol for the semistructured interviews of Thai salespeople are in Appendix D.

Sampling Strategy in Thailand

The goal of the surveys was to collect data from a representative sample of Thai appliance purchasers. In order to do this, the study team planned to survey customers at a range of different types of appliance stores in both Bangkok and upcountry. After some initial visits to appliance stores, we decided to randomly sample consumers at several large malls and department store complexes in each city. We pursued this strategy after determining that we could not practically obtain a large enough sample if we only interviewed people on the actual day that they purchased an appliance. However, by sampling the very large population of shoppers in a mall or department store, we could easily get a random sample of 30-40 consumers in one day.

In each city, we chose several different malls and/or department stores in different locations in the city, in order to sample a variety of consumers with different backgrounds. In the survey form, we asked for information about level of education, family size, and income, so that we could make adjustments for these factors in our statistical analysis. We also sampled an equal number of women and men.

The survey researchers conducted "intercept" interviews with consumers as they walked through the malls. They approached consumers and asked if they would be willing to take part in a five-minute appliance survey. For those who agreed to take part, they then asked whether they had purchased either a refrigerator or air conditioner within the past year. Two-thirds of the interviews (633) were conducted

with recent purchasers — i.e., people who had purchased a refrigerator or air conditioner within the past year. A smaller sample of one-third of the surveys (338) were conducted with non-purchasers.

The semistructured interviews with consumers were usually carried out in the same mall or department store complexes where the surveys were carried out. Prof. Tagud would approach the consumer or salesperson, indicate that he was a professor from Thammasat University doing a study on electric appliances, and then ask permission to tape record the interview. The advantage of this approach was that the consumers were not aware that our goal was to study the role of energy efficiency in the purchase of appliances; rather, they assumed we were doing a general market survey on appliances. This reduced the possibility of bias in their responses in favor of energy conservation.

We interviewed salespeople in two types of locations: in the appliance sections of the department stores (*hang yai*) and in smaller, "shophouse" appliance stores (*raan khaa*) in different parts of the cities. By sampling salespeople in both these kinds of stores, we were able to get a variety of perspectives, ranging from the small, independent shopkeeper to the large, corporate, department store (e.g., Central, Robinson, Merry King).

Sampling in Rural Areas

We used a similar approach to sampling consumers and salespeople in all three cities, with one major exception: we conducted four days of sampling in a total of eight rural districts (*amper*) outside of Chiang Mai and Khorat. Our sampling strategy in the rural areas was to hire a driver who knew the area, and then to visit two sub-districts (*tambon*) each day. We would start by going to the house of the sub-district chief (*kamnan*) or village headman (*puuyai baan*). Prof. Tagud would introduce himself, explain the purpose of our study (general market research on appliances) , and ask that they cooperate by introducing us to a few of the villagers. This approach was necessary in order to gain the trust and cooperation of the villagers, since we were outsiders from Bangkok (and one of us was a Thai-speaking foreigner, a *farang*). We typically interviewed occupants of six to eight households per village or sub-district.

We received excellent cooperation in all cases. The best example was in the San Khampaeng district outside of Chiang Mai. The sub-district chief (*kamnan*) asked two of his assistants to take us around the area and introduce us to villagers. For two hours, we were escorted on motorcycles and introduced to six homeowners. We had a more difficult time gaining the trust of villagers in Rim Tai sub-district of Mae Rim district in Chiang Mai. The *kamnan* was busy at the local temple, and could not find either of his assistants. So he wrote us a letter of introduction, which we were to show to villagers. While the letter was accepted by most of the households we visited, one homeowner said that he did not believe that the signature on the letter looked like the *kamnan*'s signature. He went back into his house and spent ten minutes going through his files to find a document with the *kamnan*'s signature. When he compared the two signatures and saw that they actually were the same, he apologized, and we proceeded with the interview.

While we went house to house conducting these interviews, one of the survey researchers would go to the village fresh market (*talaad sod*) and conduct survey interviews with local villagers. We also visited one or two local shophouse appliance stores in each sub-district and conducted semistructured interviews with the salespeople or owner.

Response Rate

Table 0.3 summarizes the response rate for the in-store interviews with U.S. and Thai consumers. The response rate was calculated as the number who agreed to be interviewed divided by the total number of consumers approached. It was 43% in the U.S. and 82% in Thailand. Since we told consumers that we were conducting a general market survey on appliances, there is no reason to believe that those who refused to be interviewed would have responded differently to the questions about energy efficiency than did those who agreed to be interviewed.

Table 0.3. Numbers Approached In Store and Granting Interviews, in U.S. and Thailand

Country	Total in-store requests	No. who agreed to be interviewed (no. who bought an appliance within past year)	Refused interview	Response rate (no. who agreed to be interviewed divided by total)
United States	507	220 (105)	287	43%
Thailand[a]	1,908	1,558 (457)	350	82%

[a] The Thai response rate has missing values, since some of the data sheets on which requests were tallied were lost. This total number of requests and calculated the response rate covers two out of four weeks of the survey research in Thailand.

Methodological Issues

Approaching Retailers

Not surprisingly, the optimal approaches to retailers turned out to be strikingly different in the two countries. In the U.S., I used a top-down approach. I quickly learned the importance and value of establishing contacts with the store or company management, in order to facilitate my contacts with the sales staff and to gain the permission necessary to interview consumers on the store premises. I directly contacted the corporate headquarters of the two U.S. appliance chains to request permission to conduct my research. Once granted, this allowed the research to proceed quite smoothly. I planned a similar approach in Thailand and reckoned that it would not be difficult to gain access, since Thailand is a fairly small country, whose businesses are controlled by relatively few families. However, Prof. Tagud advised against contacting store owners directly, suggesting that a more informal approach was appropriate. We directly contacted branch and store managers on the day that we planned to carry out interviews, and used Prof. Tagud's government identification card (from the university) to help us gain their trust and ensure access.

Table 0.4. Comparison of Sampling Techniques.

Techniques	Benefits	Drawbacks
Contacting Recent Purchasers (via mail or telephone)	• Can target purchasers at specific stores and within a narrow time frame. • Can link attitudes and stated preferences to characteristics (including energy efficiency) of actual model purchased. • Self-administered questionnaires eliminate the possibility of interviewer bias. • Self-administered and telephone questionnaires allow researcher to contact a large number (i.e. hundreds) of respondents.	• Difficult to gain access to customer lists. • Customer may have forgotten many details of purchase. • If surveyed by mail, they may more easily ascertain goal of survey, increasing possibility of Hawthorne effect. • Phone interviews can be intrusive — busy people are often annoyed by more demands on their time. • Requires more initial leg-work and planning than store-based interviews.
Store-Intercept/Exit Interviews	• Once you receive permission from store, can fairly quickly and inexpensively sample 10-20 consumers per day. • Reduced possibility of response bias since interviewer controls order of questions. • Semistructured interviews allow for in-depth probing and exploring of attitudes. • Environment of interview closely simulates environment of appliance purchase (i.e., noise and "busy-ness" of store around them, shopping environment, etc.). • Being in the store allows researcher to be closer to, and gain a better understanding of the sales environment. • Possible to test consumer understanding and use of label in the store.	• May need to screen many shoppers in order to get adequate sample of recent purchasers.[a] • Difficult to link response to characteristics (including efficiency) of actual model purchased. • Some details of purchase may have been forgotten, if purchase made prior to interview date. • Can be intrusive — busy people are often annoyed by more demands on their time. • Personal interviews can be reactive and require skill to avoid the Hawthorne effect. • Compared to mail surveys or telephone interviews, can contact limited number of respondents (i.e. tens rather than hundreds).

[a] In the U.S., I had to approach 5 customers in order to complete 1 successful interview with a recent purchaser (see Table 0.3)

In-Store Sampling vs. Contacting Recent Purchasers

I considered two alternative strategies for sampling recent appliance purchasers. One would involve procuring from the retailer or manufacturer a contact list of recent appliance purchasers. I would then contact these recent purchasers by telephone or mail. This strategy has been successfully pursued by researchers at the Environmental Change Unit at Oxford University (Banks 1998). A second strategy would involve interviewing customers at the store, either using exit interviews or "mall intercept"

interviews. The strategies are compared in Table 0.4, with some points elaborated upon in the following pages.

I chose to conduct in-store interviews because the technique dovetailed so closely with the rest of my research — participant observation as a sales trainee and extensive in-store interviewing of salespeople. Past social science research has indicated the importance of context and environment to the way people conceive and process information (Rogoff 1984). For example, a seminal study on how grocery shoppers make qualitative and quantitative comparisons between products and rationalize their decisions was conducted by Lave et al. using participant observation. They found that shoppers' decisions were largely based on they way they filter and interpret information in the particular environment, as well as on the attitudes they bring to the store. Shoppers rely on past experience and results, and filter overwhelming amounts of information, "only a small part of which they treat as relevant" (Lave, Murtaugh, and de la Rocha 1984: 76).

In the U.S., while it would have been desirable to link consumers' stated preferences and attitudes with the actual features and performance of the model they purchased, I decided that the benefits of conducting the interviews "in the store" outweighed the limitations. Conducting all my research in the store also reduced my transaction costs and facilitated my interactions with consumers and salespeople, since I could interview both consumers and salespeople on the same day.

Besides being more convenient and less expensive, the in-store approach had three key benefits, listed in Table 0.4: it reduced the possibility of response bias, since I controlled the order of the questions; it allowed for in-depth probing and exploring of attitudes; and it enabled in-store tests of consumer cognition of the energy labels.

Exit Interviews vs. Mall-Intercept Interviews

Our strategy for interviewing consumers was adapted to the circumstances in each country. In the U.S., I received permission from Electric World and Acme Appliance to perform "exit interviews"` with consumers as they were leaving the appliance superstores. In fact, the U.S. stores contained many electrical and electronic items besides large household appliances (e.g., stereos, televisions, computers). Thus, when I would ask someone if they would participate in a five-minute "appliance survey," there would be only a 10-40 percent chance that they had bought, or shopped for, a large household appliance on that day. Under these circumstances, it would have been much more time-consuming to only interview people who had bought on that day. I thus interviewed anyone who had purchased a large household appliance within the past year, on the theory that they would remember enough about the decision process to provide useful and fairly accurate information for the interview.

In Thailand, there are no such appliance superstores. Thai consumers buy appliances at two kinds of stores: large (often huge) department stores, which have an appliance department; and small, shophouse stores, which usually are cramped with a fairly small selection of appliances, and over which shops the owner and his family typically live. It was thus impractical to perform exit interviews either near the appliance department inside the large stores or by waiting outside the shophouse stores. To attempt such a strategy, one would be fortunate to complete even four or five interviews a day.

We decided instead to sample the rather large population of shoppers at the many "mega-malls" that dot the Bangkok landscape. The three survey researchers, armed with clipboards and survey forms, would stroll through the mall, asking shoppers at random whether they would participate in a five-minute appliance survey for Thammasat University. Using this strategy, each researcher was able within a day to survey 10 to 15 people who had bought an appliance within the past year.

Limitations of the Methodology

There are a few potential limitations in my methodology. One is that I did not gather data on the specific model and efficiency of the appliance purchased by each respondent. I was thus unable to make the crucial link that would determine the ultimate effectiveness of the label: the extent to which the label and other consumer priorities influenced their decision to buy a more efficient model. Despite this drawback, I feel that the advantages of performing store-based research allowed me to gain a more in-depth perspective on consumer cognition and behavior than I would have if I had done a retrospective mail survey of recent appliance purchasers.

A second limitation is that I did not use strictly parallel methodologies in the U.S. and Thailand. My U.S.-Thai comparisons were made between a database of 100 consumers U.S. who were interviewed in a semistructured format and a database of 971 Thai consumers who were surveyed in a closed-ended format. This disparity in the sample sizes is mitigated by the fact that I carried out semistructured interviews with 62 Thai consumers, and this helped me interpret the data from the Thai surveys. In addition, my own function as the developer of both the U.S. and Thai interview and survey instruments reduces the possibility that there is significant instrument bias or variation between the way the interviews were conducted in Thailand and the manner in which the surveys were carried out in Thailand.

Another limitation, mentioned in Chapter 1, is that I limited my research to the role of energy efficiency in the retail appliance purchase. It does thus not address other classes of appliance sales such as the bulk purchase of appliances by apartment managers and builders of tract homes who have no incentive to buy energy-efficient equipment. However, since the vast majority of appliances are owned (rather than rented) in both the U.S. and Thailand, this research addresses the most significant portion of the U.S. and Thai appliance markets.

Despite these limitations, I feel confident that the methodology is robust because it comprises a set of complementary, mutually-reinforcing techniques — participant observation, unstructured and semistructured interviews, and a closed-ended survey questionnaire.

Conclusions

This chapter has described a set of complementary research techniques which I used in my research projects in the U.S. and Thailand. The research began in the U.S., where I observed consumers and salespeople by working as a sales trainee at an appliance store, and developed semistructured interview protocols that I used to interview 16 policymakers, 14 retailers, and 100 consumers. On the policy side, my goal was to understand the mental maps of policymakers — that is, how they interpret and frame the information that forms the basis for their decision-making. On the retail side, my central focus was on the cognitive environment of consumers and retailers: how consumers prioritize their decisions, trade off purchase factors, and view and understand the label; and whether retailers have any incentives (or disincentives) to promote energy-efficient products. I adapted the U.S. interview protocols for use with a parallel group of policymakers, retailers, and consumers in Thailand. In addition, I conducted a national survey of 971 consumers in Thailand that was based largely on questions raised in the semistructured interviews.

The methodology is robust because it comprises a set of complementary and mutually reinforcing techniques — participant observation, unstructured and semistructured interviews, and a closed-ended survey questionnaire. The methodology also avoided the problem of response bias, which has plagued

other studies by energy researchers of consumer priorities in the appliance purchase. As a result, it should provide an accurate picture of both the policymaker and retail environments.

CHAPTER 4

POLICYMAKERS

Chapter Abstract

This chapter discusses my findings from interviews with 16 U.S. policymakers and 11 policymakers in Thailand who are involved in the design and implementation of consumer energy policy. It explores the policymakers' mental models of consumer behavior and the role of energy efficiency in the retail appliance market. It also examines how the policymakers draw conclusions about program effectiveness. The interviews with U.S. policymakers revealed strong divisions about the role of government in promoting energy efficiency. The interviews with Thai policymakers raised issues of how new programs and policies are adapted for implementation in a developing country, the role of foreign consultants and expertise, and the role of evaluation in program design.

Introduction

The purpose of including policymakers in this dissertation research is that while they play a central role in developing energy policy, little is known about their mental maps – that is, the assumptions they make and the way in which they gather, organize, and interpret the information that forms the basis for their decision-making. In my research on energy policy and consumer behavior, I found that the existing literature does not go far enough in explaining the mental maps of policymakers and how those mental maps affect subsequent development of consumer energy policy.

The planning and implementation of different types of energy policy requires understanding the steps necessary for the success of each program. For example, for minimum efficiency standards some of the steps include the assessment of the marginal cost for technical improvements, the development of cost-efficiency curves for these improvements, the assessment of the economic impact on consumers, and some level of support from, or at least dialogue with, manufacturers. For labeling, the steps include the availability of reliable testing facilities, the design of a consumer-friendly label, the establishment of rational ranking categories, the development of ancillary materials (such as educational brochures), education of the sales force to help promote the label and to educate consumers, and regular process and impact evaluations of the labeling program. These steps have been fairly consistently followed in the case of efficiency standards. However, for labeling, there does not appear to be a common understanding among policymakers about the necessary steps for an designing an effective program. Several of the steps are not as well understood and not as consistently followed as with standards.

This chapter describes the results of in-depth, semi-structured interviews with U.S. and Thai policymakers responsible for developing energy-efficiency policies in the two countries. The methodology is described in Chapter 3. The preliminary results of my interviews with U.S. policymakers alone are described in a previously published paper (du Pont and Lord 1996); this chapter expands that analysis and compares the U.S. results with the Thai results. Both sets of interviews addressed the barriers to the sale of energy-efficient products, consumer purchase priorities, effectiveness of appliance policy, and the appropriate role of government. The interviews with Thai policymakers also contained

questions specific to the context of implementing new types of policies and programs in a developing country. These included questions on the policymaking process and the role of evaluation in program design.

Sample Description

The sample of U.S. and Thai policymakers we interviewed is summarized in Table Chapter 4 .1. Fifteen U.S. policymakers were interviewed in January 1996. They ranged in age from 28 to 59 years old, with an average age of 42 years old. Their experience in energy and/or energy-efficiency issues ranged from six months to 26 years, with an average of 13 years. Eleven of the policymakers were male and four were female. Six worked for government agencies, four worked for congressional staff or committees, and five worked for non-profit organizations.

I interviewed 11 Thai policymakers in July and August 1996. They ranged in age from 35 to 60 years old, with an average age of 47 years old. Their experience in energy-related issues, ranged from 4 to 15 years, with an average of 8.1 years. Nine of the policymakers were Thai, and two were foreign advisors. All were male. Five worked for government agencies, three worked for the electric generating utility (a state-owned enterprise), and three worked for the private sector, but served as advisors and consultants on the government and utility energy conservation programs.

While energy-efficiency policies have been implemented in the U.S. for more the two decades, Thailand initiated its ambitious national energy-efficiency programs just seven years ago. Thus while the U.S. policymakers I interviewed had an average of nearly 13 years of experience, the Thai policymakers had just eight years of energy-related experience, and most of these had only three to four years direct experience in the implementation of energy-efficiency programs.

Table Chapter 4 .1. Summary of Policymaker Samples

	Sample Size	Gender		Average Age (years)	Average Experience (years)
		M	Figure		
U.S. Policymakers	15	11	4	42	13
Thai Policymakers	11	11	0	47	8.1

While all of the U.S. sample worked for public or non-profit agencies, the Thai sample had no non-profit workers and three individuals working in the private-sector. The reason for this disparity is that the non-profit sector in Thailand has to date had very limited involvement in the actual design or formulation of energy policy. One of the three private-sector respondents used to work for a non-profit think tank before he started his own consulting firm; he is still involved with the Thai Load Forecast Subcommittee. Another Thai businessman recently retired from a university position to run a private-sector firm; he continues to serve on the government committee that oversees the Energy Conservation Promotion Fund. And the third private-sector respondent is a foreigner who provides consulting expertise to Thai government agencies on a contract basis. Since the Thai private sector employees, like the U.S. non-profit staff, are analysts involved with the design, promotion, or implementation of energy efficiency programs, the difference in the sample composition should not bias comparisons between policymakers in the two countries.

Issues Common to Both Countries

This section compares and contrasts the responses of the two sets of policymakers to a common set of questions about the development of consumer energy policy. These include their understanding of the barriers to energy efficiency, their views on consumer attitudes, their understanding of the salience of energy efficiency to consumers, and their views on program effectiveness. Subsequent sections describe sets of issues that are particular first to the U.S. policy environment and then to the Thai policy environment.

Barriers to Efficiency

The majority of the U.S. policymakers effortlessly recited a list of existing barriers that prevent manufacturers and consumers from producing and purchasing energy-efficient equipment. Three-quarters of the 16 U.S. policymakers began by mentioning "cost" or "first cost" as one of the major barriers to the sale and production of energy-efficient products.

Three-quarters of the U.S. policymakers also mentioned lack of information, limited distribution networks, and consumer and manufacturer "perceptions" of energy efficiency as additional barriers to the production and purchase of these products. Half of the policymakers suggested that manufacturers "perceive" a risk involved with introducing energy-efficient technologies, that manufacturers seem to believe neither that there is a market for energy efficient products, nor that consumers are willing to pay more for such products. These same policymaker respondents also mentioned consumer perceptions as a barrier.

The Thai policymakers tended to recite a shorter list of barriers, but the primary barrier they cited was also price. Seven of the 11 mentioned either the high price of efficient equipment or low energy prices. Other barriers cited included lack of standards, lack of information, and lack of consumer awareness, Surprisingly, given the small market share of energy-efficient products in Thailand, only two Thai policymakers mentioned the lack of availability of energy-efficient equipment. Two of the policymakers also cited policy barriers as their primary concern: one bemoaned the lack of standards specifying criteria for energy-efficient equipment and the other pointed to the policy overlap between the utility and the government agency's programs as the cause of delays and problems with program implementation.

Two policymakers in the electric utility's DSM Office, which is operating the first nationwide programs to promote appliance efficiency, mentioned price as a barrier, but also indicated that the primary barrier was cultural and had to do with awareness. The director of the DSM Office said,

> If you give the money to the people, people will do it when you give them the money. But after that, they might forget it. But in Thailand … we would like to convince the people to join our program not by forcing them or giving them money, but by heart they accept the principle and they will help you and it will last very long for Thai people. So in every program here in this country, we talk about cooperation by people (Thai policy interview no. 3).

Another official in the Thai DSM Office, Vichai, echoed his boss's emphasis on building awareness rather than focusing on pricing and incentives:

> I mean in U.S.A. they think that price is the barrier, they have incentives. That is their way. I think that is a mistake. I mean you have to understand clearly the attitude and the culture of the public … I mean when we have a battle, in fighting, the army, you need to know which side to attack first, this one first, that one second, that one third, not attack all at once. In U.S.A. they think price is the only barrier, and they use incentives to attack all … But we don't do that (Thai policy interview no. 4).

While Vichai's generalization about all U.S. energy efficiency programs is not accurate, it is true that most U.S. energy conservation programs have focused on providing some sort of rebates or incentives to spur the adoption of energy-efficient equipment and practices (Nadel 1991). The above quotes help to explain why the Thai DSM Office has decided to design most of its initial energy efficiency programs as voluntary programs with limited or no financial incentives. The Thais perceive the barriers differently than do their U.S. counterparts and do not consider price to be the primary obstacle. The second quote also reveals apparent resentment of the U.S. policy approach. This theme is discussed later in this chapter in the section on how rebates are viewed in Thailand.

Do We Actually Understand the Barriers?

Alone among all U.S. and Thai policymakers, one individual, who has more than 20 years experience analyzing and advocating energy-efficiency technologies and programs, gave a unique response to the question about barriers:

> Primarily we don't understand what the barriers are. There is a whole standard list from the literature that you know as well as I do. But I don't think that goes far enough in explaining, from a theoretical viewpoint, what the problem is. For some reason or another, manufacturers have the perception that efficiency doesn't sell, so they don't produce it. Consumers don't have the choice of efficiency in a convenient way and are talked out of it by the salesman when they start making a decision in that direction. There is a role for retailers and distributors. And it isn't understood even by the experts in the business. It's sort of like asking why is there so much sex and violence on the television. Do consumers choose ugly, sexy movies? Do producers foist bloody movies on the public? Generally no. But generally the movies get produced and sold, and people see them (U.S. policy interview no. 5).

This respondent (hereafter referred to as "the dissenter") makes an important point about consumers not being able to conveniently choose energy-efficient models. Although he has more than 20 years' experience as leading national advocate for energy efficiency, he was the only policymaker from either country who did not recite a list of barriers to energy efficiency. He went on to say that there are no real data on how consumers perceive energy efficiency in the purchasing process. Rather "there are

impressions from manufacturers, and there is behavior that follows from those impressions." He appears to believe that policymakers have theories or explanations about why energy efficiency doesn't sell, but that consumer preferences for energy efficiency have never been tested in an experimental way.

A central theme of his message was that the behavior of consumers and retailers is not well understood. Up and down the decision-making sequence, from producer to consumer, decisions are made in the absence of good information about the true relevance of energy efficiency to the consumer. The "sex and violence on television" analogy underscores this attitude of powerlessness he feels in attempting to fathom the decision-making processes of manufacturers and consumers. There is no clear and unambiguous "cause" for the lack of marketing and purchase of energy-efficient products. According to the dissenter, policymakers are therefore forced to develop policy responses to a problem that is not well understood.

Views on Consumer Attitudes

I queried policymakers to understand the extent to which they base their assumptions about consumer preferences and behavior on social science research and market studies. I also assessed the extent to which consumer input affected the development of policy and program design. Only about half of the policymakers in either country appeared cognizant of value of basing policy on detailed consumer research; an even smaller percentage pointed to explicit input from consumers in the policymaking process. When asked about consumer preferences, policymakers tended to frame their responses in personal terms, using anecdotes or relying on their own personal experience or that of friends.

For example, several of the U.S. policymakers did not believe that consumers would be sophisticated enough to calculate the payback for an energy-efficient appliance. Yet none were able to cite specific research results to back up this claim. One policymaker expressed the belief that consumers tend not to be aware of appliance operating costs and that, even if they were, they would not know how to calculate life-cycle cost and compare appliances based on this measure. He explained:

> Who realizes that two-thirds of the total cost of a refrigerator is electricity, one-third is first cost? You and I and about thirty other people know that. And, you know, even if people did realize that electricity is important, they don't know how to compare costs, how to calculate life-cycle costs, or compare products (U.S. policy interview no. 1).

Thai policymakers also tended to draw conclusions about consumer behavior based largely on their own experience. When asked a general question ("Do you think that consumers actively seek information about energy use when they buy an appliance?"), seven of the 11 Thai policymakers provided a yes or no response without citing any specific research. Instead, they cited sources such as "I ask salespeople," "from my own experience," or "common sense." Two provided a response but admitted they lacked data, and two provided at least some reference to support their response. A typical exchange is shown below:

> *Do you think that consumers actively seek information about energy use when they buy an appliance?*

Pongsak: Not really, except those who have high education. With the low-income consumer, they don't care about quality, just look at the low-price product. If it's affordable, it's O.K. for them. They don't look at the quality, just look at the price.

How do know this?

Pongsak: Uh, it's uh … common sense (Thai policy interview no. 7).

Anecdotal or personal experience was again predominant when I asked policymakers from both countries about consumer priorities when making an appliance purchase. About half of the policymakers in both countries quickly rattled off a list of consumer preferences without referring to any supporting information such as studies, surveys, or conversation with manufacturers or suppliers.

Most of the U.S. policymakers listed "price" as the consumer's number one priority, with "features", "color", "brand name", "convenience", "performance" and "delivery" as other key factors in the decision. Several referred to their own personal experience and the experience of colleagues and staff. One U.S. legislative assistant asserted that "price and features are the top priorities," adding that "energy efficiency is probably at the bottom of the list." When asked how he knew this, he cited his own personal experience: "I have looked at labels on appliances, but I have never made a decision based on energy use. I am your worst nightmare." Another U.S. policymaker, an energy-efficiency advocate, felt that consumers really do care about energy efficiency. Without being able to cite any specific data — beyond conversations with friends — he said he believed that interest in energy efficiency was increasing.

About half of the U.S. policymakers were able to separate their personal feelings or intuition from the scientific question of whether data exist on consumer preferences and what the data actually indicate. Three U.S. policymakers cited manufacturers (either discussions or surveys), and one cited discussions with salespeople involved in a program that he manages. One legislative assistant stated that cost was the first priority, citing a Gallup poll on general consumer preferences (not related to energy-consuming products). One-quarter of the policymakers stated that they either had no idea or there were no data available. The following response, from a congressional committee staffer, is typical of the cautious attitude of a minority of respondents. It also contains an air of resignation about it. The implication is that we do not have it in our power to really understand consumer decision-making.

I don't know. This is something we need more information on, I mean consumers are more aware than they were 10 years ago. Labeling has gone a long way, but has it affected consumer decisions? We don't know, we can only make it [the label] available (U.S. policy interview no. 15).

As in the U.S., about half of the Thai policymakers were cautious about making broad assumptions about consumer priorities. Two provide responses that were based on input about consumer preferences based on discussions and interviews with manufacturers; and three stated that they had no idea because there were no data available. The remaining six policymakers easily provided a list of priorities, all based either on their own experience or educated guesses.

Apparently, at least half of the policymakers we interviewed in both countries felt comfortable making broad assumptions about consumer preferences without any market research or supporting data.

Yet the consequences of such a lack of reliance on consumer surveys and input can be disastrous. One U.S. agency employee, Bob, provided a specific example of a strong negative consumer response to a proposed policy intervention. The example involved an advance notice for a proposed rule for a federal standard that would have largely eliminated electric resistance water heaters in favor of a more efficient technology, heat pump water heaters. Bob explained that, early in the process, he and his staff were aware that consumers and utilities might have concerns about the proposed rule. As the process wore on, the initial "gnawing in his gut" about the strong proposed standard was gradually outweighed by its large dollar and energy benefits. However, after the proposed rule was published, the agency received a torrent of letters and responses directly from consumers (who, in the policymaker's view, seemed to have been motivated, or at least organized, by the electric utility industry). Bob concluded that he should have listened to his first instinct (the gnawing in his gut) and realized that the proposed rule, despite its impressive energy and economic benefits, would stir intense opposition from consumers and industry.

Policy analysts such as Bob tend to be more concerned with saving energy and quantifying consequent economic and environmental benefits than with assessing the likely consumer response to a policy. Like Pongsak, who assumed that low-income consumers would not care about quality but just focus on price, he makes assumptions without any evidence. In fact, we found that both the U.S. and Thai policymakers whom we interviewed rarely requested formal input from consumers at any point in policy development. To the extent that it occurs, the feedback from consumers is usually indirect, and is filtered through dealers, distributors, and manufacturers who deal directly with consumers. In both countries, the consumer energy labels were developed by bureaucrats, without targeted consumer research to optimize the label in terms of consumer acceptance and understanding.[1]

In summary, it appears that policymakers in both countries rarely solicit direct feedback from consumers and tend to make policy that affects consumers based on limited data and personal experience, rather than on solid market research. If they are to develop truly effective policies, policymakers must become experts in marketing and consumer behavior, in order to develop a better understanding of how to influence the sales transaction.

The Salience of Energy Efficiency

The vast majority of U.S. and Thai policymakers whom I interviewed assumed that energy was not a high priority for consumers and thus not a salient factor in appliance purchase decisions. Based on published data and data collected as part of this study, it appears that U.S. policymakers are correct and that energy is not a high priority for consumers. On the other hand, Thai policymakers may be underestimating consumer interest in energy. I elaborate on this comparison below.

All but two U.S. policymakers asserted that energy efficiency was at or near the bottom of the list of priorities. Given published research on this topic, the U.S. policymakers are certainly correct in asserting that energy consumption is not a top priority for U.S. consumers in either the purchase of automobiles (Hill and Larsen 1990) or appliances (Dyer and Maronick 1988, Brown and Whiting 1996). However, the U.S. policymakers seemed to infer that, since energy efficiency was a low priority that it could not be an effective sales tool. This is not necessarily a sound conclusion. The fact that energy efficiency is not a top-tier priority does not necessarily mean that efficiency is irrelevant or might not play a more important role in the consumer decision making process. Research cited in Chapter 2 suggests that consumer decision-making is a two-stage process that includes an initial screening on just a few attributes and a final decision process that involves comparison among all available attributes (Bettman

[1] Consumer responses to, and understanding of, the labels will be discussed in Chapter 6.

1979; Verplanken cited in de Loor and Zeelenberg 1991). This indicates that there may be more than one point at which energy efficiency could play a role in the decision.

When asked where energy efficiency falls in the list of consumer priorities, two U.S. policymakers distinguished between energy efficiency as a consumer priority, and energy efficiency as a "selling point." One federal agency employee described energy efficiency as a potential "deal breaker" [sic][2]. He suggested that energy efficiency does not have to be a top priority in order to play a role in the consumer decision-making process, indicating that consumers may be susceptible to marketing campaigns that highlight the merits of reduced operating cost for consumer durables and appliances. Another policymaker suggested that consumers needed guidance during the shopping process, and that a clearer message might bring efficiency more readily to the mind of the consumer. This is the underlying premise of the Energy Star Retailer Initiative, a joint U.S. program between the Environmental Protection Agency and the Department of Energy to provide point-of-purchase promotional materials and sales training to stimulate the sale of energy-efficient refrigerators and other appliances.[3]

Thai policymakers also rated energy efficiency as low on the list of consumer priorities. While most of the policymakers felt that the appliance energy labeling programs had been effective, they tended to believe that the manufacturers, who had heavily marketed the energy labels and increased the percentage of labeled products available, were primarily responsible for the programs' success. Only one Thai policymaker listed energy as one of the top three decision criteria for consumers. When asked how he knew this, he cited "friends."

My interviews and surveys with Thai salespeople and consumers indicate that policymakers may be underestimating consumer interest in energy efficiency. In interviews with 43 Thai salespeople in three cities, energy efficiency was rated as the second highest consumer priority in the purchase of refrigerators, after brand.[4] In the survey, 366 Thai consumers who had recently purchased a refrigerator gave energy efficiency had a lower ranking (fifth overall), but nearly one-third (29%) listed efficiency as one of their top-three priorities.[5]

Given the influence of salespeople in the appliance purchase decision, the Thai programs could do more to influence consumer purchase decisions is at the retail level. I found it surprising that salespeople have been almost entirely ignored in the design of the Thai programs. When asked about the role of the salespeople in promoting energy efficiency, about half of the Thai policymakers admitted that salespeople could potentially play a very important role. Two of the respondents cited instances in which salesmen actually played a negative role. In one case, a policymaker visited a store and found that salesmen were questioning the believability of the label. In another case, a DSM official reported that salesmen were trying to convince customers that the refrigerator with the energy label did not provide enough cooling, and that they should buy a model with no label, because it cooled more effectively. A Thai consultant, Boonchu, stated that salespeople could play an important role in the promotion of energy efficiency. Boonchu, who has years of experience advising the government on energy policy, said he

[2] While the term "deal breaker" often refers to terms or conditions that can eliminate a potential sale, the context in which this policymaker used the term actually had the meaning of "tie breaker" – that is, that all other things being equal, the fact that a model is energy-efficient could become a deciding factor.

[3] The results of this program are described briefly in Chapter 3.

[4] Fifty-six percent of salespeople listed brand within the top-three priorities, 49% listed energy efficiency, and 30% listed size (see Chapter 6).

[5] Sixty-one percent of consumers rated brand within the top-three priorities, 54% listed price, 39% listed color, 35% listed quality, and 29% listed energy efficiency (see Chapter 7).

was skeptical of the motivations of salespeople and that, in his experience, they tended to say good things about their brands and bad things about their competitors' products.[6]

None of the Thai policymakers with whom we spoke suggested the need to provide general training for salespeople about energy in general and specific training on the use of labels as a selling tool. In fact, two policymakers spoke rather disparagingly about salespeople. One said that salespeople don't know anything about the technical aspects of products and have a limited capacity to respond to specific, technical questions from consumers. When asked about the role of salespeople, another Thai policymakers, a government official, had this to say:

> If they [salespeople] could do a good job, it would help. But it is quite difficult to train a salesperson to understand this kind of thing. Especially for consumer products … if you train them to speak out, it's O.K. They can speak out as you train them. But if consumers ask further questions they cannot respond (Thai policy interview no. 5).

In my judgment, neither the Thai nor U.S. policymakers have adequately examined the role of energy efficiency in the sales transaction. In the U.S., energy efficiency is not a salient factor in the purchase of white goods, but if marketed effectively it may have the potential to become more salient and to play the role as a "tie breaker." Thai policymakers have thus far focused on cooperating with manufacturers, and their views on consumer behavior may underestimate the salience of energy efficiency in the appliance sales transaction. In addition, they have not included salespeople in the development of the appliance labeling programs, and have thus ignored the major role of salespeople in influencing consumer purchase decisions.

Which Types of Programs Are Most Effective?

To compare policymaker perceptions of program effectiveness, we asked policymakers in both countries to assess the effectiveness of different types of energy conservation programs. We asked them which type of program was most effective at saving energy : minimum efficiency standards, incentive-type programs (such as rebates), or voluntary-type programs.

In the U.S., minimum efficiency standards for appliances were widely perceived by policymakers as being an effective policy instrument. Nine of the 16 U.S. policymakers named standards as the most effective federal policy. Of these nine, two were congressional staffers who acknowledged the effectiveness of standards while indicating that they were ideologically opposed to the policy. Two of the policymakers stated that they felt voluntary programs were the most effective type of program. Three did not answer the question directly because they felt the question was unfair, since the three types of policies were best implemented together, as a package. For example, the response below suggests a sequence of policies. It may additionally indicate a growing reluctance by analysts to be drawn into a polarized political debate over mandatory and voluntary types of public programs.

[6] As discussed in Chapter 6, many salespeople in department stores are hired directly by the manufacturer or distributor of a certain brand name, rather than by the store itself.

> This is not a fair question. They're not comparative, they're part of a continuum. Once technologies are tried and true, it's not appropriate to do a rebate. You distort the market, and you're sending a signal that this thing isn't really worth what it's really worth. Then, you need to do voluntary programs, provide unbiased information, and get it to people in order to make a decision. And when you try to transform a market, the ultimate transformation is when it becomes a standard, because everyone uses it or because the government writes a law that says everyone has to use it. That's the purpose of a standard, to culminate the transformation process (U.S. policy interview no. 12).

The Thai policymakers' responses were evenly split between standards and voluntary or "cooperation" programs as the most effective approach. While almost all of the Thai policymakers expressed the opinion that voluntary programs were very appropriate in Thailand, only four of 11 felt that voluntary programs would be most effective at saving energy. Five of the 11 Thai policymakers described standards as the most effective policy. Two responded that standards and voluntary programs should be implemented in conjunction with some form of financial incentives.

Since Thailand has not yet implemented minimum efficiency standards, the responses reflect the fact that there has been four years of experience with voluntary and incentive programs in Thailand and, as yet, no minimum efficiency standards have been passed. Voluntary programs are widely viewed as a politically safe strategy, and standards are seen as highly effective but more difficult to implement than are voluntary programs. The Department of Energy Development and Promotion, which has the mandate to implement standards, has its hands full implementing the compulsory law for large buildings and factories and is not likely to soon issue minimum standards for appliances and equipment. Rebates and financial incentives are seen as problematic because of the large financial difference between the poorer rural population and the wealthy consumers in Bangkok who, the policymakers presume, would benefit most from such incentives.

Policy Issues Raised Only in the U.S.

The salient political issue related to energy efficiency during the time of our interviews with U.S. policymakers (January 1996) was a debate over minimum efficiency standards that called into question the role of the U.S. government in promoting energy efficiency. In addition to questioning policymakers about their views on minimum efficiency standards, we solicited their opinions on the role of government in energy policy and on the effectiveness of the U.S. appliance energy labeling program.

The Role of Government

The submission by the Department of Energy (DOE) of a set of aggressive proposals for minimum efficiency standards led to intense opposition, primarily among Republicans[7], and eventually to the passage of a one-year moratorium on the establishment of new efficiency standards in early 1996. Thus, during the time that we conducted our interviews, it was not easy for the U.S. policymakers to talk about policy effectiveness without also referring more generally to the appropriate role of government.

[7] The proposed moratorium on standards became identified with the agenda of the Republican congress elected in 1994, vowing to enact its Contract with America.

There was broad support for a government role in energy efficiency policy. Nearly all of the U.S. policymakers (14 of 16) believed that government should play at least some role in promoting energy efficiency. Those policymakers who support a strong government role were more likely to reply that minimum efficiency standards had been the most effective policy. Those who favored a more limited government role were less likely to say standards were effective. And those who did not believe that government should promote energy efficiency argued that standards were not effective; however, they were unable to cite specific studies to discredit the effectiveness of standards.

One individual, a member of a non-profit think-tank, did not believe that the federal government should promote energy efficiency because he views the federal government as a market-distorting force. In his view, if the government were to play any role, it should be limited to the provision of information. At the same time, he even voiced skepticism of the ability of the federal government to provide unbiased information. This policymaker's distrust of government was at odds with the rest of those whom we interviewed. Policymakers who supported a federal role in improving energy efficiency characterized the government as an appropriate medium through which to convey "unbiased" information, largely due to its inherently "broad contact with the public". They cited the benefits of energy efficiency to society, the environment, and consumers. They also described a "moral obligation" to improve the energy efficiency of the economy. Six respondents stated that market failures justified government intervention to promote energy efficiency.

Are U.S. Efficiency Standards Effective?

In the debate over U.S. efficiency standards, I found a curious disagreement over the seemingly easy-to-measure issue of whether minimum efficiency standards for appliances have in fact saved energy. The minority of policymakers who claimed that standards were not effective did not offer proof of their argument but rather suggested that the impact of standards was either difficult to discern or had not been measured. Two respondents argued that increases in product efficiency are a natural outcome of free markets and competition. One legislative aide, Vincent, remarked that the lack of a control group hinders our ability to tell whether standards have been effective: "We will never know if industry would have done better without them" (U.S. policy interview no. 6). This statement seems disingenuous, since Vincent has easy access to information from appliance manufacturers that could help answer this question. Since Vincent has been lobbied by several manufacturers opposing standards, he should have access to information on the impact of standards on manufacturer decisions through conversations with industry lobbyists.

I asked two analysts with non-profit advocacy groups to respond to Vincent's assertion that there is no evidence of the effectiveness of the U.S. appliance efficiency standards. They acknowledged the lack of a control group, but pointed out that one could observe the impact of standards by observing the large increases in product efficiency that occurred during the years that standards went into effect. They quoted peer-reviewed studies estimating that standards for appliances and electrical equipment had saved 2.5-3% of U.S. annual residential consumption and were saving the average household more than $200 per year on energy costs (Nadel and Goldstein 1996; McMahon et al. 1996). One of them pointed out that the 1993 standard, which was passed into law in 1989, was so stringent that none of the existing 1989 models were capable of meeting it.

When pressed, the legislative aide Vincent made it clear that his opposition to standards was philosophical:

> Philosophically, I don't think the government should mandate what products can and cannot be produced. It's not a role the government should play. Is it [standards] effective? There are equal numbers of people who say it is effective and ineffective, but that is not the issue for this office. Benign monarchy is probably effective, but none of us want it (U.S. policy interview no. 6).

Another legislative aide opposed to standards, Jack, mentioned several times the need for "hard science" and "good science" in order to provide legislative decision-makers with objective information on complex policy issues. He proceeded to complain about an advance notice for a proposed federal standard that would have eventually required horizontal axis (as opposed to the currently common vertical axis) washing machines, seizing on this as an argument against standards. His argument against horizontal axis machines was based largely on anecdotal evidence: his brother lives in Germany and is dissatisfied with them; he once lived in Japan and found that the horizontal axis machines were "dinky" and "could only fit two pairs of Levis"; and "people in the U.S. almost overwhelmingly choose vertical axis machines".[8] He added, "We shouldn't have DOE decide how people wash their clothes." When asked to compare standards, manufacturers incentives, voluntary programs, and education, Jack argued that education should be the highest priority. When asked which of the four program types has had the most impact, he replied, "I don't know" (U.S. policy interview no. 3).

Both Vincent and Jack avoided the issue of effectiveness and argued against minimum efficiency standards on the grounds that they limit consumer and manufacturer choice. Said Jack: "We have to be real careful that we don't force a technology down peoples' throats. A program is beneficial to some extent if it is putting labels on equipment and providing information. But we have a problem if we mandate production lines and eliminate consumer choice." Vincent argued that the government role should be to "encourage" and not to "mandate". "Consumers will choose more energy-efficient products as they become available ... current policy is not demand driven. It seeks to force demand by limiting available products."

In response to the argument that standards limit product availability, a congressional committee staffer pointed out that individual choices to purchase energy-inefficient products have negative environmental impacts:

> I think from a public policy perspective we shouldn't give consumers the choice to maximize the externalities they're imposing on the rest of society and on the environment, because of their self-serving choices ... And if consumer choice is less ... energy-efficient, then well, we ought to slap a huge tax on it to offset the societal cost of the externality that you're imposing by maintaining this consumer choice. But [these choices are] not cost-free (U.S. policy interview no. 14).

Another policymaker, an energy-efficiency advocate, contended that standards do not limit consumer choice:

[8] When we pressed him to back up this claim, he said that "98 % of U.S. households have vertical axis washers, based on sales -- when you go to Sears, you see it." This appears to be an invalid argument against horizontal axis machines: that U.S. consumers choose vertical-axis machines over horizontal axis machines because only vertical axis machines are available.

> I would say that the standards by and large don't limit choice. You still have all the same colors, features, and with whatever else you want, it's just that all of the units are more efficient. There has been no proven case that I am aware of that, following standards, the amount of choice has actually gone down (U.S. policy interview no. 2).

In our discussions with U.S. policymakers, we were often left with the feeling that we were talking with two groups of people who speak different languages. In the view of policymakers opposed to minimum efficiency standards, such standards limit the ability of manufacturers and consumers to choose which types of products they want to make and buy, respectively.[9] Some, but not all, of these opponents of standards also argued that standards had been an ineffective policy, but were unable to cite any research to support this claim. In the view of the energy-efficiency advocates and most of the federal agency employees, minimum efficiency standards do nothing to alter the amenity provided by a product class, and they actually increase choice by offering consumers a way to save money on their energy bills. One of the advocates mentioned the fact — ignored by the policymakers who opposed standards — that research has shown that the minimum efficiency standards also provide this amenity at no significant additional first cost.[10]

Are the EnergyGuide Labels Effective?

Unlike our discussions about standards, there was near unanimous agreement among the policymakers that appliance energy labeling is an appropriate government policy. Most policymakers were not aware of any studies or evaluations of the labels, but this did not prevent them from stating opinions, which varied widely. Jack and Vincent, the two legislative aides opposed to standards, asserted that labeling was a good policy by virtue of the fact that it was making information available to consumers. Said Vincent:

> There is a valid role for the government to provide tools for consumers to make a good choice. Even though the majority of consumers don't look at the labels, it's still a good program (U.S. policy interview no. 6).

In an odd contradiction, Vincent supports a program that he believes is clearly ineffective. And at the same time, when pressed as to how he knows that consumers don't look at labels, he was unable to cite any research to support this claim.

Jack felt that while consumer awareness was low, the label itself provided clear information:

[9] One of the legislative aides worked for a Congressman who was among the most vocal in pressing for a moratorium on efficiency standards in 1995. In this Congressman's district lies a ballast-manufacturing facility which would have been rendered obsolete by a draft standard for lighting ballasts efficiency proposed in 1995.

[10] The available data show no significant increase in appliance prices due to either state or federal efficiency standards over the past fifteen years (McMahon 1995).

> EnergyGuide labels are on the outside [of appliances], but awareness is till a problem. From what I am told, energy use is not a big selling item … Information, consumer awareness and education are the key. We need to inform people and give them a real desire to buy energy-efficient products … Big yellow labels, it doesn't get any clearer than that (U.S. policy interview no. 3).

A number of other policymakers were skeptical about the impact of the labeling program, since they had not seen any evaluation results. One energy-efficiency advocate remarked that he thought there had been a study conducted in the mid 1980s. Another said, "I have yet to see any data that proves that they [the labels] have done anything" (U.S. policy interview no. 5). However, these advocates and some of the agency officials argued that the label was an important building block, since it formed the basis for comparisons and was used by utility DSM rebate programs. One policymaker opined that the impact of the label on manufacturers probably far exceeded whatever impact it had on consumers:

> The FTC [Federal Trade Commission] did a study in the mid '80s, and it was inconclusive, but I don't feel that the program has been very effective. Although the original goal was to change consumer decision-making, the labels have had a large effect by changing manufacturer decision-making. In conversations with manufacturers, they have said that when they saw their product at the bottom of a range, they would cut off their lowest models. So when you look at the program overall, it has had a positive impact, and labeling has also been important in utility rebate programs (U.S. policy interview no. 5).

Curiously, in light of our results from the study of retailers and consumers — which showed a low level of interest in and understanding of labels by U.S. consumers (see Chapters 5 and 6) — only one of the policymakers was openly critical of the EnergyGuide label and its comprehensibility. This respondent argued that it was much too complicated for the average consumer to easily read and understand:

> Is the label effective? Yes and no. The FTC label has the information there. But it's my observation that consumers aren't getting the message. You might have 20 consumers coming into the store, and one of them might really say, "Oh, here's the FTC label, let me take a quick look at this. The other 19 will go, "I didn't know it was there," or "I don't care," or "I can read English, but it's too dull," or whatever. I mean, it has all the information there, but have you ever read a prospectus for a stock fund? You don't have any of these mutual fund companies coming to you and saying, "Oh, first read this prospectus." They summarize it for you and tell you quickly what the outcome will be – 20 percent increase last year and your five-year average is 18 percent. I mean, who wants to read a prospectus? (U.S. policy interview no. 8)

In summary, policymaker evaluations of the EnergyGuide label ran the gamut, from assuming that it is a useful policy even though most consumers don't look at the labels; to assuming that the labels had

primarily influenced manufacturer, rather than consumer, decisions; to questioning the design of the label and its basic comprehensibility. The common thread, however, is that the purpose of the labeling program in the view of these policymakers is primarily cognitive (to provide information and to make consumers aware) rather than behavioral (to stimulate a measurable change in consumer purchasing).

Policy Issues Raised Only in Thailand

Wide-scale planning and implementation of energy-efficiency programs in Thailand only began in the early 1990s. In order to understand the issues facing Thai policymakers, I added a series of questions to the interview protocol addressing the implementation of energy policy in developing countries and the challenges of interagency coordination. This section thus addresses the following issues: the adaptation of foreign ideas and programs, the need for interagency coordination, the question of whether rebate programs can succeed in Thailand, and the question of how to measure program effectiveness.

How Programs Are Adapted in Thailand

One issue that interested me was the role of foreign expertise and consultants, and how programs were adapted and designed to operate in Thailand. I was particularly interested in why the Thais had decided to pursue a strategy of relying largely on voluntary cooperation with manufacturers and limited or no incentives, instead of the incentive-based approach proposed by Western consultants and the World Bank who advised the Thai government in the early 1990s.

The responses of Thai policymakers were marked by a recognition of the need for foreign expertise, tempered with a pride in the ability of (and need for) Thais to decide among themselves how best to adapt foreign programs in the Thai context and in Thai style (*baap thai*). The director of the Thai DSM Office described the process this way:

> Consultants come and give advice, we take this into account and decide by ourselves. We have many consultants who come – six in the past year. This year a consultant will come and advise on setting up an ESCO [energy service company] … But in reality, we just sit and talk with two or three people here in our office and find out a better way. We discuss strategy and we debate. Of course, we learn from the experience, from the success and failure of each country and each program. We try to adapt it to the model of *baap thai* [Thai style], as you know (Thai policy interview no. 3).

Apichart, a high-ranking policymaker, explained how the closely-knit fabric of Thai society, especially the relationships among leaders in society, predisposed policymakers to adopt voluntary, rather than mandatory types of programs:

> That sort of thing [voluntary cooperation with manufacturers] has been done in Thailand before, maybe not with energy conservation appliances but other things like fuel specifications, for example. When we got the oil companies to agree to changes in the fuel specification, we didn't have to have a lot of debate and public hearings before

> passing a law … like in the US. Thailand is a much smaller country, and the government still has a lot of influence on the private sector. So it was relatively easy, I think in both cases, for appliances and fuel specifications to simply sit down with them and simply force them somehow to agree, because I think they do realize that if they do not agree then the government could use its power to come up with compulsory standards, which would affect them anyway, so they might as well agree (Thai policy interview no. 1).

One foreign consultant, who had spent several years advising a Thai government agency on the development of its energy-efficiency programs, mused that what he learned had little to do with energy engineering and finance, but everything to do with "dealing with the Thai culture, with the idea of marketing, dealing with politicians and policies and how to do DSM within the Thai context." He quickly learned the limitations of being a foreigner in Thailand — that his role was simply that of an advisor, who could gather data on international programs and technologies and share this information with the Thai policymakers, but not presume what approaches would be effective:

> I think the very first thing I learned was try not to tell them what's right or wrong, but give them as much exposure to other experiences as possible, and let them decide if and how it can be adapted. Now that's not to say just hand it to them and step back, but offer them other alternatives, other ways that it can be used but try not to take your, um, understanding or experience with the culture and say I think this will work here, because you're not part of the culture necessarily. And there's two things that'll probably happen. One you'll probably get it wrong, even though you might think you're right. and the other thing is you won't be perceived as being right. I don't know what it would be like for a foreigner who has been here 30 years, but as someone who's only been here two years, I'm still a foreigner (Thai policy interview no. 11).

This foreign consultant also professed admiration for the way that the Thai policymakers were able to enlist industry buy-in and cooperation to its programs. He described the Thai approach as less "heavy handed" than in the West and observed that the Thais involved the manufacturers more directly in the process of program design. However, while he agreed that the most effective types of programs for Thailand were those in which the government reached agreements directly with trade allies and manufacturers, he felt that the agreements to date had resulted in only limited efficiency gains because they did not create an incentive for manufacturers to "push" the market with leading-edge technologies. In essence, he argued, because of the lack of a government definition for what is "high efficiency", the products promoted by the utility's DSM program (thin-tube, 36-watt fluorescent tubes and air conditioners and refrigerators rated at 4 and 5) have become the *de facto* upper limit for efficiency:

> So we're kind of a long way off before we start seeing appliance and equipment standards implemented. And because of that, EGAT, although they've implemented some programs, like refrigerator labeling and air conditioner labeling and the thin-tube program, they're reluctant to start pushing those technologies into making large efficiency changes without minimum codes or testing standards mandated by the government. So what that means in terms of getting … the market potential for high

> efficiency technologies, the public sector is promoting moderate-to-low-efficiency technologies, even though they're still you know the 4s and 5s in the labels, they're still no leading edge. And the market sort of sees this is a 4 or a 5, why should I go for what might be considered an 8 or a 10, when the public sector is telling me 4s and 5s are good (Thai policy interview no. 11).

Inter-Agency Coordination

Over the past seven years, Thailand has passed national energy-efficiency legislation, established a large energy conservation fund, and initiated the first comprehensive DSM program in Asia virtually without political opposition. My interviews and discussions with Thai policymakers over the past few years have revealed a sometimes uneasy truce between the three primary policy agencies masked by an outward appearance of interagency coordination.

The National Energy Policy Office (NEPO) is the lead policymaking organization: it serves as the secretariat for the National Energy Policy Committee and oversees the Energy Conservation Promotion Fund. The Department of Energy Development and Promotion (DEDP) is responsible for Energy Conservation Promotion Act, which requires energy conservation measures in all large buildings and factories. DEDP also has the authority to issue appliance efficiency standards and building efficiency codes. And the Electricity Generating Authority of Thailand (EGAT) staffs and directs the Demand Side Management Office, which is responsible for promoting end-use efficiency programs in the commercial, industrial, and residential sectors. The potential for overlap and confusion arises at the intersection of the commercial and residential sector DSM programs, operated by EGAT, with the DEDP program, which mandates all large buildings and factories to implement energy efficiency plans.

While most of the Thai policymakers said they felt that there was adequate coordination between the DSM and DEDP programs, two policymakers argued forcefully that the DSM Office was overstepping its bounds and, primarily through its Green Buildings Program, trying to interfere with DEDP's program for large buildings and factories. Boonchu, the consultant, explained that the committee structure, while intended to be a vehicle to develop consensus on policy and program direction, was not working effectively.

> In the Thai situation as you probably know, they usually set up committees, and they invite everyone [from the utilities, government agencies, and universities] to join that committee. So presumably there would be coordination in that committee, right? But in fact, it has never happened, because when they go back to their own agency, and when they come to the time when they have to set up a target, set up a budget, they will disregard whatever the other party is doing. So, a committee is a place where people meet so they can say they are in coordination, but in practice, it's not coordination … there is no assignment of responsibility from the top … there is no top-down policy from the government to clearly assign the objective and assign the responsibility for who is doing it" (Thai policy interview no. 9).

Can Rebates Work in Thailand?

As mentioned earlier, the Thai policymakers whom I interviewed were evenly split on the issue of whether minimum efficiency standards or voluntary programs was the most effective policy approach, in terms of potential energy savings. Of the three policy options we discussed – minimum standards, rebates, and voluntary programs, there was the greatest sensitivity to the concept of providing direct financial incentives (i.e. rebates) to either consumers or manufacturers. Two of the Thai policymakers stated flat-out that rebates cannot work in Thailand. One, Vichai, stated:

> I learned from foreign countries that they implement DSM by incentive way. That's what I learned from them … But I know that those … measures cannot be implemented in Thailand. Never. Because we cannot rebate. If you give money to somebody, they say, "EGAT is very rich, why you give money to that person? We are poor. No money for eating. And you give money to buy air conditioning"[11] (Thai policy interview no. 4).

Clearly, Vichai is sensitive to the political implications of providing rebates in a society where there is such a wide income gap between the rich people in Bangkok — who may be buying their second, third or even fourth air conditioner — and the poor farmers in the country, who may consider themselves lucky to have even a small refrigerator in their household. The bulk of the rebates would constitute a government subsidy of appliance consumption by the wealthy.[12]

When I queried Apichart, the senior policymaker who has significant responsibility for policy formulation, about rebates, he separated the question of the program's effectiveness from the issue of its political feasibility:

> Rebates could also be effective. I think rebates could change consumer behavior very quickly, but then I think there are also problems with rebates in Thailand. I think what EGAT told you was probably the fact that politically it could be difficult because the program was implemented by EGAT, which is a government organization … [for such] government organizations, providing an outright rebate as you do in the U.S. could be difficult (Thai policy interview no. 1).

[11] Vichai resents the fact that a team of foreign advisors — who performed a pre-investment appraisal for the a large grant from the Global Environment Facility to Thailand's DSM program — were dictating what types of programs he should implement. "Our culture is different so much. We are poor, and EGAT still gives money to rich people to buy number 5 [the highest efficiency rating] air conditioners? But the World Bank said, 'Why don't you do this?' I'm against it, and they said I am stupid. O.K. forget it. This is my way, and I know."

[12] A logical extension of this argument, not made by the interviewees, is "why should the government pay for large power generation increases to provide for appliances for the wealthy?" One of the Thai air conditioner salesmen that we interviewed appeared quite uncomfortable with the emphasis on promoting the *sale* of efficient air conditioners rather than the need to conserve: "It seems to me that EGAT is promoting that people use number 5 products, but they aren't telling people that they should save energy. If you look at and listen to the ads closely, it seems that's what they're saying. They have advertisements to get people to buy, but they don't have advertisements to get people to save energy … Its mainly a product promotion program. They should really say, "please save energy" (U.S. sales interview no. 13).

However, two other policymakers said they thought that rebates could work in Thailand, and one, a senior member of one of the energy policymaking committees, felt that Thais should at least attempt a pilot rebate program. "Rebates have worked in other countries, why not in Thailand?" asked Boonchu, the consultant. "We have to try. Using the experience of other countries that have been doing this kind of programs for many years, they have been well received by many customers. Why shouldn't it work in Thailand? I don't think Thai consumers are any different from consumers in any other countries. Why would they be different?" (Thai policy interview no. 9)

In fact, the debate over rebates is nuanced and cannot drawn in black and white. Vichai's opposition to rebates does not preclude the possibility of financial incentives being provided to EGAT customers in different forms. Financial incentives are already included as part of the Thai program mix. The DSM Office is implementing two programs that provide financial incentives. One is a zero-interest loan program for air conditioners described in Appendix B. When asked about this form of financial incentive, Vichai replied that this is not the same as a rebate program, since the customers have to pay back their loans. Also, one of the foreign consultants pointed out to me that the DSM Office is providing direct rebates in a program in which purchasers of large electrical motors receive a rebate to cover the incremental cost of high-efficiency equipment. The motors program does not raise equity issues because it is primarily for large industrial facilities (and not wealthy consumers) that buy large motors.

How to Measure Program Effectiveness

While most of the Thai policymakers I interviewed paid lip service to the importance of evaluating program effectiveness and the role of evaluation in improving program design, their responses indicated a lack of in-depth understanding of the type of data needed to perform proper evaluations. Most made general statements about the need to conduct surveys and to collect data on end use.

The DSM program provides a case study for how Thai policymakers perceive the role of evaluation in program design and improvement. When I asked policymakers about the effectiveness of the DSM programs, most of those familiar with the programs felt comfortable in asserting that the programs[13] had been effective. For the thin-tube lighting program, the evidence of the program's success was widely apparent: the five manufacturers of fluorescent lamps switched production of all their "fat tube" 40-watt and 20-watt fluorescent tubes to "thin tube" 36-watt and 18-watt tubes over an 18-month period as the result of a voluntary agreement with the government. For the appliance labeling programs, the cited evidence of success was less clear. Some cited the saturation in television advertising for the labeling programs. Two policymakers told me that the DSM program was the largest TV ad campaign for any one "product" in the country.[14] Several others noted that there had been a documented increase in the sales of air conditioners and refrigerators with high-efficiency labels.[15]

[13] The DSM programs which had been under way for at least one-two years included the thin-tube fluorescent lamp program and the energy labeling program for refrigerators and air conditioners. These programs are described in Chapter 2.

[14] EGAT's advertising budget during the years 1995 and 1996 was approximately US$12 million per year. The majority of this advertising budget was spent to promote EGAT's DSM programs, although some was also used to promote the utility's corporate image and to build awareness of the benefits of nuclear power, a technology that EGAT managers would like to adopt in the future. Two of the main TV channels provide a 45% discount for EGAT's advertisements, so while EGAT has the greatest number of "spots" or minutes on TV, they do not technically have the largest television advertising budget (Ratanopas 1997).

[15] The available data on sales of refrigerators and air conditioners with energy labels is discussed in Chapter 2.

While staff at the DSM Office were confident of the success of their labeling program, three other policymakers, not within EGAT, expressed skepticism about the program's effectiveness, based either on their own experience at retail shops or from accounts of problems in newspaper articles. In addition, the DSM staff and several of the other policymakers expressed a caveat: while it appeared that manufacturers were embracing the program and putting high-efficiency labels on their appliances, there was a recognition of the need to conduct market surveys in order to get actual data. Several policymakers noted that the lack of baseline data on the appliance market as well as ongoing data on appliance production and sales would hamper evaluation efforts. One of the foreign consultants described how the DSM Office, during the negotiations with appliance manufacturers had missed an opportunity to gain valuable market information from the manufacturers.

> I think EGAT needs to be far more forceful in what they demand from their participants. In the very first program [the thin-tube program], I think EGAT gave a lot to the manufacturers and received very little in return – very little market information. EGAT essentially eliminated a market barrier, and the manufacturers reaped some manufacturing savings. It didn't adversely affect their market shares, improved their reputations with the customers overall, and yet in terms of the enhanced information that EGAT was able to obtain on the market, it was very small. They [EGAT's DSM Office] don't know what the real size of the market is. They don't know the adoption rate. They don't know the sales shares of each of the manufacturers … I think that information could have been obtained from the manufacturers as part of participating in the process. The same goes for the air conditioner and refrigerator programs.

The implications of this statement are that the DSM managers lack an appreciation of the role of evaluation and the necessary steps that must be taken to continually develop and update baseline market data. In the case of the appliance labeling programs, the DSM Office does not have data on the true market size for either refrigerators or air conditioners, and not all units are labeled. Thus given their current data, they can only see changes in numbers of labeled units and not movements in the market as whole

The director of the DSM Office acknowledged the important role that an evaluation would play for his office, indicated that he did not know much about evaluation methodology, and stated that this would be recommended by an outside consultant, who would soon begin to provide them assistance in this area. Another policymaker complained about the high cost of evaluations and the fact that he did not have a budget to conduct evaluations. He mentioned a proposal he had recently received by a consulting firm to fund an evaluation of a government-funded program: the proposal requested US$200,000 to evaluate a program that had spent US$160,000!

Only one respondent, the consultant Boonchu, articulated a clear understanding of the basic steps in a program evaluation:

> It's straightforward. They have to follow from the start, even before the start of the program, how the consumer responds to the program, how the supplier responds to the program, what the change is of the penetration of these kind of appliances, how the stock of the appliances have changed, how the utilization has changed, and eventually the result is how much energy you have saved as a result of this program. They have to do

> it, but it's not simple. But they should do it now, not wait until five years from now and still make an evaluation process. You can't do it, because you will lose a lot of important information. You have to keep track of information from day one (Thai sales interview no. 9).

Most of the policymakers focused on the need to conduct impact evaluations – that is, on just measuring how many kW or kWh were saved as a result of the program. One policymaker associated with the government's compulsory program for large buildings claimed that their evaluation would be 100% effective, since they were collecting monthly data on energy use from each designated facility and putting it into an evaluation database. Only three of the policymakers described the need for some sort of process evaluation in order to get feedback on the mechanics of the program operation and on customer awareness, attitudes, and response.

One government policymaker responsible for funding energy conservation projects commented with a smile on the lack of interest among consultants in evaluating their programs:

> Funny enough, you don't hear much about evaluation. What they say to you is this is the program, this is what we have spent, this is at the end of year, but less do people talk about how much they get from spending this kind of money. [We intend] to do that, but unfortunately you come into a very early stage. We have spent, but the results are not there yet (Thai policy interview no. 2).

In summary, Thai policymakers are aware of the importance of evaluation in program design, but few of them have a sophisticated understanding of what is involved. The DSM Office has taken steps to improve their capability by contracting long-term foreign consultants to assist them in this area. It is also important to remember how long it took utilities and government agencies in North America to make serious progress in evaluating their own programs. When asked what types of evaluations had been conducted on Thai programs, one foreign consultant put the issue of evaluation in perspective, replying, "None. But this is probably not much different from the early days of energy efficiency in [Australia]" (Thai policy interview no. 10).

Conclusions

Common Themes

Our interviews with policymakers in the U.S. and Thailand reveal that their mental maps of the appliance marketplace do not accurately reflect consumer purchase behavior. Policymakers in both countries rarely conduct marketing or behavioral research and rarely solicit formal input from consumers. Instead, they tend to make policy that affects consumers based on limited data and personal experience. When asked about consumer preferences and interest in the energy labeling programs, fewer than half of the policymakers in each country cited empirical research results to support their assertions or conclusions.

The vast majority of U.S. and Thai policymakers whom I interviewed assumed that energy was not a salient characteristic in the purchase of appliances and thus not a high priority for consumers. Based on previous research and data collected as part of this study, it appears that U.S. policymakers are correct

and that energy is not a high consumer priority. However, Thai policymakers may be underestimating consumer interest in purchasing energy-efficient products.

Among the U.S. policymakers, minimum efficiency standards for appliances were widely perceived as being the most effective policy instrument, and there was also strong support for both voluntary-type programs and rebate programs. The Thai policymakers' responses were evenly split between standards and voluntary programs as the most effective approach. In Thailand, voluntary programs were widely viewed as a politically safe strategy, and standards were seen as highly effective but more difficult to implement than voluntary programs.

Policy Issues Raised Only in the U.S.

In our discussions with U.S. policymakers, we were often left with the feeling that we were talking with two groups of people who speak different languages. In the view of the energy-efficiency advocates and most of the federal agency employees, minimum efficiency standards do nothing to alter the amenity provided by a product class, and they actually increase choice by offering consumers a way to save money on their energy bills. In the view of the minority of policymakers opposed to minimum efficiency standards, such standards limit the ability of manufacturers and consumers to choose which types of products they want to make and buy, respectively. We also found a tendency among the opponents of standards to confuse the issue of effectiveness with their view of the proper role of government. When asked whether standards were an effective policy, these policymakers responded by expressing their philosophical opposition to government intrusion into this area.

Unlike our discussions about standards, there was near unanimous agreement among U.S. policymakers that appliance energy labels are an appropriate government policy. While nearly all of the U.S. policymakers interviewed strongly support the energy labeling program, the majority also tend to think that it is largely ineffective. Although most policymakers were not aware of any studies or evaluations of the labels, this did not prevent them from sharing their opinions.

Policy Issues in Thailand

Most Thai policymakers strongly supported continued development of voluntary-type energy efficiency programs such as the thin-tube agreement with lamp manufacturers and the appliance energy labeling programs. The majority also supported the eventual implementation of some form of minimum efficiency standards. However, opinion was divided over the feasibility of implementing rebate programs in Thailand.

Rebates were seen as problematic for two reasons: first, some policymakers claimed that while price is an important barrier, it is not nearly as important as assumed by Western energy experts. These policymakers emphasized the need to conduct a massive public awareness campaign to spark a long-lasting cultural shift in Thailand toward energy efficiency. Another reason that rebates do not have full support among Thai policymakers was political: rebates were seen by some as politically untenable because of the wide income gap between the generally rich consumers in Bangkok and the poor farmers and villagers who would not benefit from most rebate programs.

Despite an outward appearance of interagency coordination, the interviews revealed a sometimes uneasy truce between the three agencies responsible for implementing Thailand's ambitious energy-efficiency programs. The potential for overlap and confusion arises at the intersection of the commercial and residential sector DSM programs, operated by the Electricity Generating Authority of Thailand, with

the Department of Energy Development and Promotion's program, which mandates all large buildings and factories to implement energy-efficiency plans.

While most of the Thai policymakers recognized the importance of evaluating program effectiveness, their responses indicated a lack of in-depth understanding of the type of data needed to perform proper evaluations. Several policymakers noted that the lack of baseline data on the appliance market as well as ongoing data on appliance production and sales would hamper evaluation efforts. Most of the policymakers focused on the need to conduct impact evaluations – that is, on just measuring how many kilowatts or kilowatt-hours were saved as a result of the program. Only three of the policymakers described the need for process evaluations in order to get feedback on the mechanics of the program operation and on customer awareness, attitudes, and response.

CHAPTER 5

APPLIANCE RETAILERS

Chapter Abstract

This chapter explores the retail environment where appliances are sold. It discusses my findings based on participant observation at a retail appliance store in the U.S. and semi-structured interviews with 67 salespeople in the U.S. and Thailand. I found that salespeople exert a significant influence over the final purchase decision in roughly half of appliance purchases. With the exception of air conditioning, salespeople have no incentives to sell energy-efficient appliances. To the contrary, their primary incentives are to sell larger units that use more energy. The concept of energy efficiency appeared to be significantly more salient in the Thai retail environment, and the energy label appeared to be much more of a selling point for retailers. Thai salespeople reported that nearly two-thirds of their customers asked about or looked at the energy label; the corresponding figure for the U.S. was 20%. It is also apparent that due to the time constraints on each sale and the large number of criteria being evaluated, consumers spend very little time reading the label.

Introduction

This chapter reports the findings of my study of U.S. and Thai appliance retailers. It addresses a number of questions intended to further understanding of the consumer purchase environment. The topics I pursued included the role of the salesperson in the decision-making process; identification of salesperson incentives and how these affect their motivation to sell energy-efficient appliances; salespeoples' perceptions of consumer purchase priorities; the salience of energy efficiency in the sales transaction; and consumer and salesperson understanding of, and use of, the energy label.

In my study of the retail environment in the U.S. and Thailand, I used a combination of techniques. In the U.S., I conducted semistructured interviews with 14 salespeople. I spent two weeks in December 1996 working as a "sales trainee" at a New Jersey branch of Acme Appliances (a pseudonym), a regional appliance chain covering the eastern U.S. I interviewed three corporate managers in the retail appliance industry: a vice-president at Acme Appliances and two senior appliance buyers, one each at two of the top-three U.S. appliance retailers. In addition, one of the companies allowed me to review proprietary market research data, which it uses to assess market trends and consumer preferences. In Thailand, I conducted semistructured interviews with 53 salespeople. I also interviewed the marketing director of one of Thailand's major appliance manufacturers. I reviewed the catalogues of all of the major Thai air conditioner manufacturers to assess the salience of energy efficiency in their promotional literature. Details of the methodology used were discussed previously in Chapter 3.

Overview of the Salesperson Samples

The U.S. appliance market is dominated by three major national retailers, Sears, Circuit City, and Montgomery Ward. Appliances are also marketed by computer and electronics superstores such as Best Buys and Nobody Beats the Wiz, but for these stores appliance sales accounts for a small percentage of their total turnover. There are also a number of regional appliance chains as well as local appliance retailers with just one or two locations. In the U.S., I studied one national retailer (Electric World, a pseudonym) and one regional appliance chain (Acme Appliances, also a pseudonym). I conducted semi-structured interviews with 11 salespeople at four stores in New Jersey and Delaware — two branch stores of Electric World, and two branch stores of Acme Appliances.

In Thailand, we divided our Thai sales interviews between shophouse (small, usually family-owned) stores (60%) and department stores (40%).[1] In department stores, there are two types of salespeople: those employed by the store and those employed by the manufacturer or its licensed distributor. The company (as opposed to the store) employees are more likely to work on a commission basis and tend to earn higher incomes than the store employees. Nearly a quarter of the Thai salespeople we interviewed were in rural districts, in order to account for the large percentage of the Thai population living in rural areas.

Table Chapter 5 .1 compares demographics and sales experience in the two countries. The U.S. salespeople I interviewed were older than the Thai salespeople (42.1 vs. 31.5 years) and tended to have more experience selling appliances (8.1 vs. 5.0 years). Compared to the U.S., a significant portion of the Thai sales force is comprised of young men or women with little schooling and/or training.[2]

In Thailand, a quarter of the salespeople earned less than US$400 per month, and half less than US$800 per month.[3] Salesperson income depends to a great extent on whether they earn a commission. While all of the U.S. salespeople we interviewed earn a commission, only slightly more than half of the Thai salespeople we interviewed earn a commission.

[1] The Thai appliance market is divided between two types of stores: shophouse stores and department stores. Over the past decade, the overall growth in department stores has been phenomenal, both in Bangkok and upcountry, and they have gained an increasing share of rapidly growing appliance sales. Yet shophouse stores still retain the vast majority of the market. The most common type of shophouse store is a family-owned business run out of the first floor of a typical Chinese-style shophouse building, in which the family that operates the store lives on the upper floor or floors. In some urban areas (such as the Prakanong area in Bangkok), there are concentrations of appliance stores, and these are generally known by consumers as good places to go shopping for appliances. Some of the shophouse retailers have taken over entire buildings, expanded to multiple locations, and branched out to sell a range of products including furniture, motorcycles, cars, and in some cases, even real estate.

[2] One marked difference between the samples is the lack of females in the U.S. sample. Female salespeople are rare at U.S. appliance stores, and at the four stores I studied, I encountered just three female salespeople, and one of these sold just electronics and stereo equipment (brown goods). Unfortunately, due to problems with scheduling, I was unable to interview either of these two appliance saleswomen. In Thailand, female salespeople are more prevalent, and more than one-third of my sample was female.

[3] Average family income in Thailand is about US$940 per month. This is based on per-capita GDP of US$2,830 (1995) and average family size of 4 people.

Table Chapter 5 .1. Comparison of Demographic Information on U.S. and Thai Salespeople

	U.S. (% of 14 respondents)	Thailand (% of 53 respondents)
Gender		
Male	100	62
Female	0	38
Age: ave. (range)	42 (28-57)	32 (17-52)
Years experience selling appliances: ave. (range)	8.1 (2-27)	5.0 (0.1-20)
Education: ave. (range)	15 (12-21)	12 (4-18)
Monthly income (N=45)		
< US$400	na	27
$400-$800	na	27
$800-1,200	na	24
$1,200-$2,000	na	16
$2,000-2,800	na	6.7
Urban/rural split		
Urban	na	77
Rural	na	13
Type of Store		
Shophouse store	na	60
Department store	na	40

Notes: na = not applicable. Since the U.S. interview format was modified to suit the Thai context, not all questions were addressed in both countries.

Sales Views

U.S. sales views on appliance efficiency standards and labeling are shown in Table Chapter 5 .2. In the U.S., nearly all of the salespeople (13 of 14) were aware of the national minimum efficiency standards for appliances. Ten of 14 thought the standards policy was appropriate, two were not sure, and two said the policy was inappropriate. Since my research focused on the role of the energy label in the sale of appliances, I also asked about the EnergyGuide labels. All of the salespeople said that energy labeling for appliances was an appropriate policy, and nearly all of them (eight of the nine salespeople who were asked) said that they preferred the old EnergyGuide label to the new EnergyGuide label, which has been phased in over the past two years.

Thai sales views on appliance energy labeling and the environment are shown in Table Chapter 5 .3. When asked a general question as to whether they were aware of the government's energy conservation programs, most of the Thai salespeople (58%) said yes. Five out of six (87%) of salespeople said that they felt that the energy labeling program was effective. Three-quarters of the respondents said that buying an appliance has an impact on the environment, and of these, 83% mentioned CFCs as the primary environmental concern.

Table Chapter 5 .2. U.S. Sales Views on Appliance Efficiency Standards and Labeling

Question	% of 14 respondents
Are you aware of U.S. minimum energy efficiency standards for appliances?	
Yes	86
Not sure but assumed they existed	7
No	7
Do you think minimum standards are an appropriate government policy?	
Yes	71
No	14
Not sure	14
Is the energy labeling program appropriate	
Yes	100
No	100
Do you prefer old label or new U.S. EnergyGuide label? (N=9)	
Prefer old label	89
Prefer new label	11

The Sales Environment

As articulated by salespeople in both countries, the overriding goal of a salesperson is to listen closely to the customer and to sell them what they want to buy. The commonly voiced theme in our interviews was the need to strike a balance between serving the customer's needs and selling the products that make as much profit for the store (and the salesman) as possible. These comments by a Thai salesman reflect that balance — his motivation to get them to look at products with additional features, while not denigrating the quality of a product the customer was initially looking at:

> Once they say they're interested, then the sale really begins. We need to either sell them the unit they came to look at or the unit that we want to sell them. After they've looked at the products, I will talk about the good aspects of the product that they looked at. There are good points and bad points, and I will explain them. Then, I have to find a way to persuade them to look at another product. Sometimes, the quality is a little worse, or the brand has a little less promotion, but we have to talk about both the weaknesses and the strengths of the product before we sell it, you see? *But we can't attack the product that they came to look at.* [Emphasis added.] They won't buy it from us. They'll think we are liars, or that we are exaggerating (Thai sales interview no. 10).

Table Chapter 5 .3. Thai Sales Views on Appliance Energy Labeling and the Environment

Question	% of 53 respondents	
Aware of Thai government energy-efficiency programs (N=31):		
Yes	58	
No	42	
Is the energy labeling program effective? (N=15)		
Yes	87	
No	13	
Does buying an appliance affect the environment? (N=50)		
No	20	
Don't know	6	
Yes	74	
Of which:		
mention CFCs		83
mention pollution		8
mention recyclability		3
Able to correctly explain how CFCs affect the environment (N=23)		
Yes	44	
No	57	

In general, products with more features have a higher retail price and make more profit for the store and the salesperson. Yet salespeople must learn to "push" their preferred products with a *legerdemain*, so that the customers do not feel as if they are being unduly influenced. In controlled experiments with refrigerator buyers nearly 20 years ago, Redinger and Staelin (1981) observed the paradox of unrecognized (by the consumer) salesperson influence in the purchase decision: while the researchers observed that salespeople appeared to have a large impact, this influence was discounted by consumers, who indicated very little salesperson influence over product selection. Yet the reality of retailing is that products with new and additional features make more money for the store; these are the products that the store management wants to sell and which salespeople must promote in order to do well.

> If there are five products, and there's a basic product that pays 50 cents, and then there's a better basic product that pays a buck and a half, and then there's a mid feature product that pays five bucks, and then there's a fully featured product that pays 10 bucks, you need to understand what those different feature packs are and what the commissions are that go along with them, and how you encourage people to buy the fully featured product and why. I mean, you have to understand the reasoning, and you have to do it with the right amount of pressure. If you push people too hard, they get a negative feeling of the shopping experience, And if you don't push them hard enough, then you get a negative feeling in your pocket (U.S. sales interview no. 14).

These comments explain the dilemma faced by manufacturers and retailers who want to "push" energy-efficient products. First of all, energy efficiency is a feature that can be added to product, but it is often invisible to the consumer and difficult to sell. And second, with the exception of air conditioners, the value added for energy efficiency is much less than that for most other features (e.g, glass shelves and through-the-door ice for refrigerators, sealed burners for stoves), which yield a higher unit profit for both the manufacturer and the retailer.

The salespeople we interviewed said that they are able to apply subtle pressure only after establishing a rapport with the customer and overcoming the negative connotations that many customers have, especially in the U.S., of salespeople as pushy and not trustworthy. One of the other U.S. corporate managers described the balance as a fine line between being a pushy shark and being an aloof, non-caring salesperson:

> The biggest thing salesman has to do is to quickly break down the defenses and fences that go up on the customer from walking into a store in our industry. The industry still has a reputation of sharks. It's an unbelievably hard job. Because I just think it is so hard to bust your ass and walk away with no money one day … And I've seen how good they [salespeople] can be. They can both get what they want, which is sell the product that they choose to sell and make money on, but they truly believe in it and they can give the customer what they want too. But it's a fine line between selling what the customer wants and giving them what you want to sell them. It's hard. I mean, if I'm on them in less than ten seconds I'm a shark. And if I wait more than a minute, we don't care. It's really tough. It's a fine line (U.S. sales interview no. 13).

Influence of the Salesperson

I found a strong level of confidence among salespeople in both countries that they could influence the majority of customers and affect the purchase decision. Apparently, the need to walk the "fine line" does not prevent salespeople from being able to successfully (in their eyes) push the products that they want to sell.

These parallel comments from a junior Thai salesman and a U.S. store manager reflect the strong self assurance of the majority of salespeople we interviewed:

> If we want to persuade the customer buy another product, we can do it. If we want a customer to buy the no-name brand, we can do it. It depends which product we promote. We can compare the two products and tell them that everything is the same, the quality, the guarantee, just that it's not a name brand. Or if we want to sell them the Sharp [i.e. the brand-name model], we can. It depends on our technique and the way we talk to them (Thai sales interview no. 19).

> How much influence [do salespeople have in the purchase decision]? … [He whistles.] Tons of influence. A salesman usually has a very large impact on what the customer buys. Not always, but for at least 50 percent of them, they'll buy what the salesman recommends most of the time … if you do a good job. You know, that's what

> separates a good salesman from a bad salesman. Some people come and they want just the one in the ad. And a lot of those people can even be shown something better … If they [customers] don't like their salesman, and they really like the product, they probably won't buy. If they love their salesman a lot, and they're iffy on the product, they may actually go ahead and buy the product because they like the salesman (U.S. sales interview no. 4).

I reviewed proprietary market data that addressed the topic of salesperson influence. The researchers measured salesperson influence in appliance purchases by asking consumers of different appliance types about the role of the salesperson in the purchase. They found that generally, salesperson influence is higher for audio and TV/video products (~60-90%) than for white goods (~30-50%). Nonetheless, for most classes of white goods, salesperson influence was estimated to be significant and often greater than 50%. Table Chapter 5 .4 summarizes the results of the survey. Salesperson influence appears to be highest for products such as mid-priced refrigerators and heavy-duty washer-dryers, where the salesperson can "sell" the benefits to the consumer of purchasing models with additional features.

Table Chapter 5 .4 Salesperson Influence in Sale of White Goods in the Northeastern U.S.

Type of product	Typical length of sale	Estimated amount of salesperson influence	Comments
Refrigerators	18-45 minutes	33-75%	Influence was least (33%) for promotional refrigerators, and most (75%) for mid-priced models
Washers and Dryers	12-45 minutes	20-60%	Influence was least (20%) for Maytag models, and most (60%) for extra-heavy-duty models.
Dishwashers	35 minutes	55-60%	Not as much data available for dishwasher sales

Source: proprietary market research from a U.S. appliance retailer

Sales Approach

Several of the questions in the semi-structured interview protocol attempted to discern whether salespeople used special techniques or heuristic devices to categorize and influence customers. These questions included, "Can you tell up-front whether a customer will make a purchase here today?" and "Do you 'type' customers into different categories?" For the vast majority of customers the answer to both of these questions was no. Most of the salespeople said they treated each customer as an individual and responded to their individual concerns and needs. One Thai saleswoman warned of the danger of making assumptions based on appearances, saying "Really, we can't do this [categorize customers], because you can't tell by looking at the customer. You can't tell by looking at their clothes or their face.

Some guys come in here wearing casual clothes, just shorts, and will spend more than 100,000 baht (US$4,000) on appliances!" (Thai sales interview no. 2)

However, at Acme Appliances, we found a core of salespeople who had been trained at another regional appliance chain (their former employer) in the psychology of sales, and had learned to slightly adjust their sales approach in order to establish better rapport with different types of customers. These customer types are described by one of the store managers in Table Chapter 5 .5. These five categories are similar to the four categories described by Westbrook and Fornell (1979) 20 years ago and discussed in Chapter 2.

Table Chapter 5 .5. One U.S. Store Manager's Description of Customer Types and How They Are Used by Some Salesmen

Customer Type	Description of Category
Achievers (also called "status seekers")	"You know, like the high-fallutin types that know what they want, they want the best one. 'Hey, where's your best washer at?' There's a different type of sales pitch you can use, and I use this example, 'Can you afford this washer?' 'Yeah.' 'Alright, well get it then. This is the easiest choice, this is the best one, you can afford it, so you wanna get this one.' You know, with TVs, I'll say, 'this is the biggest and the best.' And that's how you sell to someone. You don't have to explain to 'em what it has — just hammer away that it's the best, and that'll make them buy it."
Cynics	"These are the folks who come in with all the magazines. You want to make sure that you stick to factual information."
Comfort Seekers (also called "Wishy-Washy People")	"They're the ones where you say, 'Yes sir, you're making the right decision.' Now those are the people who are going to want to see literature or owner's manuals, and they may not buy the first time in. Those are usually the hardest ones to deal with. You have to be very, uh, like sympathetic, 'Oh, I'm sorry your washer broke.' And 'What's the warranty on this?' and 'What don't they cover?' They tend to comb through details and owner's manuals."
Sociable People	"These are the ones that have to like their salesmen. They come in, and they'll tell you about their job, their car, 'Oh, I'm buying a TV. I'm putting it in this new winter home I got. It's got this, it's got this.' And all you gotta do is listen to their stories, and a lot of times those type of people you just gotta make small talk with."
Low Reactor Types	"They'll wander the store, look at everything, then they'll come grab you and say, 'I want to buy this and this.' They like to make their own decisions … they're the low reaction type people, you have to identify, they just don't like talking to people. Whatever you do, no matter how charismatic you are, they're not gonna talk to you."

Source: U.S. sales interview no. 4

The store manager described how he uses these psychological rules to help him deal more effectively with his customers:

> So as a salesman, if you can identify that not all customers are the same — I think the best salesman is a salesman that doesn't sound like a salesman. You know, find out what kind of person you're dealing with. And that's psychology … Naturally, I've made it very over simple, there's more than that. You can even have combinations of both. You can have people that are social, but they want the best. So that would make them a combination of sociable and achievers. You know, there's a whole zillion different categories (U.S. Sales interview no. 4).

During my two-week tenure as a sales trainee at Acme Appliances, I developed a lexicon of salesman slang and shorthand terms used by the salesmen among themselves (see Table Chapter 5 .6). As in other subcultures, the special lexicon reflects the primary concerns and the items of discussion among salespeople.

Table Chapter 5 .6. Lexicon of Appliance Sales Terms

A.D.V. – advertised model. These are sold at a low sticker price in order to attract customers to the store. Generally salespeople would greatly prefer to sell a "push" piece, as compared to an A.D.V. piece, since their commission will be higher on the former.

bad hair – a general term used to cover a multitude of situations when things go wrong, such as when a customer returns an appliance, when a warehouse cannot fulfill an order on the date promised, or any sort of customer complaint. A commonly used term was "Today is a bad-hair day."

boater – fishing term, someone who buys the whole ball of wax, tag & 10.

brown goods – these are electronic devices, stereo equipment, and TVs, as distinguished from white goods, which are kitchen appliances

close (also called "bang") – to complete a sale. There are a number of ways of closing, some aggressive ("When would you like that delivered?") and some more subtle ("Would you like me to check and see if we have that in stock?")

cank – shorthand for "cancel." When someone canks, it is bad hair.

cheese (also called "air") – see warranty

chisler – similar to tire kicker; someone who keeps chipping away to get the best deal

clem – clearance model, that is a model that is on sale and that the store wants to sell to reduce their inventory. Generally, salespeople would prefer not to sell clems, since they make little commission on them.

landing – what a customer does when they settles in on a product he is interested in. One customer came in and Mike said, "I'll wait until he lands. He is still cruising around looking, he hasn't landed yet" (like a bird)

laydown – a customer who is a pushover; who will "lay down" and buy at tag & 10 without trying to negotiate or cut a better deal

leader – loss leader, an item with little or no profit margin that are sold at a low sticker price in

order to attract customers to the store

major – the major appliances are refrigerators, freezers, air conditioners, dishwashers, clothes washers and dryers, ranges, and ovens.

MAP – minimum advertised pricing. For licensed dealers of brand-name products, this is the minimum amount at which a product can be advertised. This limits the retailers flexibility in advertising sales and specials and is carefully policed by distributors.

N.L.A. – no longer available.

Push piece – a high-profit-margin piece that the store and salespeople want to sell (as opposed to an A.D.V. piece, the purpose of which is to attract shoppers to the store)

points – a term used to describe the percentage above a store's cost

service – an extended service plan sold by the store which typically extends the manufacturer's one-year warranty to three or five years. Selling "service" is essential for a salesperson to do well and make a good income.

seven-second test – used by salespeople as a rule of thumb for ease of explaining something to a consumer. If a feature cannot be explained or easily understood within seven seconds, the salesperson is likely to lose the customer's interest.

spif –a fixed, per-unit amount that is paid indirectly by the manufacturer via the store to the salesperson. Spifs tend to be larger for more expensive items. One saleperson described the spif as "basically a kickback from the manufacturer for selling their product."

step up – persuade a customer that they should buy a high-value product with additional features and conveniences, compared to the one they came in intending to purchase. The unit will cost more for the consumer and will yield a higher commission for the salesperson.

strapper – strappers are not loyal customers. They come into to the store and try to get as much information as they can, without any real intention of purchasing. The name comes from the word for an Australian cowboy.

tag and 10 (also called "T and T") – means you sell the appliance at the full price on the sales tag (no further discount) plus 10 years worth of warranty.

tire kicker – someone who isn't really serious about buying, but asks a lot of questions and grills you for information.

warranty – this is an extended service plan to provide additional protection in case the appliance fails beyond the usual one-year manufacturer warranty. It provides additional commission to the salesman on the same appliance. Also referred to as "cheese," "air," "CPP" (customer protection plan, Silo Co. usage), or "MAS" (maintenance and service, Sears Co. usage).

white goods – the full range of kitchen appliances. Excludes air conditioners.

The salesman are motivated to try to avoid selling the "leaders" or the "A.D.V." pieces and instead "step up" customers to convince them of the extra convenience they will receive from buying a more expensive "push piece" that has additional features and benefits. The ideal situation is to sell a "push piece" at "tag and ten" (i.e. sell a high-profit model at list price with ten years of service). None of the slang terms that I learned while at Acme Appliances related to energy efficiency or reduced operating costs. This reflects the fact that, with the exception of air conditioners, energy efficiency is not a significant issue of discussion among the sellers of white goods.

Salesperson Training and Incentives

Table Chapter 5 .7 compares training and incentives for appliance salespeople in the two countries. A major difference between U.S. and Thai retailers was a greater emphasis in the U.S. on training and keeping up to date with product knowledge and developments. All of the salespeople at the four stores received more than three days per year of ongoing training. At Acme Appliances, salespeople spend 10-15 days each year (one day every other week during the off-peak periods, August to November and February through May) in product training courses at the headquarters. These training sessions are usually led by equipment suppliers and cover the latest developments in their product lines and in the product area generally. At the national retailer, they have formal training for all new salespeople at the corporate headquarters, which lasts about a week. After that, they have two types of ongoing training, usually on a weekly basis, at the stores: presentations by vendors, and also cross-training between the salespeople at which they share their experiences. The other national retailer, for which I interviewed the senior buyer for refrigerators, has a mentorship program in which new salespeople are paired up with another salesperson for their first four to six weeks. After that, they have a regional seminar about once a year for major product groups to talk about developments in the product and share sales experience.

Table Chapter 5 .7. Salesperson Training and Incentives in the U.S. and Thailand

	U.S. (% of 14 respondents)	Thailand
Amount of training [a]		
No training	0	40
Initial training only	0	21
Less than 3 days/year	7.1	26
More than 3 days/year	93	13
Do you receive a commission on sales?[b]		
Yes	100	54
No	0	46

[a] N=38 Thai respondents for this question
[b] N=24 Thai respondents for this question

In Thailand, the training is less formal and less extensive. Compared to the U.S. salespeople we interviewed, nearly all of whom had more than three days training per year, only 13% of the Thai salespeople received more than three days training per year. At shophouse stores, there is usually no formal training, and most of the learning occurs as mentoring between the owner or manager and junior salespeople. Occasionally, salespeople attend local product seminars by distributors held at a hotel or conference center. Department stores generally have a structured training period, during which the new employees wear “trainee” badges for several weeks while they learn the systems and procedures of the store. And they also tend to have more ongoing training from appliance distributors over the course of a year. The company employees tend to have more regular training on their manufacturer’s new products and technologies.

In neither country, did I find any incentives relating to the sale of more energy-efficient equipment.[4] In the U.S., all of the salespeople whom I interviewed worked on a commission basis and at all four stores, the sale of extended service was the largest single component of salesperson commission income. In contrast, in Thailand, slightly over half of salespeople worked on a commission basis.

Incentives at Acme Appliances

At Acme Appliances, I observed the constraints on the price at which a retailer can sell an appliance. One is set by the manufacturer, and is the minimum advertised price, or MAP, of a product. In essence the manufacturers cannot control the price at which the retailer sells the product, but they can penalize, or even terminate, the retailer for selling a product below MAP. Acme Appliances strongly discourages its salespeople from selling any appliance at less than 15% above the cost to the store.

An actual transaction can be used to demonstrate how this works. A couple who had shopped for price at a nearby appliance store, came into Acme Appliances and looked at a Kitchen Aid dishwasher with a sticker price of $609. The customer tried to bargain down the price, saying that the neighboring store had the piece on sale for $559. The salesman, James, said "Let me see what I can do, let me talk to the store manager." James found out that Acme Appliances' cost was $490. He explained to me that he knew right off the bat that with a $609 sticker price he would be hard-pressed to sell it for $559. The way he calculates whether he can sell it is whether it is 15% (also called 15 "points") above their cost. James has strong incentives not to sell anything below 15 points, because below 15 points, his commission drops from 2% to 1% of the value of the sale.

James worked out the example for me. He said that on this Kitchen Aid dishwasher, 15 points (i.e. 15% above his store's cost) would be $571. So he quoted the couple a price of $589, because he didn't want to go below the 15 point level. If he had been able to sell the dishwasher for $589, he would have made a total of about $22 — $12 commission plus a per-unit fee, called a spif, of $10.[5] If he sold it for less than 15 points, he would be penalized twice: first, he would make only the commission, and no spif; and second, his commission rate would drop from 2% to just 1%. Thus if James had sold the dishwasher at $559, he would have only made 1% on $559, or $5.59. He said that not only wasn't it worth it for him to sell at that price, but the company questions you when you sell products below 15 points.

In this case, James lost the sale. As it turned out, the couple had initially been shopping for a Whirlpool dishwasher that sells for $400. After comparing different products, they decided to "step up" to a substantially higher-quality dishwasher with a stainless steel tub and spend an extra hundred dollars or so. Because of this decision, they felt that they had to shop vigorously on price. They had already been to two other stores, and the extra $30 they could save by going to the neighboring store was very important to them. So James lost the sale.

At Acme Appliances, the salespeople's paychecks are calculated based on the amount of their profit margin and the amount of service they sell. The company wants you to have a profit margin of more than 15% — that is, your total sales should exceed the store's cost for those products by at least 15%. If it's less than 15%, as noted earlier, you get a lower commission percentage.

[4] This statement is true for white goods but not for air conditioners. In general, within a given size category, high-efficiency air conditioners tend to have a higher sticker price and thus yield a higher sales commission.

[5] A commission is a fixed percentage of the sale value, which is earned by the salesperson. At Acme Appliances the percentage commission rate can vary depending on the salesperson's monthly sales. A spif is a fixed, per-unit amount that is paid by the store to the salesperson. Spifs tend to be larger for more expensive items. One saleperson described the spif as "basically a kickback from the manufacturer for selling their product."

But the major incentive for the salesmen at Acme Appliances is to sell an extended service plan (a.k.a. "service"). If more than 8% of your total sales are service, then 20% of the service goes directly to the salesperson. The commission a salesperson earns from selling service is called "cheese" or "air" (see Table Chapter 5 .6). For example, if you sell a refrigerator for $800 plus a five-year extended service plan for $200, you would earn approximately about $76 — $16 on commission, $20 as a spif and $40 for the service plan. In the salesperson culture a real home run occurs when you sell an appliance at list price plus the maximum amount of service, 10 years. In the sales argot, this is referred to as "tag and ten." A salesperson may say, "I sold it at tag with ten years of cheese (or air)." According to the salespeople at Acme Appliances, you cannot really succeed unless you sell a substantial amount of service:

> In this business, my motivation is to sell service. In this company, you cannot survive without selling service. I really don't, the bottom line is I care what they buy, but I care more that they buy service, because without that, I lose. I can't stay in this business … they ought to have a better pay structure. They don't believe — the bottom line is, in order to survive and provide for my family, I've gotta sell service. and without selling service, I won't stay here (U.S. salesperson interview no. 5).

None of the incentives that I observed in the U.S. appeared to be related to energy efficiency. In fact, the incentives motivate salespeople to "step up" customers and influence them to purchaser larger products with additional features. To this extent, the incentives appear tilted toward the sale of products that use more energy rather than less.

Incentives in Thailand

In Thailand, the presence of commission and its structure varied greatly by region and by type of store. Overall, we found slightly more than half of the salespeople reported that they worked on a commission basis. The tendency to offer a commission did not vary between department stores and shophouse stores, although we found only one store in a rural district that offered commissions to its salespeople.

Many of the managers said that they used to have sales goals, but because of the slow economy and their relatively slow sales, they did not strictly track these goals.[6] The most common way of compensating salespeople was a bonus system — usually not related to sales — common for most Thai companies, whereby the salespeople are given a year-end bonus equal to one month's worth of pay. None of the performance evaluation criteria that we observed were related to energy efficiency.

The most common type of incentive we observed was a "spif". The value of the spifs ranged from as low as 0.3% of the product retail price (US$0.75 to US$1.25 on a US$250 refrigerator) to as high as 3%. In some cases, the spifs would increase to a higher level if the salesperson exceeded the quota. For the stores that offered percentage-based commissions, the commissions generally ranged from 1% to 3%. The most generous commission structure was for Singer, which sells products through its outlets directly

[6] Although these interviews took place four months before the beginning of Thailand's currency crisis, which sparked the beginning of the Asian economic crisis of 1997, many of the retailers whom we interviewed complained that sales of appliances had been sluggish for the previous 12 to 18 months.

to customers, and finances nearly all of its purchases. Singer salespeople receive a 5% commission on the sale value plus a 9% collection fee, and they are responsible for collecting the monthly payments from the customers.

The sales incentives can also vary by product and manufacturer and may not be based just on the price of the unit. For example, I asked one Thai shophouse salesman if he would generally get a larger commission for selling a more expensive product.

> No. It depends on the manufacturer and which products they are selling a lot of. For instance, if we get 100 Toshiba units, we'll get a lot of commission for selling Toshiba. It depends on the company and what sales goal they set (Thai sales interview no. 10).

As in the U.S., the incentives in Thailand are geared toward selling larger, higher-value products with more features that tend to used more — not less — energy. In Thailand, because many of the salespeople are employed by a brand distributor rather than the retail store, there is also a strong incentive to sell models produced by a particular manufacturer. We observed no incentives related to the sale of energy-efficient equipment. As in the U.S., the exception to this rule was for air conditioners. Within a certain size category, salespeople have an incentive to sell higher efficiency air conditioners that tend to pay a higher commission.

Consumer Priorities

Past research in the U.S. has shown that, despite years of campaigns and nearly two decades during which energy labels have been prominently displayed on U.S. appliances, energy use is not a high priority during the typical consumer's decision-making process (Dyer and Maronick 1988; and du Pont and Lord 1996). Understanding priorities in consumer decision-making is difficult, since these priorities may be unspoken, may vary between the two (or more) purchasers, and may be biased in the reporting. One such problem, bias in self-reporting of energy as a priority (the Hawthorne Effect) was discussed in Chapter 3. Below, I report the results on consumer priorities gained from my semi-structured interviews, as well as from my two-week participant observation at Acme Appliances.

Table Chapter 5 .8 shows the ranking of the top purchase criteria for the U.S. The table has two columns of results. The left column shows the priorities as reported by the salespeople whom I interviewed. The right column shows the results from my two weeks of participant observation as a sales trainee at a New Jersey appliance store.[7] During the two weeks, I was able to rank consumer priorities based on my detailed observation of 25 appliance sales.

The different results between the two columns in Table Chapter 5 .8 have to do with the method of data collection. I feel that the results from the participant observation are more reliable and accurate, since they represent a record of what was actually observed on the store floor at the time of the sale. In the salesperson interviews, they responded to a question about priorities in the abstract, based on their experience. Their responses indicate a common view among the salespeople that feature, price, and size were they key priorities. In my observation of actual purchase decision cases, these three were indeed most important, but price (mentioned in 23 of 25 transactions) and features were way ahead. Size, color and other (financing, availability, quality) were the next most important.

[7] The results of this participant observation are described in Chapter 7.

Table Chapter 5 .8. Ranking of Consumer Purchase Criteria Based on Interviews with U.S. Salespeople and Participant Observation (Major Appliances, Excluding Air Conditioners).

Purchase Criterion	Interviews with 14 salespeople (% in top 3)	Participant observation of 25 sales (% in top 3)
Features	64	80
Price	57	92
Size	43	32
Energy efficiency	7	4
Brand	7	8
Quality	7	0
Durability	7	0
Appearance	7	0
Guarantee	7	0
Other	7	16
Finance	7	4
Delivery	7	0
Color	0	24

Table Chapter 5 .9 summarizes the Thai salespeople's perceived purchase criteria. In Thailand, I had no participant observation to compare with the salesperson perceptions, so Table Chapter 5 .9 is best compared with the first column in Table Chapter 5 .8. There are several obvious differences in the results between the two countries. In the U.S., features (64% of salespeople mentioned it, and in 80% of sales I observed it) were mentioned much more frequently than in Thailand (just 23%). At the same time, brand (7.1% and 8.0%) and efficiency (7.1% and 4.0%) were mentioned much less frequently in the U.S. In Thailand, brand was mentioned most often as a top priority (56%). Energy efficiency (49%) was the second most frequently mentioned criterion.

When I asked salespeople in both countries about priorities, it was clear that price was not really a priority in the purchase decision, but more of a boundary. In their explanations of consumer priorities and decision-making, salespeople from both countries indicated that, while consumers might have a price range in mind, this was not *the* determining factor and did not eliminate many tradeoffs between various features on the models that they were comparing. One U.S. salesman described the price barrier that many customers begin with and his strategy of trying to "step up" customers to more expensive models with more features:

Table Chapter 5 .9. Ranking of Consumer Purchase Criteria for Refrigerators Based on Interviews with Thai Salespeople

Purchase Criterion	Percent
Brand	56
Energy efficiency	49
Size	30
Price	28
Quality	21
Durability	23
Appearance	23
Features	23
Guarantee	12
Color	12
Other	9
Finance	7
Delivery	0

> I would say that most of the time they're looking at a price range, and the price range restricts the features that are available to them. So sometimes what I try to do, if they're not aware of features, is show them the top of the line product, because that usually has all the features, and they can decide from there which features they want to pay for and which they don't (U.S. sales interview no. 8).

U.S. salespeople stressed the need to deliver perceived value. One salesman referred to it as saving consumers time and providing them convenience. Another stressed the fact that he tries to sell features rather than price: "I try to express features and benefits, rather than price, because any salesman can drop price. You can have a monkey standing in the store [dropping the price] …" (U.S. sales interview no. 6).

In Thailand, refrigerators tend to be simpler (single-door, 4-6 cu. ft. models make up 60% of sales) and there are fewer convenience features to distinguish one model from another. This is probably the explanation for why features were ranked much lower than in the U.S. The type of convenience features mentioned most often by Thai retailers were automatic defrost, semi-automatic defrost for refrigerators and air filters and remote control for air conditioners.

While my U.S. research suggests that there is less brand loyalty in the U.S. than ten or 20 years ago[8], brand clearly plays a major role in decision-making for Thai consumers. First, the marketing of appliances in Thailand is driven much more by television than in the U.S.; Thai consumers are bombarded with advertisements from the different appliance manufacturers each night on TV. The Thai retail environment also lends itself to brand identification. Department store displays are typically set up in sections, divided by brand, so that the Sharp refrigerators are displayed in a separate area from the

[8] My conversations with salespeople suggested that strong brand loyalty is less prevalent in appliance sales than it used to be. In a proprietary market study conducted for Acme Appliances, 30% of respondents replied "no brand" when they were asked, "Does any one appliance brand first come to mind?" Another market study for Acme Appliances found that appliance sales are more brand-driven than three to four years ago.

Mitsubishi, National, and Toshiba models. And as mentioned earlier, the salespeople are just as likely to be employed by the brand distributor as by the store itself. Thus, they often tend to promote the unique advantages of their particular brand over other brands and to discourage a customer from choosing as freely between different brands.

Salience of Energy Efficiency

The results of my sales interviews and participant observation in the U.S. and Thailand make it clear that the energy efficiency of the products is a more salient issue in Thailand than in the U.S. One salesman, indicating that the energy label has become a clearly identifiable product feature, described how brand and energy efficiency play out as the two most common criteria sought out by customers:

> Every customer, they walk through and look at the products first. They ask, "What brand is this? Do you have Whirlpool? Do you have Sanyo?" Then they see the labels on the refrigerators and ask "What number is this? You don't have number 5 for this brand? This brand only has 4?" Then they change their mind and look at this other brand. But a lot of people who come in and want a particular brand, there's not that much difference (Thai sales interview no. 32).

In contrast to Thailand, where energy efficiency, as embodied by the number 5 label, was discussed by the vast majority of salespeople as an important and tangible criterion, in the U.S., the quality or property of being "energy efficient" was often not clear to either the customer or the salesperson and was described by one U.S. consumer as a "gray area." Most of the factors involved in the evaluation and purchase of an appliance are discrete and easily understood. Some of these factors include the size, volume, price, available financing options, and features such as glass shelves and side-by side doors (for refrigerator-freezers); sealed burners and self-cleaning capability (for ovens); and a stainless steel tub and three-level wash (for dishwashers). A salesman from Acme Appliances explained the intangibility of energy efficiency:

> Basically, you're not selling a refrigerator on energy consumption. You're really selling it on features and benefits to the customer. The only reason I tell you that we will start to explain to them that it costs more to run is because they're entitled to know that. Otherwise, if you didn't explain that to them, they wouldn't know. I mean, that tag does not say on it "This costs more to run than a top and bottom." I mean, nothing's that explicit. So the consumer, only through the salesperson, will know that it costs more. And refrigeration is bought on features and benefits. What does it have. What does it do for me? How does it make my life easier than the one I own now (U.S. sales interview no. 2).

During my two-week participant observation, energy efficiency was not a salient characteristic in discussions among salespeople or the actual sales transactions. In the 25 sales that I closely observed, efficiency appeared to be an important decision criterion in only one case, and the salesmen rarely

referred to the EnergyGuide label. In only three cases, all with the same salesman, was efficiency used as a selling tool. Below I describe three cases I observed, representing a range of typical situations. In only one of them was energy efficiency an issue.

Energy-efficiency as an unnecessary, complicated, or expensive feature. In one case, an elderly woman spent a long time shopping for a dishwasher at Acme Appliances and couldn't make up her mind. She asked about a Frigidaire dishwasher listed at $219 (4 cycles, 24"). The salesman, Tom, tried to "step her up" to a higher-priced model, a White Westinghouse unit on sale for $244 (5 cycles, 24"). He claimed that it was an "Energy Saver," and that it used half as much energy as the Frigidaire.[9] At first the woman replied, "Oh, I don't need that," about the Energy Saver. The woman seemed disinclined to get a unit with extra features and buttons. She wanted to get something cheap and simple, and the fact that there are a lot of buttons made her feel like she was paying more for features she didn't need, even though she was getting a very good price, $244. Her initial inclination had been to think that the "Energy Saver" was just another button or another feature that would add to the cost of the unit, so she did not want it. But then Tom explained to her how it saved energy (lower water usage and booster water heater). After hearing the benefits explained in terms of reduced operating cost, she decided that she wanted the feature, and said "Oh, energy saver, that's good."

Energy efficiency ignored by salesman because not among customer's primary concerns. A well-dressed businessman named Chris came into Acme Appliances to buy a refrigerator-freezer for his girlfriend. He said that the existing unit, which has a top-mounted freezer, works fine, but she doesn't like it and has been "bugging" him to buy a new one. They just bought a new house. Chris said that since the existing refrigerator is brown and the other appliances in the kitchen are black, getting a black refrigerator was the most important criterion, followed by the convenience of the features. Chris spent most of his time comparing three side-by-side models, outlined in Table Chapter 5 .10.

All three models were side-by-side models with through-the-door ice and water. After twenty minutes of looking them over and discussing the details with the salesman, James, Chris said he preferred the Frigidaire to the other two models because he liked the look of the inside, the shelving arrangements, and the design of the door handle. The energy use was apparently an invisible feature. Although the Frigidaire had the highest energy use, he never looked at the label and didn't consider that. James never pointed out the fact that the Amana would cost $16 less per year to run (about $28 less per year in that area of New Jersey), and Chris never even considered energy use in his decision.

Table Chapter 5 .10. Comparison of Size, Price, and Operating Cost among Three Refrigerators

	GE Profile	Frigidaire Gallery	Amana
Size	21.6 cu. ft.	22 cu. ft.	21.8 cu. ft.
List Price	$1,399	$1,349	$1,399
Operating cost	$74/year	$76/year	$60/year

[9] The White Westinghouse had a label on the outside that showed 624 kWh/year and had listed operating costs of $54/year for electric and $30/year for gas. The Frigidaire did not have a label either on the outside or the inside (most dishwashers at the store had the labels sitting on the interior racks), so I could not tell if Tom's claim was true. I suspect it was an exaggeration.

Energy-efficient unit selected even though efficiency "invisible" to customer. I also observed a case in which a customer bought the highest efficiency model in a size category without even being aware of it, because he was focusing on other criteria. A man who came in looking for an almond-colored, top-mounted refrigerator-freezer. He needed a model within a certain price range and, without any assistance from a salesperson, chose a Kitchen Aid unit for $699. He pulled the price tag off the front of the unit and started walking to the front of the store to pay for it. When I pointed out that he had purchased an energy-efficient unit, he said, dismissively, "Oh, they're all within $10-20 anyway. I then explained to him that his model was rated at $46 per year, and this was $10 less than the nearest similar model. Further, at local electricity rates, this would actually save him about $18 per year, or nearly $200 over the lifetime of the refrigerator. He thanked me for the information and seemed mildly pleased, but then went on to explain his primary, and much more pressing, concern: he wanted a new model with proper temperature regulation. In his existing unit, food freezes in the refrigerator, and if he turns the thermostat down too much, food melts in the freezer.

Commenting on the lack of salience of energy efficiency, one of the U.S. corporate managers opined that marketing energy efficiency *per se* would not solve the problem. Instead, he said, it was necessary to integrate energy efficiency into the array of features offered in the entire appliance package and to make it a profitable proposition. He cited the examples of Whirlpool and Amana, and stated that these two companies had not been able to develop energy efficiency as a profitable feature in their mix of products.

> Marketing alone won't help to sell energy efficiency. It has to be packaged and sold as an additional value-added feature … Whirlpool and Amana are dropping their lines of energy-efficient refrigerators. They have emphasized this for the past few years, but found that they are not making money on these, so are going to drop them … They had energy efficiency as an additional feature in their deluxe models, but it doesn't work if you're not getting a bang out of the feature. A good feature is one you can add on for $1 and get an additional $10 on the selling price. But that's been the problem with some of the energy-efficiency features, they've been expensive to add on. You need to make a feature work for you. You need to have a good margin (U.S. sales interview no. 12).

The above comments emphasize the important point that the economics of "features" being sold (i.e. added to new models) requires a much higher return on investment than the base characteristics of the appliance. The economics that this executive is describing appear to be quite different from the economics assumed in models used to determine what are "cost effective" measures in the development of national minimum efficiency standards. Apparently, according to this U.S. respondent, who is a senior buyer for a national appliance retailer, Whirlpool are Amana are dropping their lines of energy-efficient refrigerators because they do not get a big enough bang (i.e. enough profit) from energy efficiency as a marginal feature.

Using Efficiency as a Selling Point

Our interviews revealed that efficiency is more actively used as a selling point by Thai appliance retailers than by U.S. retailers. When asked whether use energy efficiency as a selling point, more than three quarters (80%) of Thai salespeople said yes, compared to just over half (54%) of U.S. salespeople. In addition, Thai salespeople reported greater consumer interest in the energy label. On average, Thai

salespeople stated that nearly two thirds (62%) of consumers asked about or looked at the label, compared with a reported average of just one fifth (21%) of U.S. consumers (see Table Chapter 5 .11).[10]

Table Chapter 5 .11. The Role of Energy Efficiency in the Sales Transaction

	U.S. (% of 14 respondents)	Thailand (% of 53 respondents)
Estimated percent of customers who ask about or look at energy label: ave. (range)	21 (5-95)	62 (20-100)
Do you use energy efficiency as a selling point (N=39)		
Yes	54	80
No	46	21

The following comments by a U.S. salesman reflect the relative lack of importance of energy efficiency and the EnergyGuide labels on the overall sales process:

> To be totally honest with you, I think that [the EnergyGuide label] has no bearing on a purchase. I really think it has no bearing, but then you'll get that one consumer who's really involved in the yellow EnergyGuide and what it really means. But I think that, just you know — because every refrigerator is very close from manufacturer to manufacturer, like if GE's 18 cubic foot is 58 [dollars], Whirlpool's gonna be 56 [dollars] — so personally I don't think that's gonna have a bearing on a sale.
>
> *What percentage of customers might ask about it?*
>
> I'd say, it would be less than 10 percent.
>
> *And those customers who look at the label, do they really understand it?*
>
> Out of that 10 percent, maybe there's one percent that actually knows what it actually means.
>
> *Do you think the labels are effective as they are now?*
>
> Again, I really don't think so. It depends, on a small percentage basis, I would say yes. Out of 100 people looking for refrigerators, I would say less than 10 percent would actually ask the salesman to explain what this EnergyGuide is. And of that 10 percent,

[10] Since the sample of U.S. salespeople (N=14) was small, it is affected by outliers. In this case, one of the salespeople reported that 95% of customers look at the label. If this data point, is removed, the U.S. average falls from 21% to just 13%.

only one percent would actually buy because of the EnergyGuide (U.S. sales interview no. 6).

This attitude was reflected in the comments of the corporate managers whom I interviewed. One of the managers, who personally felt very strongly about the need to conserve energy, and who has committed his company to participating in the U.S. government's Energy Star Retail Labeling Program,[11] nonetheless stated that, "I mean it [energy efficiency of the product] is just not a factor when we consider what will spur sales and what won't." A vice-president at Acme Appliances, who described himself as skeptical of environmentalists and not personally very interested in energy efficiency, said that he felt that the labels were essentially irrelevant:

> From our perspective, we put 'em [the labels] on there less because it's a feature to sell than because it's the law. And as in everything in running a retail store, it's a question of compliance getting them on there. I've never heard of a customer either complaining that it was there or be happy that it was, and I'm also not sure based on the industry's reputation that they [consumers] believe what it says (U.S. sales interview no. 13).

The label is the primary vehicle for Thai salespeople to communicate that the unit will save energy and reduce operating costs. Below is a sample of responses by Thai retailers to the question, "Do you use energy efficiency as a selling point?"

> We explain to the customer that this number 5 is an important aspect of this air conditioner. Number 5 is the number that saves the most energy. It goes from 1, 2, 3, 4, and then 5, and number 5 saves the most energy (Thai sales interview no. 15).

> Yes, it's an important selling point for refrigerators and air conditioners. People will ask, "does this use a lot electricity?" Some villagers don't know that when they buy some of these appliances that their electricity bill will go up quite a bit, for example if their bill is 50 baht, it could go up to 100 per month (Thai sales interview no. 29).

> Yes. This is a very important piece of information. If a customer comes in and looks at a product, it can be a way for them to make up their minds. For example, "Is this number 5?" If it's number 4, it takes a bit longer. If it's number 5, they say, "Oh, this saves energy. This is better" (Thai sales interview no. 46).

> Yes. In almost all cases, if they see a number 5, then they take the unit. They want that brand. And if there isn't a number 5, they say, "OK, we'll take a number 4. You don't see number 3 anymore" (Thai sales interview no. 21).

[11] This program, which combines training of salespeople, point-of-purchase information, and placement of an Energy Star logo on four types of appliances, is described in Chapter 2.

Another respondent was more conservative in his assessment of the role of energy efficiency, but still referred to it as if it were a highly tangible feature:

> Well, there are other things too, like its capacity, its appearance, inside features, like a wide freezer space. The label is just one possible selling point (Thai sales interview no. 5).

Energy as a Selling Point for Air Conditioners

We also surveyed product literature from the Thai air-conditioning industry to measure the extent to which energy efficiency and the number 5 label were being used as a selling point specifically for air conditioners. One would expect energy efficiency to be a salient feature in the promotion of air conditioners, and the results indicate that this is so; however, the results also reveal how "crowded" the information marketplace is in terms of conveying messages to the consumer. Energy efficiency and air filter/cleaner were the most frequently used marketing messages, each appearing in about 40% of the product catalogues. At the same time, there were a total of 10 different advertised features that appeared in at least 25% (5 out of 25) of the catalogues (see Table Chapter 5 .12).

Table Chapter 5 .12. Summary of Sales Criteria Used in 25 Thai Air-Conditioning Catalogues

Criterion	Number of catalogues in which this criterion used as selling point (N=25)
Energy saving	11
Air/dust filter	10
Warranty/quality	8
Durability	7
Quietness	7
Small (saves space)	7
Compressor	6
Easy to clean	5
Controllable air vents	5
Very cool	5
Temperature control	4
Other	3
Humidity control	2
Appearance	3
Timer	4
Remote control	3
Easy installation	2

How the Label is Used

Based on the salesperson response reported above, the Thai label appears to be more successful than the U.S. label at clearly communicating to customers which models are the most energy-efficient. This may explain the different ways in which the label is used in the two countries. In Thailand, there is a high level of consumer interest due to the large, nationwide television advertising campaign, and it appears that the energy label is being used as a pre-screening device by a large percentage of consumers. In contrast, in the U.S. appliance stores I visited, the label plays a negligible role in most transactions; however, there appears to be support for the idea of energy efficiency being used as a "tie breaker," to help consumers choose between two otherwise similar models.

In Thailand, a Screening Tool

Research cited in Chapter 2 has concluded that in the area of appliances, information search is a two-stage process: initially consumers compare (i.e. screen) all alternatives on just one or a few attributes. When the search continues, they select a smaller number of alternatives and compare these on all available attributes (Bettman 1979; Verplanken 1990 cited in de Loor 1991). In Thailand, the energy label has apparently made it into the first stage of the process, the initial screening of products. Incredibly, after just two years of the labeling program, energy efficiency is such a salient issue in appliance purchases that it appears to be on the tip of most consumers' tongues when they enter the store. Salespeople consistently reported that customers ask about the energy labels as they begin their product search in the store. These comments from two Thai salespeople indicate the extent to which energy efficiency is used as a primary sorting criterion by consumers:

> For the most part, customers approach me and they ask, "Miss, do you have a number 5 refrigerator?" It's like that. "What models or brands do you have that are a number 5 refrigerator? Can you show me some?" … The label can play an important role in roughly a third to a half of all sales (Thai sales interview no. 2).

> These days, since EGAT has begun its ad campaign, customers generally look for number 5. If it's more expensive, that's OK. But it has to be number 5. They consider that number 4 is inferior, a lower grade, is not very good. It's lower than 5 (Thai sales interview no. 46).

The second quotation suggests that the energy efficiency rating has, for some customers, become a general quality rating. However, this screening relies on models having a diversity of ratings. As noted earlier, we were told by a number of refrigerator retailers that as more of the models receive the number 5 rating, the impact of the label as a tool for screening models will diminish:

In the U.S., Perhaps a Tie Breaker

Two U.S. policymakers introduced the idea of energy efficiency being used as a "tie breaker" or "deal breaker" — that is, as an extra attribute that could be used to close a sale when a consumer was weighing two units that were similar in most other respects. We tested this idea by asking several of the U.S. salesmen the question, "Could energy efficiency be used as a tie breaker?" The responses were mixed, indicating some acceptance of the idea, but revealing that much more retailer education would have to be done in order for them to use it in that way. This salesmen responded positively:

> I usually point it [the EnergyGuide label] out to them. When it comes down to indecision … to try to help them decide which way to go when they're undecided between one or two products, I point out one or two differences that they may have overlooked. For example, I might say, "You know, one of the things you might consider is the energy efficiency of this particular model, especially in an area where energy costs are high" (U.S. sales interview no. 8).[12]

But another salesman indicated that the label itself would have a lot less weight than would his own advice and suggestions:

> I think that the deciding factor to break a tie is gonna be what the salesperson's advice is. I think if he says, and he really talks a lot about how it uses less energy and over the course of a year it can save you a couple hundred dollars, that'll be meaningful. To point out the difference in the EnergyGuide A being less expensive than B, but B I sell a lot of and my customers really seem to like it, I think they're gonna buy B. I think a salesperson's advice carries a lot of weight (U.S. sales interview no. 13)

Other salesmen were more skeptical of whether energy efficiency was a strong enough attribute to be used as a tie breaker.

> You could use energy efficiency as a selling point in addition to other features, but not as a tie-breaker. Most people don't care too much about the environment. Some people can be turned off if you talk too much, and you can lose a customer. I won't make a big deal out of it (U.S. sales interview no. 9).

> There are so many other factors that customers are considering that energy efficiency wouldn't be the one thing to break a tie. But it could be used as another selling feature, and salespeople could be educated on how to explain the benefits of this feature. It's clearly a benefit. When a customer is comparing models, it doesn't hurt at all for the salesman to point out that this model is energy efficient and can save you so much money (U.S. sales interview no. 12).

[12] This salesman also said that he would buttress his argument by showing them that the actual electricity use, at the local electricity price of 14 cents/kWh, was off the scale of the cost table at the bottom of the label, and thus even more expensive than the highest annual cost shown on the table.

At the corporate level in the U.S., there is some feeling that, while energy efficiency is not one of the top-tier features in a typical appliance sale, it has the potential to give an appliance retailer a competitive advantage. One of the corporate managers who is participating in the U.S. government's Energy Star Retail Labeling Program, said, "We feel that energy savings in the future will be another feature used to sell appliances, and this program is helping to educate consumers" (U.S. sales interview no. 12). Another corporate manager whose company is also participating in the Energy Star program acknowledged that energy efficiency "is just not a factor when we consider what will spur sales and what won't" (U.S. sales interview no. 14). Yet this same manager, when asked why his company was participating in the Energy Star program, cited very personal reasons having to do with the oil shocks in the 1970s and his feeling that eventually there will be another similar crisis, for oil, or electricity, or water. He said that the preliminary data he had seen from the program indicated to him that energy efficiency was being used as a tie breaker in stores that participated in the program: "We did this awareness stuff in D.C., and they used it [energy efficiency and the energy labels] effectively. And it didn't drive sales, but it was a tie breaker. I mean the sales of those units were up."[13]

Understanding the Energy Labels

In my discussions with salespeople in both countries, it became apparent how little time customers in either country actually spend deciphering the label. Given the time constraints on the sale; the need for the salesperson to establish a rapport with the customer, talk about the many attributes of the products and the stores, and discuss financing and service arrangements; and the pressure on the salesperson to keep the customer's attention, they have little time to spend explaining the fine print and technical details on the appliance labels. Chapter 7 focuses on consumer understanding of the energy labels.

Many of the U.S. salesmen said that they would not normally point out the EnergyGuide label. Among those who said they did point out the label, most indicated that they would do just the bare minimum when discussing the EnergyGuide label with a customer.

> It's too much work for salesperson to go into it and calculate it out. A customer's attention span listening to a salesman I think is very short, unless you've really established good rapport with them. So if you hit 'em with too much detail like that, my experience has been you turn them off. Because they think you're trying to sell, instead of trying to help them make a decision that they feel is their own (U.S. sales interview no. 8).

A common theme among Thai salesman was that customers usually only understand whether a unit has a 4 or a 5 rating, and they are content with that superficial level of information. Said one, "Customers usually don't look at that level of detail. The just read the big number, the number and the size" (Thai sales interview no. 26). The marketing director of a major Thai appliance manufacturer

[13] His comment should be interpreted to mean that elements of the Energy Star Retailers program acted as a tie breaker. These elements included trained salespeople, point-of-purchase information, and a special Energy Star logo on high-efficiency units to spur sales of more efficient refrigerators. His comment does not necessarily mean that the existing EnergyGuide label could be used effectively as a tie breaker.

praised the Thai appliance labeling program but indicated that consumers don't look beyond the overall numerical rating of the model:

> This [EGAT's labeling] program has … made consumers aware that you have to look at the label first. Just only aware. But they never look at the label in detail to see for each brand, how important it is. because some brands will save more. For example, even though two models are both number 5, but a Sanyo number 5 might save more than a Toshiba number 5. The consumer is not aware at this level (Thai sales interview no. 54).

The U.S. salesmen whom I interviewed uniformly said that few customers bother to look at the label and those who do have a hard time understanding it. Said one. "I don't think they understand it. I mean, if I had ten customers, maybe one of them would understand what it really means, unless you explain it to them" (U.S. sales interview no. 2). Another reported a similar experience: "They usually ask how to interpret it. It's hard for the average person to understand what exactly it means" (U.S. sales interview no. 4). One salesman called me over to a nearby refrigerator to discuss his views on the EnergyGuide labels:

> I think they're too confusing … Gosh, I talk to people, and I say all right, you know you're from 64 to 121 [dollars], and 74 [dollars, the rating for this unit], but that's going at these rates per kilowatt-hour. So I ask, "What are you paying?" And nobody knows what they're paying as far as kilowatt-hours goes. At least I haven't found anyone telling me what they're paying.
>
> *Could you figure out how much this model would cost to use in this area?*
>
> Absolutely not. I couldn't do it. And I work here. And the main reason I don't is I never want to get too technical. I want to get features and benefits. Let me show you this one, right over here [walks to refrigerator that he said sells for $1,500.] This is a 25 cubic-foot refrigerator, it uses 60 dollars per year, side by side. this is extremely energy-efficient and quiet. In fact this one and the 27 [cubic-foot model] was rated number one in *Consumer Reports*. Then I boom, boom, boom, and I go through all of this stuff [features and benefits of the refrigerator] (U.S. sales interview no. 5).

This response indicates a layer of barriers to the problem. First, he finds the labels confusing and can't fully understand them or explain them himself. Second, he knows that customers find the labels confusing and he would be unlikely to take the time out to explain them even if he did fully understand the label. And finally, his first priority is selling the "features and benefits" that the customer desires, and these do not include anything but a passing reference to the unit's energy consumption. He is afraid that if he spends too much time on the energy label, he will lose their interest and thus lose the sale.

<u>Is the New U.S. Label an Improvement?</u>

In 1994, the Federal Trade Commission issued a final rule that revised the format and design of the EnergyGuide appliance labels (FTC 1994). The new labels now appear on about half or more of white goods in U.S. appliance stores. In an effort to understand how well the new label design has been received by salespeople, I showed sample EnergyGuide labels to nine of the 14 U.S. salespeople and asked which label was easier for consumers to understand (see Figure 0.1 and Figure 0.2). Eight of the nine responded that they preferred the old label, and the overwhelming reason was that having a dollar amount on the label makes it easier to explain and compare.[14] Below is a sampling of their comments:

> Actually, I think we've gone backwards here with this label. That's only my opinion. Because the energy cost dollar number is very, very small, and it's almost at the bottom of the label. It's not prominent on the label. I think this [dollar] figure should be prominent on this label, because it can catch your eye and then lead someone to look further at this (U.S. sales interview no. 7).

> If there was a way of saying right up front this is what it's gonna cost you approximately to run per year and just having one figure there, to be honest with you, that would probably make the whole thing easier, if you could do it (U.S. sales interview no. 1).

> The dollar figure is what's important, and it's easier to understand, especially because it is so large on the old label (U.S. sales interview no. 9).

> It doesn't relate it to dollars for you, so it's much more difficult to use (U.S. sales interview no. 14).

> I like the other one better because I think dollars are more understandable than kilowatts (U.S. sales interview no. 13).

> Yeah, I've seen these [the new EnergyGuide labels], but I've had a tendency not to pay any attention to 'em. Because it doesn't seem to be as bold as this [the old label]. This [small dollar figure at the bottom of the new label] should be bolder down here. I think if this was up here [if the dollar amount were at the top of the label], peoples' attention is drawn more to dollars (U.S. sales interview no. 8).

One respondent was more analytical and picked up on a theme that was echoed by many of the U.S. consumers on whom I later tested the label (see Chapter 7). Compared to the old EnergyGuide label, the new label is graphically improved and has a simpler design that contains less information and is thus less likely to be confusing. At the same time, however, primary emphasis is on the dollar figure (rather than kilowatt-hours, which are not an understandable concept to many consumers[15]), and the use of large, bolder type could greatly improve the new label's readability.

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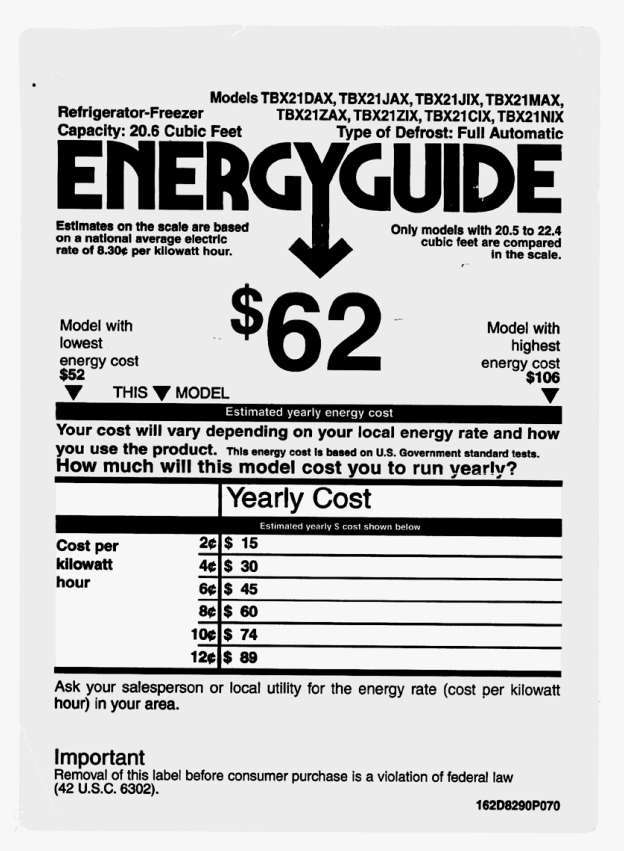
[14] The old label has a large, bold dollar figure prominently displayed near the top of the label. The new label instead has a kilowatt-hour figure, in smaller point size, as the primary figure near the top of the label. It also has a dollar figure, representing estimated annual operating cost, in even smaller type near the bottom of the label.

[15] See Patterson 1991, page 27



Models TBX21DAX, TBX21JAX, TBX21JIX, TBX21MAX, TBX21ZAX, TBX21ZIX, TBX21CIX, TBX21NIX

Refrigerator-Freezer
Capacity: 20.6 Cubic Feet
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 8.30¢ per kilowatt hour.

Only models with 20.5 to 22.4 cubic feet are compared in the scale.

$62

Model with lowest energy cost $52

THIS ▼ MODEL

Model with highest energy cost $106

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

	Yearly Cost
	Estimated yearly $ cost shown below
Cost per kilowatt hour 2¢	$ 15
4¢	$ 30
6¢	$ 45
8¢	$ 60
10¢	$ 74
12¢	$ 89

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important
Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302).

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Figure 0.1. The "Old" EnergyGuide Label. This is still on about one-third to one-half of white goods in appliance stores.

> From a graphical standpoint, I would say this [the scale on the new label] would be easier to understand. But if you're not so oriented, then I think this [the old label] would be easier. Because this [the old label] relates to cold, hard cash. So it depends on what the individual relates to. I mean, I like the graphical representation better on the other one [the new label] because it shows more, so it jumps out at you. But I probably would like it better if you used that kind of representation with money (U.S. sales interview no. 11).

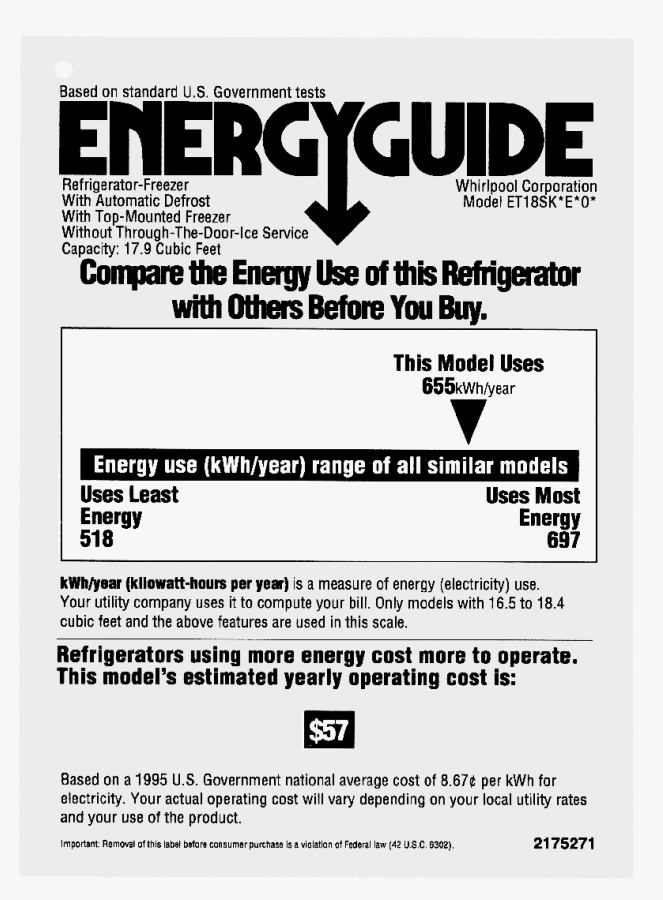


Figure 0.2. The "New" EnergyGuide Label. Introduced in a 1994 ruling, this label is gradually being phased in on all new models to replace the old label.

Essentially, he is saying he would prefer the new label even more if the horizontal scale on the new label — which clearly compares the energy use of this model to that of other similarly-sized models — displayed energy use as operating cost (dollars) rather than energy units (kilowatt-hours).

One of the corporate managers was less charitable. He has a fifteen-year background in marketing and retail (department stores, women's clothing, and appliances), and he scoffingly remarked that the label "Looks like it was designed by a bureaucrat."

> If the EnergyGuides were more customer friendly and more marketing tools … It's not done the way you would write an ad. It's pretty technical, it's pretty ugly. It's very government looking, and it doesn't say "Save a hundred bucks, see details." You know that would get somebody's attention … If we really wanted to help consumers to save money, then someone with a marketing bent would redesign the tag, wouldn't they (U.S. sales interview no. 13)?

Why the U.S. Label Works Better on Air Conditioners

A comparison of my interviews with U.S and Thai salespeople led me to hypothesize that the Thai energy labels were more salient, at least in part, because they provide a simpler metric that is both easier for the salesperson to explain and for the customer to understand. As one Thai salesperson said, "It goes from 1, 2, 3, 4, and then 5, and number 5 saves the most energy (Thai sales interview no. 15). The simplicity of this numbering system is easy to grasp, much like the numerical rating system for the efficiency of air conditioners. On the U.S. EnergyGuide label, the energy-efficiency ratio (EER) of the unit is shown in large bold type.[16] One U.S. salesperson said that, for him, the air conditioner label was easy to explain because he could easily categorize the models into "good, better, and best." "Anything above an 8, I tell 'em it's good. Over a 9, it's better. And anything over 10 is the best U.S. sales interview no. 5)."

A couple days after our interview, while I was doing participant observation, the same salesman described how he had tried to incorporate this comparative strategy into his presentation of refrigerators. He had explained to a customer that refrigerators that are around 80 dollars a year on the EnergyGuide label are good, the ones that are around 70 are better, and the ones that are under 60 are best. To him, this was a quick and simple way of using the EnergyGuide label to distinguish between models. He said he thought that he convinced the customer to trade up to a "better" model in the 60 dollar range, but the customer left the store, and he didn't close the sale.

Other salespeople indicated that customers pay more attention to the energy efficiency of air conditioners for a number of reasons. First they are more aware that air conditioning will be a big part of their energy bill. As one salesperson put it, "The efficiency of spreading this much cold air over my entire room is more understandable than just cooling one small box with food with it" (U.S. sales interview no. 13). And second, unlike refrigerators, which have a panoply of convenience features that distinguish them, an air conditioner — especially a room air conditioner — has few distinguishing features. Said one salesman, "It's just an ugly box with brown on the front" (U.S. sales interview no. 4). These comments explain why consumers are more likely to pay attention to the EnergyGuide label on an air conditioner; however, they do not address the comprehensibility of the label. Several salesmen felt that numerical rating system for air conditioners is much easier for them to explain and for consumers to understand:

> Yes, [the EER rating is easier] because it is simple, and people can tell quickly that a higher number is a better unit and will save them more money (U.S. sales interview no. 12).

> I think the EER is easier for the salesman to explain, it's easier for the customer to understand, and it is a ranking. You just go look for a higher number. Anything over nine is considered high efficiency. Then you have them going right down [the row]. They don't look at it. They don't have to multiply it out. It's very simple and easy to understand (U.S. sales interview no. 4).

It appears that although consumers do not understand the technical aspects of the EER rating system for air conditioners, it works better than the scale of relative energy use on the label for white goods. It

[16] EER ratings are expressed to the nearest tenth of a unit (e.g., 8.7, 9.3, etc.). The EER units for the very best units available are in the range of 12 to 14.

works better because its simple (just one large number), it's easy for the salesperson to explain, and it's easy for the consumer to understand.

Factors Limiting the Thai Label's Effectiveness

Although the label appears to be used by most Thai salespeople as a selling point, there are two factors that limit its usefulness. These limitations are discussed below.

Problems with the Closed-Ended Rating System. In urban areas, especially Bangkok, we found that as the percentage of single-door refrigerators with high-efficiency labels increased [17], the ability to use the label as a selling point reduced. When most of the units in a product display are rated at 5, the number 5 rating becomes less unique. The marketing manager for a major Thai appliance manufacturers told me, "At first, we started using this as a selling point, but after everyone had labels, it wasn't a selling point any more. It's like it just became another part of the assembly process. Now, consumers don't look into it too deeply" (Thai sales interview no. 54). Other retailers we interviewed made similar comments:

> Really, it doesn't help that much these days, because almost all of the refrigerators are number 5 now. It's not like only some brands are number 5. Now, almost all of the models are number 5. At first, it may have been a selling point, but now it's like it was before (Thai sales interview no. 45).

We received similar comments from salespeople, who said that as more of the models receive the number 5 rating, the impact of the label as a tool for screening models will diminish:

> Most customers come in and they ask to see models with the energy saver sticker number 5. That's the first thing. Then they see that a lot of the brands have number 5 and they're not that interested anymore, because there is very little difference between them. Because now almost all of the models are number 5 (Thai sales interview no. 9).

This clustering of models in the highest category is a characteristic problem of closed-end category ratings (vs. a kWh, cost, or EER scale), which possibly could be addressed by periodically "re-calibrating" the scale. This problem is being faced by Australia and the European Union, who are considering how to deal with the issue.

Rating Efficiency Vs. Rating Overall Resource Use. Another potential problem with the labeling system occurs for retailers who are selling both regular-size units, single-door refrigerators (typically 4 to 6 cu. ft.) and larger-volume, two-door (and multi-door) units, which tend to be imported. Because the labeling scheme only covers single-door units, larger (mostly imported) refrigerators do not have any labels. For salespeople selling the larger units, this puts them in the awkward position of having to

[17] According to an informal survey I conducted, more than half of single-door refrigerators in Bangkok have a number 4 or 5 label. The results from this informal survey are reported in Chapter 7.

explain why the larger units do not have an energy-efficiency label. One shophouse salesman, who sells an entire range of brands and models, imported and domestically produced, said he tends to avoid using the label as a selling point since it hurts his ability to sell imported units:

> No, I tend to look at the specifics of the product and the quality. If we look at number 5 as a selling point, then the products that don't have number 5, like these imported refrigerators which don't have number 5 [he points to two- and three-door imported refrigerators] — these use about the same amount of energy as a number 5, but we can't sell them on the basis of the label (Thai sales interview no. 9).

Another salesman, employed by a distributor of imported refrigerators, uses the energy efficiency of his imported refrigerators as a selling point, but finds himself at a disadvantage because the energy labels have not yet been approved for models with more than one door.

> People come in looking at the large refrigerators and ask, "Why isn't there one with a number 5 label?" So I have to explain to them, before I tell them anything about the product. Because if I say that this unit doesn't use much energy before they know the reason, the customer won't necessarily believe what I say (Thai sales interview no. 10).

This points out a problem with the Thai scheme of rating models from 1 to 5, compared to using local currency (i.e. baht or dollars) as the primary rating. It does not distinguish between efficiency and overall resource use. Once EGAT expands its labeling to cover large refrigerators, a large, multi-door refrigerator could be rated at 5 because it is more efficient than other large models. But this model might not be efficient in the Thai context — that is, it would use a lot more energy than a more traditional, single-door refrigerator to cool food. With a numerical rating system geared to categories, there is no way for consumers to quickly and easily compare the energy use of different-sized. While it is theoretically possible for consumers to do this by looking at the annual operating cost (baht per year), our interviews with customers showed that only 16% read the label in any level of detail.

Role of the Environment

A final set of questions had to do with the linkage between the production and use of appliances and the environment. In neither country was energy use widely seen as being linked to the environment. In the U.S., the focus was on the CFC substitutes being used in refrigerator-freezers and the opportunity that this presented to sell extended service plans. In Thailand, CFCs were a salient issue because of the extensive advertising on this topic by refrigerator manufacturers.

In the U.S.: "CFC-Free" as a Sales Tool for Service Protection

In the U.S., environmental regulations required the shift away from CFCs in all refrigerators and refrigerator-freezers as of January 1, 1996. The U.S. salespeople with whom I spoke said that while CFCs had been an issue of considerable consumer interest during 1994 and 1995, it was much less of an issue when I conducted my interviews in late 1996 and early 1997. As one salesman remarked, "Two years ago, this was the first thing out of their mouths, 'Is this CFC-free?' Of course, it was hitting the papers, it was hitting the news, everybody was reading about it. Now, I'll be honest with you, it still comes up, but it's like in passing" (U.S. sales interview no. 1).

The more interesting finding from my discussions with U.S. salespeople was that many of them were using the issue as a selling point for their extended service plans. (As mentioned earlier, selling multiyear service plans for white goods is a major source of income for the salespeople I interviewed.) Their basic argument to their customers is that since the new CFC substitutes do not have a track record as far as longevity and repair, it is in the customer's best interest to purchase an extended service plan to cover repairs to their refrigerator that may be necessary if the new refrigerant causes a breakdown or malfunction in future years. Here is a sample of their reasoning:

> I bring up the freon versus the R134a because that's very important, and because the R134a does not have a proven track record, it could be a costly expense to you down the road (U.S. sales interview no. 3).

> I usually bring it [the environment] up, but for different reasons. I bring it up because it's part of my, it's preliminary to my service pitch. Because I tell them this refrigerant has only been on the market for two years, so it has a very small track record. And freon was on the market for 80 years, and that usually helps me close service. That's the only context I ever bring it up in (U.S. sales interview no. 8).

> Some people ask about it [CFCs]. I usually volunteer the information, too, as a selling point and making the link to ozone. Our service plan will protect you from the extra cost of recharging the new refrigerant (U.S. sales interview no. 9).

Viewed in the context of the retailers' motivations, the use of CFC substitutes as a tool to sell service plans makes sense. As a purely environmental issue, "CFC-free" is no longer a selling point in the U.S., because all refrigerator-freezers are now required to use CFC substitutes. Thus, for a refrigerator to be CFC-free is no longer a distinguishing attribute. However, retailers make a large margin on the sale of their extended service plans, and thus any possible reason they can offer the customer to invest in the multi-year service plan is to the benefit of both the company and the individual salesperson.

This practice of using the switch to CFC substitutes as a way of selling service was not an official policy at any of the stores I visited. Neither was it endorsed by any of the corporate managers whom I interviewed. In fact, one of the corporate managers, when told of this strategy, was surprised and replied, "That's not a very positive thing to sell something to someone and then to say that it may not work very well" (U.S. sales interview no. 12). He felt there was something perverse about selling a new product and then claiming that there is a problem with the product and using that as the rationale for needing an extended warranty. When I tried making this criticism to salespeople, they asserted that it was not a faulty product, but rather the by-product of a new government policy, and that there really was legitimate concern about the longevity of the CFC-free substitutes.

In Thailand: An Urban/Rural Divide

Nearly all of the Thai salespeople whom we interviewed were aware of CFCs, and 83% mentioned CFCs when they were asked the question, "Does buying an appliance affect the environment?" A number of the salespeople said that CFCs were a very popular topic with customers and that the extensive television advertising on this topic by manufacturers had been effective. A typical response from a Bangkok salesperson was: "We don't have to bring it [CFCs] up. They [customers] often specify a model that is CFC-free. If there is a model that isn't CFC-free, they might tend not to buy it. The advertisements on this topic have been very effective" (Thai sales interview no. 13). Another Bangkok retailer, when asked about the link between appliances and the environment, replied, "These days, there are two things, CFC-free and new, energy-saving appliances" (Thai sales interview no. 8).

Upcountry, there was less familiarity with CFCs and, especially in the rural districts we visited, salespeople said that many of their customers weren't familiar with CFCs or why they might pose a threat to the environment. Those salespeople who claimed to use the CFC issue as a selling point said that, while customers may have seen the ads on TV, "The farmers and people around here have a difficult time grasping what the problem is" (Thai sales interview no. 32).

The majority of salespeople tended to associate CFCs more with global warming than with ozone depletion. While CFCs are in fact a greenhouse gas, they are of greatest concern because of their effect on stratospheric ozone depletion. We asked about 15 of the Thai salespeople to explain what impact CFCs had on the environment. The most common response was that CFCs cause global warming. Only a small minority were able to clearly state CFCs' impact on the ozone layer, and a few mentioned that CFCs did something to damage the atmosphere. Several of the salesmen clearly had no idea, such as the one salesman who said that CFCs was a chemical that controls odors, and another who tentatively guessed that it affected the atmosphere by "making it less pure" (Thai sales interviews nos. 26 and 27).

Another issue raised in our discussion of the environment with Thai retailers was a lack of common understanding of the meaning of the word "environment." A Bangkok salesman (no. 15) responded by citing the local impacts of the appliances, such as the heat given off by the condensing units, which he stated was more of a problem in the city than in the country. But our questions about the environment, when posed to upcountry and rural retailers, were much less likely to yield responses touching on the impact of CFCs or pollution from power plants. Often, the "environmental" impacts of appliances were seen in terms of the direct effect on a consumer's lifestyle or residence. A Khorat salesman said, "I don't know what [environmental] effects it [the appliance] has. I know that if you use an air conditioner, the dirty water leaks outside the building. And there is dust from the air conditioner, when you clean it" (Thai sales interview no. 39).

Conclusions

A commonly voiced theme in our interviews with salespeople was the need to strike a balance between serving the customer's needs and selling the products that make the store (and the salesman) as much money as possible. At the same time, we found a strong level of confidence among salespeople in both countries that they could influence the purchasing decisions of the majority of customers.

The primary incentive for salespeople who work on commission (all of the U.S. sample and more than half of the Thai sample) is to sell products that have a higher retail price and thus generate more commission. The vocabulary used by salespeople illustrates the focus on "stepping" customers up to models with additional features and to selling "push" pieces (i.e. models that make more profit) rather than "A.D.V." pieces (advertised models, which make little profit). None of the incentives that I observed

in the U.S. appeared to be related to energy efficiency. In fact, the incentives motivate salespeople to "step up" customers and influence them to purchaser larger products with additional features that use more energy. In the U.S. an additional incentive is for salespeople to sell extended service plans, which can double what they earn on the sale of a specific product. In Thailand, because many of the salespeople are employed by a brand distributor rather than the retail store, there is also a strong incentive to sell models produced by a particular manufacturer.

The sale of energy-efficient products appears to motivate neither the stores nor their salespeople because of the low value-added of energy efficiency as a feature. Energy efficiency can be added to a product, but it is often invisible to the consumer and difficult to sell. According to a corporate manager of a U.S. appliance retail chain, good features have a margin of 10:1, meaning that manufacturers can charge an extra $10 at retail for $1 worth of feature. The margin on energy efficiency improvements is much less than this.

As reported by salespeople, energy efficiency was a significantly higher consumer priority in Thailand than in the U.S. In Thailand, the top reported priorities were brand, efficiency, size, and price. Half of the Thai salespeople reported that energy efficiency was a top-three consumer priority. U.S. salespeople reported that the top consumer priorities were reported to be features, price, and size. Only 1 in 14 U.S. salespeople reported that energy efficiency was a top-three priority.

In Thailand, energy efficiency was discussed by the majority of salespeople as an important and tangible criteria, clearly communicated via the number 5 label. In contrast, in the U.S., the quality or property of being "energy-efficient" was often not clear to either the customer or the salesperson and was described by one U.S. consumer as a "gray area." A comparison of my interviews with U.S and Thai salespeople led me to hypothesize that the Thai energy labels were more salient, at least in part, because they provide a simpler metric that is both easier for the salesperson to explain and for the customer to understand.

Energy efficiency is more actively used as a selling point by Thai appliance retailers than by U.S. retailers. More than three quarters (80%) of Thai salespeople said that they use energy efficiency as a selling point, compared to just over half (54%) of U.S. salespeople. In addition, Thai salespeople reported greater consumer interest in the energy label. On average, Thai salespeople stated that 62% of consumers asked about or looked at the label, compared with a reported average of just 21% of U.S. consumers.

In Thailand, there is a high level of consumer interest in the energy label due to the large, nationwide television advertising campaign, and it appears that the energy label is being used as a pre-screening device by a large percentage of consumers. In contrast, in the U.S. appliance stores I visited, the label plays a negligible role in most transactions; however, a small number of salespeople report using energy efficiency as a "tie breaker," to help consumers choose between two otherwise equally attractive models.

In my discussions with salespeople in both countries, it became apparent how little time customers in either country actually spend deciphering the label. Given the time constraints on the sale; the need for the salesperson to establish a rapport with the customer, talk about the many attributes of the products and the stores, and discuss financing and service arrangements; and the pressure on the salesperson to keep the customer's attention, they have little time to spend explaining the fine print and technical details on the appliance labels. The U.S. salesmen whom I interviewed uniformly said that few customers bother to look at the label and those who do have a hard time understanding it. Thai salesman reported that customers usually only understand whether a unit has a 4 or a 5 rating, and they are content with that level of information.

Finally, I asked salespeople about the linkage between the production and use of appliances and the environment. In neither country was energy use widely seen as being linked to the environment. In the U.S., the focus was on the CFC substitutes being used in refrigerator-freezers and the opportunity that

this presented to sell extended service plans. In Thailand, CFCs were a salient issue because of the extensive advertising on this topic by refrigerator manufacturers.

CHAPTER 6

APPLIANCE CONSUMERS

Chapter Abstract

This chapter reports the results of interviews with 100 consumers in the U.S., 62 consumers in Thailand, and a survey of 971 consumers in Thailand. The topics covered include consumer information search, consumer priorities, salience of energy efficiency, awareness of the energy labels, perceptions of the role of government, and the relationship between purchasing an appliance and the environment. Energy efficiency is a significantly higher consumer priority in Thailand than in the U.S. This supports the findings from the interviews with salespeople, which suggested that energy efficiency was being used as a screening tool by Thai consumers in the purchase of refrigerators and air conditioners. I also find evidence to support the theory that the consumer decision-making process has multiple stages, and that if energy efficiency can potentially be used as a selling point in any of the stages, it can have an impact on the purchase decision. Finally, I find the environment to be a more salient factor in discussions with Thai consumers than with U.S. consumers.

Introduction

This chapter focuses on understanding the attitudes and behavior of appliance purchasers. It compares data from participant observation, unstructured and semi-structured interviews, and surveys in an attempt to answer these questions: What role do energy efficiency and other environmental considerations play in the purchase of a home appliance?, How effective are the existing energy labeling programs?, and What factors might influence a consumer to purchase a more energy-efficient appliance?

Overview of Interview and Survey Samples

I conducted semi-structured interviews with 100 U.S. consumers at four appliance stores in New Jersey and Delaware in March, November and December 1996 and January 1997. I also conducted participant observation in December 1996 by working for two weeks as a sales trainee at a New Jersey branch of the regional appliance chain that I here call Acme Appliance. I closely observed 25 sales during this time period, and the experience provided me with insights that were helpful in interpreting the results of the consumer interviews. The methodology is discussed in Chapter 3. Table 0.1 summarizes the demographic data on the sample of U.S. consumers interviewed.

Slightly more than half (55%) the respondents were males, and the remainder were either females (18%) or couples shopping jointly (27%). The average age of the respondents was 45, and the average educational level was three years of college (15 years of schooling). The sample had a higher income

than the U.S. average[1], with a median income of slightly more than $50,000. Twelve percent of the sample was African-American, mirroring the percentage of African-Americans in the U.S. population.

Table 0.1. Demographic Data on U.S. Consumers Interviewed.

	% of 100 respondents
Gender	
Male	55
Female	18
Couple	27
African American	12
Age	45 years
Education level (mean value)	15 years
Family Income level (per month) (N=87)	
< $15,000	2.3
$15,001-$30,000	4.6
$30,001-$50,000	28
$50,001-$100,000	46
>$100,000	14

Note: Includes only consumers who have purchased a major appliance within the past year.

We administered a structured survey to 971 Thai consumers in three Thai cities and eight rural districts in March and April 1997. Roughly two-thirds of the surveys (633) were conducted with consumers who had purchased an appliance within the past year, and one-third (338) were conducted with consumers who had not recently purchased an appliance. We also conducted semi-structured and unstructured interviews with 62 Thai consumers in the three cities and eight rural districts. The interview data provided more textured and detailed responses that assisted in the analysis of similar questions asked in the survey. The methodology is discussed in Chapter 3. Table 0.2 summarizes the demographic information on the sample of Thai consumers surveyed.

The survey sample was split evenly between men and women. The average age of buyers sampled was slightly younger than the U.S. sample, at 35 years. And the average level of education, at 13 years, was higher than the country's median education level of just 6 years[2] (Andrews 1997). This reflects the fact that appliance buyers in Thailand are more likely to be middle-class families with incomes and education levels higher than the national average. It also reflects the sample frame, which was predominantly Thai consumers shopping at malls in Bangkok, Chiang Mai, and Khorat. The corresponding demographics on gender, age, and education for the sample of non-buyers were not statistically different from those of the buyers, although the income of buyers was slightly higher than that of non-buyers.

[1] U.S. median family income in 1995 was $34,000 (Statistical Abstract of the U.S. 1997).

[2] Compulsory education in Thailand is 6 years. The adult literacy rate is 93.5%. Primary school enrollment (grades 1-6) is 97%; secondary school enrollment (grades 7-12) is 33%; and tertiary education enrollment (beyond high school) is 19%.

Table 0.2. Demographic Data on Thai Consumers Surveyed.

	Buyers N=633 (%)	Non-Buyers N=338 (%)
Gender		
Male	51	51
Female	49	49
Age (mean value)	39 years	37 years
Level of education (mean value)	13 years	12 years
Location of interview		
Bangkok	48	29
Chiang Mai	23	31
Khorat	29	41
Interview in rural or urban district?		
Urban	91	78
Rural	8.8	23
Home location		
In district area (urban)	83	65
Outside district area (rural)	17	35
Family income level (per month)		
<B10,000 (<US$400)	10	22
B10,001-20,000 (US$401-800)	25	31
B20,001-30,000 (US$800-1,200)	37	29
B30,001-50,000 (US$1,200-2,000)	20	13
B50,001-70,000 (US$2,001-2,800)	6.8	4.5
>70,000 (>US$2,800)	1.4	0.9
Number of people in home (mean value)	4.0 people	3.9 people

Half of the buyers sampled were from Bangkok (48%), and roughly one-quarter each were from Chiang Mai and Khorat (23% and 29%, respectively). The sample of non-buyers had fewer Bangkok respondents and was more weighted toward Khorat.

The samples were biased toward urban areas and represent a higher proportion of urban residents than the Thai population as a whole. Ninety-one percent of the interviews were conducted in either Bangok, Chiang Mai, or Khorat. The remaining 9% of interviews were conducted in the eight rural districts that we visited. The proportion of urban interviews was slightly higher for buyers than non-buyers (78%).

The heading of "home location" is an indicator of how close the respondents live to a government district office and is a better indicator than interview location of whether a respondent is from the city or from a rural area. The Thai government is organized into provinces, which are somewhat similar to states in the U.S. and have a governor (although in the case of Thailand, the governor is appointed by the Minister of Interior). Within each province, there are a number of districts, and many of them are quite rural. Within each district, there are sub-districts and then villages. The data on home location indicates that among the buyers we sampled, 17% lived in rural areas, whereas among non-buyers, 35% lived in

rural areas. According to 1993 census data, 31 % of Thailand's population lives in urban areas and 69% live in rural areas (Mahidol University 1993).

For buyers, the median income level was between 20,000 and 30,000 baht (US$800 and 1,200) per month. For non-buyers, it was slightly below 20,000 per month.[3] The lower income level of non-buyers reflects the fact that the sample of non-buyers had fewer Bangkok residents and more from Khorat. Finally, the average number of people per home (~4) was statistically similar between buyers and non-buyers.

Comparisons between the U.S. and Thailand

What Appliances They Purchased

In the U.S., the EnergyGuide labels are affixed to the following home appliances: refrigerators and refrigerator-freezers, freezers, water heaters, dishwashers, clothes washers, room and central air conditioners, and furnaces (FTC 1979). In Thailand, the voluntary labeling program applies only to two classes of home appliance: single-door refrigerators and room air conditioners with capacity smaller than 13,000 Btu/hr. Table 0.3 shows the appliances purchased within the past year by the consumers whom we sampled. In the U.S., the primary appliance purchased was refrigerator-freezers (44%), followed by stoves (27%), clothes washers (26%) and clothes dryers (25%). In Thailand, I only interviewed consumers who had purchased either a refrigerator or an air conditioner within the past year; 58% had purchased a refrigerator and 44% had purchased an air conditioner.

Table 0.3. Appliances Purchased within the Past Year

Appliance purchased	U.S.	Thailand
	% of 98 respondents	% of 633 respondents
Refrigerator/refrigerator-freezer	44	58
Stove/range	27	
Clothes washer	26	
Clothes dryer	25	
Air conditioner	14	44
Dishwasher	12	
Water heater	2	
Other appliance	5	

Note: column totals exceed 100% because of multiple appliance purchases

Nearly all of the respondents purchased an appliance that displays an energy label. In the U.S, all appliances sampled except stoves and clothes dryers have EnergyGuide labels (Table 2.3 lists appliances covered under the U.S. labeling rule). In Thailand, we sampled recent purchasers of refrigerators and air conditioners, which are the only Thai appliances with energy labels.

[3] Average family income in Thailand is about US$940 per month. This is based on per-capita GDP of US$2,830 (1995) and average family size of 4 people.

Who Made the Purchase Decision?

In the U.S., nearly two-thirds (62%) of respondents reported that they made a decision jointly with their partner, and slightly more than one-third (36%) reported that they made the decision themselves (see Table 0.4). In Thailand, fewer than one-quarter (23%) said they made a joint decision, half (51%) said they made the decision themselves, and one-quarter (23%) said their partner made the decision. In the U.S., 27% of the U.S. respondents were couples, while none of the Thai respondents were couples. This reflects a slight difference in methodology between the U.S. and Thailand: when I conducted my U.S. interviews, I would enter the respondents as being a couple as long as the partner participated minimally in the interview; in Thailand, the survey team noted the gender of the respondent (male or female) who took the primary role in the interview.

Table 0.4. Who Made the Appliance Purchase Decision?

Who made purchase decision?	United States (% of 98 responses)	Thailand (% of 419 responses)
Jointly with partner	62	23
Respondent	36	51
Partner	2	23
Other	0	3

Why They Bought the Appliance

Table 0.5 compares reported reasons for purchasing a new appliance from two different studies. The first column shows data from a national appliance survey in the U.S. conducted by the Association of Home Appliance Manufacturers. The second column shows data from my interviews with 100 recent appliance buyers in Delaware and New Jersey. The third column shows data from my survey of recent appliance buyers in Thailand.

According to the AHAM survey of 8,740 purchasers of all types of major appliance (AHAM 1996A), the most common reason for purchasing a new home appliance in the U.S. is “new home” (people moving into a new home). This is followed by “broken” (an appliance breaking down or requiring costly repairs) and then by “update model” (purchasing a more modern, updated model). The results for a subsample from that survey of 1,956 purchasers of refrigerators are shown in the first column of Table 0.5.

My own much smaller sample of 89 consumers in New Jersey and Delaware has a slightly different breakdown of responses than the AHAM survey. The most common reason for buying a new appliance was “broken,” which was the second most common reason on the AHAM survey. This was followed by “new home” (moving into a new home) and then “remodeling.”

Table 0.5. Reasons for Purchasing the Appliance

Why did you buy the appliance?	United States AHAM Survey[a] Full-Size Refrigerators (% of 1,956 responses)	United States This Study (% of 89 responses)	Thailand This Study (% of 419 responses)
Broken	31	41	23
New home	41	16	4
Remodeling	5	10	7
Update model	24	8	13
First-Time appliance	0	6	31
Other reason	4	8	4

[a] Data from national survey by Association of Home Appliance Manufacturers (AHAM 1996A: 32)

While the Thai results also show that "broken" is an important reason for purchasing a new appliance, it was only the second most important reason. The most important reason was "first-time appliance" (consumers making a first-time purchase of an appliance). This difference reflects the relative immaturity of the Thai appliance market and the fact that (with the exception of refrigerators in Bangkok) there is not yet full saturation for most household appliances (the saturation of appliances in Thailand is discussed in detail in Appendix B). Another difference between the Thai and U.S. responses is the much smaller role of "new home" in an appliance purchase. This probably reflects the fact that Thais move less often than do people in the U.S. and that, even after they leave school and enter the work force, many young Thais continue to live with their parents.

Pre-Store Information Search

Similar percentages of U.S. and Thai consumers indicated that they conducted some sort of information search before they went to buy the appliance at the store: 60% in the U.S. and 67% in Thailand (see Table 0.6). The two primary information sources in the U.S. were newspapers (30%) and *Consumer Reports* articles (28%), followed by friends (19%). In Thailand, the biggest information source was television (37%); in contrast, not one U.S. respondent indicated that they had gotten information from television. Other important information sources in Thailand were brochures (30%) and friends (29%). Brochures are a very common way of marketing the convenience features of home appliances in Thailand; they are widely available at stores and are often distributed in rural districts by sales representatives.

Market studies conducted for Acme Appliance have ranked the importance of newspapers, television, direct mail, and radio in order to direct the firm's advertising efforts. Table 0.7 shows the results of their surveys of ~1,100 appliance consumers in the northeastern U.S. in 1989, 1992, and 1996. The results indicate that tabloid inserts and circulars are the most widely seen form of advertising, followed by television and direct mail.

At the same time, the market studies also show that newspaper inserts were less important in 1996 than in 1989, while the influence of direct mail was larger. In my unprompted question about information sources, not one of the 100 respondents mentioned television; in contrast, roughly one-third of those surveyed in the retail chain's studies (28-32%) reported that television ads most influenced their decision, and 38% said they looked at television ads before shopping. The difference likely has much to

do with the survey methodology; I believe that television is a less important medium than indicated in these market research studies, since not one of the 100 consumers whom I interviewed mentioned television as an information source.

Table 0.6. Sources of Information Before Entering Store

Did you search for information before you went to the store?	United States (% of 89 responses)	Thailand (% of 633 responses)
No	40	33
Yes	60	67
of which:		
Television	0	37
Newspaper	30	13
Consumer Reports	28	na
Friends	19	29
Family	8	4
Brochures	0	30
Magazines	0	3
Other information source	7	2
Average number of information sources	1.6 sources	1.2 sources
Average number of stores visited	2.4 stores	2.5 stores

Note: Percentage totals exceed 100% because of multiple responses from each person.

A comparison of the results on information search between the U.S. and Thailand indicate that in both countries, a significant percentage of consumers (40% in the U.S. and 33% in Thailand) enter the store having conducted virtually no prior information search. This fact underlines the importance of providing point-of-purchase information on energy efficiency as a part of labeling efforts intended to promote the purchase of energy-efficient appliances. In addition, it highlights the influential role of the salesperson in the appliance purchase and the necessity of involving retailers as an integral part of an appliance labeling effort. The results also highlight differences in the importance of media in the purchase. In Thailand, it appears that television plays a major role (through the national television advertising campaign funded by the DSM Office), and that consumers rely heavily on word of mouth (friends) and brochures that they get from the stores or in the mail. In the U.S., consumers report that they rely heavily on articles in the magazine *Consumer Reports*, as well as advertising circulars distributed in the local newspapers. Market research data from Acme Appliance suggests that television and direct mail are an important source of reaching appliance purchasers, but I discount these sources based on the lack of reference to them by consumers whom I interviewed.

Consumer Priorities

The question of consumer priorities is critical to an understanding of how and whether to market energy efficiency. If, for example, energy efficiency is among the top priorities, then it will likely be

given equal weight in the decision-making process with other criteria such as brand, price, features, or color. However, if it is a much lower priority, it may require special promotional or marketing strategies, or salesperson incentives, to make it a more salient factor in the shopping environment and thus more of a factor in the purchase decision.

Table 0.7. Impact of Different Advertising Media on Appliance Purchasers in the Northeastern U.S.

	% that looked at this medium before shopping (1992)	Which form of advertising influences your decision most?	
		1989	1996
Newspaper (tabloid inserts, circulars)	57	55	30
Television	38	32	28
Direct Mail	28	5	19
Radio	14	6	8

Source: retailer's market surveys of approximately 1,100 recent appliance purchasers

Research cited in Chapter 2 has shown that energy efficiency is generally low on the list of priorities for consumers purchasing appliances (excluding air conditioners) . Studies in the U.S. have found that energy efficiency is ranked as the fifth, sixth or seventh priority (Dyer and Maronick 1988, Brown and Whiting 1996). Surveys of recent appliance buyers in Australia and the U.K. have found energy efficiency to be among the top three consumer priorities for appliances, but these studies appear to be plagued by the problem of response bias (Gas and Fuel Corporation of Australia 1991, Strang 1996).[4]

To avoid the possibility of response bias in the measurement of priorities, I used two strategies. First, asked recent buyers about their priorities as part of a broad-ranging interview (survey in Thailand) on "appliances." Since we asked about priorities early in the interview, before mentioning our interest in energy use or energy efficiency, there is little chance of a response bias toward energy efficiency. Also, we decided to pose the question in an unprompted format, simply asking, "What were the top three factors in the purchase of your appliance?" In asking the question, we clarified which factors were the first, second, and third most important. To simplify analysis, I tallied the number of times any factor was mentioned among the top-three criteria. I did not ask about energy efficiency until half-way through the interview.

The second strategy I used was to also measure consumer priorities (in the U.S. only) as observed during my two weeks as a sales trainee at an Acme Appliance store in New Jersey. The actual observation of consumer priorities in sales transactions, and the comparison of these results with priorities reported by consumers and salespeople, provides my results with greater validity than earlier studies of consumer priorities. In observing the sales, I counted as a priority the top three features or criteria mentioned most frequently by the customers in their discussion with the salespeople. In some cases, I would ask questions to clarify the ranking of the priorities they were using. Any product-specific attributes such as side-by-side doors or glass shelves (for refrigerators) or sealed burners (for ranges) I considered as "features."

[4] The problem of response bias was discussed in detail in Chapter 2.

Figure 0.1 compares U.S. consumer priorities using the two methods: self-reporting by consumers and participant observation. The basic order of priorities is similar in both cases: features and price are the top-two priorities, followed by size, and then color. Energy efficiency ranks near the bottom of the list using both techniques: it ranks seventh using participant observation and ninth using self-reporting by consumers. The fact that both techniques produced data showing that energy efficiency was no higher than the 6th priority indicates the challenge faced by U.S. policymakers who attempt to influence consumer energy behavior through energy labeling programs. This finding reinforces the results of earlier studies in the U.S. and elsewhere which have found that energy labeling alone will have little or no impact on consumer appliance purchase behavior without an in-store "push" from salespeople (Redinger and Staelin 1991, BPA 1988, Ling and Wilhite 1992).

Figure 0.2 compares consumer priorities as measured in both countries using the same technique: self-reported priorities by consumers using an unprompted (or "free listing") format. The emphasis on priorities among U.S. and Thai consumers appears to be quite different. In both countries, price and quality were among the top four priorities. Brand name was also important in both countries, but appears to be a much more important factor for Thai consumers (61%) than for U.S. consumers (31%). We applied the term "features" to any mention by consumers of a range of product-specific attributes relating to the convenience or function of the appliance. These included factors such as side-by-side doors or glass shelves (for refrigerators) or sealed burners (for ranges). In the U.S., features were the second highest priority, after price, and were mentioned by 55% of consumers. In Thailand, features appeared sixth on the list of priorities, mentioned by just one-fifth (21%) of respondents. This likely reflects the fact that Thai refrigerators (and other appliances) are smaller, simpler, and have far fewer convenience features to distinguish one model from another than is the case in the U.S. For example, a typical U.S. consumer may want a side-by-side refrigerator with an ice-maker, through-the-door ice and water, glass shelves, sealed and humidity-controlled crispers, and gallon-jug containers in the doors. Most of these features are simply not available on the 4- to 6 cu. ft. models that dominate the Thai marketplace.

The size of the appliance was reported to be much more of a factor in the U.S. than in Thailand. The difference in the importance of appliance size (third in the U.S. at 41% versus tenth in Thailand at 6%) reflects the large size of U.S. appliances[5] and their size relative to U.S. kitchens, which are cramped with counters, cabinets, and other appliances, thus making the size and dimension of the appliance a critical factor. My interviews with U.S. consumers revealed that size is an important screening criterion for because the refrigerator or dishwasher must be able to fit through the doorway opening, or into the available space between counters. Since refrigerators in Thailand are much smaller, such considerations are less of an issue, and consumers rarely mentioned size as a screening criterion in the Thai interviews.

In terms of consumer energy policy, the most important result from these consumer-reported priorities is that energy efficiency was not among the top-three criteria in either country. The results show, however, that energy efficiency appears to be a significantly higher priority among Thai consumers buying refrigerators than among the sample of U.S. consumers I interviewed, who purchased a range of white goods, but primarily (48%) refrigerators. Energy efficiency was ranked in interviews as the fifth overall priority for Thai consumers, but the fifth priority for U.S. consumers. More than one-quarter of Thai consumers ranked efficiency within their top-three priorities (28%), while only one in 10 U.S. consumers (11%) ranked efficiency within their top-three priorities. The participant observation of U.S. sales — a more reliable indicator of actual consumer priorities — showed that energy efficiency was a top-three criteria in only one of 25 sales (4%). This strengthens my conclusion that energy efficiency is typically a much lower priority among U.S. appliance consumers than among Thai appliance consumers.

[5] The size of typical U.S. refrigerators (18-24 cu. ft.) is three to four times that of Thai refrigerators (4-6 cu. ft.).

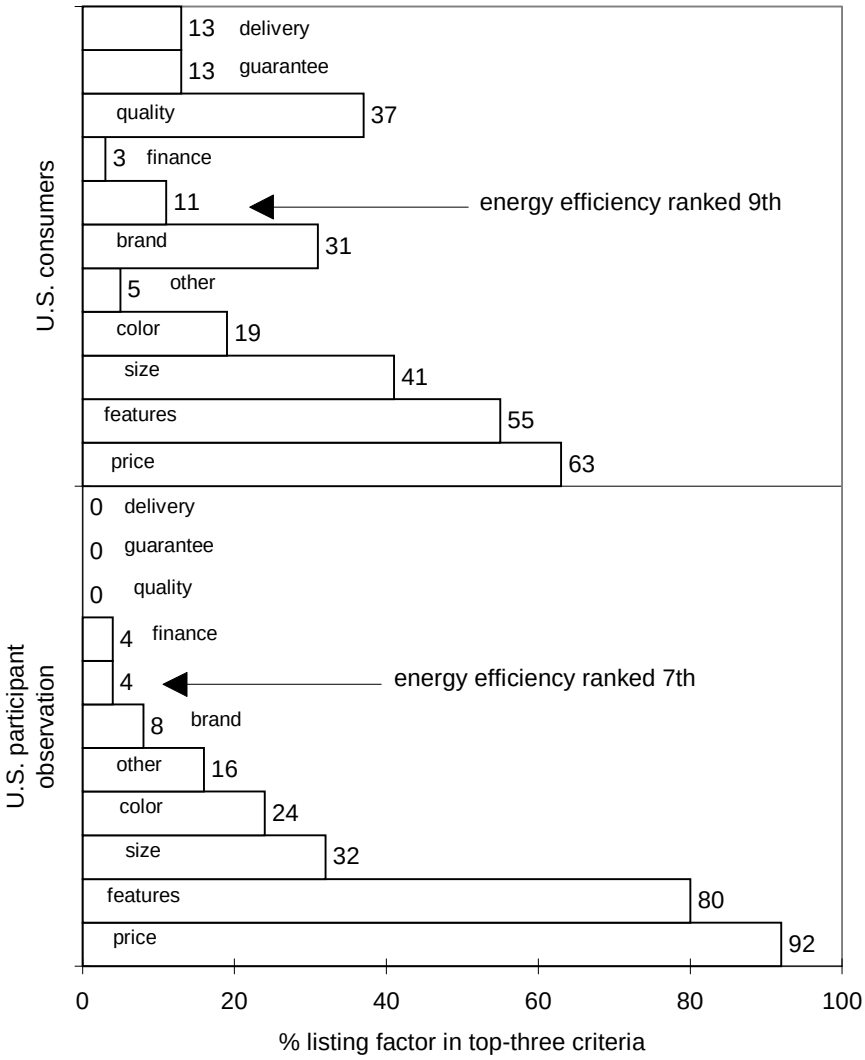


Figure 0.1. U.S. Consumer Priorities as Measured by Participant Observation and by Consumer Estimates. Based on participant observation of 25 appliance sales and interviews with 100 recent appliance purchasers in Delaware and New Jersey.

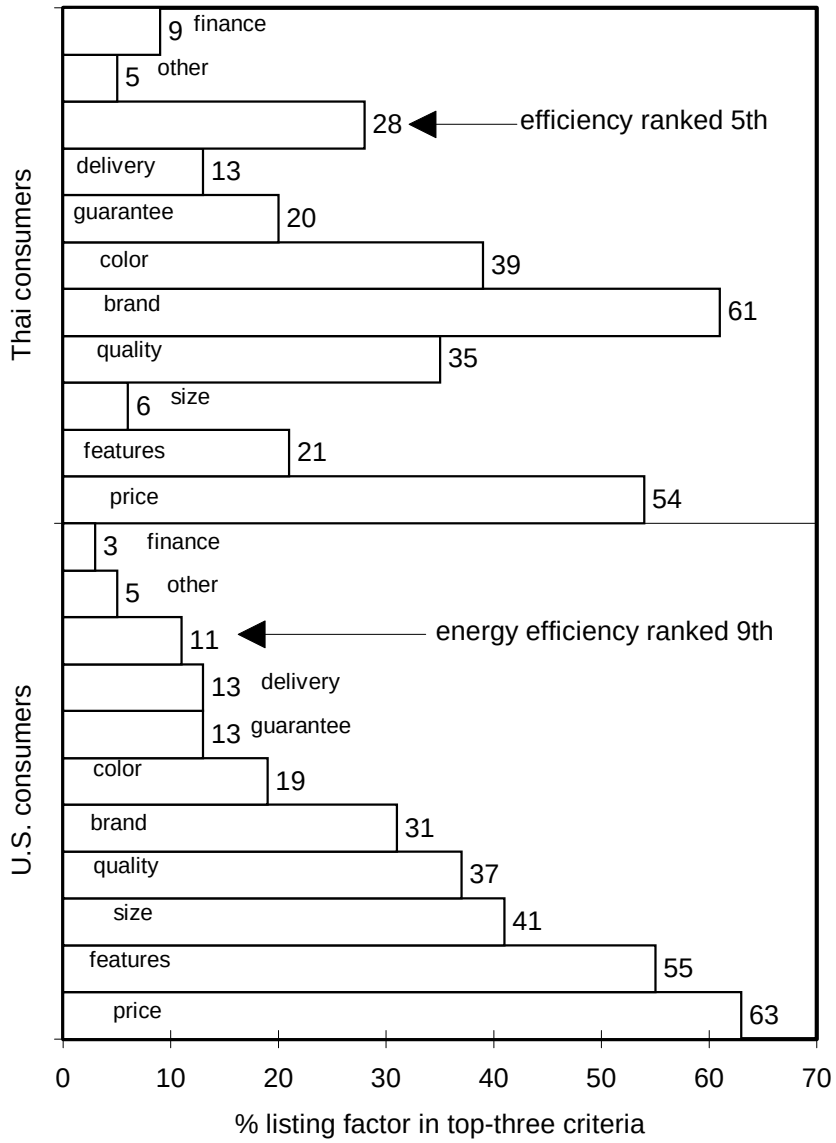


Figure 0.2. Comparison of U.S. and Thai Consumer Priorities. Based on interviews with 100 recent appliance purchasers in the U.S. (48% of whom bought refrigerators) and a survey of 366 recent refrigerator purchasers in Thailand.

Multi-Stage Decision-Making

Bettman (1979) and Verplanken (cited in de Loor and Zeelenberg 1991) found that consumers shop for appliances in a two-stage process: initially they screen all alternatives on just one or a few attributes. When the search continues, they select a smaller number of alternatives and compare these on all

available attributes. In my observation, it appears that the primary first-stage screening criteria being used by consumers in the U.S. and Thailand are price, features, size, color, and brand.

Olshavsky (1973) distinguished a third phase in the appliance shopping process. During this final stage, he found that consumers weighed the various non-product attributes (such as financing and service protection) being offered by the store. In my assessment of consumer priorities, there also appears to be a second tier of decision criteria that are used during this final stage of the decision-making process. These criteria are listed less frequently among the top-three criteria, but in a number of cases are decisive in the purchase. They relate not to the actual product itself but, as Olshavsky suggested to the conditions under which the product is purchased: guarantee, financing, delivery and availability. In my participant observation in the U.S., I noticed that these factors would often tilt the scale toward the purchase of a particular model. For example, the same model might have been available at a nearby store, but with less favorable financing terms than at Acme Appliance. Or the customer would want a specific model of refrigerator in a specific color, and they would curtail the purchase and head to another store if the product were not available for immediate delivery by Acme Appliance. The implication of considering a more complex model in which energy is a two-stage or three-stage decision process is that it provides different points at which energy efficiency, if it can be marketed effectively, can have an impact on the purchase decision.

Salience of Energy Efficiency

Given that energy efficiency does not appear to be a top-three priority for the respondents in either country, one wonders how familiar consumers are with energy efficiency and how salient a characteristic it might be when they are weighing options in the decision-making process. The results of my U.S. consumer interviews indicate that energy efficiency is not a very salient characteristic. Half of the respondents (48%) said they had no idea about energy efficiency, and 80% said they did not know their electricity rate (see Table 0.8). This latter result is particularly important, given the fact that the new U.S. EnergyGuide labels require consumers to know their electricity rate in order to calculate the annual cost of operating a home appliance in their area. In addition, most (80%) of the respondents said that they did not know the annual operating cost for the appliance that they had recently purchased.

Despite the professed lack of knowledge about energy efficiency and electricity rates, nine out of 10 consumers (92%) said that they would be willing to pay more for an energy-efficient appliance. While these types of "willingness to pay" questions typically give higher values than the decisions that people will make in practice, this result indicates promise for potential marketing efforts aimed at "green" and energy-efficient appliances.

We asked a different set of questions to assess the salience of energy efficiency in Thailand. The questions focused on peoples' awareness of their electric bills and the relative contribution of each particular appliance. We did not ask whether consumers knew their electricity rate, since there is essentially a single residential rate for the entire country, and the single operating cost that is shown on the Thai label reflects that rate. Therefore, it is not necessary for the consumer to know her electricity rate in order to know the energy cost datum needed in the appliance purchase decision — the operating cost of the appliance. The results for these questions are shown in Table 0.9.

Table 0.8. Knowledge of Energy Efficiency among U.S. Consumers

Question	%
How much do you know about energy efficiency? (N=93)	
No idea	48
Some knowledge	44
Know a lot	8
Do you know your electricity rate (in cents/kWh)? (N=64)	
Yes	20
No	80
Do you know the appliance's annual operating cost? (N=76)	
Yes	20
No	80
Would you be willing to pay more for an appliance that is energy-efficient? (N=89)	
Yes	92
No	8

Virtually all Thai respondents (>98%) were able to provide estimates of their monthly electric bill. Not surprisingly, the mean estimated bill amounts were significantly higher in Bangkok than in the rural districts. However, if one compares the monthly electric bill as a percentage of monthly income, it is roughly similar for both Bangkok and rural residents, between 3% and 4% of income.[6]

Table 0.9. Knowledge of Monthly Electric Bill and How Much Appliances Cost to Operate in Thailand

	Recent appliance buyers (N=633)
Monthly electric bill	
Can provide estimate	99%
Mean estimated value	B627 (US$25)
Range	B100-5,000
Refrigerator monthly operating cost[a]	
Can provide estimate	46%
Mean estimated value	B83 (US$3.30)
Air conditioner monthly operating cost[b]	
Can provide estimate	45%
Mean estimated value	B263 (US$10.50)

[a] This question was asked of all respondents

[b] This question was asked only of recent purchasers of an air conditioners

Notes: 25 Thai baht (B25) = US$1

[6] This rough estimate was arrived at by dividing the mean estimated electric bill for Bangkok respondents (B1,093) by their median income (~B28,000); and by dividing the mean estimated electric bill rural respondents (B503) by their median income (~B15,000).

Table 0.9 also shows differences in reported awareness of the contribution that major appliances make to their total bill. For refrigerators, more than half (54%) of the Bangkok respondents were able to provide an estimate of their monthly refrigerator bill, while fewer than one-third (31%) of rural residents were able to do so. The difference in reported awareness was smaller (but still significant) for owners of air conditioners: 45% of Bangkok respondents provided estimates, while only 38% of rural residents were able to do so. In fact, it is surprising that such a high percentage of respondents are able to estimate how much they think that their individual appliances cost to operate, since there has been no specific data available on appliance operating costs until the advent of the refrigerator labeling program in late 1994 and the air conditioner labeling program in early 1996.

To test the success of the label in educating consumers about appliance operating cost, I compared knowledge of electric bills and appliance operating costs among consumers who had purchased an appliance within the past year. Since virtually none of the DSM program's promotion media (television, radio, newspaper, brochures) includes specific information on the operating cost of appliances, any increase in awareness of appliance operating costs must be associated with consumer reading of the appliance energy label. The results, shown in Table 0.10, show only a small, statistically insignificant difference between buyers and non-buyers, suggesting that the labels have not had a significant impact in educating consumers about appliance energy costs. This finding is consistent with findings reported in Chapter 7 that only 16% of Thai consumers read the labels closely (and thus are likely to read and remember the estimated annual operating cost).

Table 0.10. Knowledge of Monthly Electric Bill and How Much Appliances Cost to Operate, among Buyers and Non-Buyers

	Buyers (N=633)	Non-Buyers (N=338)
Monthly electric bill		
Can provide estimate	99%	99%
Mean estimated value	B944	B842
Refrigerator monthly operating cost [a]		
Can provide estimate	46%	43%
Mean estimated value	B83	B60
Air conditioner monthly operating cost [b]		
Can provide estimate	45%	37%
Mean estimated value	B263	B236

[a] This question was asked of all respondents
[b] This question was asked only of respondents who own an air conditioner
Notes: 25 Thai baht (B25) = US$1

Calculating Payback Time

As another indicator of the salience of energy efficiency, we asked consumers in both countries whether they would be willing to pay more for an energy-efficient appliance, and how they would

consider recouping their investments for slightly high-first-cost, energy-efficient models. U.S. consumers generally seemed more comfortable with the concept of payback time than Thai consumers. They were also more likely to discuss differences between models in terms of operating cost and savings. This is likely due to the fact that the U.S. appliance energy labels have operating cost as the primary metric. In contrast, operating cost is in very small type on the Thai label, along with other technical product details on the bottom half of the label.

In the U.S. The U.S. consumers were more sophisticated about calculating payback time than was assumed by some of the U.S. policymakers whom we interviewed. I measured knowledge of payback awareness by asking a series of questions intended to elucidate how a respondent would decide whether to pay more for an energy-efficient unit. First, I asked whether consumers would pay more for a $600 energy-efficient refrigerator, compared to a $500 standard-efficiency unit. (As I already noted in Table 0.8, 92% responded yes.) Then I asked how they would decide whether it was worth spending the extra hundred dollars. Nearly half of the respondents (48%) articulated a quantitative payback methodology, and an additional one-third (35%) articulated a qualitative methodology. Only 17% were unable to articulate a payback methodology (see Table 0.11).

Table 0.11. Payback Times for U.S. Consumers

Question	% of 79 respondents
Can they articulate a payback methodology? (N=79)	
Yes, with quantitative response	48
Yes, with qualitative response	35
No	17
Desired payback time (mean value)	4 years

This response, from a 49-year old accountant with an MBA, is fairly typical of the quantitative methodology I observed:

> How would you decide whether it was worth spending the extra 100 dollars?
>
> Well, in that instance, depending on what the savings are, I would just multiply the savings and say, look, in three years, we would save the, the initial outlay of funds we would get back in two years or something.
>
> OK, so two or three years would be acceptable? Where would your cutoff be?
>
> Five years. I'd say that, just quickly (U.S. consumer interview no. 61).

Another consumer, a 42-year-old home health aide with a high-school degree, provided a typical example of a qualitative response. She said that she would be likely to pay more for energy-efficient appliances that she uses frequently, since they will be more likely to pay for themselves in savings.

How would you decide whether it was worth spending the extra 100 dollars?

Well, if I use it all the time it would be worth it. If I don't, like the dishwasher, I don't use it all the time, so … it's the price range, and why should I go and spend 500 dollars if I only use it maybe … and since we had it over a year, we just only used it three times (U.S. consumer interview no. 85).

And finally, this couple, a college-educated insurance auditor and a housewife with a high-school degree, provides an example of a response that lacked any apparent methodology for computing payback. They did not appear interested in the numerical calculations involved with computing the value of energy savings.

And how would you decide whether to spend that extra 100 dollars or whatever it was?

Mike: Gee, I don't know

Chris: Just decide to do it, I guess. Is that what you mean?

Yeah, would you do some sort of calculation, or how would you decide whether it was worth it?

Mike: No, we wouldn't sit down and like figure out the numbers or anything.

Chris: We would just decide (U.S. consumer interview no. 58).

The responses on payback methodology indicate that, contrary to assumptions made by policymakers, roughly half of U.S. consumers are sophisticated enough to comfortably trade off first cost and energy savings in the purchase of an appliance — if provided information in a format that is easily understandable and where the calculation is facilitated for them, as I did in my question format.

In Thailand. In Thailand, we did not include a question parallel to the U.S. question of "how would you decide whether it was worth paying the extra cost?" Our question simply asked, "If you pay more for an energy-efficient appliance, in how many years would you like to get your money back?" The results are shown in Table 0.12. We found that 19% of consumers were unable to respond when asked the length of time in which they would want to recoup their investment for a higher-first-cost, energy-efficient appliance. The ability to answer this question was significantly higher for Bangkok than for rural residents, and for men than for women. These differences indicate possible roles for education and gender in determining consumer ability to make trade-offs between first price and energy savings when buying an appliance. Bangkok residents reported a longer desired payback time than rural residents, and males reported a shorter payback time than female respondents.

Table 0.12. Payback Times for Thai Consumers

Question	Data by Location of Interview		Data by Gender		Data for Entire Sample (N=633)
	Bangkok (%)	Rural (%)	Male (%)	Female (%)	(%)
Know how quickly they want a payback?					
Yes	84	71	85	76	81
No	16	29	16	24	19
Desired payback time (mean value)	6.7 years	3.6 years	4.6 years	5.5 years	5.0 years

In semi-structured interviews with Thai consumers, I found that operating cost was not a salient factor. Discussions of efficiency tended to revolve around the numerical ranking on the label, and only rarely did respondents report comparing operating costs between units. Future research in this area should focus on the practical issue of understanding how Thai consumers use the label, and should include questions such as "Do you use the label to decide whether it is worth buying a more efficient unit?" and "How would you decide whether it is worth paying more for an energy-efficient unit?"

Awareness of the Label

Awareness of an energy label is the first step in its effectiveness, and this awareness must be followed by understanding and action. The only national survey of awareness of the U.S. labeling program was conducted in the early 1980s as part of the overall program evaluation (Dyer and Maronick 1986). This survey found that three years after the initiation of the labeling program, in 1983, 58% of refrigerator buyers and 52% of washer purchasers were aware of the energy labels. In my own pre-test interviews, conducted 13 years later in 1996, all of the consumers whom I interviewed were aware of the U.S. EnergyGuide label, and I did not include a question about label awareness in the interview protocol.

Thailand's DSM programs began quite recently: a voluntary program to switch to manufacture of energy-efficient, thin-tube fluorescent lamps began in 1993, and the energy labeling program only began in late 1994 for refrigerators and in early 1996 for air conditioners. I thus included in the Thai protocol several questions about awareness of the array of energy efficiency programs and the energy label in particular. The purpose of these questions was to measure salience of these energy efficiency programs among the general public and to see whether awareness was significantly different among buyers and non-buyers.

Table 0.13 compares awareness of the major Thai energy efficiency programs between buyers and non-buyers. The question was unprompted, so respondents had to be able to recall the name of each program independently. The results indicate the tremendous effectiveness of the national advertising and awareness campaign for the labeling program: 78% of the respondents mentioned the labeling program. The next most well-known program was the thin-tube program for fluorescent lamps, which was mentioned by nearly one-third (31%) of consumers surveyed. This was followed by advertising campaigns, which were mentioned by one-quarter (25%) of respondents. "Advertising campaigns" refers

to a number of television-based advertising campaigns, including advertisements done by the DSM Office and another Thai agency, the National Energy Policy Office, to promote its "Join Together and Divide by 2 (*ruam palang han 2*) campaign to reduce resource and energy use. Buyers were had slightly higher awareness levels for the labeling program and the advertising campaigns, which were statistically significant.

Table 0.13. Awareness of Thailand's Energy Efficiency Programs among Buyers and Non-Buyers

Program	Buyers (N=633)	Non-Buyers (N=338)	Total (N=971)
	%	%	%
Labeling program	82.6	71.0	78.6
Thin-tube lamps	29.4	32.8	30.6
Advertising campaigns	27.8	19.2	24.8
Energy saving in buildings	15.3	10.7	13.7
Energy saving in factories	1.6	1.8	1.6
Other	3.3	2.1	2.9

Table 0.14 provides a more detailed look at consumer awareness of the Thai energy label. The first label shows the response to a question about whether consumers were aware that there was an energy label on appliances. (Note that the response rate to this specific question was slightly higher than the response to the broader question asked earlier of whether consumers were aware of the energy labeling *program*.) Nine of ten Thai consumers (91%) who had recently purchased an appliance reported that they were aware of the labeling program before they went to the store, and nearly all of these respondents associated the program with refrigerators. A smaller, but still high, percentage of respondents (68%) were aware that the labeling program also applied to air conditioners. The results also indicate that the mass media campaign for the energy label has been effective among the general population, since 82% of non-buyers were also aware of the labeling program and knew that it covered refrigerators.

Table 0.14. Awareness of the Energy Label among Thai Consumers.

	Buyers (% of 626)	Non Buyers (% of 338)	Total (N=964)
Aware of Label			
Aware	91.4	82.2	88.2
Not Aware	8.6	17.8	11.8
Thought label was on refrigerators	89.1	80.5	86.7
Thought label was on air conditioner	67.5	56.2	64.0
Thought label was on other appliances	3.2	5.0	3.8

I also examined consumer understanding of the label by including a label comprehension test in my interviews (as per Lave, Murtaugh, and de la Rocha 1984 and Rogoff 1984). These results are discussed in Chapter 7.

The Role of Government in Promoting Energy Efficiency

We asked a number of questions to assess consumers perceptions about the role of government in implementing energy efficiency programs. Initially, we included these questions in the U.S. consumers interviews after hearing some of the U.S. policymakers whom we interviewed argue vociferously that minimum efficiency standards were an intrusion into the marketplace and were hurting consumers by limiting product choice. We decided to ask a parallel set of questions in Thailand to gather information on consumer views of the labeling program and the role of the government (and of EGAT, the state-owned electric generating utility) in promoting energy efficiency.

Minimum efficiency standards for appliances were an invisible policy to the majority of U.S. consumers whom we interviewed. Seven in ten consumers were unaware that minimum efficiency standards even existed for appliances. Only 17% were aware of the federal standards, and 13% said they had assumed that some sort of standards existed, but were not sure (see Table 0.15).

Table 0.15. U.S. Consumers' Views on the Role of Government

Question	% of 100 responses
Are you aware that there are national minimum efficiency standards for appliances?	
Yes, aware of standards	17
Assumed there were standards	13
Not aware of standards	70
Are such standards an appropriate role for government?	
Yes	82
No	18
Is requiring energy labels an appropriate role for government?	
Yes	98
No	2

We found broad support among consumers in both countries for a government role in promoting energy efficiency. In the U.S., 82% of respondents said that minimum efficiency standards were an appropriate role, while nearly all of the respondents (98%) said that requiring the EnergyGuide labels was an appropriate government role.

In Thailand, we asked buyers and non-buyers about their views on the government programs. Nearly all of the respondents (98%) expressed support for the government's role in the appliance labeling program, and three quarters (76%) expressed a desire to see the government do more to promote energy efficiency (see Table 0.16). These views were not sensitive to gender differences, but support for

additional government actions to promote energy efficiency was significantly lower in rural areas (64%) than in Bangkok 84%).

Table 0.16. Thai Consumers' Views on Role of Government

Question	Total (% of 971)
Is labeling program appropriate? (N=629)	
Yes	98
No	2
Would you like to see government do more on energy efficiency? (N=629)	
Yes	76
No	15
Don't know	9

In the U.S., the support for a strong government role in energy efficiency seemed to reflect a distrust of manufacturers and a desire to have comparative product information provided by a reliable source. One consumer responded that energy labeling "goes right up there with unit pricing for canned goods in a grocery store." Here are two other typical responses, from a 37-year-old police office with two years of college education, and then a 46-year-old attorney with a business degree and a masters in religion:

> [The government should] Not so much set the standards, but at least have a — sure for safety purposes and efficiency wise, sure. Yeah, I mean, the manufacturers would be pushing out shit if there wasn't some standard for them to produce a product that was reliability and within a certain range — you know what I mean, efficiency range. People are looking for efficiency (U.S. consumer interview no. 50).

> That's why I say it [standards and labeling][7] is the proper role of government. I'm not a big government person, you know, but this is the exact area where the government should require that information be displayed in the appropriate manner that the average person can look at and make a reasonable decision. 'Cause the marketplace won't require this. The marketplace won't reflect this anywhere in price or value or sales, and there's no incentive to put it in here, so that's why government has to act on this. But there's no incentive in the system, from sales all the way to manufacturing, to inform the consumer (U.S. consumer interview no. 56).

Both of these respondents indicated an initial reluctance to have government intrude into too many areas, and this distrust of government was a very common reaction among consumers we interviewed.

[7] This respondent felt that both minimum efficiency standards and energy labeling were appropriate government activities.

Yet both also articulated their feeling that there is a market failure and that government plays an important role in protecting consumers — against decisions by manufacturers to produce low-efficiency equipment — by setting standards and providing clear product labeling and information.

The Thai respondents voiced similar sentiments and seemed highly supportive of a policy designed to help consumers save money on appliance operating costs. A 24-year-old Khorat native, who recently received his college degree in marketing, was clearly concerned about the environmental problems that Thailand is facing and felt that the government could play a critical role in providing unbiased information and leading public campaigns on environmental causes.

> Yes [the government energy efficiency programs are appropriate], how will villages know which ones will save energy? They don't take an interest in or study this information. So the government has to prompt what is good … in my feeling, whatever the government supports and advertises, I will use in my house. For example, on the environment, they are saying that we should use white cloth instead of died cloth, so we are trying to use undied cloth (Thai consumer interview no. 38).

Another respondent, a 36-year old management consultant with a bachelor's degree in engineering and an M.B.A. degree, voiced similarly strong support for a government role, but at the same time expressed reservations about the equity impacts of the air conditioner labeling program.

> I totally agree with the [appliance energy labeling] program, because this campaign helps people to see the big picture and that we should help save energy. The problem is the difference in purchasing power. Most of the purchasing power is with the middle class, and it is easier for them, say, to buy air conditioners with labels. But people without much money will buy the "no name" brands, which costs 10s of thousands of baht less (Thai consumer interview no. 8).

He is referring to the price differential between the top-tier of air conditioners (imported models and the better domestic brands capable of achieving a 4 or 5 rating) and low-end air conditioners that he refers to as "no-name" brands. The price of a one-ton, high-end model ranges from approximately B25,000 to B40,000 (US$1,000-1,600), while a one-ton, low-end unit can sell for as low as B10-12,000 (US$400-480) or less.[8] He is concerned that the labeling program for air conditioners will do nothing to help the poorer consumers, especially villagers, who on the one hand, do not have enough money to pay the extra B10,000-20,000 first cost for an efficient unit and will, at the same time, be penalized with much higher energy bills for buying the cheaper unit.

Linkages with the Environment

The final section of the consumer interview protocol and survey examined the linkages between appliances and environmental issues. The goal of these questions was to elucidate the salience of the

[8] These units are commonly referred to as Btu/per baht (*B.T.U. tor baht*) units, which means that they cost, roughly, 1 baht per Btu of cooling power.

environment in the retail appliance market. Little research has been done in this area. In Chapter 2, I discussed Dunlap's survey of environmental polling (1991) and the high percentage of Americans who associate themselves favorably with environmental issues. Dunlap poses the question as to how much the favorable public attitudes toward the environment translate into behaviors and actions. Initial research for the Energy Star Retail Labeling program in the U.S. found that the most effective in-store appeal for promoting energy-efficient appliances was an emphasis on lower utility bills, followed by performance, and then protecting the environment (DOE 1995). However, like other studies by energy researchers, this study had problems with response bias, since the researchers "telegraphed" their primary interest in energy efficiency early in the interview.

In both countries, the respondents expressed a high level of concern for the environment: 66% of the U.S. respondents and 58% of the Thai respondents said that they were either very concerned or extremely concerned about the environment (see Table 0.17). However, for most of the U.S. respondents, this high level of concern did not factor into the appliance purchase decision. Only one-quarter of respondents (27%) said that their environmental concern *did* affect their purchase decision. When we asked whether the environment *could* affect the purchase decision, the positive response was slightly higher, at 37%. Unfortunately, we did not ask this question of Thai consumers, so we were not able to estimate the percentage of Thai consumers for whom the environment did or could play a role in buying an appliance.

When asked more generally about the environment and appliances, we got very high response rates. Seventy-nine percent of the U.S. respondents said that they would consider other environmental factors besides energy use when buying an appliance. And 76% of Thai consumers said that buying and using an appliance had an impact on the environment.

When consumers were asked to list the environmental impacts of appliances, CFCs and the ozone layer had the highest response in the U.S. (37%), followed by pollution (16%), water use (11%), and disposal (10%). In Thailand, pollution had the highest response (48%), followed by CFCs and the ozone layer (44%), and water use (18%). Based on these results, it appears that the Thai respondents are more inclined to link appliances to environment pollution. This may have to do with controversies in recent years about the siting of large power plant projects (including dams and lignite-fired plants) and the very high level of publicity that the issue of power generation has generated.

Despite the high level of concern for the environment shown in the above survey data, our interviews with consumers in both countries left me with the impression that there is little linkage of the environment to appliance purchases, either as awareness or a stimulus to change behavior. The U.S. responses seemed to fall into two main categories. The majority of consumers appeared to see no link, or to have never really thought about the environment while buying an appliance. Ken, a 49-year old electric engineer, explained to me why the issue of the environment never occurred to him while he was shopping for a dryer. His response, more thoughtful than most, explains the typical disconnect of most consumers between the appliance that they plug into the wall and the environment problems they read about in magazines or newspapers or see on the evening news.

> I don't think the average consumer necessarily looks that far into it, that far ahead, to realize that, uh, a common, ordinary household appliance has an effect — you know something other than a heating system. The heating system, if not set up properly, belches exhaust fumes out of the chimney. You can see the results of that, you know it's doing something, but typically one doesn't think of refrigerators, and dryers, and appliances of that sort, dishwashers as having any real effect on the environment in one way or another (U.S. consumer interview no. 98).

Table 0.17. The Relationship Between Appliances and the Environment for U.S. and Thai Consumers.

Question	U.S. (% of 100 responses)	Thailand (% of 633 responses)
What is your level of environmental concern? (N=69)		
Not concerned	1	1
Somewhat concerned	33	41
Very concerned	51	52
Extremely concerned	15	6
Did your concern for the environment affect your purchase? (N=89)		
Yes	27	na
No	73	na
Could your concern for the environment affect an appliance purchase? (N=65)		
Yes	37	na
No	63	na
Does buying an appliance affect the environment?		
Yes	na	76
No	na	24
Are there environmental factors besides energy use that you would consider when buying an appliance? (N=93)		
Yes	79	na
No	21	na
Environmental factors listed		
CFCs/ozone	37	44
Water use	11	18
Recyclability/re-usablity	7	0
Pollution	16	48
Disposal	10	0
Other factors	16	6

A smaller group of consumers said that they were very concerned about the environment, but didn't factor it into their purchase decision because they assumed that the government would set standards to deal with any environmental problems or impacts. One man, a 77-year-old retired prison worker, succinctly stated why the environment was not even on his radar screen when he shopped at the appliance store: " Because, I would assume that anything we bought would probably be a littler better than what we got. That one's twenty years old." For him, the government has a role to protect the environment by increasing standards and improving the quality of products in order to limit their environmental impact. Because government is taking care of this, he did not actively consider this criterion (the environment) when he shopped for an appliance.

I found the environment to be more salient with Thai consumers, who were more likely to either link appliance usage to general environment pollution or to mention the impact of CFCs. I attribute the

higher salience of the environment to two factors: one is the fact that 1997 was the first year that CFCs were beginning to be widely phased out by Thai refrigerator manufacturers. As a result, most of the five manufacturers has budgeted extensive television advertising campaign touting their models as being CFC-free The second factor has to do with the way the energy labeling program is being marketed. Unlike the U.S. labeling program, which has no advertising or promotional budget, the Thai program is one of the largest television advertising campaigns in the country. And the message that the Thai DSM Office is broad and emphasizes the environmental aspects of energy saving: "save your money, save our energy, save the environment" (Ratanopas 1996). Yet despite the higher salience of the environment among Thai consumers, I found little evidence that it was being used by Thai consumers as a criterion in their appliance purchases.

The linkage of environmental issues to appliances were much weaker for the Thai villagers we interviewed. In fact, rural respondents tended to have an entirely different interpretation of the question from what we intended. For most of these villagers, environmental problems such as water and air pollution, and traffic congestion are things they read about in the newspapers but do not experience in their villages. The environment impacts that they link to appliances have to do with the improvements offered by the amenity of the appliance.

> Yes. It [a refrigerator] definitely has to have an impact [on the environment]. If you have a refrigerator, you don't have to go to the market every day. If you don't have a refrigerator, it's difficult. There has to be a refrigerator to keep meat so it doesn't spoil. When your children come back home, you have food to eat. The food doesn't spoil. Before, your food would spoil! (Thai consumer interview no. 45).

Like many other villagers we interviewed, the environmental linkage they make to appliances is a benefit: the fact that the refrigerator allows them to keep food longer, travel less frequently to market, and reduce spoilage. They are not cognizant of the environmental impacts associated with the production of power to operate the appliance and would not appear to be susceptible to environmental marketing campaigns.

Conclusions

Roughly two-thirds of both U.S. and Thai consumers indicated that they conducted some sort of information search before going to the appliance store. U.S. consumers relied primarily on newspapers and *Consumer Reports* articles, as well as discussions with friends. In Thailand, the primary information source was reported to be television; in contrast, not one U.S. respondent indicated that they had gotten information from television. The key finding related to information search is that 30-40% of consumers in both countries had no information on their appliance options before entering the store. This supports the assertion of salespeople that they have significant influence over the appliance purchase decision in at least half of sales (see Chapter 5). This finding also supports Beales' (1981) conclusion that government agencies promoting energy efficiency need to realize that they are competing with retailers for the attention of the consumer.

The question of consumer priorities is critical to an understanding of how to market energy efficiency. My findings support previous research which has shown that energy use is not a high priority during the typical consumer's decision-making process. This study is unique in that unlike any other

previous study, I used two techniques to assess consumer priorities: self-reporting by consumers and participant observation in the store environment. In the U.S., energy efficiency was among the lowest of purchase priorities and was a top-three purchase criteria in only about 10% of sales. In Thailand, while energy efficiency ranked just fifth on the list of priorities, it was mentioned by 28% of respondents as being among their top-three purchase criteria.

My observations support earlier findings that the consumer appliance purchase is a multi-stage process. It appears that the primary first-stage screening criteria being used by consumers in the U.S. and Thailand are price, features, size, color, and brand. Remarkably, energy efficiency is also among the first-stage screening criteria for Thai consumers. There also appears to be a set of decision criteria that are used during the final stage of the decision-making process. These criteria are listed less frequently by consumers among the top-three criteria, but in a number of cases appear to be decisive in the purchase. They relate not to the actual product itself but to the conditions under which the product is purchased: guarantee, financing, delivery and availability. In my participant observation in the U.S., I noticed that these factors would often tilt the scale toward the purchase of a particular model. The implication of considering a more complex model in which energy is a two-stage or three-stage decision process is that it provides different points at which energy efficiency, if it can be marketed effectively, can have an impact on the purchase decision.

Just two years after the start of the Thai energy labeling program, nine out of ten Thai consumers who recently purchased an appliance were aware of the labeling program and nearly all of these associated the program with refrigerators. This is much higher than the ~50-60% awareness rate that Dyer and Maronick (1988) found among U.S. appliance consumers in 1983, three years after the initiation of the U.S. labeling program. These findings reflect the effectiveness of the national television advertising campaign launched by the Thai DSM Office. The campaign has also been effective among the general population, since more than 80% of the non-buyers we surveyed were also aware of the appliance energy labeling program.

U.S. consumers generally seemed more comfortable with the concept of payback time than Thai consumers. They were also more likely to discuss differences between models in terms of operating cost and savings. This is likely due to the fact that the U.S. appliance energy labels have operating cost as the primary metric. In contrast, information on appliance operating cost is provide in very small type, along with other technical product details on the bottom half of the Thai label.

We found broad support among consumers in both countries for a government role in promoting energy efficiency. In the U.S., four out of five respondents said that minimum efficiency standards were an appropriate role, while nearly all of the respondents said that requiring the EnergyGuide labels was an appropriate government role. In Thailand, nearly all of the respondents expressed support for the government's role in the appliance labeling program, and three quarters expressed a desire to see the government do more to promote energy efficiency.

I found the environment more salient in my conversations with Thai consumers, who were more likely than U.S. consumers to either link appliance usage to general environment pollution or to mention the impact of CFCs. I attribute the higher salience of the environment among Thai consumers to two factors: one is the fact that 1997 was the first year that CFCs were beginning to be widely phased out by Thai refrigerator manufacturers. The second factor has to do with the extensive national marketing campaign to promote awareness about the program, and the fact that the campaign has a significant environmental message. Yet despite the higher salience of the environment among Thai consumers, I found little evidence that the environment was being used by either Thai or U.S. consumers as a criterion in their appliance purchases.

Chapter 7

UNDERSTANDING APPLIANCE ENERGY LABELS

Abstract

This chapter shifts from the macro level to the micro level to focus on consumer cognition of the U.S. and Thai appliance energy labels. Only a small minority of consumers in either country reported that they read the labels carefully, suggesting the need to provide a clear, simple message on the appliance label in large, bold font. In my tests of detailed label interpretation, the U.S. EnergyGuide label fared poorly. Most respondents were able to interpret operating cost, but fewer than half were able to interpret whether the label represented an efficient model. In contrast, the Thai label was significantly more effective at assisting consumers to identify efficient models. A common response from consumers in both countries was that the labels were too detailed and not easy enough to read. Consumers often seemed overwhelmed by the technical nature of the information presented in the labels. My recommendation is to compartmentalize the detailed, technical, product information so that it does not impede understanding of, and access to, the primary label information. This will assist the large majority of consumers who might be interested in energy efficiency, but are not technically oriented.

Introduction

This research addresses for the first time appliance energy labels as a problem of cognition in context. It reports the results of in-store tests of consumer understanding appliance energy labels. In Chapter 2, I reviewed the previous literature on energy labels. Simple, non-cluttered designs have been found to be the most effective (Pirkey et al. 1982, BPA 1987, Carswell, Langel, and Borison 1989, Patterson 1991, de Loor and Zeelenberg 1991, Daamen, Weenig, and Zeelenberg 1992). Labels that have only text are much less effective than labels with graphic elements (Weenig and Maarleveld 1993). Researchers have also found that it is important for the label to have a primary message or theme conveyed with either a logo, or large, bold type that can be seen from a distance (Pirkey et al. 1982). They suggested that this primary theme should not be "masked" by extraneous product details (de Loor and Zeelenberg 1991).

There is evidence from one study that energy labels that use a categorical rating scheme are easier for consumers to remember than are labels using a continuous scale (Weenig and Maarleveld 1993). Recent research conducted on energy-billing designs yielded the surprising result that distribution-type graphs were slightly easier for consumers to understand than bar graphs, suggesting that the bar graph used as a scale of relative energy use on the U.S. EnergyGuide label may not be an optimal design (Egan 1997). Research findings on the optimal metric for consumer comparisons of energy efficiency are divided. A Canadian study recommended energy use, expressed in kilowatt-hours, as the preferred metric for comparing energy use; however the underlying data from the study did not support this recommendation, since kilowatt-hours were "unfamiliar or obscure" to the majority of respondents (Patterson 1991).

This chapter reports the results of an in-depth evaluation of consumer comprehension of the U.S. and Thai energy labels. My broad-ranging interviews with consumers in both countries investigated how

consumers in fact read the labels, interpret the different elements, and draw conclusions from this information for their purchase decision. This chapter evaluates label effectiveness, as measured by how easily consumers can read, understand, and explain them. It begins with a discussion of how consumers read the labels.

Whether and How Consumers Read the Energy Labels

One of the first questions to ask in assessing the effectiveness of any product labeling program is whether consumers actually look at and read the labels. I asked this question of salespeople and consumers in both countries in an effort to develop a better estimate of how often the labels are actually read. U.S. salespeople reported than fewer than 20% of appliance shoppers look at or ask about the label. In Thailand, salespeople estimated that more than 60% of consumers would look at or ask about the label.

Consumers themselves reported paying greater attention to the labels. In the U.S., 71% responded that they looked at the label; the corresponding figure for Thailand was 76% (see Table Chapter 7 .1). However, only a small minority of consumers reported that they read the label carefully — 26% in the U.S. and 16% in Thailand. It appears that most consumers glance at the label briefly or read it in passing, suggesting that there should be a clearly focused message on the label in large type that conveys one main idea. Any additional detail in small print must not clutter the label and thereby mask the primary message (de Loor and Zeelenberg 1991). Only 16 to 26% of consumers read the label in detail, but these are the consumers most likely to use the label as a decision tool in their purchase.[1]

Table Chapter 7 .1. Percentage of Thai and U.S. Consumers Who Look at the Label.

Did You Look at the label when shopping?	United States (N=73)	Thailand (N=425)
No, did not look at label	29	25
Yes, looked at label, of which:	71	76
Yes, looked carefully	26	16
Yes, looked in passing	45	60

[1] Pirkey et al. (1982) studied the design of the original U.S. Fuel Economy Label for automobiles and discovered that consumers found the label confusing. They decided that it was important to clearly convey the concept of "fuel economy information" to consumers using a large logo that would be visible from across the car showroom floor. DOE revised the label with a large gas pump logo, and also incorporated two fuel economy ratings — one for city mileage and one for highway gas mileage — set in very large type. Despite these efforts to simplify the label and provide a clear central message, the most recent evaluation of the Fuel Economy Label (completed in 1990) revealed that many consumers and salespeople (percentage not quantified) thought that the label still "contained too much information and was confusing" (Hill and Larsen 1990).

Interpreting the Labels

In each country, I tested label comprehension by showing consumers the energy label and asking a series of questions. The methodology is described in Chapter 3. My test of label comprehension was more rigorous in the U.S., and I did not use parallel methodologies in the two countries, so I cannot directly compare the results. In the U.S., I tested label comprehension by showing respondents sample labels during a five-minute segment of a 15-minute in-store interview with 85 consumers. In Thailand, I conducted a less rigorous comprehension test, but supplemented this with questions about label awareness on the national survey of 971 Thai consumers. The U.S. results provide more insight into how consumers interpret and understand the label, while the Thai results provide a larger sample of data about how the label is used in the shopping process.

Interpreting the U.S. Label

After conducting several initial interviews with U.S. consumers in March 1996, I realized that few consumers appeared to fully grasp the meaning of the yellow EnergyGuide labels, which are required by law to be posted on the front of seven categories of household appliances.[2] To test consumer cognition of the labels, I added a short section to the interview protocol in which I asked respondents to describe in their own words the meaning of two sample EnergyGuide labels for refrigerators: the original EnergyGuide label, which has been in use since 1980, and the revised EnergyGuide label, which was introduced in a 1994 ruling by the Federal Trade Commission (FTC 1994). Today, in U.S. appliance stores, there are both "old" and "new" labels, and eventually the "old" label will be phased out. The actual EnergyGuide labels that I used in my in-store comprehension test are shown in Figure Chapter 7 .1 and Figure Chapter 7 .2.

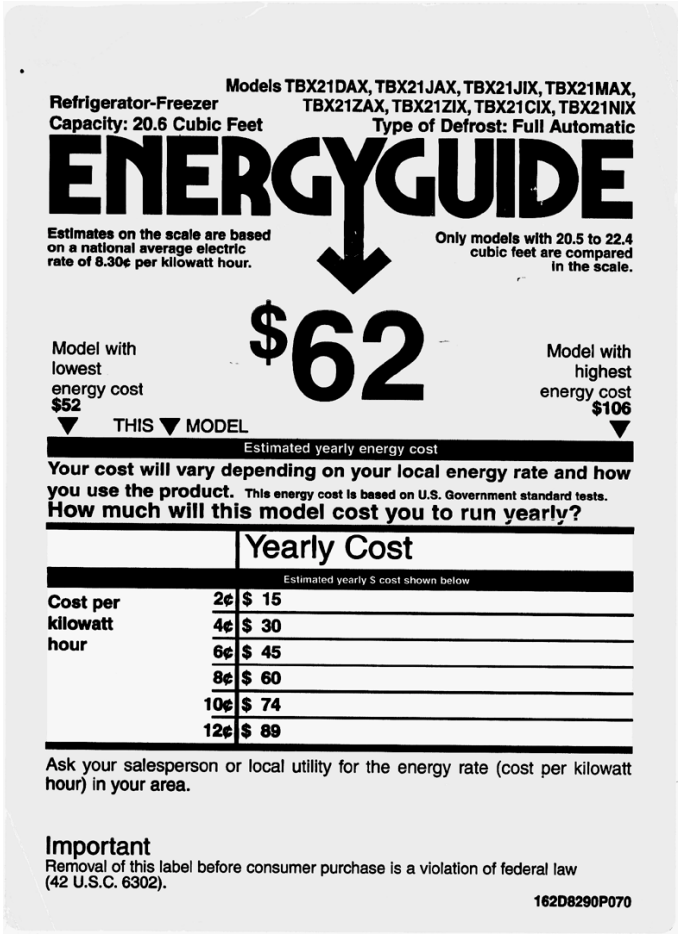
I began by showing consumers the old label and asking, "One of the things I'm doing is studying how easy the energy labels are to understand. Can you tell me what's going on here?" I followed this up by prompting the respondent to describe difficult aspects of the label. The methodology is described in Chapter 3. This set of questions allowed me to measure the length of time it took the consumer to understand each label as well as the extent to which they were able to accurately interpret four different aspects of information presented on the label: operating cost, efficiency, scale of energy use, and the table showing operating costs at different energy prices (for the old label only). The results of the label comprehension test are shown in Table Chapter 7 .2.

Time. Since I taped the interviews, I could easily measure the elapsed time required for understanding. I set the following criterion: since there are a number of different label elements (operating cost, relative efficiency, energy usage, etc.), I counted the elapsed time until a respondent had clearly shown that she understood (or thought she understood) the meaning of any two primary label elements.

Early on in my experience as a sales trainee, one of the salesmen said to me that if a customer doesn't understand something within about seven seconds, it's too long and you will lose them. He said that this was the problem with the EnergyGuide labels; they take too long for the average consumer to read and understand. In my evaluation of label comprehension, neither label passed this salesman's seven-second test. For the old label, the average time was 43 seconds and the range was from 5 seconds to as long as

[2] The labeling rules have been laid out by the U.S. Federal Trade Commission (FTC 1979; FTC 1994).

113 seconds. For the new label, even with the learning effect, the average time was 32 seconds, and the range was from 11 seconds to 102 seconds.



Refrigerator-Freezer
Models TBX21DAX, TBX21JAX, TBX21JIX, TBX21MAX, TBX21ZAX, TBX21ZIX, TBX21CIX, TBX21NIX
Capacity: 20.6 Cubic Feet
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 8.30¢ per kilowatt hour.

Only models with 20.5 to 22.4 cubic feet are compared in the scale.

$62

Model with lowest energy cost $52

THIS ▼ MODEL

Model with highest energy cost $106

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

		Yearly Cost
		Estimated yearly $ cost shown below
Cost per kilowatt hour	2¢	$ 15
	4¢	$ 30
	6¢	$ 45
	8¢	$ 60
	10¢	$ 74
	12¢	$ 89

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important
Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302).

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Figure Chapter 7 .1. The "Old" EnergyGuide Label Used in Label Comprehension Test with U.S. Consumers.

Unfortunately, I tested the labels in a sequential manner, always showing customers the old label first, followed by the new label. As a result, any direct comparisons of understanding would be invalid, since there would always be a tendency for consumers to more easily interpret the new label, after already having learned something from the experience of trying to interpret the old label first.[3]

[3] After having performed this label comprehension test and analyzed the data, I concluded that if I do a similar experiment in the future, I will alternate the label presentation (i.e. old followed by new, then new followed by old, and so one) to allow me to make direct comparisons of consumer comprehension between the two labels.

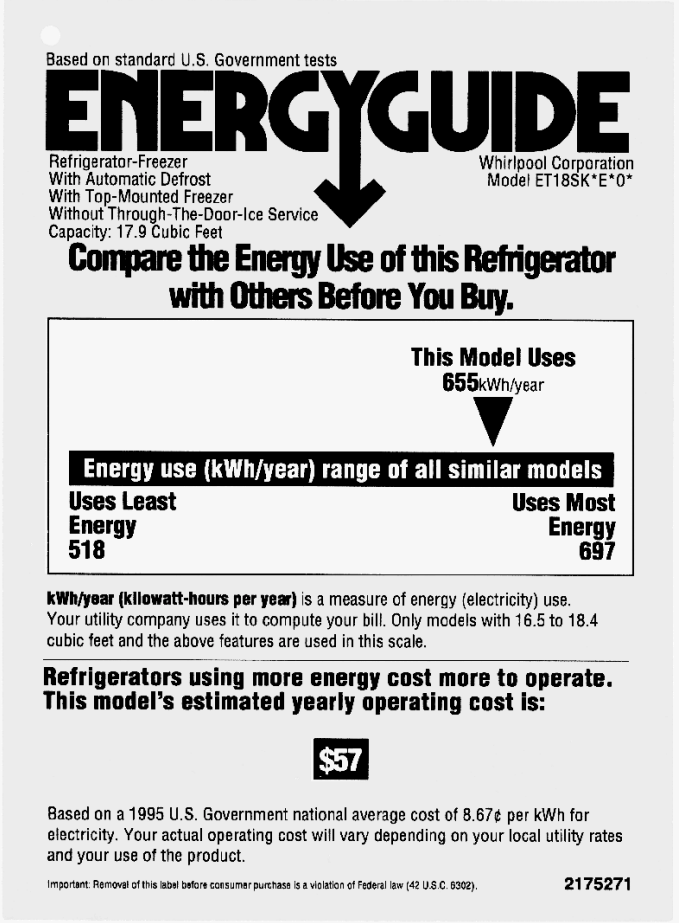

Figure Chapter 7 .2. The "New" EnergyGuide Label Used in Label Comprehension Test with U.S. Consumers.

All of the responses shown in Table Chapter 7 .2 indicate *how much the respondent understood after taking as much time as she wanted.* This was, on average, 30 to 40 seconds. In a store purchase with no participant observer, few consumers would be likely to spend this much time trying to understand the meaning of the label unless they were very interested. And we have seen from data presented in Table Chapter 7 .1 that only ~16-26% of consumers report that they take the time to carefully read energy labels on appliances.

Operating Cost. Operating cost was the most salient characteristic of the U.S. labels. Fifty-nine percent of respondents were able to correctly interpret the operating cost from looking at the old label. An additional 11% were able to interpret the operating cost with some prompting and 7% got the answer partially correct (e.g., one woman realized that the scale showed operating costs but interpreted them to be a range of operating costs for this appliance under different conditions). Nearly one-quarter of respondents (24%) were unable to use the old label to discern appliance operating costs at all. As one would expect, the scores for the new label were slightly better: nearly two-thirds of the respondents (64%) could discern operating cost without any guidance. Only 13% were unable to discern operating

costs at all. In addition to the learning effect, there is another important reason for the higher comprehension of operating cost on the new label: unlike the old label, it has text clearly stating that this figure represents operating cost. It states specifically that "Refrigerators using more energy cost more to operate. This model's yearly operating cost is $___."

One of the biggest flaws in the old label is the lack of clear labeling of the elements. This was borne out in discussions with consumers about the meaning of the large dollar figure on the label. Nearly one-third of the respondents (32%) thought that the dollar number referred to the amount that the consumer would *save* each year, not the annual operating costs. Even after extensive prompting (to stimulate a closer look at the label and to get consumers to read the fine print more carefully), nearly one-quarter of respondents (24%) still believed that the label showed *savings* (see Table Chapter 7 .2).

This exchange with a 42-year-old librarian with a masters in library science shows the common tendency among consumers to initially mistake the large dollar amount at the top of the old label as annual savings, rather than operating cost:

> Well, this — I'm assuming that it saves you 62 dollars a year. And it gives you the yearly cost … for different models, and how much kilowatts they cost, so …
>
> *OK, so what would the yearly cost of this be for you?*
>
> I guess it would be 62 dollars … It says "this model."
>
> *And you just said that's — when you started looking at it, you said you're assuming that's how much you <u>save</u> per year.*
>
> But I guess it's not. I — I don't know.
>
> *Do you find this confusing?*
>
> Yeah (U.S. consumer interview no. 16).

In another case, the respondent, a 44-year old carpenter with a ninth-grade education, assumed that the whole purpose of the label is to show energy savings and, despite the small print saying "annual operating cost" and "cost per year," he assumed that both the large dollar amount at the top and the dollar amounts on the kWh-cost table represented the amount a consumer will save:

> [long pause while he reads the label] …it tells you the size of the refrigerator, between a 20.5 to 22.4 cubic feet. And then 62 dollars is — I don't understand. What's that, yearly? If that's yearly or not. And … and with this, this chart here it's 2 cents cost per hour on a kilowatt, and you save like 15 dollars a year. 12 cents up to 86 dollars.
>
> *So what's the 62?*
>
> I'm assuming the 62 is you save 62 dollars a year on electricity, if I'm not mistaken (U.S. consumer interview no. 100)

Table Chapter 7 .2. Detailed Interpretation of the U.S. EnergyGuide Labels.

	Old Label (% of responses)	New Label (% of responses)
Time to understand at least 2 major facets of label (mean value) (N=76/73)	43 seconds	32 seconds
Correctly interpret operating cost? (N=85/75)		
Yes	59	64
Yes, with guidance	11	15
Partially correct	7.1	8.0
No	24	13
Correctly interpret whether unit is efficient? (N=77/75)		
Yes	42	55
Yes, with guidance	12	6.7
Partially correct	3.9	6.7
No	43	32
Correctly interpret meaning of scale? (N=82)		
Yes	33	53
Yes, with guidance	11	6.5
Partially correct	24	9.1
No	32	31
Correctly interpret meaning of table? (N=75)		
Yes	40	na
Yes, with guidance	1.3	na
Partially correct	16	na
No	43	na
Interpretation of scale (N=82/77)		
Scale refers just to this model	9.2	na
Scale refers just to one brand	5.3	na
Interpretation of table (N=75)		
Think table can be used to calculate hourly operating cost of unit in ¢/kWh	9.3	na
Think label shows annual savings:		
Just initially	8	na
Throughout the interview	24	na

na = question not applicable to new label

Notes: since the new label was always shown *after* the old label, one cannot directly compare the response rate times between the two labels; the learning effect made it likely that consumers would respond more quickly and more correctly to the new label after they had seen the old label. Also, the number of respondents varied slightly for each question because of the open-ended format of the comprehension test (i.e. a few respondents did not see or discuss some label elements). This might introduce a potential bias that could inflate the score, but only by a few percent (~ <5%). "Yes with guidance" indicates that the respondent required some prompting before they were able to explain a facet of the table. "Partially correct" means that a respondent understood a facet, but not fully, such as concluding that the scale showed relative energy use for one brand of models rather than for models of all brands within a particular size range.

In a few cases, I was surprised that even people with very technical job experience and advanced degrees could be so completely wrong in their interpretations of the label. The following respondent is a 47-year-old marketing manager for a company that supplies electrical equipment for substations and power plants. He has a bachelor's degree in electrical engineering and a master's in business administration:

> *Can you tell me what's going on here, what the numbers mean [I point to the old label]?*
>
> I had a problem with that myself. I would have much preferred to see what the energy cost - or the energy usage is over the year, and the rate that they use to calculate what the cost is, and the savings and what it would be. In other words, uh, they don't give you an idea of — well they say here 8 ¼ cents per kilowatt-hour, that's almost half of what I pay. I mean so that's not realistic, but technically speaking that would mean that I was gonna save a hundred and twenty dollars on that product, versus buying something else.
>
> *So what does this 62 dollars mean?*
>
> That means — in my mind, that means I'm saving 62 dollars a year. [Text deleted.]
>
> *OK, what about these numbers down here [I point to table at bottom]?*
>
> It's estimating at 10 cents a kilowatt-hour what your savings would be, at 12 cents a kilowatt-hour what your savings would be, and for this model, technically, I'd be saving 78 dollars [since he knows his rate is 12 cents], but it doesn't give you an understanding of what you're comparing it to.
>
> *Now they have a new label right here [show him new label]. Is this any easier to understand? All new appliances are going to have this label.*
>
> So this is telling you how many kilowatt-hours a year, so that's the total usage … and this gives you a range. Now this tells you how much it costs to operate, it doesn't tell you how much the savings are, it just tells you how much it would cost to operate per year (U.S. sales interview no. 38)

This exchange shows a complete failure by the consumer to overcome his initial assumption that the old label shows energy savings, even though the fine print of the label indicates that the figures he interprets to be savings actually represent annual costs. It also shows that the new label, because it shows a range of energy use in terms of kWh/year, avoids the problem of consumers assuming that the label represents energy or dollar *savings*.

It is understandable that consumers might assume that the yellow label would show energy *savings*, and many of those whom I interviewed indicated that they viewed the label as an "energy savings" label. But this problem does not necessarily mean that dollars are an ambiguous metric. In fact, the misunderstanding can easily be avoided with clearer typesetting, such as the use of large-font text besides the dollar amount saying "cost per year." On the old label, the words "yearly operating cost" are set in

very small reverse type in a bar underneath the dollar amount, and many of the consumers did not read or notice this small text.

Efficiency. I compare the ability of the U.S. and Thai labels to convey the concept of efficiency in an later section. Only 42% of U.S. respondents were able to tell me whether the old energy label represented a model that was more efficient than most models (see Table Chapter 7 .2).

Scale. The EnergyGuide labels use a scale to show relative energy use. Visualizing the scale on the label is the first step toward understanding how relatively efficient a model is. Only one-third (33%) of respondents were able to tell that the horizontal bar graph on the old label represented a scale of relative energy use. Another one-third of respondents were only able to understand the scale either partially[4] (24%), or with prompting (11%). More than half of respondents (55%) were able to discern and understand the scale on the new label without any prompting; 7% needed prompting, and 9% only partially understood the scale (see Table Chapter 7 .2).

My exchange with a 44-year-old high school math teacher with a master's degree in education administration indicates how the scale is graphically much clearer on the new label. When I asked her if she could tell whether the model represented by the old label was more efficient than most models, she replied "Couldn't tell you unless you have a bunch of them in front of you to compare." When I showed her the new label, she immediately saw that the main feature of the label was a scale comparing energy use: "Well sure. Because it's telling you exactly where this one falls based on all the similar models, which is quite high, based on all similar models" (U.S. consumer interview no. 47).

The above remarks, and the compiled results, indicate that the scale on the new label was clearer, easier to see, and less ambiguous. At the same time, there appeared to be a core of about one-third of respondents for whom the graphical scale was not useful. The percentage who did not "see" the scale was virtually the same: just under one-third for both labels (32% for the old label and 31% for the new label).

The problem with partial understanding of the scale on the old label (which carried over to the new label in some cases) was a misunderstanding of the universe represented by the scale. Consumers fell into two main categories: those who thought the scale referred to all models made by just one manufacturer, and those who thought the scale referred to the range of use for just one particular model. Nearly one in ten respondents (9%) felt that the scale referred to the range in energy use for just the one model; and one in twenty (5%) thought that the scale referred to just the energy use of appliances sold by one manufacturer.

One respondent, a forty-year old businessman with a masters in economics, said, "I guess I'm — as I look at these, what's confusing is the range is just the model of that particular manufacturer. I would have thought that if you had it across all models, that would be more valuable" (U.S. consumer interview no. 31). And the comments below were made by a 39-year-old high-school graduate who assembles heaters and air conditioners at a local Trane Co. factory. As we started the label test, he expressed great familiarity with the yellow EnergyGuide labels, since labels must be applied to the products that his company makes before they are shipped.

[4] The most common kind of "partial understanding" of the scale occurred when a respondent thought that the scale showed relative energy use either for just one particular brand, for one particular model, or for all models of all sizes (i.e. they did not understand that the scale showed relative energy use for models of all brands within a certain size range).

OK, what does the 62 mean here?

[reading from label] "… estimated yearly" … Uh, it will cost you, uh, 62 dollars a year to run this, right?

OK, and then what are the 52 and the 106?

That's the lowest it will cost you and the most it will cost you, for energy, if it is turned all the way up.

OK, and then what are these rates down here and the dollar amounts [I point to kWh-cost table at bottom of label]?

This would have to be savings, maybe, or something like that, I'm not really sure.

How about this — they have a new label. [Show him new label.] How does this compare. Is this easier to understand?

At the lowest setting, this uses 518, at the highest setting, this is the most it ever uses [points to 697 at right end of scale] (U.S. consumer interview no. 36)

This man makes two mistakes. First, he believes that the scale shows the range of energy use for just that one appliance rather than for all appliances within the same size range. Second, he believes, though he is not sure, that the kWh-cost table shows savings.

As mentioned earlier, consumers were more likely to be able to understand the scale of relative energy use on the new label than on the old label. In a few cases, consumers did not even recognize the scale on the old label and then, upon seeing the new label, they realized that both labels had a similar scale of relative energy use, but that it was more obviously displayed on the new label. The following excerpts from one interview illustrate the graphical improvements of the scale on the new label:

[Looking at the old label] Is this model more efficient than most?

I guess it would be more, because the lowest would be 52. The highest would be 106 dollars. So this falls, this is not even in the midrange. But I guess it gives you a point at the scale where it is [points to arrow]. Now I would look at it, after I deciphered it for a while, but if it was more user friendly, where they could show you were going to save, actually year by year and so forth and so on … what the hell is a kilowatt-hour? [Text deleted.]

[Now looking at the new label.] *How about this one? Can you tell by looking at this label whether it is more efficient than most?*

Yeah, this would be. Now that you can see that [points to scale with larger arrow]. I still don't think it's really user friendly.

OK, why do you say — this part's a little easier, the scale on top [of the new label]?

Right.

Why is that?

Well, it stands out. You know, the other one [old label], I think doesn't really stand out. I mean, it shows it, but it's smaller. This stands out.

Right, the arrow is showing you where you are —

Right, it's more pronounced. Right (U.S. consumer interview no. 65).

These comments illustrate several points. First, the respondent was able to make out the scale on the old label, but it was clearly a difficult and time-consuming task and he would not necessarily have taken the time to do so under normal shopping conditions. Second, while the scale was more apparent on the new label, the respondent, a wilderness educator with a master's degree in educational psychology, still felt that it was difficult and not user-friendly. And finally, his comment, "What the hell is a kilowatt-hour?" reveals the frustration of consumers who — while they are shopping for an appliance and simultaneously considering eight or 10 other criteria besides energy use — are asked to understand technical details that require an extra dimension of knowledge and understanding.

KWh-Cost Table. The kWh-cost table is the table on the bottom half of the old EnergyGuide label that shows the annual operating cost for the model over a range of electricity rates, which are supposed to span the range of electricity costs across the U.S. The table was not included in the design of the new label, in part because it was deemed to be confusing to consumers. My results support the fact that the table introduced an element of confusion into the ability of consumers to understand the label.

Table Chapter 7 .3. KWH-Cost Table on Old EnergyGuide Label that was Used in Label Comprehension Test.

Cost per kilowatt-hour	Yearly Cost
2 ¢	$ 15
4 ¢	$ 30
6 ¢	$ 45
8 ¢	$ 60
10 ¢	$ 74
12 ¢	$ 89

There were a number of difficulties with consumer comprehension of the kWh-cost table. First, while 40% of respondents correctly interpreted the meaning of the table, a slightly higher percentage (43%) were unable to interpret the table, either partially or with prompting.

A number of the respondents who understood the label were unhappy that it did not reflect the high cost of energy in their service area. As Table Chapter 7 .3 indicates, the kWh-cost table shows the

annual operating cost for the model at a range of electricity rates. However, the range of electricity rates extends from 2 ¢/kWh only up to 12 ¢/kWh. The electricity rate in parts of New Jersey is 14 ¢/kWh, and it exceeds 12 ¢/kWh in much of the northeastern U.S. Although only 20% of respondents were aware of their electricity rate, these were the people most likely to use that information with the kWh-cost table, and they were often unable to easily calculate the actual cost of operating the appliance in their service area.

One in ten respondents came up with a completely novel interpretation of the table. These respondents (7 of 75, or 9% of the total) interpreted the table backwards — that is, instead of using their local electricity rate to calculate the actual cost of operating the appliance in their area, they used the cost shown at the top of the label to calculate the hourly cost of operating the appliance, in cents per kilowatt-hour (see Table Chapter 7 .2). The comments of a 42-year-old steam fitter who works in the power industry show how these consumers were confused the presence of two complex elements (the scale and the kWh-cost table) on the old label:

> [Pointing to old label] *What is this telling you down here, the table?*
>
> Well, it's telling us that yearly cost, well, at 62 dollars it will cost you 8 cents per kilowatt-hour to run.
>
> *So this refrigerator will cost 8 cents per kilowatt-hour to run?*
>
> Yeah, I would like to see something more like this [he points to line with 4 ¢/kWh and $26].
>
> *More like 26 and 4 cents?*
>
> Right (U.S. consumer interview no. 40).

This man sees the large $62 at the top of the label and then looks down at the kWh-cost table below to find the closest dollar amount, which is $60. He then interprets that at $60, the hourly cost to run the appliance is 8 ¢/kWh. He would prefer to have a model that costs less to operate as measured by its cost in ¢/kWh and associated annual operating cost. He apparently does not understand that the purpose of the table is to calculate the cost of operating the refrigerator in different regions of the country.

Another respondent used the table on the bottom as a scale of relative energy use. When I asked a 54-year-old college-educated nurse whether the model represented by the old label was more efficient than most, she replied, “It’s in the middle. Its like right here [points to row showing 8 ¢/kWh and $62 on the table]” (U.S. consumer interview no. 82). Like the man above, she used the large $62 figure and found the closest dollar figure in the table, $60. She saw that $62 was in the middle of annual cost figures shown in the table, which ranged from as low as $15 to as high as $89, and thus assumed that this model was “in the middle,” or about average.

Misinterpretations of the U.S. Labels

Table Chapter 7 .4 summarizes the different ways in which the two EnergyGuide labels were misinterpreted by the 85 U.S. consumers who took the comprehension test. The problems fall into two broad categories: problems that can be fixed by tinkering with the design and typesetting, and problems that require a major design change or removal of an element.

Table Chapter 7 .4. Summary of Misinterpretations of U.S. EnergyGuide Labels

Which Label?	Label Element	Problem	Solution
Old and New	General	Text too small. Cannot read without reading glasses.	Very size of text. Have very large text for primary message and smaller text, without clutter, for detailed product information.
Old and New	Efficiency	Only 40-50% can tell whether label represents an efficient model.	Change wording at either end of scale so reads: "Highest/lowest efficiency model uses." Use a categorical rating system.
Old and New	Scale	Think scale applies to just one manufacturer. Think scale shows range of energy use for just one model. Don't recognize scale (1/3 on both labels).	Add text to clarify (done on new label). Change wording at either end of scale so reads: "Highest/lowest efficiency model uses." Scale on new label improved, but still 1/3 do not see it as a scale. Use another graphic?
Old	kWh-cost table	Think dollar amounts represent yearly *savings* instead of yearly operating cost. Use to calculate hourly cost (¢/kWh) to operate appliance. Use as scale of relative energy use for different models.	Add large-font text to clarify. Remove table; too confusing or most consumers (table does not appear on new label).
Old	Dollar figure	Think dollar amount represents yearly *savings* instead of yearly operating cost.	Add large-font text to clarify.
New	kWh metric	Most consumers prefer dollars to kWh as comparative metric. Only 20% know their electricity rate.	Use dollars or categories as primary comparative metric.

A number of misunderstandings can be corrected simply by better typesetting and using larger fonts. For example, a number of consumers were confused by the words "uses most energy" and "uses least energy" at either end of the scale on the new label. Some of the consumers did not clearly understand these words, since there is no subject to this sentence. What is the subject? "This model?" "Another model?" Consumer understanding could be improved by using the words: "highest efficiency model

uses" at the left end of the scale and "lowest efficiency model" at the right end of the scale. Alternatively, the wording could be "model using the least energy" and "model using the most energy" as appeared on the scale on the old label. Similarly, another typesetting fix could be found to the problem of consumer misunderstanding of the dollar figure as savings on the old label. Placing the words "cost per year" in large type next to the large dollar figure would eliminate the tendency I observed of one-third of consumers to interpret the dollar figure as *savings*. Consumer understanding of these design modifications could be tested empirically, and the best option chosen.

The other problem categories are more fundamental and point to the possible need to rethink the entire design of the label. At least one-third of all consumers appear not to understand the scale as a means of comparing relative energy use of different models. In Chapter 2, I reported on the surprising result by Egan and colleagues (Egan 1997; Lord et al; 1996), who compared different graphical displays for use in a comparative energy billing format. They found that the rate of comprehension of distribution graphs was significantly higher than for bar graphs. The findings of Egan and the results of this research suggest that the bar graph may not be the optimal graphic to use for comparison on the EnergyGuide label.

The label comprehension tests revealed at least two other fundamental problems with the design of the new EnergyGuide label: the text is too small, and the font sizes are not varied. A number of consumers remarked that "nothing jumps out at you" on the new label, reflecting the fact that the label conveys no primary focus or message. This problem could be solved by redesigning the label so that there is a primary focal point (either a logo, and a large number figure, or both) at the top of the label, with blocks of detailed but uncluttered product information in smaller type at the bottom of the label. An excellent example of this is the Fuel Economy label used on U.S. automobile. It has a gasoline pump as a logo. This is on the top-central part of the label and can easily be seen across a showroom floor. It also has two large-font numbers representing the fuel efficiency in miles per gallon, which can also be seen from a distance. The rest of the detailed product information is in two small block paragraphs of text at the bottom of the label.

New vs. Old Label.

After I had shown consumers both the old and new labels, I asked them which label was easier to understand and which label they preferred. The majority of respondents (72%) said that the new label design was easier to understand. This response, from a 32-year old computer programmer with three years of college education, is typical of the many respondents who said they thought the new label was easier because they could see the scale of relative energy use more clearly:

> Well, I could tell right away that it was higher on the scale, it uses most energy, so … using more costs more … This gives me, right way, I'll say OK, my fridge sits right here on the scale, so maybe I'll wanna get one that's down here [points to left end of scale], cheaper (U.S. consumer interview no. 67).

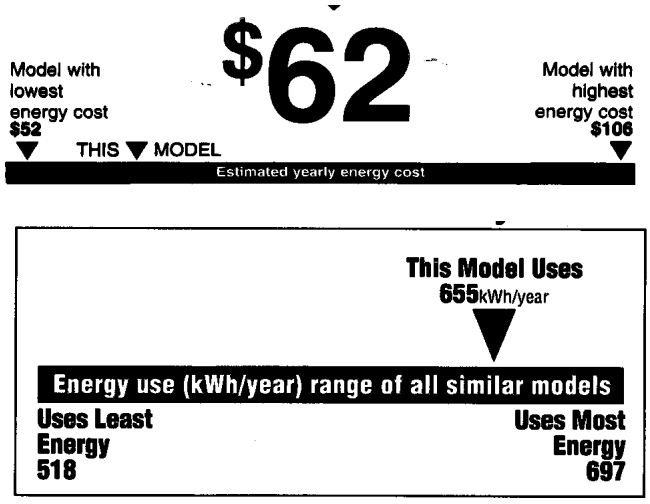

Figure Chapter 7 .3. The Scale of Relative Energy Use on the Old EnergyGuide Label (Top) and the New EnergyGuide Label (Bottom, Inside Box).

It was clear from the consumers' responses that the scale comparing energy use was much more salient and easy to understand on the new label than on the old label (see Figure Chapter 7 .3).[5] One couple, both white-collar professionals in their late twenties with college degrees, said they preferred the new label because they liked to be able to see how a model rated compared to other models.

> Because I guess it's more important to know where your refrigerator would be standing compared to other refrigerators, 'cause the number really doesn't mean anything if you don't know what the other 'frigerators are going for (U.S. consumer interview no. 84).

Despite the fact that most consumers found the new label simpler and easier to look at, there was strong resistance to the use of kilowatt-hours as the primary metric. This comment from a 64-year-old executive with a master's in business administration reflects the ambiguous nature of many of the responses; he liked seeing a clear comparative scale, but would prefer to see dollars as the comparative metric:

> Well let's see … [reading from label] "This model uses 655 kilowatts" … so I can see where it is. Yeah. I think this is much clearer, in that this uses quite a lot compared with the least. So this unit uses a lot of power, right? In other words, on the scale, it's a high

[5] The small arrows on the bar graph on the old label are a relic of printing constraints when the label was first developed in 1970. The first labels had to be printed on line printers, so the small v-shaped arrows were a by-product of the primitive printing hardware and were never enlarged to make the scale easier to read (Meier 1998). Although the scale on the new label has a larger arrow indicating the usage of this model, the scale itself is largely based on the old scale, and there is substantial room for improvements that would to make the scale more comprehensible.

> user of energy. Now what that means, if this model's unit operating cost is 57 dollars [dollar cost shown at bottom of label], then something down here [points to left end of scale] would be less, but you have no idea how much.
>
> *Hmm hmm.*
>
> I don't know what this means. I understand that this is not a particularly efficient model. But — and I understand that this is going to cost 57 dollars. But I have no concept at all, without going into a pencil and paper calculation, as to what it means, what would it mean if you were here [points to left side of scale]. Would it be 50? Would it be 30? I don't know.
>
> *So in other words if you were lower down on the scale —*
>
> I don't know what it would mean. No I — I, I mean could do it, because you're saying it's 8.67 per kilowatt hour, and that this uses 655 — I mean you could go through a mathematical calculation, but you're shopping for an appliance, you don't want to spend a half hour doing this (U.S. consumer interview 69).

Although he likes the scale, he feels frustrated in that the kilowatt-hours are a meaningless metric to him. Since the scale shows the variation between models in terms of kilowatt-hours. He knows that he can calculate the annual operating cost of other models in the range by multiplying 8.67¢/kWh times the energy use in kWh, but he cannot be bothered with the calculation. The scale is therefore not very useful to him.

In summary, the majority of U.S. consumers said that the new label was easier to understand because it was simpler and they could see where the model fell on a scale of relative energy use, compared to other models. There was also no confusion about whether the dollar amount represented cost or savings (as on the old label), since the text at the bottom of the new label clearly says, "This model's yearly operating cost is $57." Yet despite these positive points, consumers were clearly uncomfortable with having kilowatt-hours — a metric with which most of them were unfamiliar — as the metric on the scale. Their suggestions on how to improve the new label fell into two categories: to put the single dollar figure in very large font at the top of the label above the scale; and to use dollars, instead of kilowatt-hours as the metric on the scale. In Appendix I, I experiment with some of these suggestions as an illustration that some label improvements may not be difficult to do.

The Thai Label

A sample of the Thai energy label for a refrigerator is shown in Figure Chapter 7 .4. The following section presents survey results on consumer recall of the label contents and understanding of the label. This is followed by a section on misinterpretations of the Thai label and then a comparison of the ability of the Thai and U.S. labels to convey the concept of efficiency.

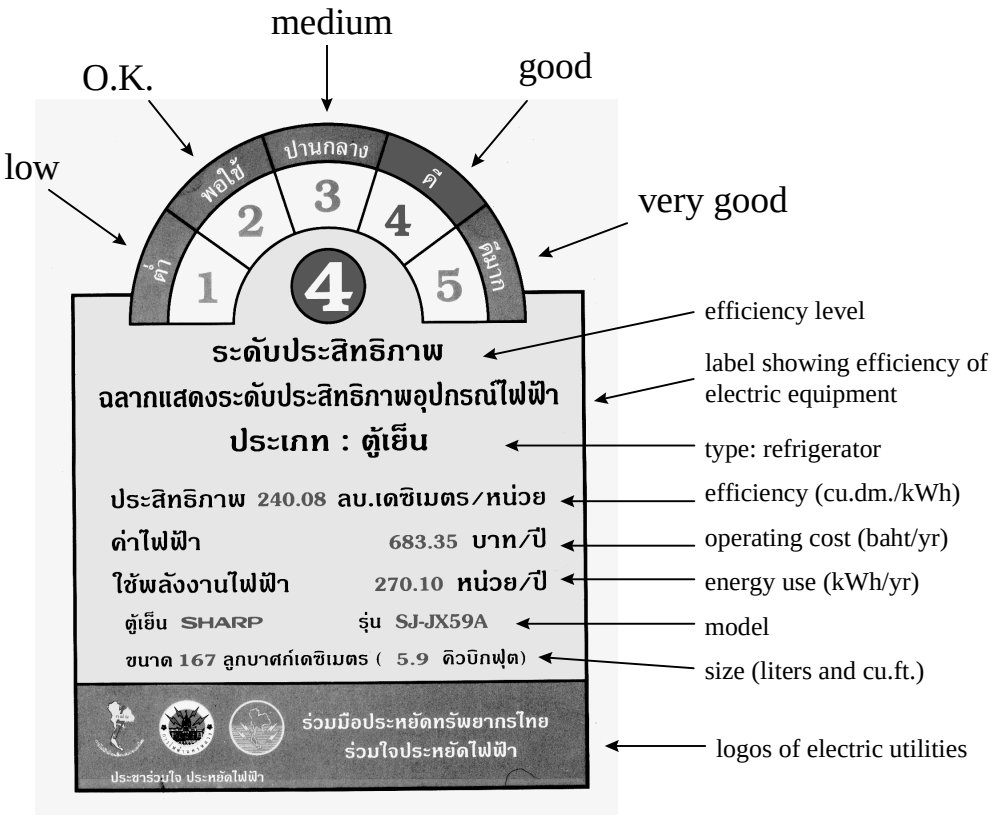

Figure Chapter 7 .4. The Thai Refrigerator Label.

Consumer Recall of Label Contents

We tested the recall and comprehension of the Thai energy label as part of our survey of 633 recent appliance purchasers. In one question, without showing them an actual label, we asked respondents to list what type of information was on the energy label. Table Chapter 7 .5 shows the results. More than half of respondents stated correctly stated that the label showed the efficiency of the appliance (55%) or its operating cost (53%). Smaller percentages were able to provide additional details, and the average number of items listed was 1.8, indicating that the respondents were not very familiar with the detailed information on the appliance label.

We got a more revealing response to another question in which we asked how well consumers felt they understood the label. Only 16% felt that they understood the label well, and 85% said they either didn't understand the label (22%) or only understood it somewhat (see Table Chapter 7 .6). This response is explained by our semi-structured interviews, in which many consumers said that they only looked at the large, 1 to 5 rating system at the top of the label and did not look at, or did not understand the technical details on the bottom half of the label.

Table Chapter 7 .5. Recall of Label Contents among Thai Consumers Who Recently Purchased an Appliance

What information is on the appliance energy label?	% of 421 respondents who recalled label detail
Efficiency	55%
Electricity cost of appliance	53%
Size of appliance	32%
Electricity units	21%
Other information	13%
Don't know what is on label	18%
Average number of label details recalled? [c]	1.8

Note: This question was added one week into the survey and was asked of 425 consumers.

Table Chapter 7 .6. How Well Thai Consumers Understood the Appliance Energy Label

How well did you understand the appliance energy label?	% of 421 responses
Didn't understand	22
Understood somewhat	63
Understood very well	16
Understood extremely well	<1%

Notes: Column total exceeds 100% because of rounding. This question was added one week into the survey and was asked of 425 consumers.

We thus find a situation in which the national advertising campaign appears to be very effective and the majority of appliance purchasers are aware of the labeling program and know that they should look for a number 5 model in order to save energy (see results on awareness on Chapter 6). At the same time, most consumers only appear to be reading the numerical rating system at the top of the label, and feel uncomfortable with the technical details displayed in smaller print at the bottom of the label. Consumer reluctance to spend time understanding detailed technical information on the label — a reluctance we found among both Thai and U.S. consumers — will be discussed later in this chapter.

Misinterpretations of the Thai Label

In Thailand, I performed in-store tests of label comprehension with 42 consumers. The label comprehension test was shorter and less rigorous that the U.S. label test. I asked two questions. First, while showing the respondent a number 4 label, I asked, "Is this more efficient than most models?" Then I held up a number 5 label next to the number 4 label and asked which label represented a more efficient model? I then asked for general feedback on the design of the label.

Because of the way I performed the test, the only direct comparison I can make between the U.S. and Thai label tests is on their effectiveness at conveying the concept of efficiency. This comparison is made later in this chapter, and it shows that a higher percentage of Thai consumers were able to use a single energy label as an indicator of whether a model was energy-efficient.

While more than half of the Thai consumers (55%) whom we interviewed could tell that a number 4 label was energy-efficient, and three-quarters (76%) could tell that a number 5 was more efficient than a 4, a small minority of those interviewed, mostly in rural districts, had misconceptions about the label. These misconceptions fell into two categories.

Conflation of Efficiency and Quality. The text above the numbers at the top of the label indicates "medium" for 3, "good" for 4, and "very good" for 5. For some consumers — who were aware of the media campaign about the importance of buying a refrigerator with a number 5 label, but who had not understood the underlying message of *why* they should buy number 5 (because it's more efficient and saves money) — the "very goodness" of the 5 acted as a barrier to them desiring it. One consumer, when asked whether a number 4 or a number 5 was more efficient, responded,

> Take Number 4. It's good enough. I don't want too good a model. Number 5 is very good, it might be too good, and you might not be able to find it. So you shouldn't be disappointed if you can't find a number 5. Number 4 is OK (Thai sales interview no. 45).

Another villager, upon viewing the label, said, "I think that for people in the country, they'll read it but not be able to understand it. It's a language that rural people won't understand." This respondent went on to prove his point when he was asked whether he would choose a refrigerator with a number 4 or a number 5 label, replying, "If I had to choose, I would choose number 4." When asked why he would choose number 4, he said, "That's very good [points to number 5 label], but I think I would just choose one that's good [points to 4] (Thai consumer interview no. 54). The implication of this is that the number 5 model is of a quality that is too good for simple, rural people. While he understands that number 5 conveys the idea of quality, he does not understand the basic concept that the number 5 will have lower operating costs and thus provide him with a benefit (cost savings) every month when he pays his electric bill.

In our interviews with urban Thai consumers, we also found a tendency for some consumers to interpret the label as a indication of quality. This tendency is fostered, at least in part, by the text above the numbers which indicates quality and not efficiency: the word "good" appears above number 4 and "better" above number 5. A Thai policymaker recounted to me a revealing anecdote about how the number 5 label had come to confer the idea of "quality" for Thai consumers. In the Thai air conditioning market, imported air conditioners are typically much more expensive than domestically produced models. Prior to the introduction of the energy labeling system, Toshiba sold it's one-ton, wall-type air conditioners for about 50,000 baht ($2,000). After the labeling program began, sales of Toshiba units began to fall. Apparently, consumers who had previously bought Toshiba air conditioners because they knew that the imported, Japanese models would be high-quality, were convinced that number 5 rating on some Thai-produced air conditioners meant that these units were of equally high quality. Yet the domestic units sold for about 40% less than the Toshiba models, or around 30,000 baht (US$1,200). In order to avoid losing market share, Toshiba was forced to reduce the price on its one-ton imported air conditioners by 25%, to 40,000 baht ($1,600).

The Thermostat Dial Inside the Refrigerator. We found another misconception exclusively among villagers who had either not been exposed to the television advertising campaign, had not paid attention to it, or who only knew about it vaguely. These respondents (4 out of 32 villagers with whom we tested the label) were applying their mental model of the thermostat dial inside the refrigerator to the similarly numbered energy label developed by the Thai DSM Office. The two women below work as seamstresses in a small village about 40 kilometers outside of Chiang Mai. Although they were familiar with the television commercials about the energy label, they did not know specifically what the number 5 on the label means.

[first woman] I want to get number 1. It saves energy.

[second woman] At our house, we just set it at 2.

So you understand it [the label] as the temperature setting inside your refrigerator?

[second woman] They say that it is on strong at 4 or 5, it will use a lot and waste energy.

[first woman] I use it at number 1.

Do you understand the same as her?

[second woman] Yes, but what number should we get if we don't want to waste energy?

You're asking us [smiling]? We'll tell you at the end.

[first woman] We want you tell us now [laughs playfully].

[second woman] Number 5 is what they say on T.V., they say number 5. And there's that fat woman crying in the commercial [they laugh].

[first woman] What does it mean? Number 5! (Thai consumer interview no. 27).

The response below is from a woman in the same village who owns a small shop that sells food and drinks.

What does number 1 mean?

Not very cold.

And what does number 5 mean?

The most cold, things will get very cold.

If you had to choose between a 4 and a 5? Which one is better?

Number 5 is better.

How is it better?

It goes from the lowest up to number 5. And the level of coolness is different. Number 5 is the coolest. When I use it, I try to save, I don't use number 5. I just set it at 1 (Thai consumer interview no. 31).

The seamstresses and the vendor are clearly very conscious of the cost of operating their refrigerator and prefer to set the thermostat dial in the refrigerator at the lowest levels, 1 and 2. The dial thermostats in Thai refrigerators go from either 1 to 5, or sometimes 1 to 6. It is thus natural for them to link this same numerical rating scheme to the 1 to 5 rating they see on the new energy labels. The result is the opposite of that intended by the DSM Office: these women think that a number 1 refrigerator will use the least energy, and a number 5 will use the most. They are aware of the television advertisements and assume that the number 4 and number 5 units are being advertised because of their quality, because of their greater cooling ability, and this uses more energy. Another respondent in a village outside of Khorat in northeastern Thailand, when shown a number 4 label responded that "People out in the country don't use any higher than the lowest level, this number [points to number 1 on the label]. I don't understand" (Thai consumer interview no. 48).

Linking the Thai Label to a Purchase

In order to assess the impact of the Thai appliance energy labels on the market, we gathered two types of data. First, we gathered data on the prevalence of labels in stores by conducting an informal survey of labels in 24 appliance stores in Bangkok, Chiang Mai, and Khorat. Overall 57% of refrigerators in the stores we sampled had energy labels and 26% of air conditioners had labels. The percentage of models with labels was significantly higher in Bangkok than upcountry.

The second type of data we gathered was on the prevalence of labels on models purchased. We asked recent buyers of refrigerators and air conditioners whether they had purchased a model with a label. Since the Thai labeling program is voluntary, not all models have energy labels. In practice, manufacturers only put labels on appliances that are more efficient than average — that is, with a 4 or 5 rating. We compared the prevalence of labels from our two information sources: the percentage of labels in stores and the percentage of labels on purchased models. The objective was to see if the percentage of labeled models purchased by consumers matches the percentage of labeled models actually observed in stores. Table Chapter 7 .7 shows the comparison. The table shows that the percentages of models with energy labels is quite similar for refrigerators: 62% as reported by recent buyers and 57% as observed in stores. However, the percentages are quite different for air conditioners: while 82% of recent air conditioner buyers reported buying a labeled model, we only observed 26% of models in the store with labels. There are two possible explanations for this result: (a) consumers are over-reporting the percentage of units with labels; or (b) there is a large consumer "pull" effect — that is, the percentage of number 5 models being purchased by consumers is higher than the percentage of models available in stores. I think that while there may be some over-reporting, the data indicate a large pull effect, and that consumers are driving demand for number 5 air conditioners.

Table Chapter 7 .7. Prevalence of Energy Labels on Thai Appliances

	Prevalence of labels on refrigerators		Prevalence of labels on air conditioners	
Label rating	% bought (reported by 357 buyers)	% in stores (observed in survey of 24 stores)	% bought (reported by 267 buyers)	% in stores (observed in survey of 24 stores)
No Label	38	43	18	74
Label	62	57	82	26

I also examined the breakdown of labels being purchased, in order to estimate what percent of labeled models are rated 5, 4, and 3. To do this, I compared data from our survey of recent buyers with data from the DSM Office on the breakdown of labels supplied to manufacturers. Table Chapter 7 .8 shows the comparison. The prevalence of number 5 labels in our survey sample of purchased refrigerators closely matches the prevalence of number 5 labels supplied by the DSM Office to appliance manufacturers through the labeling program. Sixty-eight percent of consumers who purchased a labeled refrigerator said the label was a number 5, while 62% of refrigerator labels supplied by the DSM Office during the last six months of 1996 were number 5. Eighty percent of consumers who purchased a labeled air conditioner said the label was a number 5, while 77% of refrigerator labels supplied by the DSM Office during the last six months of 1996 were number 5.

Table Chapter 7 .8. Breakdown of Number Ratings on Thai Energy Labels

	Label breakdown for refrigerators		Label breakdown for air conditioners	
Label rating	% bought (reported by 357 buyers)	% supplied by DSM Office, Jul-Dec '96	% bought (reported by 267 buyers)	% supplied by DSM Office, Jul-Dec 1996
Rated 5	68	62	80	77
Rated 4	25	32	15	23
Rated 3	6	6	2	0

Important note: this table shows a percentage breakdown only for models with appliance labels. Data shown in Table Chapter 7 .7 indicate that roughly 62% of consumers in our survey reported that they purchased a refrigerator with a label, and 82% purchased an air conditioner with a label.

In sum, the above data suggest that roughly 60% of refrigerators and 80% of air conditioners being purchased have energy labels. I also infer that there is a large consumer "pull" effect for air conditioners, since the percentage of number 5 models being purchased by consumers is much higher than the percentage of models available in stores.

Comparisons from Study of the Labels in Both Countries

In the final section of this chapter, I draw some comparisons from my study of consumer understanding of labels in the U.S. and Thailand. First, I compare how well each label conveys the concept of efficiency. I then describe a common problem with the labels, as reflected in consumer comments: too much detailed product information.

The one question for which I can directly compare responses between the two countries is the following: "Is this model more efficient than most units?" Table Chapter 7 .9 and Table Chapter 7 .10 indicate the extent to which the label in each country conveyed the concept of energy efficiency.

In the U.S., only 42% of respondents were able to tell me whether the old energy label represented a model that was more efficient than most models; roughly the same proportion (43%) was unable to say at all whether the label represented an efficient model. The remainder, about 16%, either got the answer partially correct (e.g., a few respondents thought the scale for efficiency referred to just one brand of refrigerators) or needed assistance (i.e. needed to be prompted with additional questions in order to encourage them to think more before answering).

A higher percentage of respondents was able to use the new label as an indicator of efficiency. For the new label, more than half of respondents (55%) used the label to tell whether the model was efficient, yet one-third (32%) were still unable to discern whether the label represented an efficient model. There are two likely reasons for the higher proportion of correct answers for the new label: one is that the scale is improved and more clearly marked on the new label compared to the old label. This improvement was mentioned by a number of respondents. Another reason, mentioned earlier, was the learning curve effect: after having interpreted the meaning of the old EnergyGuide label, respondents were be more likely to respond correctly on a second label that has a slightly different design but is similar in many respects. Unfortunately, the new label was always presented second, so we cannot infer how much better the new label is compared to the old at conveying the concept of energy efficiency.

Table Chapter 7 .9. Comprehension of Energy Efficiency on U.S. Label

Did they understand whether this model was more efficient than most models?	Old Label (% of 77 responses)	New Label (% of 75 responses)
Yes	42	55
Yes, with guidance	12	7
Partially correct	4	7
No	43	32

Column totals exceed 100% because of rounding.

As mentioned earlier, we administered the label test slightly differently in Thailand. We only tested one label design, since there is only one style of energy label in Thailand. First, we would show the respondent a number 4 label and ask whether they could tell if it was more efficient than most models. After they responded to this question, we would show them two labels side by side, a number 4 and a number 5, and ask which was more efficient.

More than half of the Thai respondents (55%) were able to tell that the number 4 label represented an energy-efficient model. When comparing a 4 and a 5 label, three quarters (76%) of respondents answered correctly that the number 5 model was more efficient than the number 4. In the Thai label comprehension test, our sample was heavily weighted toward rural respondents: 33 of the 42 respondents

to this question were from rural districts, where the population tends to be poorer and less well-educated. Since eight of the 9 urban consumers we tested (5 in Bangkok and four in Khorat), responded correctly to both questions, we can safely infer that the actual rate of efficiency comprehension for the urban Thai population would be significantly higher than 55%.

Based on the above results, I conclude that it is cognitively somewhat easier for Thai consumers to recognize an efficient Thai label than it is for U.S. consumers to recognize an efficient U.S. label. The U.S. consumers whom I interviewed used the U.S. label to make deductions about energy efficiency in one of two primary ways: First, only 42% of respondents were able to use the scale on the old label and the relative position of the arrow to tell where a model's operating cost fell relative to other models (as intended by the Federal Trade Commission, which establishes rules governing label design); this percentage increased to 55% when viewing the new label, due to both the learning effect and to the fact that the scale itself is more graphically distinguishable on the new label (see Figure Chapter 7 .3). The second way that consumers made deductions about energy efficiency was by comparing the dollar amount (or kWh amount) on one label to the corresponding dollar figure on a nearby model. When I took this option away from respondents by asking them to only look at the single label, 43% were unable to use the single label as an indicator of energy efficiency.

Table Chapter 7 .10. Comprehension of Efficiency on Label in Thailand.

Question	% of 42 responses
Is this model [number 4] more efficient than most models?	
Yes	55
No	45
When shown two labels, one with a 4 rating and one with a 5, can tell which is more efficient?	
Yes	76
No	24

Note: 33 of the 42 respondents in this sample were from rural districts, where the population tends to be poorer and less well-educated. The comprehension among the urban Thais in our sample was significantly higher: 8 of 9 answered correctly.

A typical U.S. consumer response, when asked to determine whether the model was more efficient than most was, "Couldn't tell unless you had a bunch of them in front of you to compare" (U.S. consumer interview no. 47).

The Thai consumer responses to the label is a reflection of the massive national advertising campaign, which has made most Thai consumers aware of the number 5 rating system.[6] It is remarkable that in just two years of implementation, the Thai label appears to more effectively convey the concept of energy efficiency than the U.S. EnergyGuide label, which has been on U.S. appliances for nearly 20 years. The results may also indicate the effectiveness of a simple categorical rating system at conveying the concept of energy efficiency. The vast majority of Thai consumers who were aware of the

[6] In our survey, 83% of 633 recent buyers and 71% of 238 non-buyers, were aware of that energy labels were posted on appliances.

advertising campaign and knew that they should buy a model with a number 5 rating. The highest level of understanding, observed in just a small proportion of those whom we interviewed, is represented by this individual, a merchant in a rural district outside of Chiang Mai in northern Thailand:

> The label explains what it means. Number 5 saves the most … it begins with 1, 2, 3, 4, 5. Five is the best. Four is good. Three is medium. Two is barely [he laughs]. For the most part, they are 4 or higher. If its lower than 4, they don't bother to sell it (Thai consumer interview no. 18).

However, the more common approach to reading the Thai label was to focus on the numerical rating system at the top and to become slightly (or greatly) confused by the details of the small print (e.g., units of energy use, size in cubic decimeters, annual operating costs) on the bottom half of the label. One man, a Bangkok insurance manager with a college education and a high income level, became frustrated by the details on the bottom part of the label, saying, "I guess I just don't understand it … I would just look at the electricity cost per year, just this. I don't know how many units it uses." He then went on to add:

> Really, the most important point is this number here [points to the number 5 on the label], because this number is the same one that I have seen on the advertisement. I know that number 5 is the best, so I don't have to look down here [points to small print on bottom half of label].
>
> *If you compare this label, which is more efficient? [holding up a number 4 label]*
>
> This [number 4] means good, but not very good, not as good as a 5.
>
> *Which model is more efficient?*
>
> I don't have the time to compare and calculate, but I know that this unit [number 5] saves the most" (Thai consumer interview no. 9).

This response, which is typical of the Thai consumers whom we interviewed illustrates two points. First, it indicates that, to some degree, the Thai energy label has conflated the two concepts of quality and energy efficiency, a problem that was mentioned earlier. This man links the 1 to 5 scale to quality, 4 being "good" and 5 being "best."[7] Only after he mentions that 5 is "the best" and 5 is "very good" does he state that it saves energy. The second point illustrated by the above response is the reluctance, which we also found among U.S. consumers, to spend a lot of time learning the details of energy units and the other technical specifications listed on the labels. For most consumers, the detailed information on the bottom half of the label appears to be extraneous and often is a source of confusion.

[7] Note that the text above the numbers 4 and 5 on the label says "good" and "very good," respectively.

The Problem of Too Many Details

Previous research by de Loor and Zeelenberg (1991) has warned of the danger of "masking" a primary message about energy use or energy efficiency with detailed product information. Consumers in both countries often seemed overwhelmed by the technical nature of the information presented in the labels. In the U.S., some respondents often replied in frustration that they would have to be technical specialists to fully understand the label:

> When I looked at this, I had a hard time focusing on anything. It's just, it's just too much. It's like reading a page from a grid (35-year-old fundraiser with a law degree; U.S. consumer interview no. 23).
>
> [When asked if he could tell whether the label represented an energy-efficient model:] Not as a simple citizen, if I would be a, a electrician or something, I'd be more able (59-year-old cabinet maker with a high school education; U.S. consumer interview no. 76).
>
> [When asked how he would compare two models to see if the energy-efficient model would pay for itself over time:] I'm sure there's a mathematical equation that you could punch in to figure that out (32-year-old electrician with a high-school degree; US interview no. 43).

Thai respondents voiced similar concerns about the presentation of too many technical details on the Thai energy label. This comment came from a 32-year-old soldier with a high-school degree and two years of higher education in marketing:

> I don't understand it very well, some points I don't understand. Like it says, efficiency 240.08 cubic decimeters per kWh, right? For regular people, this will be difficult to understand. But for students or technicians, they'll know what the word "decimeters" means and how big it is … But for the most part, they won't be that interested (Thai consumer interview no. 36).

A Thai management consultant with a bachelor's degree in engineering and a master's in business administration degree echoed these comments:

> It [the label] is pretty good, except there's one problem. They should write something that summarizes it easier than this. People who buy appliances, not everyone is all that educated. Some people may not know as much as others. If they try to read the efficiency, or the amount of electricity use … sometimes, it will be pretty funny [reading from label, sarcastically] "fan coil … condensing" … it would have to be pretty funny, they're not going to have any idea (Thai consumer interview no. 8).

After spending 45 seconds trying to determine whether a number 4 label represented an energy-efficient model, this policeman from a rural district said:

> I think that for people in the country, they'll read it but not be able to understand it. Its a language that rural people won't understand (Thai consumer interview no. 54).

The Problem of Precision. The policymakers who designed the U.S. and Thai labels included a level of precision that is mind-numbing and not necessary for nearly all consumers who will read the label. The Thai label has detailed product data to a precision of five significant digits (e.g., operating cost is 683.35 baht per year). This level of precision is not necessary for two reasons: first, it is far beyond the precision that will be useful for consumers comparing energy costs between units; and second, it is beyond the level of precision of the refrigerator energy test itself. Similarly, the U.S. label informs the consumers that the operating cost shown is based on a national average price of 8.67 cents per kWh. This figure is not used by most consumers and, in any event, it would be easier and more understandable to calculate operating cost using a representative figure, say 9 cents per kWh, to make the calculation easier for consumers to see and interpret.

The consumers whom I interviewed said that the amount of information and the level of detail on the labels made them difficult to understand. The concern — common to consumers in both countries — about the readability of the labels can be illustrated in comments made by two U.S. consumers about the need for a more simple presentation of information about the appliance's energy efficiency. One woman emphasized that a sixth grader ought to be able to read and understand the label. Another woman, a professional fundraiser with two bachelor's degrees and a law degree, set the bar a little higher:

> I mean I really don't even think that this label is the best that can be done. Because I think if you can't get a high school kid to come, to be able to figure this out, to understand this, then you're not gonna get the average adult, because there are adults walking in here, who — their education is, even if they went to graduate school, if they majored in things that had nothing to do with math, or if they've been away from math for X years, they only know the basics of going to the supermarket and figuring out X,Y,Z, or miles to the gallon times the — you know, like basic, basic things (U.S. consumer interview no. 23).

Did You Bring Your Glasses? Early on in the process of interviewing U.S. consumers, I noticed that one of the respondents was not able to read the EnergyGuide label I was showing him. He said that he had left his reading glasses in the car. The only elements of the label he could read clearly were the large dollar amount and the scale of relative energy use. In this particular interview, we were able to continue only because his wife answered the questions relating to detailed interpretation of the label. After that, I kept track of how many consumers needed their reading glasses in order to be able to understand the label. In the end, 9% (7 of 76) of the U.S. consumers on whom I tested the label were not able to read the label without their reading glasses, and about half of these did not have their reading glasses in the store with them.

Conclusions

The data in this chapter provide a wealth of information about how U.S. and Thai consumers read and interpret appliance energy labels. I assessed the extent to which consumers look at energy labels during the appliance purchase by first asking salespeople and then asking consumers themselves. Salespeople's estimates of how often consumers look at the energy label were lower than consumers' self-reported estimates, indicating the possibility that self-reported responses about label awareness might overstate the importance of the label in the purchase decision. However, only a small minority of consumers in either country reported that they read the labels carefully, suggesting that most consumers are likely to do no more than glance at the label and read it briefly. This finding argues for the need to provide a clear, simple message on the appliance label in large, bold font, and to supplement this with detailed information that does not detract from or mask the primary message.

In my tests of detailed label interpretation, the U.S. EnergyGuide label fared poorly. Most respondents were able to interpret operating cost, but fewer than half were able to interpret whether the label represented an efficient model. Most striking was the finding that one-third of respondents thought the dollar figure on the old EnergyGuide label represented *savings*, the opposite of the truth. And one-third of respondents were unable to "see" the comparative scale of energy use and thus use this as a basis of comparison with other models. The comprehension scores for the new EnergyGuide label were slightly higher than for the old label on all of these criteria. Unfortunately, the new label was always presented after the old label on the comprehension tests, so I cannot be sure that the new label is better. By cognitive criteria, the labels, whether new or old, do not do the job they were intended to do.

In an effort to understand consumer reactions to the EnergyGuide label designs, I asked consumers which label they preferred and which was easier to understand. The majority of consumers said that the new label was easier to understand because it was simpler, and because they could more easily see where the model fell on a scale of relative energy use, compared to other models. However, there was strong resistance among most consumers to the use of kilowatt-hours, rather than dollars, as the primary metric on the new label. Consumers' suggestions on how to improve the new label fell into two categories: to put a single dollar figure in very large font at the top of the label above the scale; and to use dollars, instead of kilowatt-hours as the metric on the scale. Clearly, the cognitive ease with which consumers interpret dollars should be weighed against the logistical problems that led the Federal Trade Commission to remove dollars as the primary metric in its 1994 rulemaking for the new EnergyGuide label.

Compared to the U.S. respondents, there were fewer misconceptions about the meaning of the label among Thai consumers. Most of the Thai respondents focused exclusively on the 1 to 5 ranking at the top of the label, and few were comfortable reading the technical details on the bottom half of the label. This aversion to reading the technically oriented bottom half of the label is supported by the finding that the vast majority of Thai consumers responded that they either did not understand the label (~22%) or understood it only somewhat (~63%). The Thai label appears to succeed at conveying the concept of energy efficiency through the 1 to 5 rating system, but the label also appears to intimidate many consumers who do not feel fully comfortable interpreting the technical details on energy use, operating cost, and size at the bottom.

A comparison of the results from the U.S. and Thai label comprehension tests indicates that significantly higher percentage of Thai than U.S. respondents were able to tell whether the energy label represented a model that was more efficient than most models. I conclude that the Thai label is significantly more effective at identifying efficient models than is the U.S. label.

We found two types of misinterpretations about the Thai label among a small proportion of the villagers we interviewed in upcountry Thailand. Several villagers viewed the label as a quality rating and

assumed that the models with higher-ratings, such as 4 and 5, were the highest quality available and would provide the most cooling. When asked which model they would prefer to buy, these villagers said 3 or 4, since a number 5 was too good for them, and a lower-rated model would be good enough. Our conversations with urban Thai consumers and an anecdote related to me by a Thai policymaker support the notion that the label is being perceived by many Thais as a "quality" label as well as just an "efficiency" label. This conflation of "energy efficiency" with "quality" is not surprising, given the text labels above the numerical ratings on the label: the word "good" appears above number 4, and "better" above number 5. However, from a policy perspective, this might not be desirable, since consumers could purchase high-efficiency units that are low quality in other respects (e.g., noise) and become disenchanted.

We found another misinterpretation among a number of respondents in one village. They confused the numbering system on the thermostat inside the dial with the numbering system on the label, indicating that they preferred to keep their refrigerator at 1 or 2 and that a refrigerator rated 4 or 5 would be too cold for their needs. These villagers were not familiar with the labeling program and had not recently purchased an appliance. These problems can be dealt with through education by retailers and exposure to the labels in a store environment. At the same time, such feedback on consumer reaction to the label would be very helpful input during the design phase of the label development.

A common response from consumers in both countries was that the labels were too detailed and not easy enough to read. Consumers often seemed overwhelmed by the technical nature of the information presented in the labels. The level of precision on the labels — e.g., five significant digits on the Thai labels — leads many consumers to either ignore the information or to not use it. This finding is consistent with research previous research in the Netherlands (de Loor and Zeelenberg 1991) which has shown that information not essential to the primary message of the label often has the effect of "masking" the primary information and reducing, or slowing, consumer understanding. This might be resolved by having higher and lower salience information distinguished by typography, such as font size.

This last recommendation requires a brief explanation. Admittedly, consumers are not homogenous, and there will be a stratum of consumers who read the label in detail. These people are important for two reasons: they are the consumers most likely to use the label to purchase an energy-efficient unit; and they are also likely to talk about the label and share their opinions with others. My recommendation is not to "dumb down" the label, but rather to compartmentalize the detailed, technical, product information so that it does not impede understanding of, and access to, the primary label information. This will assist the large majority of consumers who might be interested in energy efficiency, but are not technically oriented, and who do not have more than a few seconds to scan the label and decide whether it is a useful decision tool.

CHAPTER 8

FINDINGS AND RECOMMENDATIONS

Abstract

This chapter begins by summarizing the results from my analysis of policymaker, retailer, and consumer perspectives on appliance energy policy in the U.S. and Thailand. After just four years of implementation, the Thai appliance labeling program appears to be having much greater impact on the consumer appliance market than the U.S. program, which has been operating since 1980. In Thailand, a large percentage of consumers are already using the energy label to assist them in the first-stage screening of products when they enter the store. There is also potential for energy efficiency to be used as a tie-breaker at a later stage in the sales transaction. Such an objective cannot be achieved without the active involvement of retailers, who are the group that exerts the most influence over a purchase decisions. Finally, I lay out a research agenda covering appliance labeling issues for policymakers in both industrialized and developing countries.

Introduction

As home appliances proliferate in the developing world, they will become an increasingly significant contributor to energy demand worldwide. Energy labeling programs such as those in the U.S. and Thailand have the potential to significantly check the growth in energy demand from appliances. Worldwide appliance sales will reach US$77 billion annually in the year 2000. If one assumes that labeling programs alone have the modest potential to influence 20% of consumers to buy models that are 10% more efficient than they would have otherwise purchased, then the potential benefit from well-researched and effective labeling programs worldwide could be on the order of US$800 billion annually in the coming decades.[1]

In this dissertation, I have examined ways to limit the impact of appliance usage from a number of perspectives. First, to understand the basis of policy formulation, I have examined the framework from which policymakers gather and interpret information (i.e. their mental maps) in order to understand the basis of consumer energy policy. Second, to study the milieu in which the appliance sale takes place, I have used the techniques of an anthropologist and social scientist — participant observation, unstructured and semi-structured interviews, and a national survey. As a component of this store-based research, I also examined cognition in context (per Lave, Murtaugh, and de la Rocha 1984 and Rogoff 1984) — in other words how individual consumers think about and understand energy-related

[1] The calculation assumes that the lifetime costs of operating these appliances will be approximately equal to their purchase price — ~US$77 billion. If 20% of consumers use an appliance energy label to choose a model that is 10% more efficient in the year 2000, they will save ($77 billion x 0.20 x 0.10=) $1.54 billion in lifetime operating costs. Assuming the lifetime of the appliance to be 10 years, this is a savings of $154 million in year one. Over time, the savings would accumulate; the cumulative savings over a ten-year period would average 7.7 billion, or an average savings of ~$770 million annually.

information (specifically energy labels) when they purchase an appliance. And at a third level, I have used a cross-cultural framework to compare the differences between policymaker perceptions and consumer decision-making in the U.S., an industrialized country which has had a national appliance energy policy for more than 20 years and Thailand, a rapidly industrializing country which has initiated a set of national energy-efficiency programs within just the past five years.

This chapter synthesizes the threads of my research. It begins with a brief discussion of the salience of energy efficiency in the appliance purchase decision, based on previous research and augmented by my findings for the U.S. and Thailand. It then compares the ways in which policymakers from the two countries make assumptions, gather information, and then develop and analyze consumer energy policy. This is followed by a discussion of the sales environment, including the role of the salesperson, salesperson incentives, consumer priorities, and consumer decision-making. The subsequent section discusses the impact of appliance energy labels in consumer decision-making and the role of energy labeling. And finally, in an effort to apply what I have learned to the practice of public policy, I make a set of policy recommendations that could help policymakers in both industrialized and developing countries to better evaluate the impact and potential of appliance labeling policy.

How Salient is Energy Efficiency in the Appliance Purchase Decision?

Broadly speaking, policymakers use two models of consumer energy behavior. One model, *consumers as active seekers of energy information*, supports a policy of labeling and information to stimulate a consumer shift toward purchase of more energy-efficient appliances. A second model, *consumers as passive and disinterested in energy efficiency*, leads policymakers to support efficiency improvements primarily through mandated minimum efficiency levels, which are essentially invisible to the consumer. These models represent two ends of a spectrum, and in reality they coexist.

In order to understand which model more closely reflects consumer behavior, I studied the salience of energy efficiency in the appliance marketplace — that is, how important is energy use, or appliance operating costs, or perceived product energy efficiency in the purchase of an appliance? Is it a major or minor factor in the sales transaction? And when we examine cognition in context, what factors make energy efficiency more or less salient?

In interviews with scores of retailers and hundreds of consumers in both the U.S. and Thailand, it became apparent that the energy efficiency of appliances was a much more salient issue in the Thai retail environment than in U.S. stores. In the U.S., the quality or property of being "energy-efficient" was often not clear to either the customer or the salesperson and was aptly described by one U.S. consumer as a "gray area." While many of the factors involved in the evaluation and purchase of an appliance — e.g., size, volume, price, financing options — are discrete and easily understood, most consumers were at a loss to describe or rate the energy efficiency, operating costs, or energy savings for particular products. During my two-week participant observation as a sales trainee at a New Jersey appliance store, energy efficiency was not a salient characteristic in discussions among salespeople or in actual sales transactions. In the twenty-five sales that I closely observed, the salesmen referred to the EnergyGuide label in only three instances, and efficiency appeared to be an important decision criterion in only one case.

In contrast, energy efficiency was a salient issue among both salespeople and customers in Thailand. Energy efficiency, as represented by the number 5 (most efficient) rating on the appliance energy label, was described by the vast majority of Thai salespeople as an important and tangible criteria. Salespeople reported that customers would often come into the store specifically seeking models with the number 5 rating. In marketing jargon, this means that energy efficiency has become critical in the "screening"

stage of the purchase decision. Interviews and surveys with Thai consumers revealed that there is high awareness of the energy labeling program; that the label is effective at communicating the level of product energy efficiency; and that a majority of consumers are purchasing energy-efficient models. Interviews with salespeople and with the marketing director of a Thai appliance manufacturer also indicated that the label is being widely used by manufacturers as a marketing tool.

There appear to be major national differences in the effectiveness of the U.S. and Thai programs. After just four years of implementation, why does the Thai appliance labeling program appear to be having much greater impact on the consumer appliance market than the U.S. program? Four years ago, Thai consumers had no idea about the energy efficiency of appliances because there was no labeling or information available in the stores. Yet now, energy efficiency, while not among the top three consumer priorities, has become a very important part of the appliance sales transaction.

How do Policymakers Get Information about and Design Policy?

While many social scientists who study consumer behavior have noted that consumers are not rational economic actors, it is equally true that the policymakers who design consumer energy policy do not design consumer policy in a way that reflects the actual behavior of consumers. In fact, many policymaker decisions and actions depend largely on their mental maps — that is, the assumptions they make and the way in which they gather, organize, and interpret the information that forms the basis for their own decision-making (Eulau and Prewitt 1973; Wolman 1992). Our interviews with policymakers engaged in the formulation and implementation of energy efficiency policy in the U.S. and Thailand revealed much about these mental maps.

Policymakers Do Not Use Empirical Data on Consumers

We found a disturbing tendency for policymakers from both countries to base their views of consumer behavior (and thus both the design and assessment of labeling programs) largely on personal experiences and anecdotes — their own or others' — about consumer preferences and behavior. Only about half of the policymakers in either country appeared to recognize the value of basing policy on consumer research; an even smaller percentage reported any input from consumers in the policymaking process. To the extent that it occurs, the feedback from consumers is usually from interested intermediaries, filtered through dealers, distributors, and manufacturers who deal directly with consumers. Stern (1993) recognized that the failure to involve consumers in the design of programs intended to change their behavior was a critical shortcoming in energy policy. He wrote:

> [Policymakers] assume implicitly that programs can be designed optimally in advance, with the result that when evaluation is used, it is used for final judgment rather than as a tool in the implementation process. In short, when policymakers apply common sense, they are often led into error (Stern 1993: 1898).

Policymaker Perceptions of Barriers to Energy Efficiency

The majority of policymakers in both countries believed that they understood the most significant barriers to improving consumer energy efficiency. U.S. policymakers seemed more convinced that price was the primary barrier to efficiency and would thus require some form of financial incentives in order to effectively change the market. In contrast, while the majority of Thai policymakers cited price as a barrier, several of them, particularly managers within the electric utility's DSM Office, took the position that the primary barrier was cultural and had to do with awareness.

This difference in perspective about the importance of price helps to explain the divergence in approach between the U.S. and Thai energy efficiency programs. Over the past twenty years, financial incentives and rebates have been an important element within many federal and state programs as well as utility-sponsored DSM programs in the U.S. It is thought by U.S. policymakers that these incentives are necessary in order to help offset the incremental first cost of energy-efficient products which save energy and money over the log run. However, the Thai DSM office has decided to implement its energy-efficiency programs primarily as voluntary-type programs. Since its inception in 1993, the Thai DSM Office has pursued a strategy of relying largely on voluntary cooperation with manufacturers and limited or no incentives or regulations. This is in contrast to the incentive-based approach proposed by Western consultants and the World Bank who advised the Thai government in the early 1990s, or the predominantly regulation-based policies pursued in the U.S.

Which Programs Did Policymakers Believe to Be Effective?

Most U.S. policymakers viewed minimum efficiency standards as the most effective policy for delivering energy savings. Only a small minority questioned the impact of standards and some of these appeared to confuse their assessment of effectiveness with their ideological opposition to government interference in the consumer appliance market. Financial incentives such as rebates were widely accepted as effective, and there was also strong support for voluntary programs, although a number of U.S. policymakers thought voluntary programs unlikely to deliver large savings.

In Thailand, policymakers distinguished between "appropriate" and "effective" policies. While most of the Thai policymakers viewed voluntary-type programs as appropriate for their country, their responses were evenly split between standards and voluntary or "cooperation" programs as being the most effective approach at saving energy. This belief in the appropriateness of voluntary programs reflects the direction that the Thai DSM program has taken during its initial four years of implementation.

The issue of financial incentives, especially rebates, was politically sensitive among the Thai policymakers. Of the three policy options we discussed — minimum standards, rebates, and voluntary programs, there was the greatest sensitivity to the concept of providing direct financial incentives (i.e. rebates) to either consumers or manufacturers. Two key policymakers in the Thai DSM Office stated unequivocally that rebates cannot work in Thailand. Their reasoning was that first, changes in consumer behavior will reverse themselves after the rebates have been discontinued or phased out; and second, providing rebates will be politically untenable. They were sensitive to the political implications of providing rebates in a society where there is such a wide income gap between the rich people in Bangkok — who may be buying their second, third or even fourth air conditioner — and the poor farmers in the country, who may consider themselves lucky to have even a small refrigerator in their household. They argued that the bulk of the rebates would constitute a government subsidy of appliance consumption by

the wealthy.[2] These opponents of rebates appeared to be going with their gut political instincts, and neither cited any specific research or surveys suggesting that rebates would be an unpopular policy.

The opposition to rebates was not unanimous, however. Two senior Thai policymakers felt that since rebates had been an effective policy in other countries and had been well received by many customers, they ought to be attempted in Thailand. Upon closer inspection, the concern over rebates appears to apply only to certain types of high-profile energy-efficiency that would benefit wealthy consumers. The Thai Energy Conservation Promotion Fund is providing financial incentives to factories and buildings to upgrade their facilities to comply with the Energy Conservation Promotion Act. And the DSM Office, as part of its industrial motors program, is providing rebates to factory owners to offset the increased cost of buying energy-efficient motors.

Policymaker Perceptions of the Label

In the U.S., nearly all policymakers favored the intent of the appliance energy labeling policy and supported the goal of providing information to consumers. However, policymaker viewpoints of labeling program effectiveness do not follow a logical chain of reasoning. Most of the U.S. policymakers put energy efficiency far down the list of consumer priorities when purchasing an appliance. The U.S. policymakers are correct in asserting that energy consumption is not a top priority among U.S. consumers, but few questioned the effectiveness of the labeling program or were able to cite any research or evaluation results to judge whether the program had been effective. That is, most of the U.S. policymakers seemed content to support the labeling policy, but not to question its effectiveness, even in light of their perception that there is little consumer interest in energy efficiency.

In contrast to the U.S., Thai policymakers appeared to underestimate the importance of energy efficiency as a consumer priority. While most of the policymakers felt that the appliance energy labeling programs had been effective, they tended to believe that the manufacturers, who had heavily marketed the energy labels and increased the percentage of labeled products available, were primarily responsible for the program's success. Only one Thai policymaker listed energy as among the top-three decision criteria for consumers. In fact, the data collected from Thai salespeople and consumers during this research indicate that 50% of salespeople and 28% of consumers ranked energy efficiency among the top-three consumer priorities. This may indicate untapped potential to build more consumer "pull" into the Thai programs.

The Purpose of the Energy Label As Conceived by Policymakers

In our conversations with policymakers, we observed a fundamental difference in the stated purpose of the U.S. and Thai labeling programs. The objective of the U.S. program is primarily cognitive — to provide consumers with information to assist in their appliance purchase decision. In contrast, the objective of the Thai program is behavioral — to persuade consumers to use the label as a tool to buy a more efficient appliance that will save money and protect the environment. These differing purposes

[2] A logical extension of this argument, not made by the interviewees, is "why should the government pay for large power generation increases to provide for appliances for the wealthy?" One of the Thai air conditioner salesmen that we interviewed appeared quite uncomfortable with the current emphasis in the Thai programs on promoting the *sale* of efficient air conditioners rather than the need to conserve.

have significant consequences for the way the labels are designed and promoted, and, ultimately, their effectiveness.

In Thailand, the appliance labeling program is the centerpiece of a national demand-side management (DSM) program run by the Electricity Generating Authority of Thailand. EGAT has the largest national television advertising account, and the vast majority of its television budget is for marketing the DSM programs in general and the appliance labeling program in particular. During the program's first four years, the DSM office has spent nearly 300 million baht (US$12 million)[3] to promote its energy-efficiency programs, which include an energy-efficient lighting campaign and the labeling programs for air conditioners and refrigerators. The marketing campaign relies largely on the popularity and image of television and movie celebrities and sports stars to promote the benefits of saving energy.

Another significant aspect of the Thai marketing campaign, besides its sheer size, is the broadness of its message. The campaign explicitly links energy efficiency together with money savings and the environment in a patriotic appeal to consumers to help their country and buy an energy-efficient appliance in order to "save your money, save our energy, save the environment" (Ratanopas 1996).

In contrast to the high-profile nature and marketing flair of the Thai program, the U.S. appliance energy labeling program is about to pass its twentieth anniversary, and much of the initial popular enthusiasm for the program — and indeed, for saving energy in general in the U.S. — seems to have dissipated. The major federal initiative to spur energy savings in the residential sector is the minimum national efficiency standards for appliances.[4] Energy labeling is an ongoing policy, but is not supported by any national or local marketing or promotional efforts, as is the case in Thailand. Federal policymakers involved with the labeling program stated that the goal of the EnergyGuide label is not to promote energy efficiency or environmental awareness *per se*, but rather to fulfill the letter of the federal law. The federal mandate regarding what must appear on the label is limited to the statutory directive in the US Federal Code. The code itself requires the label to show (a) the estimated annual operating cost (if feasible), and (b) information on the range of operating costs.[5]

The difference between the two labeling programs is clear: the Thai labeling program is part of a pro-active national campaign operated by an aggressive national utility implementing its first-ever DSM programs with the nation's largest television advertising budget. Its goal is to exhort consumers to help their country by buying an appliance that will save energy, save money, and save the environment. The Federal Trade Commission, the agency implementing the U.S. program, takes a legalistic position of its mandate to implement the federal law.[6] The U.S. program has virtually no supporting marketing campaign, and does not have a high-profile public agency promoting it. It is ironic that, while the best electric utility DSM programs in the U.S. have consistently emphasized the role of trade allies and retailers in their appliance rebate programs, the U.S. federal labeling program —which, research has shown, requires in-store information and assistance in order to be effective — has no linkage to the management or sales force of appliance retail stores.

In sum, policymakers often base energy policy on common sense and do not realize the need for detailed consumer research. They do not use empirical data and tend to think of program evaluations as and endpoint, instead of an ongoing part of program development. Standards are viewed by U.S.

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[3] Assumes pre-July-1997 exchange rate of 25 baht = US$1.

[4] The standards were passed in the form of the National Appliance Energy Conservation Act in 1987.

[5] There is also a caveat that the operating cost may not need to be displayed if it "is not likely to assist consumers in purchasing decisions."

[6] One could speculate that — given its track record implementing the Energy Star programs — if the U.S. Environmental Protection Agency were implementing the federal appliance labeling program, there would be much more emphasis on promotion and marketing.

policymakers as the most effective program in terms of saving energy. In Thailand, an equal number of policymakers supported standards and voluntary or "cooperation" programs as being the most effective type of program. But the Thai policymakers feel that voluntary programs are a particularly effective approach for Thailand, and they have largely eschewed incentive and rebate type programs designed for them by U.S. and international consultants. I have also observed a fundamental difference in the intent and purpose of the U.S. and Thai energy labeling programs, which likely has much to do with the greater success achieved by the Thai program.

The Role of Salespeople

Understanding the retail environment is critical to being able to design an effective appliance energy policy, since appliance salespeople interpret product information and features for consumers and guide customers to the products that they want to sell themselves. Salesperson support of energy-efficiency programs is also important because the salesperson, with her influence over the customer purchase, has the ability to steer customers *away* from energy-efficient models as well as toward them.

As articulated by the salespeople whom I interviewed and observed in both countries, their overriding goal is to listen closely to the customer and to sell to the customer what the customer wants to buy. At the same time, there is always an underlying tension for the salesperson: the need to strike a balance between serving the customer's needs and selling the product that makes the salesman the most commission. I found that salespeople themselves, in both countries, claimed with confidence that they could strike that balance and still exert a strong influence on the purchase decision of the majority of customers.

Salesperson Influence

The role of the salesperson in influencing consumer choice has been recognized for years[7], and retailers have been a cornerstone of the most effective DSM programs in North America. My research with consumers in the U.S. and Thailand revealed that up to two-fifths of consumers came to the store without having done any pre-store information search. This indicates, at the very least, that salespeople will likely have a large impact on this segment of buyers. A market study conducted for a regional appliance retailer in the northeastern U.S. found that salesperson influence over model selection for white goods was significant, and typically in the range of 30-50%. For mid- to high-priced models with more features, the influence tends to be even higher and can be as high as 75%.[8]

[7] Beales et al. (1981) reviewed empirical studies on information search and found that the amount of external information search that most buyers do is limited for all but the most expensive durable goods. Instead, consumers tend to rely on passively acquired information from prior personal experience, previous external searches, or low-involvement activities like advertising or word of mouth. They concluded that salespeople have the potential to exert a major influence on the consumers' decision criteria

[8] The study was based on consumer response to questions about the level of assistance and influence that salespeople had in the purchase decision.

Salesperson Incentives

Given the significant influence that salespeople have over the purchase decision, it is unfortunate that there is little or no incentive for salespeople in either country to promote energy-efficient appliances. To the extent that I observed incentives in my interviews and participant observation, these were primarily driven by sales commissions. All of the salespeople whom I interviewed in the U.S. worked on a commission basis, while only half of the Thai sample earned a commission. In Thai department stores, there are two kinds of employees, those employed by the store and those employed by a brand distributor. The incentives for the latter appeared to be solely to sell their own specific brand name. In the U.S. stores I visited, the major incentive driving salespeople was the financial benefit of selling extended service plans. The salespeople earn relatively low base salaries and rely heavily on commissions. And because they earn a much higher percentage on the sale of a service protection plan, as opposed to their commission on the product itself, a salesman can often double what she earns on the sale of a single product by selling a multi-year extended service plan.

The reality of retailing is that products with new and additional features make more money for the store, and these are the products that the store management wants to sell. In general, products with more features will have a higher retail price, make more profit for the store and the salesperson, and will be larger and use more energy. So in most cases, there are structural incentives to sell equipment that actually uses *more* energy. The only exception to this I observed was the sale of room air conditioners in the U.S. Unlike refrigerators or other kitchen appliances, room air conditioners do not have a lot of distinguishing convenience features. One of the store managers whom I interviewed described them as an "ugly box with brown on the front" (U.S. sales interview no. 13). Because of this fact and because of the high level of consumer awareness that air conditioners are expensive to operate, U.S. salespeople are able to use the EnergyGuide labels as a significant selling point for air conditioners. This is the only appliance for which I found this to be the case. And in the case of air conditioners (as compared to, say, refrigerators), more expensive units within a certain size range tend to be more energy-efficient. In this case, the salesperson's incentive (increased commission income) is well aligned with the policy goal of improved energy efficiency.

The Value of Involving the Salesperson

Despite the fact that a number of U.S. research studies have concluded that in-store aids and salesperson training were essential in order for appliance energy labels to be effective (Redinger and Staelin 1981, Anderson and Claxton 1982, BPA 1988), these elements have never been part of the national labeling program in the U.S.. However, the value of ancillary information has been recognized by other governments: for example, Australia has a companion consumer guide designed to support its appliance energy label (SEC Victoria 1991), and in Denmark a pilot study found that simply training salespeople and providing point-of-purchase information on energy efficiency can increase the priority that consumers place on energy efficiency as a purchase criterion (DTI 1994). This approach of providing point-of-purchase information is now being used by two national retailers, Montgomery Ward and Circuit City, that are participating in the Energy Star Retail Labeling Program in the U.S.

The Energy Star Retail Labeling Program is a joint program between the U.S. Department of Energy and the U.S. Environmental Protection Agency. It was designed to stimulate increased sales of energy-efficient appliances through better marketing and partnerships with retailers. The program, which has 1,100 participating retail stores and 11 utility partners nationwide, consists of promotional activities with utilities, regional and point-of-purchase advertising and promotion, and labeling of products that meet

pre-specified efficiency levels. An initial pilot project in four cities had training of salespeople; under the expanded program, a training manual is sent to participating utilities, but there is no required training for salespeople — that is left up to the store. The energy label used in the program is roughly the same size as the yellow EnergyGuide label and has a large "Energy Star" logo. It is placed only on qualifying appliances — those that exceed the federal minimum efficiency standards by a specified amount.[9] The contractor managing the program for the federal government conducted focus groups and surveys in a number of participating cities and found that, while energy efficiency was not a "first-tier" issue, customers were more inclined to by energy-efficient products once they had been exposed to information about appliances and energy use (Brown and Whiting 1996; DOE 1995).

One successful outcome of the Energy Star Retail Labeling Program is that it has spurred manufacturer interest in the use of the Energy Star logo as a marketing tool for the sale of high-efficiency models. Several manufacturers have petitioned the Federal Trade Commission for the right to voluntarily print a small rendition of the Energy Star logo on the yellow EnergyGuide label, for their qualifying models. The manufacturers' petition is currently being reviewed internally by the Federal Trade Commission and, if approved, will need to go through the process of federal rulemaking and public comment before it can be accepted as an amendment to the current U.S. labeling rules (Mills 1998).

In Thailand, the labeling program has been implemented without any input from, or participation by, appliance retailers. While the policymakers whom I interviewed at the DSM Office agreed that involving salespeople would be a good idea, they indicated that they had no plans to do so. Thai salespeople appeared to receive significantly less training than their U.S. counterparts, and the only information they received about the appliance energy label was from the national television advertising campaign.

In most cases, this poor communication may not much matter, since consumer demand for efficiency is high. However, we found one example in Thailand of poor communication with retailers, which caused problems in program implementation. The air conditioner program labeling program was designed to be supplemented with zero-interest loans of 5,000 baht (US$200) for units rated number 4, and 10,000 baht (US$400) for units rated number 5. The program is called the Green Shop program: customers buying air conditioners at participating "Green Shops" can apply for the loans. In the initial stages of program development, there was inadequate communication with the retailers involved in the program, and as a result, there was widespread confusion among retailers as to how the program should work. Only 50 air conditioners were financed nationwide during the first month, and the DSM Office had to set up a special bank of phones and staff to handle phone calls from retailers with questions about the program. To its credit, the DSM Office recognized the problem and embarked on a crash program to educate 400 retailers nationwide. Nonetheless, when we interviewed participating retailers in Chiang Mai and Khorat, and in rural districts outside these cities nine months later, we found widespread skepticism of the program, a feeling that it was poorly designed, and in some cases retailers would even told us they would discourage customers from using the program.

The influence of salespeople is significant in the purchase of appliances. I conclude this based on my interviews with salespeople in both countries; the fact that roughly 40% of consumers in both countries perform no information search before going to the appliance store; and market research conducted for Acme Appliances in the northeastern U.S., which shows a strong salesperson influence in the selection of white goods. Innovative programs in Denmark and the U.S. (Energy Star Retail Labeling program) have highlighted the value of involving retailers and have also demonstrated that consumer research can improve public policy

[9] Qualifying levels are 13% better than federal standards for dishwashers, 15% for room air conditioners, 20% for refrigerators, and 115% for clothes washers (Bodner 1997).

Consumer Priorities and Decision-Making

Consumer Priorities

I assessed consumer priorities in the purchase of appliances using three methods: interviews about consumers with salespeople in both countries, interviews and surveys with consumers in both countries, and participant observation of consumer search preceding actual sales transactions in a U.S. store. Assessing consumer priorities from the standpoint of the retailer as well as consumer is a useful technique: because the salesperson has so much influence over the process, her view of consumer priorities reflects not only what she views as consumer's interests, but also to some extent her own priorities in selling. To the extent that there are differences in the priority rankings, these may reflect a misalignment between what the salespeople are trying to "push" and what the consumers think of as important.

In the U.S., price, features, and size were ranked as the top-three criteria by both consumers and salespeople. The consumer responses showed a greater variety of priorities: five criteria were ranked among the top three by at least 30% of respondents: price, features, size, quality, and brand. Energy efficiency was listed as a top-three criteria by only one in ten consumers and ranked ninth, after color, delivery, and finance.

The findings from the Thai interviews and surveys reveal some interesting differences between the responses of the salespeople and consumers. Energy efficiency was ranked as the second highest priority by Thai salespeople, ahead of size and price. Yet it was ranked as the fifth-highest priority by Thai consumers after brand, price, color, and quality. Still, three times as many Thai compared to U.S. consumers ranked energy efficiency as one of their top-three purchase criteria.

In terms of consumer energy policy, the most important result from this analysis of consumer priorities is the difference in the priority placed on energy efficiency in the two countries. In the U.S., energy efficiency was ranked as an important priority by just one in ten salespeople and consumers. Among the list of consumer-ranked priorities, it fell in ninth place. In contrast, in Thailand, energy efficiency was listed as a high priority by half of salespeople and nearly one-third of consumers.

Why is energy efficiency a much higher purchase priority for Thai consumers? Based on data from salespeople and consumers, I conclude that the major factor in the high priority placed on energy efficiency is the extensive television and media advertising campaign for the Thai DSM programs, including the labeling program. Ninety percent of recent appliance buyers and 80% of the non-buyers were aware of the energy labeling program and high percentages of consumers were also aware of the numerous other national, energy efficiency programs. This awareness, combined with the simplicity of the Thai energy label (1 to 5, where 5 is the best rating) make it easy for Thai consumers to seek out and select energy efficiency in the appliance store. There appears to be no other adequate explanation for the fact that energy efficiency is being widely used as a screening criteria by Thai appliance purchasers just two years after introduction of the energy label.

Consumer Decision-Making

Research cited in Chapter 2 has concluded that in the area of appliances, information search is a two-stage process: initially consumers compare (i.e. screen) all alternatives on just one or a few attributes. When the search continues, they select a smaller number of alternatives and compare these on all

available attributes (Bettman 1979; Verplanken 1990 cited in de Loor 1991). Olshavsky (1973) distinguished a third phase in the appliance shopping process. During this final stage, he found that consumers weighed the various non-product attributes (such as financing and service protection) being offered by the store.

My observation of appliance sales transactions supports a multi-stage theory of decision-making. For example, I found that consumers appeared to negotiate on price only after they had selected an appliance based on a certain set of features. During the qualifying stage of the sales transaction, they tended to present two or three primary screening criteria, which typically include size, type of model (e.g. side-by-side vs. top-mounted refrigerator-freezer), price, or brand. Then, either by themselves or with assistance from a salesperson, they would focus in on the detailed differences between the products that meet the screening criteria. And in a few cases, as Olshavsky suggested, a non-product attribute would tip the balance in favor of a particular selection.

I also found that price was rarely the single highest priority in the consumer purchase decision. Most consumers wanted a "good deal", but did not come to buy the cheapest appliance in the store. Only after certain criteria were met did price became the key negotiating point. Often, consumers would come into the store with a certain price range in mind, and then allow the salesperson to "step them up" to a higher-priced models that had additional features they desired. One consumer put it this way, "the bottom line is that the bottom line makes a difference, but there are some elegant negotiables" (U.S. consumer interview no. 5).

This remark illustrates the nature of consumer decision-making and highlights opportunities for targeted policy intervention. First, it illustrates that once the basic screening criteria have been met, consumers may be interested in trading off small increments in purchase price for additional features or options (the elegant negotiables). Second, by reinforcing the multi-stage nature of decision-making, it highlights the fact that energy efficiency could potentially have an impact on the decision process at more than one stage. As described in Chapter 5, my conversations with salespeople have led me to conclude energy efficiency is already being used as a first-stage screening criterion in Thailand and has the potential to be used as a second-stage criterion in the U.S.

The Role of Energy Labeling

Awareness of the Label

Despite a high level of label awareness in both countries, it was apparent in my discussions with salespeople in both countries that customers spend very little time deciphering the label. At the same time, consumers are likely to receive very little help on the label from salespeople. Given the time constraints on the sale and the many other factors in the purchase (brand, price, color, features, availability, etc.), salespeople have little time to spend explaining the detailed technical information on the label.

Reading the Label

Salesmen reported that 62% of Thai consumers asked about or looked at the energy labels, compared to just 20% of U.S. consumers. The corresponding numbers were much higher when we asked the consumers themselves; however, only a minority reported that they read the labels carefully — 26% in

the U.S. vs. 16% in Thailand. It thus appears that most consumers are likely to glance at the label briefly and read it only in passing. This finding argues for the need to provide a clear, simple message on the label in large font and to supplement this with detailed information that does not detract from or mask the primary message.

Interpreting the Label

The results of my in-store tests of label cognition reveal that while the Thai label is more effective than the U.S. label at conveying the concept of energy efficiency, there are problems with the interpretation of both labels. The U.S. respondents had difficulty interpreting several elements of the EnergyGuide labels, including the dollar cost figure on the old label and the scale of relative energy use on both the new and old labels. The majority of U.S. consumers felt uncomfortable with kilowatt-hours as a metric for comparing different models, and many complained that there was too much detailed information on the label.

Compared to the U.S. respondents, there were fewer misconceptions among Thai consumers in the tests of label interpretation. Most of the Thai consumers tended to focus exclusively on the 1 to 5 ranking at the top of the label, and few were comfortable reading the technical details at the bottom. This is supported by the finding that 85% of Thai consumers responded that they either did not understand the label (~22%), or understood it only somewhat (~63%). The label appears to succeed at conveying the concept of energy efficiency, but it also intimidates many consumers who do not feel fully comfortable interpreting the technical details on energy use, operating cost, and size at the bottom.

We also found two types of misinterpretations about the label among a small proportion of Thai consumers. Several villagers confused the numbering system on the thermostat dial inside the refrigerator with the 1 to 5 rating system on the energy label, indicating that they preferred to keep their refrigerator at 1 or 2 and that a refrigerator rated 4 or 5 would be too cold for their needs.

A second misinterpretation was more widespread. A number of rural and urban consumers apparently conflated the properties of energy efficiency and quality, assuming that the highest-rated model (rate 5) was the highest overall quality. While this might be a favorable outcome for energy advocates, it is misleading and could potentially result in negative backlash if consumers buy energy-efficient models and are disappointed with the quality of other aspects of the product's performance These misconceptions of the label's meaning can be dealt with through education by retailers and exposure to the labels in a store environment. At the same time, they demonstrate the need for greater clarity in the label design, as well as for intermediate evaluations of consumer reaction to the label during the process of label development.

Recommendations

The fundamental recommendation of this dissertation is to apply Stern's dictum about the need for consumer-based scientific research (Stern 1993) to the area of appliance energy policy. The research described in this dissertation took the consumer as its central focus. This research project is unique in that it is the first time consumer responses to energy labeling have been studied as a problem of consumer cognition in context (per Lave, Murtaugh, and de la Rocha 1984; Rogoff 1984). This kind of consumer-based input is essential to the development of effective policies that work because they are based on sound research.

My interviews with policymakers in the U.S. and Thailand revealed that the mental maps of policymakers — their expectations and preferences, and perceptions of their environment (Eulau and Prewitt 1973) — are not attuned to the importance of using consumer-based research as the basis for developing energy policy that relies on consumers to engage in certain behaviors. The Thai DSM Office has taken a huge step beyond U.S. policymakers by successfully marketing its labeling program to the Thai masses through television and other media. However, the Thai policymakers developed the label without significant consumer input and have not relied on evaluations or partnerships with retailers to improve the effectiveness of the labeling program.

Methodological Recommendations

Policymakers designing consumer energy programs that depend on consumers to act in a certain way should use a mix of research techniques in order to identify key problems, frame important research questions, develop useful research and policy instruments, and ultimately craft effective responses to problems. The combination of methodologies used in this research — participant observation, unstructured and semi-structured interviews, a survey questionnaire, and independent assessments of the perspectives of consumers and salespeople — allowed me to build a strong basis for assertions about consumer behavior and then to test these assertions using data from different sources. Other studies of appliance energy labels have taken one of two approaches: surveys or interviews with consumers to get their responses to the label; and laboratory experiments, removed from the retail environment which test label understanding and cognition, but out of the context of the retail environment.

It is important to avoid the problem of response bias in consumer surveys on energy. The same mistake has been made repeatedly by researchers studying energy labeling in the U.S, the United Kingdom, and Australia: researchers can bias their findings by revealing their interest in energy in the early stages of an interview, thus obtaining inflated estimates of the impact of energy efficiency. In order to obtain an unbiased perspective of how consumers weigh the multitude of different criteria in an appliance purchase, it is important to develop a neutral survey instrument. I did this by referring to my interviews and surveys as generic marketing research on appliances.

Finally, I cannot overemphasize the value of using participant observation as a bedrock tool for studying any problem, but the appliance energy transaction in particular. I used it both in acting as a salesman and in following consumers through 25 purchase decisions. By actually spending time observing the nuances and signals in the retail environment, the researcher develops the basis for further tools such as interview protocols and surveys, while also improving the robustness of her results and conclusions.

Retailers: The Missing Link

Retailers are the critical missing link in both the U.S. and Thai labeling programs. Because of their influence on appliance selection, which appears to be significant in at least 30-50% of transactions, retailers represent enormous potential for leveraging a labeling program. It is ironic that one of the central lessons of U.S. experience in demand-side management programs — the importance of developing trade allies — is being ignored in the U.S. EnergyGuide labeling program. In Thailand, the effectiveness of its successful labeling program is also being limited because of a lack of involvement of retailers in the program design.

My participant observation with a U.S. appliance retailer, combined with interviews with more than 60 salespeople in both the U.S. and Thailand, allowed me to carefully study salespeople's incentives. Unfortunately, there exist no incentives — besides altruism — for salespeople in either country to actively promote the sale of energy-efficient appliances[10]. In fact, the incentives actually work against energy efficiency, since salespeople are rewarded with higher commissions for selling products with additional features that use more energy. This fact, combined with the fact that energy efficiency is extremely low on the list of selling points for most salespeople, suggest that without some form of incentive structure, it will not be possible to enlist salespeople as effective allies in an energy labeling program.

Improving Energy Labels

By conducting a micro-level study of consumer cognition of the label in the retail environment, I was able to gain insight into the qualities that would allow a typical U.S. or Thai consumer to use the label as a decision tool while they are simultaneously shopping on a number of other criteria. Below is a summary of the major lessons learned from my study of label cognition. While many of these same recommendations appear in the literature on labeling, a scan of appliance energy labels worldwide indicates that few of these guidelines are being followed by policymakers.

Simplicity. Consumers stressed the need to make the label simple to understand. One U.S. consumer said that a sixth grader should be able to read the label. In fact, a number of consumers in both countries felt overwhelmed by the amount of detail on the label and used phrases like, "I could understand it if I had a calculator," or "If I were an electrician, I could figure it out." These responses reflect a fundamental disconnect between the mental maps of policymakers and marketers. Policymakers want to provide as much detailed, accurate, and relevant information as possible. Marketers want to raise awareness about a product and get consumers to develop a positive association with that product. Policymakers need to learn to think more like marketers, and they can begin by designing a simple label.

Single Message. To be effective, an energy label should have a large logo, or large, bold font conveying one primary message. The Thai label has compromised the effectiveness of its simple numerical rating system by cluttering the bottom two-thirds of the label with detailed product information, including a measure that is meaningless to virtually all consumers: a measure of efficiency expressed in cubic decimeters per kilowatt-hour. As a result, 85% of Thai consumers in our survey said that they either did not understand or only somewhat understood the label. Fortunately, the message to "buy number 5" is strong enough that Thai consumers are using the label as a screening tool even without a full understanding of what it means.

Compartmentalize the Details. Consumers in both countries often seemed overwhelmed by the technical nature of the information presented in the labels. Admittedly, consumers are not homogenous, and there will be a stratum of consumers who read the label in detail. These people are important for two reasons: they are the consumers most likely to use the label to purchase an energy-efficient unit; and they are also likely to talk about the label and share their opinions with others. My recommendation is not to "dumb down" the label, but rather to compartmentalize the detailed, technical, product information so

[10] The one exception to this is air conditioners, a product for which higher prices within a category tend to correlate with higher efficiency and higher commissions.

that it does not impede understanding of, and access to, the primary label information. This will assist the large majority of consumers who might be interested in energy efficiency, but are not technically oriented, and who do not have more than a few seconds to scan the label and decide whether it is a useful decision tool.

Good Formatting. Many of the problems with the U.S. EnergyGuide label could be solved by better formatting and design. The new label is much improved relative to the old label in that it has a clearer scale set in a box so that it stands out against the background of the label. The scale also works better on the new label because the arrow indicating where the particular model falls is larger, bolder, and clearly linked to the energy use figure above it. However, the new label still fails is in its lack of any primary emphasis. There is no central message, no text or figures in large type to get the consumer's attention. The critical cognitive point learned from this research is that the size of typography should be proportional to the importance of the label element. Using input from the consumer interviews, I have designed a sample improved EnergyGuide label, which can be found in Appendix I.

The Value of Money. A major advantage of doing store-based research of label comprehension is that it allows you to develop a real-time understanding of how to get consumers to behave the way you want them to. In my conversations with U.S. consumers, I found that they overwhelmingly preferred to see a dollar amount on the label that would show them how much a model would save. While the implementation of dollars as a metric poses logistical difficulties from a policymaker's viewpoint, it is important for policymakers to respect the consumer preference for currency over energy units. Consumers indicated that cost comparisons — and *not* comparisons of energy units — would allow them to make meaningful tradeoffs between models as they shop.

Because operating cost is set in such small type on the Thai label, few Thai consumers use it during their selection of an appliance. The Thai label can be improved by making annual operating cost a secondary message and setting it in larger type. Sample, improved label designs for both the U.S. and Thai labels, based on consumer recommendations, are shown in Appendix I.

A Research Agenda for Appliance Labeling

While I have learned a significant amount from this research about the retail appliance environment and consumer purchase behavior, there remain a number of fundamental questions that require additional research in order to facilitate the development of more effective appliance energy policy. This problem is particularly worthy of further study because of the enormous economic and environmental impacts of the continuing proliferation of appliances not only in industrialized nations, but in developing countries as well. Below, I briefly outline a research agenda for appliance labeling issues. Most of these elements will apply to both industrialized countries that already have a labeling program as well as to developing countries that are considering initiating such a program.

Elaborate the Stages of the Decision-Making Process. An improved understanding of the consumer decision-making process will help policymakers target possible intervention points for energy efficiency as a selling point. This research can be done through participant observation of consumers both as they plan their purchase and then at the store as they compare a range of alternatives. Do most consumers have a two-stage decision process, or is there a third stage at which non-product attributes are weighed and assessed? Semi-structured interviews can also be used to test different models of decision-making in order to determine where energy efficiency is most likely to play a significant role and how the message

can best be packaged. Close cooperation with retailers will be important in order to understand the structure of a typical sale and to identify the stages at which stages retailers can introduce energy efficiency during the sales presentation.

Develop a Methodology for Measuring Label Effectiveness. Since my study of energy labeling cognition in context was the first of its kind, I developed ad hoc criteria for measuring and comparing consumer understanding of label elements. For international comparisons of label effectiveness to be meaningful, there will need to be an accepted methodology for comparing label cognition. The two key questions that need to be asked about label effectiveness are: How effective is the label at being understood by consumers? and How effective is the label at achieving policy objectives, such as amount of energy savings?

A methodology for measuring consumer understanding could be drawn in part from literature on cognition and information processing and would deal with topics such as processing time, recall ability, and comparisons of comprehension of different label elements. Effectiveness at achieving policy objectives would include a number of topics, including comparison of the impact of different types of labels. For instance, what are the energy impacts of an in-class labeling system (which provides a relative ranking for products within separate size categories, as in Thailand) and an absolute ranking system (such as the mile-per-gallon ratings on cars, which clearly reflect the larger energy impact of driving large cars that get fewer miles per gallon). These are important issues that need to be considered in developing an appliance energy rating system. In Thailand for example, the current labeling system for refrigerators will soon be expanded to cover multi-door models much larger than the four- to six-cubic-feet volume that is typical of Thai refrigerators today. A consumer comparing a six-cubic-foot model with a 10-cubic-foot model might look at a number 5 label in both cases, but the numerical rating system does not reflect the much larger energy impact of the 10-cubic-foot model.

Develop a Scheme for Revising Label Categories. Other policy issues related to labeling include the long-term implications of different labeling schemes. One current issue in labeling policy is how to adapt categorical rating schemes once efficient products begin to become "crowded" in the highest efficiency categories. These issues are not resolved and are currently being addressed in Europe and Australia In Europe, there is no standard procedure for periodically updating the label categories, but the commission hires consultants who assess the distribution of models in the market and determine whether the categories are out of date. The choices they are considering are to add an A+ category or to retest all models and reset the thresholds from A to G (Waide 1998). In Australia, policymakers are considering whether to open up the six-star rating system to, say, eight or 10 stars, or whether to retest all products and re-grade them back to five stars[11] (Harringon 1998). In either case, the development of categorical labeling systems is not a one-time activity and requires analytical expertise to regularly monitor and assess the impact of the categories. In addition, the labeling systems should have some sort of regular review process built into the legislation.

In this regard, labeling schemes that do not have fixed categories have certain advantages. The fuel economy labels for cars use miles per gallon and avoid this problem entirely; and the dollar-based U.S. appliance labels reduce the problem by simply requiring periodic revision of the empirical data (cost of energy, high and low models in each category).

[11] The Australian label was designed in 1986 with six stars as the highest efficiency rating. The selection of six stars was unfortunate, since surveys have shown that most consumers believe that five stars is the highest rating.

These issues form the basis for policy-related research that would be useful to policymakers around the world who are implementing labeling programs or considering initiating programs. They need to be explored in order to develop a systematic way of comparing different labeling and rating systems that can be used by policymakers as a gauge of both consumer understanding and policy impact.

Tests of Label Cognition. This study has produced valuable information on consumer cognition of the U.S. and Thai appliance labels. However, more basic research needs to be done starting from the fundamental question of what is the best format for providing information that is useful to appliance consumers. This research could begin with in-depth, unstructured interviews with a small sample of consumers to elicit a range of ideas for communicating energy efficiency through a label. As mentioned earlier, the findings from my study suggest that a 1 to 5 rating system is effective at identifying efficient models, but that it is not good an differentiating between gradations of efficiency. Tests with the U.S. label suggest that dollars are an extremely effective way to communicate with consumers and that consumers expect to see a dollar number that represents savings, since that is how they tend to calculate their own economic benefit. These are just some of the issues raised in my study that could lead to possible variations on label formats. There are also a number of different labeling formats in use internationally, and these were described briefly in Chapter 2. They include categorical labels with a continuous scale (such as the U.S. and Canada); categorical rating systems with numbers (such as Korea and Thailand); categorical rating systems with stars (Australia); and categorical rating systems with letters (European Union). Sample labels using these and other formats could be tested in focus groups at several early points in the design process, before a more systematic, in-store study of cognition is carried out. This study should include at least one professional researcher with a background in marketing and product promotion, and in cognition of "mental math."

In-Store Tests of Label Impact. The results of a label cognition study should be used to assess the impact of labels in an actual retail situation. The only similar study of which I am aware was a 1981 study by Redinger and Staelin carried out at a White-Westinghouse warehouse, in which they manipulated the treatment of labels and salespeople and measured the impact on the efficiency of refrigerators selected. A similar type of study could be carried out in an appliance store with trained researchers as salespeople. The goal of such a study would be to manipulate the treatment of a number of different label designs and a number of different levels of salesperson involvement on the efficiency of appliance models selected.

Experiment with Retailer Incentives. Salespeople are the group that exerts the most influence on consumer appliance purchase decisions. It would be valuable to test the impact of retailer incentives on the sale of energy-efficient appliances. Experiments in Denmark (DTI 1995) and with the U.S. Energy Star Retailer Labeling Program (Bodner 1997) have shown that salesperson education can have a significant impact on sales of efficient appliances over a short time span. Such an experiment in Thailand could cover not only training but also ongoing incentives, by either adding an incentive for efficiency or removing current incentives against efficiency. Incentives could be on both a commission and per-unit basis, to determine their impact, to assess which types of incentives are most effective, and to allow a benefit-cost analysis of the savings resulting from the program.

The Basis of Appliance Demand

An additional set of research topics could be addressed in developing countries that are coping with rapidly increasing power demand due to increases in appliance saturation. Policymakers in these countries will need to take a broader perspective than just examining labels and technical methods for improving appliance efficiency. These studies can assess the underlying bases of consumer demand for appliances and investigate options for providing consumer satisfaction and mitigating energy demand besides just the promotion of technical efficiency improvements.

Appliance Usage Surveys. Appliance usage surveys are an important step for developing countries and provide data that can prove useful on a number of levels. Typically these studies are carried out by experienced survey researchers who gather detailed data on types of appliances, power demand, and patterns of use. Thailand developed its end-use load forecast for the residential sector in 1990. These data were subsequently used in the development of savings estimates for the national DSM Master Plan in 1991. Such data can also be used by policymakers to prioritize the end-use technologies that are the major drivers of demand.

Study of Consumer Appliance Demand. The small research project in this dissertation on appliances in rural Thailand is an example of how unstructured interviews can be used to understand the causes of demand and identify possible policy responses that would help to mitigate that demand. Two of my findings on rural Thai consumers could lead to further research projects. These findings were part of this research but are not reported in this dissertation. They will be published separately elsewhere.

One is the finding that many consumers, in both urban and rural districts, tend to increase their food storage in a modular, step-wise function. That is, when their six-cubic-foot refrigerator is no longer large enough, they buy another six-cubic-foot unit. From a efficiency perspective, this is much more wasteful than operating one 12-cubic-foot refrigerator. Research could more fully explore the behavioral aspects of refrigerator purchase behavior; the social and economic considerations in play when consumers shop for their refrigerator; and the limitations of a policy that would promote replacement of small refrigerators with larger units when a family outgrows the smaller unit. There may also be other considerations that would argue against the promotion of larger units, such as the fact that the larger units are not accepted by Thai homeowners, or that widespread promotion of larger units might have the opposite of the intended effect and lead to increased energy demand countrywide

Another possible topic is generated by my finding that more than half of the rural consumers whom I surveyed said that they did not want to buy an air conditioner. This leads to the question of why consumers are buying new air conditioners, a question that has not been studied in any detail in Thailand or many developing countries. For example, the villagers whom I interviewed said that the type of people who own air conditioners are people who build new houses. But why are these people installing air conditioners when they build new houses? Is it because new houses are not constructed using passive solar techniques such as large overhangs, proper orientation, natural ventilation, and high ceilings, which would obviate the need for an air conditioner? Is it because having an air conditioner is a status symbol? A unique research project in Bangkok called the Residential Energy Efficiency Project tested the ability of ceiling insulation to reduce indoor ceiling temperatures, and reduce air conditioner demand in a Bangkok residence (Parker 1994). Similar research could be carried out in traditional-style and newly constructed houses in rural Thailand to test levels of temperature, thermal comfort, ventilation, and energy use and determine optimal housing designs that could be used in new construction. Such research could also incorporate local builders to provide training in passive solar design techniques and develop a network of firms that can build low-energy houses.