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SAVING ENERGY THE EASY WAY: AN ANALYSIS OF THERMOSTAT MANAGEMENT[1]

ABSTRACT

One of the most effective and least expensive means of reducing household energy use is to maintain low indoor temperatures during the winter and high indoor temperatures during the summer. There is a need to determine how households manage their thermostats in order to: (1) estimate energy- and cost-effectiveness of energy retrofits for individual households, utilities, and the nation; (2) improve the marketing of energy-reducing programs; (3) estimate the potential for energy reduction in homes; and (4) improve our general understanding of thermostat management.

We analyzed data on self-reported winter and summer thermostat settings and control strategies that were collected in recent surveys by utility companies, and state and federal energy agencies. We constructed several hypotheses to examine how thermostat management was related to the following occupant-related features: socioeconomic characteristics of occupants (age, education, income, home ownership, and race), building characteristics (house type, size, and age), space conditioning fuel and system, climate, and energy audit programs. We also examined thermostat management over time (during the day, seasonally, and yearly) and analyzed its relationship to energy use.

We found that thermostat management (especially during the summer) is not fixed, but varies and is sensitive to some conditions. Certain groups--younger people, better educated individuals, audited households, multi-family households, and residents of warmer climates--reduce energy use at a greater rate than their counterparts. Households lower and raise their thermostats during the day and during different seasons and also shut off their heating and air conditioning systems when their home is unoccupied. In fact, many households reported settings below 68° in the winter and above 78° in the summer, the standard temperatures used in many energy models and programs.

This study raised a number of interesting questions for future work that should lead to improvements in the study of thermostat management, design and marketing of energy conservation programs, and the design of utility surveys. We believe that larger sample sizes, uniform sampling designs and

instruments, the collection of engineering, social, behavioral, and attitudinal data, multivariate analysis, and long-term studies will produce more consistent results. In addition, metering of temperature and thermostat setting data should provide a more reliable and accurate measure of indoor temperatures and thermostat management and allow researchers to make appropriate adjustments for self-reported thermostat data.

INTRODUCTION

One of the most effective and least expensive means of reducing household energy use is to maintain low indoor temperatures during the winter and high indoor temperatures during the summer.[2] The monetary savings of thermostat management can be substantial: it has been estimated that $5 billion has been saved annually in the United States due to changes in home thermostat use since the oil embargo of 1973 (Kempton, 1984). Of course, this type of behavior may be merely transitory, and if people believe the energy shortage has ended, then they may start to keep their homes warmer in the winter and cooler in the summer, reducing or eliminating the $5 billion annual savings. This "rebound effect" may have already occurred for some households that have weatherized their homes: they may now feel that they can increase their indoor comfort level since the cost of energy is perceived to be less expensive for them than before weatherization.[3] Thus, there is a need to determine how households are managing their thermostats in order to estimate the potential for energy reduction in homes.

Another reason for examining thermostat settings in detail is to explore the amount of variability in the way people manage their indoor comfort. Although average thermostat settings may be useful for modeling energy use in unoccupied homes, estimating energy use for a large sample of occupied homes, and evaluating the impact of an energy-reducing program for a utility service area, they are not appropriate for estimating energy use in individual homes. Previous work in this area has shown that a few degrees difference can have a substantial impact on the energy consumed in the home. A difference of several degrees can affect consumers' willingness to invest in energy efficient products. Thus, knowledge of the amount of variability in thermostat settings will be useful, for example, in performing sensitivity analyses to estimate energy- and cost-effectiveness of energy retrofits for individual households, utilities, and the nation.

Thermostat settings also are useful as indicators of the type of energy-reducing behavior being practiced by individuals. Thermostat management is usually one of the first actions an occupant takes in reducing energy in the home and is often the predecessor for more time consuming and expensive energy-reducing measures such as ceiling and wall insulation. Moreover, by examining the correlates of thermostat settings (e.g., size of a dwelling, household income, and age of the respondent), one can improve the marketing of energy-reducing programs by focusing on variables that are highly correlated with thermostat management.

Ideally, one would like to monitor the indoor temperatures of residential households to determine if people are adjusting their thermostats to reduce energy use. However, the metering of thermostats is expensive and time-consuming: there have been few studies that have monitored indoor temperatures (Vine, 1983). A less expensive, albeit less reliable, surrogate for measuring indoor air temperature is the occupant-reported thermostat setting.

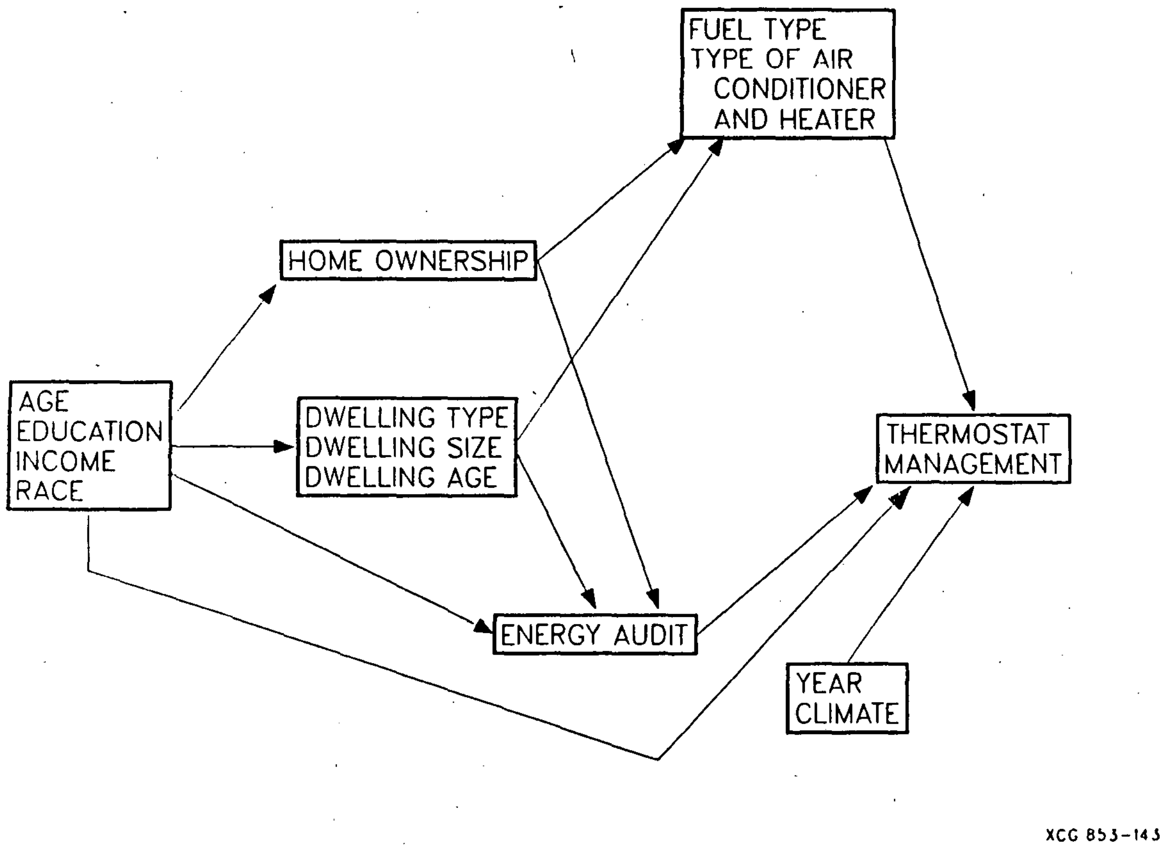
In previous work, we have shown that self-reported thermostat settings do help to explain energy use variations among households (Cramer et al., 1984; Vine et al., 1982). Relying on self-reported data, however, raises some methodological and validity issues. Without objective confirmation, one does not know the veracity of an individual's reported behavior. For example, the self-reported incidence of energy-reducing actions was reported in one of our studies as uniformly (and suspiciously) high, indicating a possible upward bias. Anecdotal data also suggest that there is a discrepancy between self-reported thermostat settings, actual thermostat settings, and indoor temperatures. So far, no one has been able to accurately estimate the relative importance of two possible sources of error--instrumentation error and respondent reactivity--to account for this discrepancy.[4] Until we have a more reliable method of measuring indoor temperatures, self-reported data will remain useful for improving our understanding of thermostat management.

CONCEPTUAL MODEL AND HYPOTHESES

We analyzed data on self-reported winter and summer thermostat settings and thermostat control strategies that were collected in recent surveys by utility companies, state and federal energy agencies, and in our own studies at Lawrence Berkeley Laboratory. We were interested not only in the distribution of thermostat settings but also in the dynamics of thermostat management (e.g., how people change thermostat settings during the day or from season to season). We examined how thermostat management was related to the following occupant-related features: socioeconomic characteristics of occupants (age, education, income, home ownership, and race), building characteristics (house type, size, and age), space conditioning fuel and system, climate, and energy audit programs. We also examined thermostat management over time (during the day, seasonally, and yearly) and analyzed its relationship to energy use.

We developed a conceptual model of thermostat management to examine these variables (Figure 1). We have drawn arrows to indicate some of the possible relationships between the variables and thermostat management.

Figure 1. Conceptual model of thermostat management.



We believe that the primary sociodemographic variables (age, education, income, and race) affect the type, size, and age of the dwelling one occupies. This, in turn, affects the type of space conditioning system and fuel used in the home. The primary sociodemographic variables also affect one's chance of owning a home. The chance of receiving an energy audit is affected by many of these variables. Winter and summer thermostat settings and thermostat control are affected by all of the above variables in addition to being influenced by climate and history (year). Similar relationships also should affect energy use during specific periods of the day (time-of-day). Using this model, we constructed several hypotheses on the relationship between thermostat management and its correlates. We developed these hypotheses on the basis of our experience with the energy use literature, discussions with experts in the field, and common sense. In several cases, we included competing hypotheses (excluding the null hypothesis) to indicate alternative relationships.

1. *Age.* (a) We hypothesized that elderly people maintained higher winter settings and lower summer settings than younger people because we believed that elderly people were more sensitive than younger occupants to extreme winter and summer temperatures and were less flexible than their counterparts in adapting to a wide range of temperatures (Beck et al., 1980; Rohles, 1981; Stern et al., 1983). (b) We hypothesized that elderly people maintained lower winter settings and higher summer settings than younger people because we believe that elderly people living on fixed incomes were willing to live with uncomfortable temperatures in order to reduce their utility bills (Diamond, 1984).

2. *Education.* (a) We hypothesized that better educated occupants maintained lower winter settings and higher summer settings than less educated individuals because we believed that the former had more access to and knowledge of energy-reducing practices and measures (Farhar et al., 1979). (b) We hypothesized that better educated individuals maintained higher winter settings and lower summer settings than less educated people because education was often highly correlated with income (see below).

3. *Income.* (a) We hypothesized that higher income households maintained higher winter settings and lower summer settings than poorer households because the former could afford the cost of energy and because the latter were already using minimal amounts of heating and cooling energy and would find it difficult to cut back further. (b) We

hypothesized that higher income households maintained lower winter settings and higher summer settings than poorer households because income was often highly correlated with education (see above) and with home ownership (see below) (Grier, 1977; Murray, 1974).

4. *Race*. We assumed that there were cultural norms attached to indoor comfort levels, perceived causes of illness, etc., that affected the setting of thermostats and which might distinguish white from non-white households. We did not know how these norms specifically affected thermostat behavior (e.g., higher or lower settings in the winter). Race needs to be controlled by education and income to deter the misinterpretation of results.

5. *Home ownership*. (a) We hypothesized that homeowners maintained higher winter settings and lower summer settings than renters because home ownership was often highly correlated with income (see above) and because we believed renters were more likely to adopt low cost energy-reducing practices, such as thermostat management, than to install expensive energy-reducing measures. (b) We hypothesized that homeowners maintained lower winter settings and higher summer settings than renters because the former directly received the total benefits of their energy-reducing actions and were frequently the typical recipients of government and utility energy-reducing programs (Black et al., 1985).

6. *Dwelling type*. (a) We hypothesized that residents of single-family houses maintained lower winter settings and higher summer settings than other residents because the former's total fuel bills were larger than their counterparts, single-family households were the typical recipients of government and utility energy-reducing programs, and because we suspected less air leakage problems (see below). (b) We hypothesized that residents of single-family houses maintained higher winter settings and lower summer settings than other residents because of their higher household income (see above), and, because of their greater size, we suspected greater air distribution problems (see below). In addition, we believed it would be easier to maintain lower winter settings and higher summer settings for residents of

apartments that capture "waste heat" from attached units.

7. *Dwelling size.* (a) We hypothesized that residents of larger homes maintained lower winter settings and higher summer settings than residents of smaller homes because of the former's higher fuel costs, ability to close off more rooms, and, because of their smaller surface, area-to-volume ratio, we suspected less air leakage problems (Stern et al., 1983). (b) We hypothesized that residents of larger homes maintained higher winter settings and lower summer settings than residents of smaller homes because of the high correlation between size and income (see above) and the difficulty in maintaining comfortable temperatures in large homes (where air distribution posed a greater problem).

8. *Dwelling age.* (a) We hypothesized that residents of recently built homes maintained lower winter settings and higher summer settings than residents of older homes because of improved construction practices and materials (including additional insulation), and because we suspected greater air leakage and distribution problems in older homes. (b) We hypothesized that residents of recently built homes maintained higher winter settings and lower summer settings than residents of older homes because, after investing in a more energy efficient home, we believed the cost of energy would be perceived to be less expensive for residents of new homes.

9. *Heating fuel.* We hypothesized that electrically-heated households maintained lower winter settings than gas-heated households because of the relatively high cost of electricity.

10. *Air conditioner type.* We hypothesized that owners of room air conditioners maintained lower summer thermostat settings than owners of central air conditioners because the conditioned space was often smaller (see above) and because we believed that owners of room air conditioners used them less than their counterparts.

11. *Energy audit.* (a) We hypothesized that audited households maintained lower winter settings and higher summer settings than before the audit and in comparison to non-audited households because the former were more knowledgable about how to save energy. (b) We

hypothesized that audited households maintained higher winter settings and lower summer settings because, after investing in energy-reducing measures, we believed that the cost of energy would be perceived to be less expensive for them than before weatherization. However, because there is a large amount of variability in the audit process--how the auditor conducted the audit, the kind of information presented, the deliverance of free low-cost weatherization, etc.--and because the effects of the audit may be transitory, the differences between audited and non-audited households may be negligible. Furthermore, control samples and pre-audit data are essential for accurately determining the effect of the audit on behavior.

12. *Climate*. We hypothesized that residents of cold climates maintained lower winter settings and residents of warm climates kept higher summer settings because of high fuel costs and severe climates (Newman and Day, 1975).

13. *Year*. (a) We hypothesized that more households maintained lower winter settings and higher summer settings over time because we expected energy information and incentive programs to become more widespread and the cost of energy to increase over time (Brunner and Bennett, 1976). (b) We hypothesized higher winter settings and lower summer settings over time because we expected households to become more complacent and/or less interested as a result of the short-term phenomena of "energy gluts" and the rise in importance of other national issues (e.g., unemployment, inflation, and crime).

14. *Time-of-day*. We hypothesized that households maintained the lowest winter settings and highest summer settings at night (when they were asleep) and the highest winter settings and lowest summer settings during the evening (when people were home) (Newman and Day, 1975). During the day (when the home was often unoccupied), we expected settings to be maintained between night and evening settings (Stern et al., 1983).

We did not expect to confirm or disprove any of these hypotheses in this investigation. We conceived of this study as exploratory in nature in our attempt to synthesize data from diverse sources and in our quest for understanding the dynamics of thermostat management.

We found that thermostat management (especially during the summer) is not fixed, but varies and is sensitive to some conditions. Certain groups--younger people, better educated individuals, audited households, multi-family households, and residents of warmer climates--reduce energy use at a greater rate than their counterparts. Households lower and raise their thermostats during the day and during different seasons and also shut off their heating and air conditioning systems when their home is unoccupied. In fact, many households reported settings below 68^{o} in the winter and above 78^{o} in the summer, the standard temperatures used in many energy models and programs.

This study raised a number of interesting questions for future work that should lead to improvements in the study of thermostat management, design and marketing of energy conservation programs, and the design of utility surveys. We believe that larger sample sizes, uniform sampling designs and instruments, the collection of engineering, social, behavioral, and attitudinal data, multivariate analysis, and long-term studies will produce more consistent results. In addition, metering of temperature and thermostat setting data should provide a more reliable and accurate measure of indoor temperatures and thermostat management and allow researchers to make appropriate adjustments for self-reported thermostat data.

METHODOLOGY

Data on self-reported thermostat settings and control strategies were primarily obtained in a survey of major utility companies and all state energy conservation offices during the Summer of 1983. We included those studies that had self-reported thermostat data and few missing cases.[5] We identified 53 projects that met these criteria. While we recognize that this survey does not include all the utilities in the country or research being conducted in academia, we do feel that the survey is representative of recent thermostat management behavior in the United States.

The number of households in each study numbered 50 or more. Some of the data were collected in utility customer surveys, residential energy audits, and residential energy audit evaluation surveys. In these surveys, data were collected using diverse methods: mail questionnaire, telephone interview, and face-to-face interview. We augmented this data base with data collected in household surveys conducted by Lawrence Berkeley Laboratory (LBL) in the past several years in the cities of Davis and Lodi, California, and Pensacola, Florida.

In Appendix A, we include the tables used for analyzing the data described in this report. In Appendix B, we present an annotated bibliography of all the relevant studies reviewed for this project. This bibliography contains information on the objectives of the study, the type of data collected, survey method, survey period, sampling method, sample size, response rate, and type of statistics used in the analysis.

Secondary data analysis is useful for evaluation research. However, it is important to note the different types of problems associated with this type of analysis. Because of the diverse methods used to collect thermostat data, different objectives each organization had in collecting and presenting data, and different types of samples and sampling periods, it was very difficult to synthesize the findings from these studies. We also were dependent on what the author(s) presented, or did not present, in their documents. For example, the statistical significance of the results was not reported in many of the studies that we examined, making it very difficult to report definitive conclusions. Similarly, many of the reports did not contain information on missing cases for particular questions: we can only assume that most of the sample in these studies did respond to the selected questions.

An associated problem was the absence of thermostat data in many surveys conducted by utilities and state energy offices. Of the organizations that did collect these data, many did not present the data in their reports (i.e., the question was listed in the questionnaire without any discussion of the results in the text). And of the ones that did report the data, most of the data were presented as frequencies (without criteria of statistical significance) and rarely as cross-tabulations. Accordingly, we were left with only a few data sources for each category of thermostat settings that were of interest to us (e.g., age, income, and house size). We attempted to remedy this omission by using data from our own surveys. Similarly, in many cases--black households, younger households, and low income groups--the sample sizes were very small, and small sample sizes made it very difficult to obtain statistically significant relationships.

RESULTS AND DISCUSSION

We summarize our findings using the conceptual framework presented at the beginning of this paper. Our conclusions are generally conservative and often support the null hypothesis (no relationship) when there is a large amount of indeterminacy.

1. *Age.* No consistent relationship seems to exist between winter thermostat settings and age, since two studies found no significant differences, one survey found lower winter settings among younger people, and a fourth study found lower winter settings among older people. All (four) studies found higher summer thermostat settings among younger respondents.

2. *Education.* No consistent relationship seems to exist between winter thermostat settings and education, since two studies found no significant differences, and a third survey, which found lower winter settings among less educated respondents, had serious methodological problems. Most (four) studies found higher summer thermostat settings among higher educated respondents, although one survey found lower summer settings at night among higher educated respondents.

3. *Income.* No consistent relationship seems to exist between winter thermostat settings and income, since five studies found no significant differences, and two studies found lower winter settings among higher income respondents. Also, no consistent relationship seems to exist between summer thermostat settings and income, since four studies found no significant differences, and two studies found higher summer settings among higher income groups.

4. *Race.* The racial basis of thermostat settings and control was examined in only one report. Black households maintained warmer homes in the winter and cooler homes in the summer than white households, but black households also reduced their heating and cooling energy use by turning off their space conditioning systems.

5. *Home ownership.* No consistent relationship seems to exist between winter thermostat settings and home ownership, since one study found no significant differences, a second study found lower winter settings among homeowners, and a third study found mixed results for a number of heating practices. Home ownership was not related to summer thermostat settings in all (three) studies.

6. *Dwelling type.* Most (five) surveys found lower winter thermostat settings among multi-family homes, although two studies found no differences. No consistent relationship seems to exist between summer thermostat settings and type of dwelling, since three studies found no significant differences, a fourth survey found higher summer settings among residents of single-family houses, and a fifth study found higher summer settings among residents of multi-family homes.

7. *Dwelling size.* There was only one study that examined the relationship between dwelling size and winter thermostat settings, and no significant differences were found. Also, size of dwelling was not related to summer thermostat settings in all (three) studies.

8. *Dwelling age.* No consistent relationship seems to exist between winter thermostat settings and age of dwelling, since three studies found no significant differences, and one survey found lower winter settings among residents of newer homes. No consistent relationship seems to exist between summer thermostat settings and age of dwelling, since two studies found no significant differences, and two studies found higher summer settings among residents of newer homes.

9. *Heating fuel.* No consistent relationship seems to exist between winter thermostat settings and heating fuel, since two surveys found no significant differences, and two studies found lower winter settings among electric-heated homes (in contrast to non-electric-heated homes).

10. *Air conditioner type*. There was only one study that examined the differences in summer thermostat settings between central and room air conditioners, and the results were inconclusive: households with room air conditioners maintained both higher and lower settings than households with central air conditioners.

11. *Energy audit*. No consistent relationship seems to exist between winter thermostat settings and energy audits, since most (six) studies found no significant differences, although three surveys found lower winter settings among audited households. Most (five) surveys found higher summer thermostat settings among audited households, although one study found no significant differences.

12. *Climate*. In the only study that examined the relationship between climate and thermostat settings, homes in warmer climates turned the heater off and maintained lower winter settings than homes located in other climates. The relationship between climate and summer thermostat settings was not examined in any studies.

13. *Year*. No consistent relationship seems to exist between winter thermostat settings and year, since four studies found no significant differences, seven surveys found higher winter settings over time, and four studies found lower winter settings over time. No consistent relationship seems to exist between summer thermostat settings and year, since seven surveys found higher summer settings over time, and three surveys found lower summer settings over time.

14. *Time-of-day*. Most (27) surveys found significant differences in winter thermostat settings during different periods in the day, although one study found no significant differences. The typical pattern was: lowest settings at night, highest settings in the evening, and daytime settings between evening and night. No consistent relationship seems to exist between summer thermostat settings and time-of-day, since two studies found no significant differences, two surveys found lower settings as the day progressed, and three surveys found higher settings as the day

progressed.

We found that thermostat management (especially during the summer) is not fixed, but varies and is sensitive to some conditions (Table 1).

Table 1. Significant correlates of thermostat management.

Variable	Winter Thermostat Settings		Summer Thermostat Settings	
	Lower (Cooler)	Higher (Warmer)	Lower (Cooler)	Higher (Warmer)
Age	---	---	Older	Younger
Education	---	---	Less	More
Dwelling type	Multi-family	Single-family	---	---
Energy audit	---	---	Non-audited	Audited
Climate	Warmer	Colder	---	---

These results strongly support three summer thermostat management hypotheses posited at the beginning of this paper (1a, 2a, and 11a) and partially support two winter thermostat management hypotheses (6b and 12). Certain groups--younger people, better educated individuals, audited households, multi-family households, and residents of warmer climates--reduce energy use at a greater rate than their counterparts. Households lower and raise their thermostats during the day and during different seasons and also shut off their heating and air conditioning systems when their home is unoccupied. In fact, many households reported settings below 68° in the winter and above 78° in the summer, the standard temperatures used in many energy models and programs.

We didn't expect to find very strong relationships between thermostat management and those variables of ultimate causal priority. Accordingly, we were unable to find consistent relationships between self-reported thermostat settings and variables such as income, home ownership, dwelling size, and race.

We also encountered an interpretation problem in our analysis: the data in several studies contradicted one another, making it difficult to draw general conclusions. For example, one study reported higher summer settings among residents of single-family houses than multi-family dwellings, while another study found higher summer settings in multi-family homes. This indeterminacy may reflect regional differences, or it may be the result of competing hypotheses.

IMPLICATIONS FOR FUTURE WORK

This investigation has raised a number of interesting questions for future work that should lead to improvements in the study of thermostat management, design and marketing of energy conservation programs, and the design of utility surveys.

First, the study of thermostat management is still in its infancy and is in need of both conceptual refinement and improved data collection. At a minimum, models of thermostat management should incorporate both engineering, behavioral, and social variables, similar to the modeling of household energy use (Cramer et al., 1984; Eichen and Tukel, 1982; Kempton and Krabacher, 1984; Vine et al., 1982).[7] Our understanding of the nature of thermostat management would also be improved if these models were to include attitudes, beliefs, and norms. For instance, personal norms (e.g., personal obligation to conserve) supply a strong internal motivation that is critical to types of behavior, like thermostat management, that must be repeated or continued to achieve maximum energy savings (Black et al., 1985; Stern et al., 1983).[8] Recent studies that have included attitudes in causal models of thermostat management are found in Brown (1984), Macey and Brown (1983), and Stern et al. (1983). More long-term studies also are needed to examine how thermostat management changes over time, especially for those households that have been audited and/or weatherized: does internal motivation weaken over time so that indoor comfort increases and energy savings decrease (the rebound effect)?

In conjunction with improvements in conceptual design and the collection of data on social, behavioral, and attitudinal variables, we believe we need a more reliable method of measuring indoor temperatures. Advances in metering technology and computerized data collection and analysis offer the potential of measuring occupant behavior relatively inexpensively and efficiently. The problems of intervention in the household remain, but the potential rewards are great. Metered temperature and thermostat setting data should provide a more reliable and accurate measure of indoor temperatures and thermostat management than self-reported data. Accordingly, we need to monitor a wide range of buildings in which we would collect metered thermostat data in addition to self-reported thermostat data. By examining the differences in the two types of data, we would be able to see how divergent the data are from one another and to construct a measure (e.g., a ratio) reflecting the differences in self-reported and actual thermostat settings. The comparison of self-reported and metered data, therrefore, would enable us to examine the relationship of overreporting (or underreporting) and particular sociodemographic groups and attitudes to see if there are population differences or attitudes associated with systematic errors in self-reporting of thermostat management (Black et al., 1985). It would then be possible to study thermostat management in a large sample of homes without monitoring and accurately report on thermostat settings by adjusting self-reported data accordingly.

The design and marketing of energy conservation programs can be improved by targeting programs to receptive groups. The results from this study have shown that a thermostat management program would have a greater likelihood of success if its actions are marketed to the following groups: younger people, better educated individuals, audited households, multi-family households, and residents of warmer climates. In contrast, the marketing of thermostat management may not be effective for the counterparts of these groups (i.e., older and less educated people, etc.) or by other characteristics for which inconsistencies were found (e.g., income level and age of dwelling).

As mentioned previously, we encountered several methodological problems associated with the way organizations conduct surveys. Because of the diverse methods used to collect thermostat data, different objectives each organization had in collecting and presenting data, and different types of samples and sampling periods, it was difficult to synthesize the findings from these studies. Hence, there is a need for improving the design and implementation of surveys so that systematic data collection and data analysis can occur. Utilities and state energy agencies should include standardized questions on thermostat management as part of their ongoing surveys and the surveys should be conducted annually. In addition, the results of the surveys should contain a detailed analysis of thermostat settings and behavior, as described in this report. A recommended model for this type of work is the U.S. Department of Energy's Residential Energy Consumption Survey (U.S. Department of Energy, 1984).[9]

NOTES

1. An earlier version of this paper was presented at the ACEEE 1984 Summer Study on Energy Efficiency in Buildings, Santa Cruz, California (Vine, 1984). We would like to thank Steve Gold for his assistance in collecting the data used in this project. We also would like to thank the following for their helpful comments: Rick Diamond, Chuck Goldman, Eric Hirst, Joe Huang, Willet Kempton, Mark Levine, Jim McMahon, Max Neiman, Ron Ritschard, Mike Rothkopf, Clive Seligman, and Tony Usibelli.

2. For example, a $1^{O}F$ increase in the summer thermostat setting can reduce cooling energy use by 4.6% in the Central Valley of California (Vine et al., 1982).

3. For example, Hirst and Talwar (1981) reported that 35% of weatherized households raised their winter thermostat setting after weatherization. In another study, Hirst et al. (1984) estimated that households participating in a retrofit project increased their indoor temperature settings after retrofit by about $0.4^{O}F$ to $1.0^{O}F$. For conceptual difficulties associated with the "rebound effect," see Condelli et al. (1984).

4. An example of instrumentation error is changes in the calibration of a thermograph used to measure indoor temperatures, producing changes in the obtained measurements. An example of respondent reactivity is when respondents seek to impress the interviewer and to give socially desirable responses (Hirst and Goeltz, 1985). Luyben (1982) reported in his study that the mean reported thermostat setting (obtained in a telephone survey) was $1.8^{O}F$ lower than the mean observed thermostat setting (obtained in a door-to-door survey). Respondent reactivity may not be an issue for the type of work described in our paper if there is a systematic response bias rather than a random response bias (for instance, Kempton and Krabacher (1984) reported a consistent under-reporting of thermostat settings). Thus, the relationships reported in our study should not be affected by a systematic bias. However, if one is interested in comparing observed and self-reported thermostat settings, respondent reactivity is a sensitive issue.

5. The importance of missing cases should not be underestimated: for example, we did not analyze data from one utility company because of the large percentage (50 to 70%) of customers not responding to several questions, although the study contained a fairly thorough analysis of thermostat settings. We felt that the results presented by this utility would not have been representative of their service area.

6. Kempton and Krabacher (1984) reported a consistent under-reporting of thermostat settings and suggested that thermostat settings derived from surveys be adjusted upward by at least 3°F to estimate actual mean thermostat settings for a sample.

7. Murray's (1974) estimation of daytime temperature settings as a function of housing quality, outdoor temperature, and total family income would have been improved if more behavioral and social data had been collected and analyzed.

8. Several studies in our survey reported an attrition in energy-reducing behavior over the last three to five years. Moreover, one study found that all energy-reducing practices (e.g., lowering thermostat settings) had dropped over a four year period while all of the more permanent energy-reducing measures (e.g., installing attic insulation) had increased.

9. This annual survey contains standardized energy-related questions that are given to a representative national sample through personal interviews.

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APPENDICES

LIST OF STUDIES

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LIST OF STUDIES

The following studies were used for preparing this report. We have cross-referenced studies and tables (Appendix A) where applicable. More information on these studies can be found in the Annotated Bibliography (Appendix B).

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2.	ARIZONA ENERGY OFFICE, Survey of Current and Potential Home Energy Management Activities Among Urban Homeowners in Arizona	
3.	ARIZONA PUBLIC SERVICE COMPANY, 1983 Residential Conservation Tracking Survey	
4.	BONNEVILLE POWER ADMINISTRATION (BPA), The Pacific Northwest Residential Energy Survey, Volume 1: Executive Summary, and Volume 2: Technical Appendix	103
5.	BOSTON EDISON COMPANY, 1980 Appliance Survey of Residential Customers	
6.	CALIFORNIA ENERGY COMMISSION, RCS Follow-Up Survey Analysis	
7.	CENTRAL MAINE POWER COMPANY, 1981 Residential Energy Survey	108
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APPENDIX A

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AGE

Table 1 Winter thermostat settings by age: Pensacola, Fla.

	28-34 Years *(N=6)*	35-44 Years *(N=19)*	45-54 Years *(N=14)*	55-64 Years *(N=9)*	65-82 Years *(N=3)*	Total *(N=51)*
Off	0%	0%	0%	0%	0%	0%
64° or lower	0	5.3	7.1	0	0	3.9
65 to 67°	0	5.3	7.1	0	33.3	5.9
68 to 70°	100	78.9	64.3	55.6	66.7	72.5
71 to 73°	0	0	0	22.2	0	3.9
74 to 76°	0	0	7.1	11.1	0	3.9
77° or more	0	10.5	14.3	11.1	0	9.8

Pearson correlation = 0.10; significance = 0.23

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Survey," Ref. [17].

Table 2 Winter thermostat settings by age and year: Mississippi

1981	18-25 Years *(N=39)*	25-35 Years *(N=92)*	35-45 Years *(N=93)*	45-55 Years *(N=72)*	55-65 Years *(N=91)*	65 Years & Over *(N=57)*
Off	2.6%	3.3%	5.4%	0%	1.1%	1.0%
Lower than 65°	20.5	16.5	10.8	16.4	7.7	8.0
65° - 68°	28.2	42.9	46.2	39.7	44.0	33.0
69° - 72°	35.9	33.0	31.2	32.9	29.7	45.0
73° - 78°	7.7	3.3	3.2	4.1	11.0	8.0
More than 78°	2.6	0	1.1	0	1.1	0
No thermostat	0	0	0	1.4	0	0
Don't know	2.6	1.1	2.2	5.5	5.5	1.0

1982	18-25 Years *(N=36)*	25-35 Years *(N=110)*	35-45 Years *(N=113)*	45-55 Years *(N=89)*	55-65 Years *(N=80)*	65 Years & Over *(N=64)*
Off	0%	5.5%	7.1%	7.9%	2.5%	4.7%
Lower than 65°	5.6	3.6	9.7	7.9	5.0	3.1
65° - 68°	38.9	43.6	31.9	44.9	31.3	31.3
69° - 72°	22.2	33.6	36.3	21.3	45.0	29.7
73° - 78°	30.6	10.0	11.5	13.5	11.3	20.3
More than 78°	0	2.7	1.8	1.1	2.5	0
No thermostat	0	0	0.9	1.1	0	1.6
Don't know	2.8	0.9	0.9	2.2	2.5	9.4

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 3 Summer thermostat settings by age: Pensacola, Fla.

	28-34 Years *(N=6)*	35-44 Years *(N=19)*	45-54 Years *(N=15)*	55-64 Years *(N=9)*	65-82 Years *(N=3)*	Total *(N=52)*
Off	16.7%	0%	0%	0%	0%	1.9%
81° or more	16.7	15.8	6.7	0	0	9.6
78 to 80°	50.0	84.2	73.3	66.7	100.0	75.0
75 to 77°	16.7	0	13.3	22.2	0	9.6
72 to 74°	0	0	0	11.1	0	1.9
69 to 71°	0	0	6.7	0	0	1.9

Pearson correlation = 0.30; significance = 0.02

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Energy Survey," Ref. [17].

Table 4 Summer thermostat settings by age: Lodi, Calif.*

	18-24 Years *(N=4)*	25-34 Years *(N=50)*	35-44 Years *(N=27)*	45-54 Years *(N=34)*	55-64 Years *(N=36)*	65-92 Years *(N=59)*	Total *(N=210)*
Off	0%	0%	0%	0%	0%	0%	0%
81° or more	25.0	12.0	11.1	0	2.8	0	5.2
78 to 80°	0	48.0	51.9	47.1	58.3	47.5	49.0
75 to 77°	75.0	18.0	25.9	26.5	19.4	28.8	24.8
72 to 74°	0	16.0	11.1	14.7	16.7	15.3	14.8
69 to 71°	0	4.0	0	0	2.8	8.5	3.8
68° or less	0	2.0	0	11.8	0	0	2.4

Pearson correlation = 0.10; significance = 0.07

* Settings are for 1 pm to 7 pm.

Source: Lawrence Berkeley Laboratory, "1981 Lodi Energy Survey," Ref. [16].

Table 5 Summer thermostat settings by age and year: Mississippi

1981

	18-25 Years *(N=37)*	25-35 Years *(N=83)*	35-45 Years *(N=78)*	45-55 Years *(N=68)*	55-65 Years *(N=72)*	65 Years & Over *(N=50)*
Off	2.7%	2.4%	1.3%	3.0%	0%	0%
More than 78°	10.8	14.5	18.0	19.4	18.1	8.0
75° - 78°	16.2	28.9	41.0	31.3	40.3	30.0
71° - 74°	24.3	25.3	20.5	20.9	23.6	24.0
68° - 70°	24.3	20.5	14.1	14.9	15.3	28.0
Lower than 68°	8.1	3.6	0	1.5	0	0
No thermostat	0	0	0	0	0	0
Don't know	13.5	4.8	5.1	9.0	2.8	6.0

1982

	18-25 Years *(N=28)*	25-35 Years *(N=86)*	35-45 Years *(N=98)*	45-55 Years *(N=72)*	55-65 Years *(N=70)*	65 Years & Over *(N=56)*
Off	0%	3.4%	3.1%	2.8%	4.2%	1.8%
More than 78°	3.6	24.7	24.5	23.6	15.5	10.5
75° - 78°	39.3	36.0	45.9	38.9	39.4	33.3
71° - 74°	21.4	14.6	12.2	16.7	21.1	19.3
68° - 70°	21.4	14.6	11.2	9.7	14.1	24.6
Lower than 68°	10.7	1.1	2.0	1.4	0	1.8

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 6 Summer thermostat settings by age and time-of-day: Davis, Calif.

Morning to Noon

	17-24 Years (N=64)	25-34 Years (N=70)	35-44 Years (N=39)	45-54 Years (N=30)	55-64 Years (N=8)	65-86 Years (N=7)	Total (N=218)
Off	64.1%	54.3%	59.0%	30.0%	50.0%	42.9%	54.1%
81° or more	6.3	14.3	20.5	10.0	12.5	0	11.9
78 to 80°	14.1	24.3	15.4	50.0	37.5	28.6	23.9
75 to 77°	7.8	5.7	5.1	10.0	0	28.6	7.3
72 to 74°	6.3	1.4	0	0	0	0	2.3
69 to 71°	1.6	0	0	0	0	0	0.5
68° or less	0	0	0	0	0	0	0

Pearson correlation=0.10; significance=0.08

Noon to 6 PM

	17-24 Years (N=63)	25-34 Years (N=70)	35-44 Years (N=39)	45-54 Years (N=30)	55-64 Years (N=8)	65-86 Years (N=7)	Total (N=217)
Off	44.4%	35.7%	33.3%	20.0%	37.5%	14.3%	35.0%
81° or more	6.3	17.1	28.2	6.7	25.0	0	14.3
78 to 80°	25.4	37.1	33.3	70.0	37.5	28.6	37.3
75 to 77°	12.7	7.1	5.1	3.3	0	42.9	8.8
72 to 74°	9.5	1.4	0	0	0	14.3	3.7
69 to 71°	1.6	0	0	0	0	0	0.5
68° or less	0	1.4	0	0	0	0	0.5

Pearson correlation=0.06; significance=0.18

6 PM to Bedtime

	17-24 Years (N=65)	25-34 Years (N=70)	35-44 Years (N=39)	45-54 Years (N=30)	55-64 Years (N=8)	65-86 Years (N=7)	Total (N=219)
Off	49.2%	28.6%	23.1%	26.7%	25.0%	42.9%	33.8%
81° or more	7.7	14.3	25.6	6.7	25.0	0	13.2
78 to 80°	26.2	38.6	46.2	56.7	50.0	28.6	38.8
75 to 77°	6.2	11.4	5.1	10.0	0	28.6	8.7
72 to 74°	9.2	7.1	0	0	0	0	5.0
69 to 71°	1.5	0	0	0	0	0	0.5
68° or less	0	0	0	0	0	0	0

Pearson correlation = 0.04; significance = 0.30

Source: Lawrence Berkeley Laboratory, "1980 Davis Energy Survey," Ref. [15].

Table 7 Temperature control by age and time-of-day: Oregon

	18-34 Years *(N=142)*	35-54 Years *(N=98)*	55 or more Years *(N=132)*	Total *(N=385)*
Lower heating thermostat to 55° when house is empty	70%	73%	75%	74%
Turn heating thermostat down upon retiring	62	70	72	69
Turn off air conditioner when house is empty	28	28	25	27

Source: Pacific Power and Light, "Energy Conservation Study of Electric Heat Customers in Oregon," Ref. [34].

Table 8 Winter temperature control by age and year: Mississippi

1981

	18-25 Years *(N=38)*	25-35 Years *(N=90)*	35-45 Years *(N=91)*	45-55 Years *(N=68)*	55-65 Years *(N=86)*	65 Years & Over *(N=56)*
Using higher setting	5.3%	7.8%	6.6%	2.9%	8.1%	10.0%
Using same setting	55.3	62.2	70.3	67.7	66.3	75.0
Using lower setting	36.8	30.0	23.1	29.4	25.6	14.0
Don't know	2.6	0	0	0	0	0

1982

	18-25 Years *(N=35)*	25-35 Years *(N=103)*	35-45 Years *(N=103)*	45-55 Years *(N=79)*	55-65 Years *(N=76)*	65 Years & Over *(N=54)*
Using higher setting	11.4%	9.3%	9.1%	8.3%	7.9%	10.5%
Using same setting	60.0	65.4	64.5	77.4	69.7	68.4
Using lower setting	28.6	25.2	26.5	14.3	22.4	21.1
Don't know	0	0	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 9 Summer temperature control by age and year: Mississippi

1981	18-25 Years *(N=32)*	25-35 Years *(N=79)*	35-45 Years *(N=74)*	45-55 Years *(N=61)*	55-65 Years *(N=70)*	65 Years & Over *(N=47)*
Using higher setting	15.6%	30.4%	25.7%	16.4%	17.1%	17.0%
Using same setting	65.6	60.8	66.2	75.4	71.4	74.5
Using lower setting	18.8	8.9	8.1	8.2	11.4	8.5
Don't know	0	0	0	0	0	0

1982	18-25 Years *(N=27)*	25-35 Years *(N=78)*	35-45 Years *(N=94)*	45-55 Years *(N=65)*	55-65 Years *(N=63)*	65 Years & Over *(N=50)*
Using higher setting	14.8%	31.0%	22.9%	19.1%	14.9%	11.5%
Using same setting	77.8	65.5	76.0	75.0	83.6	84.6
Using lower setting	7.4	3.6	1.0	5.9	1.5	3.8
Don't know	0	0	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

EDUCATION

Table 10 Winter thermostat settings by education: Pensacola, Fla.

	8th Grade or Less *(N=2)*	Some High School *(N=3)*	High School *(N=14)*	Some College *(N=15)*	College *(N=9)*	Advanced Degree *(N=7)*	Total *(N=50)*
Off	0%	0%	0%	0%	0%	0%	0%
64° or lower	0	0	7.1	0	0	14.3	4.0
65 to 67°	0	0	7.1	0	0	14.3	4.0
68 to 70°	100.0	33.3	64.3	80.0	88.9	71.4	74.0
71 to 73°	0	33.3	0	0	11.1	0	4.0
74 to 76°	0	0	7.1	6.7	0	0	4.0
77° or more	0	33.3	14.3	13.3	0	0	10.0

Pearson correlation = 0.16; significance = 0.14

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Survey," Ref. [17].

Table 11. Winter thermostat settings by education and year: Mississippi

1981

	8th Grade or Less *(N=29)*	Some High School *(N=42)*	High School *(N=124)*	Some College *(N=134)*	College *(N=113)*
Off	0%	2.4%	4.0%	0%	4.4%
Lower than 65°	17.2	9.5	14.5	11.2	12.4
65° - 68°	27.6	38.1	39.5	47.8	39.8
69° - 72°	41.4	31.0	34.7	29.9	36.3
73° - 78°	0	14.3	3.2	8.2	4.4
More than 78°	3.5	0	1.6	0	0
No thermostat	3.5	0	0	0	0
Don't know	6.9	4.8	2.4	3.0	2.7

1982

	8th Grade or Less *(N=28)*	Some High School *(N=49)*	High School *(N=180)*	Some College *(N=104)*	College *(N=132)*
Off	7.1%	4.1%	5.6%	5.8%	4.5%
Lower than 65°	7.1	8.2	5.0	5.8	6.8
65° - 68°	32.1	24.5	39.4	39.4	37.1
69° - 72°	25.0	36.7	30.6	35.6	33.3
73° - 78°	7.1	16.3	15.6	9.6	15.9
More than 78°	0	4.1	1.7	1.0	1.5
No thermostat	3.6	0	0.6	1.0	0
Don't know	17.9	6.1	1.7	1.9	0.8

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 12 Summer thermostat settings by education: Pensacola, Fla.

	8th Grade or Less *(N=2)*	Some High School *(N=3)*	High School *(N=15)*	Some College *(N=15)*	College *(N=9)*	Advanced Degree *(N=7)*	Total *(N=51)*
Off	0%	0%	0%	6.7%	0%	0%	2.0%
81^{o} or more	0	0	0	6.7	33.3	14.3	9.8
78 to 80^{o}	100.0	66.7	66.7	86.7	55.6	85.7	74.5
75 to 77^{o}	0	33.3	26.7	0	0	0	9.8
72 to 74^{o}	0	0	0	0	11.1	0	2.0
69 to 71^{o}	0	0	6.7	0	0	0	2.0

Pearson correlation = -0.23; significance = 0.05

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Energy Survey," Ref. [17].

Table 13 Summer thermostat settings by education: Lodi, Calif.*

	8th Grade or Less (N=28)	Some High School (N=18)	High School (N=52)	Some College (N=68)	College (N=22)	Advanced Degree (N=23)	Total (N=211)
Off	0%	0%	0%	0%	0%	0%	0%
81^{o} or more	0	0	1.9	4.4	18.2	13.0	5.2
78 to 80^{o}	35.7	55.6	42.3	55.9	36.4	60.9	48.3
75 to 77^{o}	42.9	16.7	28.8	17.6	31.8	17.4	25.1
72 to 74^{o}	14.3	22.2	19.2	14.7	13.6	4.3	15.2
69 to 71^{o}	3.6	5.6	5.8	4.4	0	0	3.8
68^{o} or less	3.6	0	1.9	2.9	0	4.3	2.4

Pearson correlation = -0.18; significance = 0.004

*Settings are for 1 pm to 7 pm.

Source: Lawrence Berkeley Laboratory, "1981 Lodi Energy Survey," Ref. [16].

Table 14 Summer thermostat settings by education and year: Mississippi

1981

	8th Grade or Less *(N=15)*	Some High School *(N=34)*	High School *(N=102)*	Some College *(N=127)*	College *(N=109)*
Off	0%	2.9%	2.0%	1.6%	0.9%
More than 78°	13.3	11.8	12.8	17.3	17.4
75° - 78°	20.0	32.4	27.5	33.9	37.6
71° - 74°	20.0	23.5	22.6	23.6	22.9
68° - 70°	26.7	14.7	21.6	18.1	16.5
Lower than 68°	6.7	2.9	2.9	2.4	1.8
No thermostat	0	0	0	0	0
Don't know	13.3	11.8	10.8	3.2	2.8

1982

	8th Grade or Less *(N=18)*	Some High School *(N=37)*	High School *(N=153)*	Some College *(N=84)*	College *(N=119)*
Off	5.3%	5.1%	3.2%	3.5%	0.8%
More than 78°	26.3	12.8	19.5	15.3	22.7
75° - 78°	15.8	35.9	43.5	44.7	34.5
71° - 74°	15.8	25.6	11.7	16.5	21.8
68° - 70°	15.8	10.3	16.9	10.6	16.0
Lower than 68°	0	5.1	1.3	2.4	1.7
No thermostat	5.3	0	0.6	0	0
Don't know	15.8	5.1	3.2	7.1	2.5

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 15 Summer thermostat settings by education and time-of-day: Davis, Calif.

Morning to Noon

	Less than High School (N=6)	High School (N=12)	Some College (N=43)	College (N=53)	Advanced Degree (N=105)	Total (N=219)
Off	66.6%	33.3%	62.8%	45.3%	57.1%	54.3%
81° or more	0	16.7	2.3	11.3	16.2	11.9
78 to 80°	33.3	33.3	25.6	28.3	19.0	23.7
75 to 77°	0	16.7	4.7	9.4	6.7	7.3
72 to 74°	0	0	2.3	5.7	1.0	2.3
69 to 71°	0	0	2.3	0	0	0.5
68° or less	0	0	0	0	0	0

Pearson correlation = -0.07; significance = 0.16

Noon to 6 PM

	Less than High School (N=6)	High School (N=12)	Some College (N=42)	College (N=53)	Advanced Degree (N=105)	Total (N=218)
Off	66.6%	33.3%	40.5%	26.4%	37.1%	35.3%
81° or more	0	0	2.4	17.0	20.0	14.2
78 to 80°	33.3	50.0	38.1	39.6	34.3	37.2
75 to 77°	13.3	16.7	9.5	9.4	6.7	8.7
72 to 74°	0	0	7.1	7.5	1.0	3.7
69 to 71°	0	0	2.4	0	0	0.5
68° or less	0	0	0	0	1.0	0.5

Pearson correlation = -0.08; significance = 0.13

6 PM to Bedtime

	Less than High School (N=6)	High School (N=12)	Some College (N=44)	College (N=53)	Advanced Degree (N=105)	Total (N=220)
Off	33.3%	41.7%	50.0%	37.7%	23.8%	33.6%
81° or more	0	8.3	0	18.9	17.1	13.2
78 to 80°	66.6	33.3	38.6	28.3	43.8	39.1
75 to 77°	0	16.7	4.5	9.4	9.5	8.6
72 to 74°	0	0	4.5	5.7	5.7	5.0
69 to 71°	0	0	2.3	0	0	0.5
68° or less	0	0	0	0	0	0

Pearson correlation = 0.11; significance = 0.06

Source: Lawrence Berkeley Laboratory, "1980 Davis Energy Survey," Ref. [15].

Table 16 Winter temperature control by education and year: Mississippi

1981

	8th Grade or Less *(N=26)*	Some High School *(N=40)*	High School *(N=121)*	Some College *(N=130)*	College *(N=110)*
Using higher setting	3.9%	12.5%	5.0%	8.5%	6.4%
Same setting	84.6	50.0	66.1	63.1	71.8
Using lower setting	11.5	37.5	28.9	28.5	20.9
Don't know	0	0	0	0	0.9

1982

	8th Grade or Less *(N=20)*	Some High School *(N=44)*	High School *(N=166)*	Some College *(N=95)*	College *(N=125)*
Using higher setting	13.6%	8.7%	8.1%	13.3%	6.9%
Same setting	72.7	78.3	71.5	61.2	64.9
Using lower setting	13.6	13.0	20.3	25.5	28.2
Don't know	0	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 17 Summer temperature control by education and year: Mississippi

1981	8th Grade or Less *(N=13)*	Some High School *(N=30)*	High School *(N=91)*	Some College *(N=123)*	College *(N=106)*
Using higher setting	15.4%	16.7%	20.0%	26.0%	20.8%
Kept same setting	76.9	63.3	67.0	65.9	72.6
Using lower setting	7.8	20.0	13.2	8.1	6.6
Don't know	0	0	0	0	0

1982	8th Grade or Less *(N=13)*	Some High School *(N=33)*	High School *(N=142)*	Some College *(N=75)*	College *(N=115)*
Using higher setting	14.3%	13.5%	17.3%	21.8%	26.7%
Kept same setting	85.7	78.4	76.7	76.9	72.4
Using lower setting	0	8.1	6.0	1.3	0.9
Don't know	0	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

INCOME

Table 18 Winter thermostat settings by income: Pensacola, Fla.

	$5,000-$9,999 (N=2)	$10,000-$14,999 (N=1)	$15,000-$19,999 (N=4)	$20,000-$24,999 (N=6)	$25,000-$34,999 (N=7)	$35,000-$49,999 (N=17)	$50,000 or more (N=10)	Total (N=47)
Off	0%	0%	0%	0%	0%	0%	0%	0%
64° or lower	0	0	0	0	0	5.9	0	2.1
65 to 67°	0	0	25.0	0	0	0	10.0	4.3
68 to 70°	50.0	100.0	75.0	100.0	71.4	70.6	80.0	76.6
71 to 73°	0	0	0	0	14.3	5.9	0	4.3
74 to 76°	0	0	0	0	14.3	0	10.0	4.3
77° or more	50.0	0	0	0	0	17.6	0	8.5

Pearson correlation = -0.05; significance = 0.37

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Survey," Ref. [17].

Table 19 Winter thermostat settings by income and year: Mississippi

1981

	Lower than $5,000 *(N=26)*	$5,000- $10,000 *(N=54)*	$10,000- $15,000 *(N=52)*	$15,000- $20,000 *(N=63)*	$20,000- $25,000 *(N=57)*	$25,000- $30,000 *(N=27)*	$30,000 & Over *(N=62)*
Off	0%	3.7%	0%	1.6%	5.3%	3.7%	0%
Lower than 65°	11.5	11.1	9.6	11.1	21.1	11.1	17.7
65° - 68°	50.0	33.3	51.9	47.6	38.6	55.6	53.2
69° - 72°	34.6	37.0	28.9	28.6	28.1	18.5	27.4
73° - 78°	0	5.6	5.8	11.1	3.5	3.7	1.6
More than 78°	3.9	1.9	0	0	0	0	0
No thermostat	0	1.9	0	0	0	0	0
Don't know	0	5.6	3.9	0	0.5	7.4	0

1982

	Lower than $5,000 *(N=35)*	$5,000- $10,000- *(N=45)*	$10,000- $15,000 *(N=60)*	$15,000- $20,000 *(N=55)*	$20,000- $25,000 *(N=61)*	$25,000- $30,000 *(N=58)*	$30,000 & Over *(N=109)*
Off	0%	8.9%	8.3%	3.6%	8.2%	8.6%	2.8%
Lower than 65°	5.7	8.9	3.3	5.5	6.6	6.9	6.4
65° - 68°	40.0	40.0	30.0	32.7	34.4	36.2	40.4
69° - 72°	20.0	24.4	38.3	36.4	32.8	37.9	33.0
73° - 78°	8.6	13.3	18.3	18.2	18.0	6.9	11.9
More than 78°	5.7	0	1.7	1.8	0	1.7	2.8
No thermostat	0	2.2	0	0	0	1.7	0
Don't know	20.0	2.2	0	1.8	0	0	2.8

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 20 Winter thermostat settings by household income, fuel type and time-of-day: Colorado

	Lower than $5000	$5000-$9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000-$29,999	$30,000-$39,999	$40,000 or more	Total
Day - Electric Heating (N=2959)									
60° or lower	19.3%	18.5%	21.0%	18.6%	19.6%	15.3%	19 3%	14.0%	16.1%
61 to 64°	3.6	5.0	8.5	7.2	5.2	11.3	7.5	6.1	6.9
65 to 67°	16.4	16.3	21.1	25.3	22.9	27.3	23.5	22.4	21.7
68°	9.3	21.4	20.7	23.0	22.2	22.4	25.7	28.4	21.8
69 to 72°	25.4	24.1	21.1	15.0	24.1	15.1	19.6	21.6	20.4
73° or more	5.6	3.2	0.8	1.8	1.4	0.9	0.7	1.5	2.1
No response	20.3	11.6	7.1	9.1	4.7	7.5	3.6	6.0	8.9
Average temperature setting	65.9°	65.9°	65.2°	65.1°	65.5°	65.3°	65.6°	66.2°	65.6°
Day - Gas Heating (N=3329)									
60° or lower	10.1%	13.9%	16.3%	19.2%	19.6%	14.5%	21.3%	15.3%	17.0%
61 to 64°	4.8	6.4	6.9	12.2	8.4	13.3	11.5	8.8	9.2
65 to 67°	24.2	17.5	22.4	20.3	26.5	29.1	25.9	29.1	24.5
68°	17.9	21.2	20.7	24.4	19.3	25.1	19.4	23.6	21.6
69 to 72°	23.3	29.2	20.9	17.4	17.7	15.7	17.4	18.4	19.5
73° or more	6.5	2.3	3.2	0.6	2.3	1.1	1.0	0.7	1.8
No response	13.5	9.5	7.7	5.7	6.1	1.2	3.7	4.4	6.3
Average temperature setting	66.9°	66.5°	65.5°	65.0°	65.2°	65.4°	64.9°	65.7°	65.5°
Night - Electric Heating (N=2959)									
60° or lower	30.4%	29.0%	29.2%	29.2%	30.4%	37.7%	30.2%	31.6%	30.0%
61 to 64°	3.4	11.3	10.0	12.4	11.2	14.2	16.3	16.4	12.5
65 to 66°	15.8	21.6	25.9	23.8	26.8	19.1	23.1	24.8	23.1
67 to 69°	13.7	11.8	15.3	13.0	14.4	15.4	17.3	12.2	14.2
70 to 72°	10.4	11.3	9.3	10.4	12.6	6.2	6.1	7.2	9.2
73° or more	2.4	2.1	1.6	2.8	0.6	0.6	0.7	0.4	1.5
No response	24.0	13.0	6.6	4.3	6.7	2.2	7.2	19.3	
Average temperature setting	63.4°	63.6°	63.8°	63.9°	63.8°	62.6°	63.6°	63.0°	63.6°
Night - Gas Heating (N=3329)									
60° or lower	36.2%	33.7%	30.7%	34.8%	30.5%	33.6%	32.8%	37.0%	33.8%
61 to 64°	10.1	7.1	13.0	15.0	11.7	16.7	20.6	16.7	14.4
65 to 66°	19.1	22.5	23.7	22.1	28.1	24.8	21.7	21.7	22.7
67 to 69°	10.7	16.3	14.8	16.5	13.2	16.2	13.5	13.2	14.2
70 to 72°	6.4	6.3	7.5	6.1	9.3	6.0	6.6	5.9	7.0
73° or more	2.7	2.6	2.7	1.4	1.5	0	0.3	0	1.3
No response	10.9	9.5	7.5	4.2	5.7	2.8	4.4	5.3	6.7
Average temperature setting	62.6°	63.7°	63.5°	63.1°	63.7°	63.2°	63.0°	62.8°	63.1°

Source: Public Service Company of Colorado, "1981 Residential Energy Use Survey," Ref. [41].

Table 21 Summer thermostat settings by income: Pensacola, Fla.

	$5,000-$9,999 (N=2)	$10,000-$14,999 (N=1)	$15,000-$19,999 (N=4)	$20,000-$24,999 (N=6)	$25,000-$34,999 (N=7)	$35,000-$49,999 (N=17)	$50,000 and more (N=11)	Total (N=48)
Off	0%	0%	0%	0%	0%	5.9%	0%	2.1%
81° or more	0	0	25.0	0	0	17.6	9.1	10.4
78 to 80°	100.0	100.0	50.0	100.0	57.1	64.7	90.9	75.0
75 to 77°	0	0	25.0	0	42.9	5.9	0	10.4
72 to 74°	0	0	0	0	0	5.9	0	2.1
69 to 71°	0	0	0	0	0	0	0	0

Pearson correlation = -0.09; significance = 0.28

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Energy Survey," Ref. [17].

Table 22 Summer thermostat settings by income: Lodi, Calif.*

	Less than $6,000 *(N=13)*	$6,000-$8,999 *(N=8)*	$9,000-$14,999 *(N=33)*	$15,000-$20,999 *(N=19)*	$21,000-$26,999 *(N=50)*	$27,000-$34,999 *(N=32)*	$35,000-$49,000 *(N=31)*	$50,000 and more *(N=8)*	Total *(N=194)*
Off	0%	0%	0%	0%	0%	0%	0%	0%	0%
81° or more	0	0	0	0	10.0	6.3	9.7	12.5	5.7
78 to 80°	38.5	37.5	60.6	47.4	48.0	56.3	45.3	37.5	49.5
75 to 77°	46.2	12.5	24.2	26.3	24.0	15.6	25.8	37.5	24.7
72 to 74°	15.4	25.0	12.1	15.8	12.0	18.8	9.7	12.5	13.9
69 to 71°	0	12.5	3.0	10.5	2.0	0	6.5	0	3.6
68° or less	0	12.5	0	0	4.0	3.1	3.2	0	2.6

Pearson correlation = -0.08; significance = 0.15

*Settings are for 1 pm to 7 pm.

Source: Lawrence Berkeley Laboratory, "1981 Lodi Energy Survey," Ref. [16].

Table 23 Summer thermostat settings by income and year: Mississsippi

1981	Less than $5,000 *(N=18)*	$5,000-$10,000 *(N=38)*	$10,000-$15,000 *(N=39)*	$15,000-$20,000 *(N=56)*	$20,000-$25,000 *(N=59)*	$25,000-$30,000 *(N=24)*	$30,000 & Over *(N=61)*
Off	0%	5.3%	2.6%	1.8%	1.7%	0%	1.6%
More than 78°	5.6	2.6	10.3	17.9	22.0	29.2	19.7
75° - 78°	33.3	31.6	38.5	32.1	32.2	29.2	31.2
71° - 74°	16.7	23.7	18.0	23.2	28.6	25.0	27.9
68° - 70°	33.3	26.3	12.8	16.1	18.6	16.7	16.4
Lower than 68°	0	7.9	10.3	1.8	1.7	0	0
No thermostat	0	0	0	0	0	0	0
Don't know	11.1	2.6	7.7	7.1	5.1	0	3.3

1982	Less than $5,000 *(N=22)*	$5,000-$10,000 *(N=21)*	$10,000-$15,000 *(N=45)*	$15,000-$20,000 *(N=52)*	$20,000-$25,000 *(N=54)*	$25,000-$30,000 *(N=46)*	$30,000 & Over *(N=107)*
Off	4.3%	19.0%	4.3%	7.7%	1.9%	0%	0%
More than 78°	8.7	4.8	23.4	30.8	20.4	19.1	19.6
75° - 78°	13.0	47.6	38.3	23.1	48.1	55.3	40.2
71° - 74°	21.7	4.8	8.5	17.3	16.7	17.0	21.5
68° - 70°	30.4	9.5	23.4	17.3	11.1	4.3	13.1
Lower than 68°	4.3	4.8	0	1.9	0	0	2.8
No thermostat	0	4.8	0	0	0	0	0
Don't know	17.4	4.8	2.1	1.9	1.9	4.3	2.8

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 24 Summer thermostat settings by income and time-of-day: Davis, Calif.

Morning to Noon

	Less than $6,000 *(N=40)*	$6,000-$11,999 *(N=50)*	$12,000-$17,999 *(N=26)*	$18,000-$23,999 *(N=23)*	$24,000-$34,999 *(N=31)*	$35,000-$49,999 *(N=23)*	$50,000 and more *(N=16)*	Total *(N=209)*
Off	55.0%	60.0%	61.5%	60.9%	54.8%	56.5%	37.5%	56.5%
81° or more	7.5	8.0	11.5	8.7	19.4	17.4	18.8	12.0
78 to 80°	27.5	14.0	15.4	30.4	19.4	26.1	43.8	23.0
75 to 77°	5.0	14.0	3.8	0	6.5	0	0	5.7
72 to 74°	2.5	4.0	7.7	0	0	0	0	2.4
69 to 71°	2.5	0	0	0	0	0	0	0.5
68° or less	0	0	0	0	0	0	0	0

Pearson correlation = -0.05; significance = 0.23

Noon to 6 PM

	Less than $6,000 *(N=40)*	$6,000-$11,999 *(N=49)*	$12,000-$17,999 *(N=26)*	$18,000-$23,999 *(N=23)*	$24,000-$34,999 *(N=31)*	$35,000-$49,999 *(N=23)*	$50,000 and more *(N=16)*	Total *(N=208)*
Off	42.5%	46.9%	42.3%	26.1%	35.5%	21.7%	6.3%	35.6%
81° or more	7.5	8.2	15.4	13.0	19.4	26.1	25.0	14.4
78 to 80°	30.0	24.5	19.2	56.5	41.9	52.2	62.5	37.0
75 to 77°	10.0	14.3	11.5	4.3	3.2	0	6.3	8.2
72 to 74°	5.0	6.1	11.5	0	0	0	0	3.8
69 to 71°	2.5	0	0	0	0	0	0	0.5
68° or less	2.5	0	0	0	0	0	0	0.5

Pearson correlation = 0.01; significance = 0.45

6 PM to Bedtime

	Less than $6,000 *(N=40)*	$6,000-$11,999 *(N=51)*	$12,000-$17,999 *(N=26)*	$18,000-$23,999 *(N=23)*	$24,000-$34,999 *(N=31)*	$35,000-$49,999 *(N=23)*	$50,000 and more *(N=16)*	Total *(N=210)*
Off	40.0%	39.2%	42.3%	30.4%	38.7%	21.7%	12.5%	34.8%
81° or more	7.5	9.8	15.4	21.7	9.7	21.7	18.8	13.3
78 to 80°	35.0	29.4	15.4	47.8	45.2	56.5	62.5	38.6
75 to 77°	5.0	15.7	11.5	0	6.5	0	6.3	7.6
72 to 74°	10.0	5.9	15.4	0	0	0	0	5.2
69 to 71°	2.5	0	0	0	0	0	0	0.5
68° or less	0	0	0	0	0	0	0	0

Pearson correlation = -0.02; significance = 0.41

Source: Lawrence Berkeley Laboratory, "1980 Davis Energy Survey," Ref. [15].

Table 25 Temperature control by income: Georgia

	Under $5,000 *(N=53)*	$5,000-$10,000 *(N=48)*	$10,000-$15,000 *(N=44)*	$15,000-$20,000 *(N=47)*	$20,000-$25,000 *(N=37)*	$25,000-$30,000 *(N=32)*	Over $30,000 *(N=40)*
Lowered heating thermostat							
Yes	36.1%	51.7%	68.3%	78.8%	78.4%	81.0%	77.4%
No	11.3	15.1	15.7	10.8	18.8	12.8	15.0
Raised cooling thermostat							
Yes	7.5%	14.4%	20.1%	36.2%	51.4%	53.2%	55.1%
No	16.9	23.2	25.0	32.0	21.4	21.8	24.9

Source: Georgia Power, "1979 Single Family Retrofit Survey," Ref. [14].

Table 26 Winter temperature control by income and year: Mississippi

	1981						
	Under $5,000 *(N=26)*	$5,000-$10,000 *(N=50)*	$10,000-$15,000 *(N=50)*	$15,000-$20,000 *(N=63)*	$20,000-$25,000 *(N=55)*	$25,000-$30,000 *(N=25)*	$30,000 & Over *(N=62)*
Using higher setting	11.5%	8.0%	2.0%	6.4%	7.3%	12.0%	6.5%
Same setting	50.0	66.0	78.0	66.7	61.8	48.0	66.1
Using lower setting	38.5	26.0	20.0	27.0	30.9	40.0	27.4
Don't know	0	0	0	0	0	0	0
	1982						
	Under $5,000 *(N=28)*	$5,000-$10,000 *(N=39)*	$10,000-$15,000 *(N=55)*	$15,000-$20,000 *(N=52)*	$20,000-$25,000 *(N=56)*	$25,000-$30,000 *(N=52)*	$30,000 & Over *(N=103)*
Using higher setting	17.9%	7.0%	6.7%	9.4%	10.3%	10.7%	7.6%
Same setting	67.9	69.8	73.3	60.4	60.3	67.9	69.5
Using lower setting	14.3	23.3	20.0	30.2	29.3	21.4	22.9
Don't know	0	0	0	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 27 Summer temperature control by income and year: Mississippi

	1981						
	Under $5,000 *(N=16)*	$5,000- $10,000 *(N=37)*	$10,000- $15,000 *(N=36)*	$15,000- $20,000 *(N=52)*	$20,000- $25,000 *(N=56)*	$25,000- $30,000 *(N=24)*	$30,000 & Over *(N=59)*
Using higher setting	25.0%	16.2%	22.2%	21.2%	23.2%	41.7%	17.0%
Same setting	50.0	70.3	72.2	67.3	67.9	45.8	72.9
Using lower setting	25.0	13.5	5.6	11.5	8.9	12.5	10.2
Don't know	0	0	0	0	0	0	0

	1982						
	Under $5,000 *(N=18)*	$5,000- $10,000 *(N=15)*	$10,000- $15,000 *(N=42)*	$15,000- $20,000 *(N=47)*	$20,000- $25,000 *(N=52)*	$25,000- $30,000 *(N=45)*	$30,000 & Over *(N=104)*
Using higher setting	5.6%	21.1%	13.3%	15.7%	24.5%	24.4%	27.9%
Same setting	88.9	73.7	77.8	78.4	75.5	73.3	68.3
Using lower setting	5.6	5.3	8.9	5.9	0	2.2	3.8
Don't know	0	0	0	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 28 Winter temperature control by income, fuel type and time-of-day: Colorado

	Less than $5,000	$5,000-$9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000-$29,999	$30,000-$39,999	$40,000 or more	Total
Electric (N=2959)									
Lower day heating thermostat setting than two years ago									
Yes	64.9%	73.0%	79.1%	76.0%	79.0%	80.0%	81.5%	79.0%	76.3%
No	19.6	13.8	12.1	11.3	14.0	13.6	16.1	15.0	14.4
Not applicable	11.7	12.2	7.9	8.6	6.1	4.6	1.9	3.1	6.9
No response	3.7	1.0	0.9	2.0	0.9	1.8	0.5	2.9	2.4
Lower night heating thermostat setting than two years ago									
Yes	66.4	70.9	75.1	73.5	76.3	75.0	76.7	72.6	72.7
No	18.2	15.4	16.4	16.0	16.3	18.4	21.0	21.3	18.0
Not applicable	11.6	11.6	7.9	8.1	6.8	4.2	1.9	3.1	6.8
No response	3.8	1.9	0.6	2.4	0.5	2.4	0.3	3.1	2.5
Gas (N=3329)									
Lower day heating thermostat setting than two years ago									
Yes	74.1%	81.3%	80.6%	84.0%	82.7%	84.2%	85.3%	80.7%	81.3%
No	16.4	12.5	13.1	12.8	11.4	13.2	11.6	14.4	13.5
Not applicable	6.1	4.1	3.7	2.6	4.3	2.5	1.7	3.5	3.5
No response	3.3	2.1	2.6	0.6	1.6	0.1	1.4	1.4	1.8
Lower night heating thermostat setting than two years ago									
Yes	72.1	77.4	74.0	78.6	78.7	80.4	78.8	75.2	76.7
No	16.7	16.3	19.0	18.0	15.3	17.1	17.3	19.6	17.8
Not applicable	7.3	4.4	3.0	2.9	4.3	2.0	1.9	3.1	3.4
No response	3.9	1.9	4.0	0.5	1.7	0.5	2.0	2.1	2.1

Source: Public Service Company of Colorado, "1981 Residential Energy Use Survey," Ref. [41].

Table 29 Temperature control by income, fuel type, and time-of-day: Oregon

	Less than $10,000 *(N=110)*	$10,000-$19,999 *(N=121)*	$20,000 or more *(N=113)*	Total *(N=385)*
Lower heating thermostat to 55^{o} when house is empty	77%	74%	73%	74%
Turn heating thermostat down upon retiring	68	73	67	69
Turn off air conditioner when house is empty	19	34	33	27

Source: Pacific Power and Light, "1981 Energy Conservation Study of Electric Heat Customers in Oregon," Ref. [34].

RACE

Table 30 Winter temperature settings by race and year: Mississippi

	White		Black	
	1982 *(N=433)*	1981 *(N=390)*	1982 *(N=62)*	1981 *(N=51)*
Off	4.8%	2.6%	8.1%	2.0%
Lower than 65°	6.5	13.1	3.2	11.8
65° - 68°	37.6	43.3	33.9	21.6
69° - 72°	34.9	33.6	14.5	35.3
73° - 78°	12.7	4.1	22.6	19.6
More than 78°	0.7	0	8.1	5.9
No thermostat	0.5	0.3	1.6	0
Don't know	2.3	3.1	8.1	3.9

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 31 Summer thermostat settings by race and year: Mississippi

	White		Black	
	1982 (N=379)	1981 (N=361)	1982 (N=34)	1981 (N=26)
Off	2.1%	1.7%	11.7%	0%
More than 78°	19.5	16.9	17.6	3.9
75° - 78°	40.9	32.8	20.6	34.6
71° - 74°	18.2	23.1	5.9	19.2
68° - 70°	13.7	18.1	29.4	23.1
Lower than 68°	1.3	1.4	8.8	7.7
No thermostat	0.5	0	0	0
Don't know	3.4	6.1	5.9	11.5

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 32 Winter temperature control by race and year: Mississippi

	White		Black	
	1982 *(N=400)*	1981 *(N=377)*	1982 *(N=51)*	1981 *(N=49)*
Using higher settings	7.8%	5.6%	23.5%	16.3%
Using same settings	69.0	66.8	51.0	69.4
Using lower settings	23.3	27.3	25.5	14.3
Don't know	0	0.3	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 33 Summer temperature control by race and year: Mississippi

	White		Black	
	1982 *(N=359)*	1981 *(N=338)*	1982 *(N=30)*	1981 *(N=23)*
Using higher settings	20.9%	20.7%	23.3%	26.1%
Using same settings	75.8	69.2	70.0	65.2
Using lower settings	3.3	10.1	6.7	8.7
Don't know	0	0	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

HOME OWNERSHIP

Table 34 Temperature control by home ownership and time-of-day: Northern California

	Owner *(N=68)*	Renter *(N=38)*	Total *(N=106)*
Lower heating thermostat to 55° when home is empty for 4 hours or longer	57%	74%	63%
Turn heating thermostat down to 55° upon retiring	56	61	58
Lower the maximum heating thermostat to 68° or less during the heating season	44	29	39
Turn off the air conditioner when no one is home	26	18	24
Raise the cooling thermostat to 78° or higher during the cooling season	9	5	8

Source: Pacific Power and Light, "Northern California Energy Conservation Study," Ref. [36].

Table 35 Temperature control by home ownership and time-of-day: Oregon

	Own	Rent	Total *(N=385)*
Lower heating thermostat to 55° when house is empty	74%	71%	77%
Turn heating thermostat down upon retiring	69	67	71
Turn off air conditioner when house is empty	27	31	22

Source: Pacific Power and Light, "1981 Energy Conservation Study of Electric Heat Customers in Oregon," Ref. [34].

Table 36 Temperature control by home ownership, year, and time-of-day: San Diego

	Renters		Single-Family Homeowners	
	1982 (N=200)	1983 (N=203)	1982 (N=301)	1983 (N=305)
Kept heating thermostat at 68°, or used heater less, or did not use heater	64%	65%	72%	66%
Set heating thermostat back at night	40*	35*	49	51
Turned off furnace pilot light during the summer	40*	41*	50	52
Turned furnace off at night during the winter	42	34*	47	47
Kept cooling thermostat at 78° or higher	11	10	14	10

*Statistically significant different from homeowners

Source: San Diego Gas and Electric, "1983 Conservation Tracking Study," Ref. [48].

DWELLING TYPE

Table 37 Winter thermostat settings by dwelling type: Alabama

	All Dwellings (N=1006)	Single-Family	Multi-Family	Mobile Homes
55° or below	3.1%	2.0%	8.0%	6.1%
56 to 60°	2.3	2.4	0.9	3.0
61 to 65°	8.0	7.7	7.1	11.1
66 to 67°	3.0	3.0	0.9	5.1
68°	15.1	15.5	12.5	15.2
69 to 71°	23.1	21.4	25.0	34.3
72 to 74°	8.2	7.5	9.8	11.1
75 to 79°	3.5	3.3	3.6	5.1
80° or above	0.4	0.3	1.8	0
No thermostat	33.5	37.0	30.4	9.1
Average temperature setting	68.2°	68.3°	68.0°	68.0°

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 38 Winter thermostat settings by dwelling type and fuel type: Seattle

Electric Heat Households

		Apartments		
	Single-Family *(N=341)*	Total Apts. *(N=523)*	Duplex/ Triplex *(N=93)*	4 or more units *(N=430)*
65° or below	16.4%	24.3%	24.7%	24.2%
66 to 68°	41.3	41.5	33.3	43.1
69 to 71°	37.2	27.7	35.5	26.1
72 to 74°	4.7	5.9	5.4	6.1
More than 74°	0.3	0.6	1.1	0.5

Non-Electric Heat Households

		Apartments		
	Single-Family *(N=1453)*	Total Apts. *(N=162)*	Duplex/ Triplex *(N=65)*	4 or more units *(N=97)*
65° or below	20.4%	16.7%	13.6%	18.4%
66 to 68°	47.0	36.4	42.4	32.7
69 to 71°	29.9	37.0	39.4	35.7
72 to 74°	2.6	9.9	4.5	13.3
More than 74°	0.1	0	0	0

Source: Seattle City Light, "Residential Customer Characteristics Survey," Ref. [50].

Table 39 Winter thermostat settings by dwelling type and time-of-day: Florida

Day

	Single-Family Home (N=3840)	Two Dwelling Units (N=365)	Three or Four Dwelling Units (N=285)	More than 4 Dwelling Units (N=1628)	Mobile Home (N=565)	Total (N=6683)
64° or lower	3.7%	3.3%	2.1%	3.3%	2.7%	3.4%
65 to 67°	11.2	11.1	11.5	6.5	8.4	9.6
68 to 70°	36.2	26.5	23.8	29.4	41.6	33.9
71 to 74°	32.3	30.8	31.7	33.8	34.2	32.9
75° or higher	12.2	17.5	22.1	20.0	9.0	14.8
Don't know	4.4	10.9	8.9	7.0	4.1	5.5

Night

	Single-Family Home (N=3840)	Two Dwelling Units (N=365)	Three or Four Dwelling Units (N=285)	More than 4 Dwelling Units (N=1628)	Mobile Home (N=565)	Total (N=6683)
64° or lower	15.0%	13.3%	9.2%	10.9%	30.6%	14.8%
65 to 67°	19.2	13.6	15.6	15.0	26.0	18.3
68 to 70°	29.5	23.3	20.0	26.2	23.3	27.5
71 to 74°	20.9	27.3	28.0	22.2	13.0	21.1
75° or higher	10.1	13.4	14.5	17.2	3.7	11.9
Don't know	5.3	9.1	12.8	8.4	3.4	6.4

Source: Florida Power and Light, "1980 Home Energy Survey," Ref. [9].

Table 40 Winter thermostat settings by dwelling type, time-of-day, and year: Philadelphia

	Average Temperature Setting			
	1977		1978	
	Daytime	Evening	Daytime	Evening
All units (N=3884)	69°	67°	68°	67°
All houses (N=3136)	69°	67°	68°	67°
Houses (N=2147)	69°	67°	68°	67°
Townhouses (N=989)	69°	68°	69°	68°
Apartments (N=748)	69°	68°	69°	68°
Mobile homes (N=20)	69°	67°	68°	66°

Source: Philadelphia Electric Company, "1979 Residential Conservation Survey," Ref. [38].

Table 41 Winter thermostat settings by dwelling type, time-of-day, and fuel type: Colorado

	Single-Family	Apart-ment	Town-house	Rental	Mobile Home	Total
			Day - Electric Heating (N=2959)			
60^{o} or lower	17.9%	17.5%	12.0%	20.2%	27.2%	18.0%
61 to 64^{o}	7.8	3.7	6.9	6.0	8.8	6.9
65 to 67^{o}	22.8	16.2	27.2	24.1	18.9	21.7
68^{o}	24.1	16.9	19.6	18.8	13.9	21.8
69 to 72^{o}	19.5	24.4	25.7	18.7	18.5	20.7
73^{o} or more	1.7	3.2	2.2	3.0	2.3	2.1
No response	6.2	18.1	6.5	9.7	10.4	8.9
Average temperature setting	65.6^{o}	65.9^{o}	66.9^{o}	65.0^{o}	64.2^{o}	65.6^{o}
			Day - Gas Heating (N=3329)			
60^{o} or lower	16.1%	17.3%	19.3%	20.6%	24.2%	17.0%
61 to 64^{o}	9.5	4.4	10.8	6.0	6.3	9.2
65 to 67^{o}	24.9	18.1	24.2	30.8	19.9	24.5
68^{o}	22.7	20.5	18.6	8.6	22.3	21.6
69 to 72^{o}	20.0	16.4	16.9	27.2	15.4	19.5
73^{o} or more	1.6	3.4	2.0	2.6	2.9	1.8
No response	5.2	20.0	8.3	9.2	8.8	6.3
Average temperature setting	65.6^{o}	65.6^{o}	65.2^{o}	65.2^{o}	64.5^{o}	65.5^{o}
			Night - Electric Heating (N=2959)			
60^{o} or lower	32.7%	20.1%	20.6%	29.6%	30.2%	30.0%
61 to 64^{o}	14.2	5.6	14.0	6.1	15.0	12.5
65 to 66^{o}	23.8	20.8	24.6	20.1	24.2	23.1
67 to 69^{o}	14.0	15.3	20.4	13.3	13.2	14.2
70 to 72^{o}	7.2	15.2	11.7	19.2	7.6	9.2
73^{o} or more	0.9	4.6	1.2	2.0	1.6	1.5
No response	7.2	18.4	7.6	9.8	8.1	9.6
Average temperature setting	63.2^{o}	65.5^{o}	64.5^{o}	64.3^{o}	63.0^{o}	63.6^{o}
			Night - Gas Heating (N=3329)			
60^{o} or lower	34.6%	27.0%	22.2%	27.5%	39.3%	33.8%
61 to 64^{o}	15.2	10.1	18.5	7.3	9.2	14.1
65 to 66^{o}	22.2	13.0	27.5	31.3	26.0	22.7
67 to 69^{o}	14.2	16.8	14.1	14.8	9.0	14.2
70 to 72^{o}	6.4	10.2	14.3	8.4	9.3	7.0
73^{o} or more	0.9	3.9	0	4.9	2.0	1.3
No response	6.3	19.1	3.4	5.9	5.1	6.7
Average temperature setting	63.1^{o}	64.0^{o}	64.3^{o}	64.3^{o}	62.3^{o}	63.1^{o}

Source: Public Service Company of Colorado, "1981 Residential Energy Use Survey," Ref. [41].

Table 42 Summer thermostat settings by dwelling type: Lodi, Calif.*

	Single-Family Detached *(N=180)*	Single-Family Attached *(N=18)*	Apartment/ Condominium *(N=7)*	Mobile Home *(N=7)*	Total *(N=212)*
Off	0%	0%	0%	0%	0%
81° or more	5.6	5.6	0	0	5.2
78 to 80°	50.6	44.4	14.3	42.9	48.6
75 to 77°	22.8	38.9	57.1	14.3	25.0
72 to 74°	16.1	11.1	0	14.3	15.1
69 to 71°	2.8	0	14.3	28.6	3.8
68° or less	2.2	0	14.3	0	2.4

Pearson correlation = 0.14; significance = 0.02

*Settings are for 1 pm to 7 pm.

Source: Lawrence Berkeley Laboratory, "1981 Lodi Energy Survey," Ref. [16].

Table 43 Summer thermostat settings by dwelling type: Alabama

	All Dwellings (N=1006)	Single-Family	Multi-Family	Mobile Homes
81° or more	1.5%	1.3%	0.9%	4.0%
78 to 80°	18.7	18.2	25.0	15.2
75 to 77°	10.2	9.8	16.1	7.1
72 to 74°	7.6	7.9	8.0	4.0
69 to 71°	4.2	4.5	2.7	3.0
68° or lower	1.2	1.3	0.9	1.0
No thermostat	34.1	33.6	27.7	45.5
No air conditioning	22.6	23.4	18.8	20.2
Average temperature setting	76.1°	76.0°	76.6°	76.8°

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 44 Summer thermostat settings by dwelling type and time-of-day: Davis, Calif.

Morning to Noon

	Single-Family Detached (N=68)	Single-Family Attached (N=10)	Apartment/ Condominium (N=141)	Total (N=219)
Off	44.1%	50.0%	59.6%	54.3%
81° or more	17.6	10.0	9.2	11.9
78 to 80°	32.4	30.0	19.1	23.7
75 to 77°	5.9	10.0	7.8	7.3
72 to 74°	0	0	3.5	2.3
69 to 71°	0	0	0.7	0.5
68° or less	0	0	0	0

Pearson correlation = -0.04; significance = 0.25

Noon to 6 PM

	Single-Family Detached (N=68)	Single-Family Attached (N=10)	Apartment/ Condominium (N=140)	Total (N=218)
Off	19.1%	30.0%	43.6%	35.3%
81° or more	23.5	20.0	9.3	14.2
78 to 80°	52.9	30.0	30.0	37.2
75 to 77°	4.4	20.0	10.0	8.7
72 to 74°	0	0	5.7	3.7
69 to 71°	0	0	0.7	0.5
68° or less	0	0	0.7	0.5

Pearson correlation = -0.05; significance = 0.24

6 PM to Bedtime

	Single-Family Detached (N=68)	Single-Family Attached (N=10)	Apartment/ Condominium (N=142)	Total (N=220)
Off	20.6%	30.0%	40.1%	33.6%
81° or more	20.6	20.0	9.2	13.2
78 to 80°	54.4	30.0	32.4	39.1
75 to 77°	4.4	20.0	9.9	8.6
72 to 74°	0	0	7.7	5.0
69 to 71°	0	0	0.7	0.5
68° or less	0	0	0	0

Pearson correlation = -0.02; significance = 0.40

Source: Lawrence Berkeley Laboratory, "1980 Davis Energy Survey," Ref. [15].

Table 45 Summer thermostat settings by dwelling type and time-of-day: Florida

Day

	Single-Family Home (N=3840)	Two Dwelling Units (N=365)	Three or Four Dwelling Units (N=285)	More than 4 Dwelling Units (N=1628)	Mobile Home (N=565)	Total (N=6683)
80° or higher	25.4%	23.5%	21.2%	18.5%	31.4%	23.6%
77 to 79°	46.0	48.1	40.6	43.4	37.5	44.4
74 to 76°	21.2	15.3	26.3	22.3	15.8	21.0
73° or lower	4.4	8.2	9.1	11.1	9.4	7.2
Don't know	2.9	4.8	2.8	4.7	5.8	3.8

Night

	Single-Family Home (N=3840)	Two Dwelling Units (N=365)	Three or Four Dwelling Units (N=285)	More than 4 Dwelling Units (N=1628)	Mobile Home (N=565)	Total (N=6683)
80° or higher	17.8%	15.4%	17.1%	15.0%	20.6%	17.1%
77 to 79°	43.1	40.1	38.6	39.2	29.0	40.7
74 to 76°	25.3	28.1	25.1	24.4	16.9	24.3
73° or lower	9.4	11.8	15.6	16.0	25.5	12.9
Don't know	4.3	4.6	3.6	5.4	8.0	5.0

Source: Florida Power and Light, "1980 Home Energy Survey," Ref. [9].

Table 46 Temperature control by dwelling type and time-of-day: Oregon

	Single-Family *(N=209)*	Mobile Home *(N=51)*	Apartment *(N=87)*	Other *(N=38)*	Total *(N=385)*
Lower heating thermostat to 55° when house is empty	70%	75%	83%	71%	74%
Turn heating thermostat down upon retiring	60	86	76	74	69
Turn off air conditioner when house is empty	27	43	23	18	27

Source: Pacific Power and Light, "1981 Energy Conservation Study of Electric Heat Customers in Oregon," Ref. [34].

Table 47 Winter temperature control by dwelling type and time-of-day: Southern California

	Single-Family	Multi-Family	Mobile Home	Total (N=15,526)
Lower heating thermostat while sleeping				
Yes	52.9%	39.0%	51.0%	49.4%
No	47.0	61.0	49.0	50.6
Shut off heat while sleeping				
Yes	40.0	50.4	43.3	42.7
No	60.0	49.6	56.7	57.3
Lower heating thermostat when residence is unoccupied				
Yes	26.0	16.4	26.8	23.6
No	73.8	83.6	73.2	76.4
Shut off heat when residence is unoccupied				
Yes	65.8	71.6	65.3	67.2
No	34.2	28.4	34.7	32.8
Heat at constant temperature during the day				
Yes	33.7	20.7	39.7	30.6
No	66.3	79.3	60.3	69.4
Heat at constant temperature during the night				
Yes	21.7	17.6	18.6	20.6
No	78.3	82.4	81.4	79.4
Manually turn heating system on and off				
Yes	43.8	58.3	41.5	47.4
No	56.2	41.7	58.5	52.6

Source: Southern California Edison, "1982 Residential Electrical Appliance Saturation Survey," Ref. [51].

Table 48 Summer temperature control by dwelling type and time-of-day: Southern California

	Single-Family	Multi-Family	Mobile Home	Total (N=15,526)
Higher cooling thermostat while sleeping				
Yes	14.6%	12.4%	10.6%	13.9%
No	85.4	87.6	89.4	86.1
Shut off air conditioner while sleeping				
Yes	70.6	69.8	76.7	70.6
No	29.4	30.2	23.2	29.4
Higher cooling thermostat when residence is unoccupied				
Yes	9.2	7.1	10.2	8.7
No	90.8	92.9	89.8	91.3
Shut off air conditioner when residence is unoccupied				
Yes	79.3	77.8	77.9	78.9
No	20.7	22.1	22.1	21.1
Air condition at constant temperature during the day				
Yes	38.2	28.8	40.9	36.0
No	61.8	71.1	59.1	64.0
Air condition at constant temperature during the night				
Yes	11.5	9.7	9.8	11.0
No	88.5	90.2	90.2	89.0
Manually turn air conditioner on and off				
Yes	57.0	64.3	56.2	58.7
No	43.0	35.6	43.7	41.2

Source: Southern California Edison, "1982 Residential Electrical Appliance Saturation Survey," Ref. [51].

Table 49 Winter temperature control by dwelling type and fuel type: Seattle

(N=2748)

Electric Heat

		Apartments		
	Single-Family	Total Apts	Duplex/ Triplex	4 or more Units
Reduce heat at night	43.1%	19.6%	21.6%	19.2%

Non-Electric Heat

		Apartments		
	Single-Family	Total Apts	Duplex/ Triplex	4 or more Units
Reduce heat at night	38.4%	14.1%	20.2%	12.0%

Source: Seattle City Light, "Residential Customer Characteristics Survey," Ref. [50].

Table 50 Winter temperature control by dwelling type, fuel type, and time-of-day: Colorado

	Electric (N=2959)				
	Single Family	Apart-ment	Town-house	Mobile Home	Total
Lower day heating thermostat setting than two years ago					
Yes	80.6%	58.4%	80.1%	82.4%	76.3%
No	14.1	16.8	10.3	13.2	14.4
Not applicable	4.0	20.9	6.6	2.7	6.9
No response	1.3	3.8	3.0	1.6	2.4
Lower night heating thermostat setting than two years ago					
Yes	76.7	57.8	70.7	79.4	72.7
No	17.7	19.3	19.4	14.9	18.0
Not applicable	4.0	19.9	6.6	3.1	6.8
No response	1.6	3.1	3.3	2.5	2.5
	Gas (N=3329)				
Lower day heating thermostat setting than two years ago					
Yes	82.1%	73.4%	76.9%	78.6%	81.3%
No	13.8	11.4	13.0	14.2	13.5
Not applicable	2.5	13.2	8.3	5.8	3.5
No response	1.6	2.1	1.8	1.5	1.8
Lower night heating thermostat setting than two years ago					
Yes	77.9	59.9	75.8	73.6	76.7
No	17.9	21.5	14.3	17.9	17.8
Not applicable	2.4	16.5	7.2	6.0	3.4
No response	1.8	2.1	2.8	2.5	2.1

Source: Public Service Company of Colorado, "1981 Residential Energy Use Survey," Ref. [41].

DWELLING SIZE

Table 51 Winter thermostat settings by dwelling size: Alabama

(N=1006)

	800 ft^2 or less	900 ft^2 to 1100 ft^2	1200 ft^2 to 1500 ft^2	1600 ft^2 to 2100 ft^2	2200 ft^2 and over
55° or below	6.2%	2.3%	1.2%	3.0%	3.3%
56 to 60°	0.9	1.5	2.3	4.8	3.3
61 to 65°	4.9	8.1	8.1	8.9	13.2
66 to 67°	2.7	1.9	3.5	3.0	5.5
68°	8.9	12.3	15.7	23.2	22.0
69 to 71°	21.7	15.8	21.1	32.7	35.2
72 to 74°	6.6	8.9	9.6	6.0	9.9
75 to 79°	1.8	3.9	6.5	2.4	0
80° or above	0.9	0.4	0	0.6	0
No thermostat	45.6	45.0	32.2	15.5	7.7
Average temperature setting	67.7°	68.5°	68.9°	67.9°	67.7°

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 52 Summer thermostat settings by dwelling size: Lodi, Calif.*

	800 ft^2 or less *(N=15)*	801-1,100 ft^2 *(N=38)*	1,101-1,500 ft^2 *(N=76)*	1,501-2,100 ft^2 *(N=67)*	2,101-2,600 ft^2 *(N=16)*	Total *(N=212)*
Off	0%	0%	0%	0%	0%	0%
81° or more	0	5.3	6.6	4.5	6.3	5.2
78 to 80°	53.3	39.5	50.0	49.3	56.3	48.6
75 to 77°	26.7	34.2	23.7	23.9	12.5	25.0
72 to 74°	6.7	21.1	11.8	19.4	6.3	15.1
69 to 71°	6.7	0	6.6	1.5	6.3	3.8
68° or less	6.7	0	1.3	1.5	12.5	2.4

Pearson correlation = -0.004; significance = 0.48

*Settings are for 1 pm to 7 pm.

Source: Lawrence Berkeley Laboratory, "1981 Lodi Energy Survey," Ref. [16].

Table 53 Summer thermostat settings by dwelling size: Alabama

(N=1006)

	800 ft^2 or less	900 ft^2 to 1100	1200 ft^2 to 1500	1600 ft^2 to 2100	2200 ft^2 and Over
81° or more	6.8%	2.9%	4.0%	1.7%	5.0%
78 to 80°	40.9	40.6	50.0	44.0	40.0
75 to 77°	31.8	26.1	15.0	25.0	21.3
72 to 74°	6.8	15.9	18.0	15.5	23.8
69 to 71°	13.6	10.2	13.0	13.8	10.0
68° or lower	0	4.4	0	0	0
Average temperature setting	76.5°	75.9°	76.4°	76.1°	76.1°

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 54 Summer thermostat settings by dwelling size and time-of-day: Davis, Calif.

Morning to Noon

	800 or less ft^2 (N=58)	801-1100 ft^2 (N=47)	1101-1500 ft^2 (N=52)	1501-2100 ft^2 (N=39)	2101-2600 ft^2 (N=19)	Total (N=215)
Off	62.1%	55.3%	50.0%	51.3%	47.4%	54.4%
81° or more	6.9	12.8	11.5	15.4	21.1	12.1
78 to 80°	17.2	23.4	26.9	25.6	26.3	23.3
75 to 77°	8.6	6.4	7.7	7.7	5.3	7.4
72 to 74°	5.2	2.1	1.9	0	0	2.3
69 to 71°	0	0	1.9	0	0	0.5
68° or less	0	0	0	0	0	0

Pearson correlation = 0.02; significance = 0.40

Noon to 6 PM

	800 or less ft^2 (N=58)	801-1100 ft^2 (N=46)	1101-1500 ft^2 (N=52)	1501-2100 ft^2 (N=39)	2101-2600 ft^2 (N=19)	Total (N=214)
Off	46.3%	45.7%	28.8%	20.5%	15.8%	35.0%
81° or more	8.6	10.9	11.5	20.5	36.8	14.5
78 to 80°	22.4	34.8	40.4	53.8	42.1	36.9
75 to 77°	12.1	6.5	11.5	5.1	5.3	8.9
72 to 74°	8.6	2.2	3.8	0	0	3.7
69 to 71°	0	0	1.9	0	0	0.5
68° or less	0	0	1.9	0	0	0.5

Pearson correlation = 0.08; significance = 0.11

6 PM to Bedtime

	800 or less ft^2 (N=58)	801-1100 ft^2 (N=48)	1101-1500 ft^2 (N=52)	1501-2100 ft^2 (N=39)	2101-2600 ft^2 (N=19)	Total (N=216)
Off	41.4%	35.4%	38.5%	23.1%	15.8%	33.8%
81° or more	6.9	10.4	15.4	17.9	26.3	13.4
78 to 80°	25.9	39.6	36.5	51.3	52.6	38.4
75 to 77°	13.8	10.4	3.8	7.7	5.3	8.8
72 to 74°	12.1	4.2	3.8	0	0	5.1
69 to 71°	0	0	1.9	0	0	0.5
68° or less	0	0	0	0	0	0

Pearson correlation = -0.01; significance = 0.42

Source: Lawrence Berkeley Laboratory, "1980 Davis Energy Survey," Ref. [15].

DWELLING AGE

Table 55 Winter thermostat settings by age of dwelling: Pensacola, Fla.

	1977-1978 *(N=22)*	1974-1976 *(N=17)*	1970-1973 *(N=7)*	1945-1969 *(N=4)*	Total *(N=50)*
Off	0%	0%	0%	0%	0%
64° or lower	9.1	0	0	0	4.0
65 to 67°	4.5	11.8	0	0	6.0
68 to 70°	72.7	70.6	71.4	75.0	72.0
71 to 73°	4.5	0	0	25.0	4.0
74 to 76°	4.5	5.9	0	0	4.0
77° or more	4.5	11.8	28.6	0	10.0

Pearson correlation = 0.17; significance = 0.11

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Survey," Ref. [17].

Table 56 Winter thermostat settings by age of dwelling: Alabama

(N=1006)

	2 years or less	3-5 years	6-10 years	11-20 years	21-40 years
55° or below	4.8%	9.1%	4.0%	2.0%	2.0%
56 to 60°	4.8	3.9	3.3	1.6	1.3
61 to 65°	11.3	15.6	9.3	9.7	4.7
66 to 67°	0	2.6	6.0	3.6	1.7
68°	27.4	20.8	23.2	13.4	13.4
69 to 71°	30.6	32.5	31.1	27.4	18.5
72 to 74°	6.5	6.5	9.9	9.7	7.7
75 to 79°	3.2	2.6	0.7	4.0	4.7
80° or above	1.6	0	0.7	0.4	0
No thermostat	9.7	6.5	11.9	28.2	46.0
Average temperature setting	67.7°	66.7°	67.8°	68.7°	69.0°

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 57 Winter thermostat settings by age of dwelling, time-of-day, and fuel type: Colorado

	1979-1980	1977-1978	1974-1976	1970-1973	1965-1969	1960-1964	1955-1959	1950-1954	1940-1949	Before 1940	Total
Day - Electric Heating (N=2959)											
60° or lower	26.0%	21.9%	15.6%	13.2%	13.4%	15.9%	19.4%	17.3%	23.9%	17.5%	16.0%
61 to 64°	2.9	6.9	12.5	7.4	9.3	8.3	5.9	7.7	4.9	5.5	6.9
65 to 67°	25.6	22.0	20.2	24.5	21.5	23.6	22.9	18.6	16.9	19.4	21.7
68°	18.1	18.9	24.8	26.1	21.5	23.5	29.5	23.3	21.6	17.3	21.8
69 to 72°	17.0	23.4	15.5	20.0	26.9	23.7	17.3	22.6	15.3	21.2	20.7
73° or more	0.9	1.7	2.3	2.2	2.0	0.1	1.5	2.8	2.6	3.7	2.1
No response	7.6	5.3	8.8	6.4	5.4	4.6	3.7	7.6	12.8	15.5	8.9
Average temperature setting	64.4°	65.5°	65.4°	66.2°	66.3°	65.9°	65.5°	66.0°	64.7°	65.7°	65.6°
Day - Gas Heating (N=3329)											
60° or lower	22.2%	14.6%	16.6%	17.3%	17.1%	17.2%	20.5%	12.4%	15.9%	14.3%	17.0%
61 to 64°	10.6	10.6	9.0	9.7	10.6	14.0	3.8	10.9	7.5	6.8	9.2
65 to 67°	26.6	26.6	30.2	29.1	24.6	20.0	24.5	22.1	24.1	20.9	24.5
68°	19.6	21.2	25.3	22.6	20.6	24.3	24.1	19.2	23.6	18.4	21.6
69 to 72°	13.5	16.7	11.7	16.1	20.3	19.1	23.5	25.8	25.6	22.4	19.5
73° or more	0.9	0.9	0.9	1.0	2.0	1.5	0.3	4.0	0.7	3.4	1.8
No response	6.4	5.4	4.3	4.1	4.6	4.0	3.2	5.6	2.5	13.6	6.3
Average temperature setting	64.6°	65.6°	65.0°	65.1°	65.5°	65.5°	65.6°	66.4°	65.7°	66.1°	65.5°
Night - Electric Heating (N=2959)											
60° or lower	26.4%	25.5%	25.9%	32.5%	31.2%	29.7%	40.0%	33.5%	17.8%	29.4%	30.0%
61 to 64°	10.9	12.6	13.6	12.4	12.7	15.9	11.5	14.3	13.1	11.0	12.5
65 to 66°	28.2	24.3	27.3	20.2	26.8	27.5	15.9	21.9	23.4	20.5	23.1
67 to 69°	13.9	16.6	16.6	15.6	12.9	12.4	17.5	14.5	14.3	11.7	14.2
70 to 72°	9.3	12.4	7.2	11.5	7.9	7.1	8.3	7.9	6.5	9.7	9.2
73° or more	1.6	2.4	1.3	1.9	1.2	0.5	1.4	0.3	0	1.0	1.5
No response	7.8	5.8	7.8	5.8	5.1	6.6	5.5	7.5	14.9	16.8	9.6
Average temperature setting	63.7°	64.4°	63.7°	63.7°	63.4°	63.5°	62.6°	63.3°	63.3°	63.3°	63.6°
Night - Gas Heating (N=3329)											
60° or lower	30.9%	35.9%	33.4%	37.7%	33.1%	36.0%	37.4%	29.7%	37.1%	32.0%	33.6%
61 to 64°	14.9	16.4	13.3	15.9	12.6	17.9	12.6	15.3	15.1	12.7	14.4
65 to 66°	24.0	19.9	26.6	19.9	23.9	21.0	23.1	25.7	24.1	21.3	22.7
67 to 69°	15.0	12.5	15.4	13.1	17.4	14.1	15.0	13.1	6.9	14.6	14.2
70 to 72°	9.6	7.9	5.6	6.8	7.7	5.8	5.7	5.6	6.6	6.1	7.0
73° or more	0.5	0.6	1.0	1.6	1.4	1.0	1.0	0.9	1.2	1.3	1.3
No response	5.2	5.2	4.7	5.1	3.9	4.1	5.2	9.6	4.9	12.1	6.7
Average temperature setting	63.5°	62.9°	63.1°	62.7°	63.5°	62.7°	63.0°	63.5°	62.9°	63.2°	63.1°

Source: Public Service Company of Colorado, "1981 Residential Energy Use Survey," Ref. [41].

Table 58 Summer thermostat settings by age of dwelling: Pensacola, Fla.

	1977-1978 *(N=23)*	1974-1976 *(N=17)*	1970-1973 *(N=7)*	1945-1969 *(N=4)*	Total *(N=51)*
Off	4.3%	0%	0%	0%	2.0%
81° or more	4.3	17.6	14.3	0	9.8
78 to 80°	82.6	70.6	57.1	75.0	74.5
75 to 77°	4.3	11.8	14.3	25.0	9.8
72 to 74°	4.3	0	0	0	2.0
69 to 71°	0	0	14.3	0	2.0

Pearson correlation = 0.16; significance = 0.14

Source: Lawrence Berkeley Laboratory, "1983 Pensacola Energy Survey," Ref. [17].

Table 59 Summer thermostat settings by age of dwelling: Lodi, Calif.*

	1978-1980 *(N=7)*	1975-1977 *(N=13)*	1970-1974 *(N=20)*	1960-1969 *(N=35)*	Before 1960 *(N=114)*	Total *(N=189)*
Off	0%	0%	0%	0%	0%	0%
81° or more	14.3	15.4	5.0	5.7	3.5	5.3
78 to 80°	57.1	61.5	60.0	57.1	43.0	49.2
75 to 77°	14.3	23.1	10.0	20.0	29.8	24.9
72 to 74°	14.3	0	10.0	5.7	3.5	4.2
69 to 71°	0	0	10.0	5.7	3.5	4.2
68° or less	0	0	5.0	2.9	1.8	2.1

Pearson correlation = 0.16; significance = 0.01

*Settings are for 1 pm to 7 pm.

Source: Lawrence Berkeley Laboratory, "1981 Lodi Energy Survey," Ref. [16].

Table 60 Summer thermostat settings by age of dwelling: Alabama

(N=1006)

	2 Years or Less	3-5 Years	6-10 Years	11-20 Years	21-40 Years
81° or more	3.2%	1.3%	4.0%	1.2%	0.3%
78 to 80°	40.3	36.4	29.8	22.6	7.7
75 to 77°	16.1	22.1	15.2	10.5	6.4
72 to 74°	9.7	9.1	13.2	8.5	5.7
69 to 71°	4.8	6.5	6.6	5.2	3.4
68° or lower	0	1.3	2.6	1.2	1.0
No thermostat	8.1	16.9	19.2	33.5	46.0
No air conditioning	17.7	6.5	9.3	17.3	29.5
Average temperature setting	77.1°	76.5°	76.1°	76.2°	75.1°

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 61 Summer thermostat settings by age of dwelling and time-of-day: Davis, Calif.

Morning to Noon

	1978 or later *(N=2)*	1976-1977 *(N=24)*	1972-1975 *(N=48)*	1964-1971 *(N=36)*	1948-1963 *(N=2)*	Total *(N=112)*
Off	50.0%	37.5%	54.2%	58.3%	0%	50.9%
81° or more	0	16.7	12.5	13.9	50.0	14.3
78 to 80°	50.0	41.7	27.1	25.0	0	29.5
75 to 77°	0	4.2	6.3	2.8	50.0	5.4
72 to 74°	0	0	0	0	0	0
69 to 71°	0	0	0	0	0	0
68° or less	0	0	0	0	0	0

Pearson correlation = -0.08; significance = 0.19

Noon to 6 PM

	1978 or later *(N=2)*	1976-1977 *(N=24)*	1972-1975 *(N=48)*	1964-1971 *(N=36)*	1948-1963 *(N=2)*	Total *(N=112)*
Off	0%	25.0%	20.8%	27.8%	50.0%	24.1%
81° or more	50.0	12.5	16.7	25.0	50.0	19.6
78 to 80°	50.0	58.3	50.0	44.4	0	49.1
75 to 77°	0	4.2	12.5	2.8	0	7.1
72 to 74°	0	0	0	0	0	0
69 to 71°	0	0	0	0	0	0
68° or less	0	0	0	0	0	0

Pearson correlation = 0.10; significance = 0.10

6 PM to Bedtime

	1978 or later *(N=2)*	1976-1977 *(N=24)*	1972-1975 *(N=48)*	1964-1971 *(N=36)*	1948-1963 *(N=2)*	Total *(N=112)*
Off	50.0%	16.7%	29.2%	25.0%	100.0%	26.8%
81° or more	0	20.8	14.6	25.0	0	18.8
78 to 80°	50.0	58.3	50.0	44.4	0	49.1
75 to 77°	0	4.2	6.3	5.6	0	5.4
72 to 74°	0	0	0	0	0	0
69 to 71°	0	0	0	0	0	0
68° or less	0	0	0	0	0	0

Pearson correlation = 0.007; significance = 0.47

Source: Lawrence Berkeley Laboratory, "1980 Davis Energy Survey," Ref. [15].

Table 62 Temperature control by age of dwelling and time-of-day: Oregon

	1975-1981 (N=141)	1950-1974 (N=193)	Pre-1950 (N=49)	Total (N=385)
Lower heating thermostat to 55° when house is empty	77%	72%	69%	74%
Turn heating thermostat down upon retiring	74	68	53	69
Turn off air conditioner when house is empty	28	32	8	27

Source: Pacific Power and Light, "1981 Energy Conservation Study of Electric Heat Customers in Oregon," Ref. [34].

Table 63 Winter temperature control by age of dwelling and fuel type: Colorado

	Electric (N=2959)										
	1979-1980	1977-1978	1974-1976	1970-1973	1965-1969	1960-1964	1955-1959	1950-1954	1940-1949	Before 1940	Total
Lower day heating thermostat setting than two years ago											
Yes	83.0%	78.6%	77.9%	77.5%	78.0%	77.4%	81.6%	77.5%	79.6%	73.4%	76.3%
No	8.3	17.5	17.2	14.9	14.4	15.9	11.1	16.5	14.0	14.4	14.4
Not applicable	6.0	3.2	3.5	5.2	4.4	4.9	4.5	9.7	2.4	6.0	
No response	2.7	0.7	1.4	2.4	3.2	1.4	1.9	1.1	1.9	2.6	2.4
Lower night heating thermostat setting than two years ago											
Yes	76.9	72.0	73.6	72.6	75.3	73.1	76.9	75.9	73.1	70.4	72.7
No	12.6	22.4	20.3	19.9	17.9	20.5	16.0	16.5	19.3	16.9	18.0
Not applicable	6.6	3.2	3.6	4.6	4.3	5.0	4.9	4.4	5.4	9.4	6.6
No response	2.0	2.4	2.3	2.9	2.5	1.4	2.1	1.2	2.2	3.3	2.5

	Gas (N=3329)										
	1979-1980	1977-1978	1974-1976	1970-1973	1965-1969	1960-1964	1955-1959	1950-1954	1940-1949	Before 1940	Total
Lower day heating thermostat setting than two years ago											
Yes	77.2%	83.3%	82.2%	82.4%	82.1%	82.1%	86.4%	83.8%	79.3%	75.2%	81.3%
No	12.5	12.6	12.9	13.9	15.5	14.6	9.5	11.3	16.5	16.7	13.5
Not applicable	9.1	3.1	2.8	3.2	0.7	2.4	2.8	2.8	2.9	4.8	3.5
No response	1.1	1.0	2.1	0.5	1.7	0.8	1.3	2.1	1.3	3.4	1.8
Lower night heating thermostat setting than two years ago											
Yes	72.3	81.2	75.8	78.5	75.6	77.3	80.7	79.3	76.7	73.1	76.7
No	18.2	15.2	18.8	16.7	21.7	19.7	15.6	14.6	19.0	18.7	17.8
Not applicable	7.7	3.1	2.8	3.0	- 0.6	1.8	3.3	2.4	3.5	5.0	3.4
No response	1.7	0.4	2.6	1.8	2.0	1.2	0.4	3.5	0.6	3.2	2.1

Source: Public Service Company of Colorado, "1981 Residential Energy Use Survey," Ref. [41].

FUEL TYPE

Table 64 Winter thermostat settings by fuel type: Alabama

(N=1006)

	Natural Gas	Bottle Gas	Electric
55^{o} or below	2.6%	2.1%	6.5%
56 to 60^{o}	2.3	1.4	3.8
61 to 65^{o}	8.5	7.6	9.1
66 to 67^{o}	3.3	1.4	4.3
68^{o}	15.1	12.5	22.0
69 to 71^{o}	24.3	18.8	29.0
72 to 74^{o}	8.2	6.9	10.8
75 to 79^{o}	4.3	2.8	2.7
80^{o} or above	0.5	0.7	0
No thermostat	30.9	45.8	11.8
Average temperature setting	68.4^{o}	68.4^{o}	64.2^{o}

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 65 Temperature control by fuel type: Potomac Edison

	Electric *(N=253)*	Non-electric *(N=266)*	Total *(N=519)*
Lowered heating thermostat to below 69°	71.7%	56.1%	66.6%
Raised cooling thermostat to 78° or higher	49.3	48.4	49.0
Turned off air conditioner when not at home	73.9	80.6	76.0

Source: Potomac Edison, "1981 New Home Survey," Ref. [40].

AIR CONDITIONER TYPE

Table 66 Summer thermostat settings by air conditioner type: Alabama

(N=1006)

	Window Units	Central	Heat Pump
81^{o} or more	0%	4.3%	0%
78 to 80^{o}	1.9	43.3	46.7
75 to 77^{o}	2.2	22.9	21.7
72 to 74^{o}	1.7	16.6	18.3
69 to 71^{o}	0	9.7	8.3
68^{o} or lower	0.3	3.2	0
No thermostat	93.9	0	5.0
Average temperature setting	75.7^{o}	76.2^{o}	76.4^{o}

Source: Alabama Power, "1981 Residential Customer Survey," Ref. [1].

Table 67 Summer thermostat settings by air conditioner type: Nebraska

	Central Electric	Central Gas	Window	Total (N=1628)
83 to 85°	1.8%	2.7%	8.1%	3.9%
80 to 82°	23.9	18.5	27.1	24.4
76 to 79°	34.5	30.3	16.6	28.3
73 to 75°	26.0	24.9	26.4	26.0
70 to 72°	12.1	19.0	20.0	15.3
67 to 69°	1.7	4.7	1.8	2.1
Average temperature setting	76.7°	75.9°	76.7°	76.6°

Source: Nebraska Public Power, "1982 Customer Appliance Saturation Survey," Ref. [25].

ENERGY AUDIT

Table 68 Winter thermostat settings by audit and time-of-day: Florida

	Day		Night	
	Audit Homes *(N=284)*	Comparison Homes *(N=166)*	Audit Homes *(N=284)*	Comparison Homes *(N=166)*
67° or lower	23%	27%	39%	46%
68 to 70°	49	45	38	32
71° or more	24	25	19	19
Don't know	4	2	4	2

Source: Florida Power and Light, "The Impact of RCS Class 'A' Audits on Energy Conservation Among Large Usage Residential Customers," Ref. [10].

Table 69 Winter thermostat settings by audit and time-of-day: California

Day

	PG&E		SCE		SDG&E	
	RCS Participants *(N=476)*	Non-Participants *(N=410)*	RCS Participants *(N=451)*	Non-Participants *(N=316)*	RCS Participants *(N=365)*	Non-Participants *(N=151)*
Heat normally off	20%*	27%	19%	25%	36%	51%
55° or lower	5*	2	2	2	3	1
56 to 60°	12	9	4	5	7	6
61 to 64°	9	8	4	4	2	3
65 to 67°	20	19	13	16	17	13
68°	19	20	28	20	20*	11
69 to 72°	12	12	25	24	13	12
73° or more	2	2	4	4	1	0
Don't know	0	1	1	1	1	4

Night

	PG&E		SCE		SDG&E	
	RCS Participants *(N=476)*	Non-Participants *(N=410)*	RCS Participants *(N=451)*	Non-Participants *(N=316)*	RCS Participants *(N=365)*	Non-Participants *(N=151)*
Heat normally off	38%	41%	36%*	26%	46%	52%
55° or lower	14*	7	5	4	6	4
56 to 60°	17	16	11	9	13	7
61 to 64°	8	7	10*	6	7	3
65 to 66°	9*	14	14*	19	11	11
67 to 69°	9	8	14	14	12	10
70 to 72°	4	5	8*	17	3	8
73° or more	1	1	2	3	1	1
Don't know	0	0	1	1	1	3

*Statistically significant different from non-participants.

Source: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), "RCS Follow-up Survey," Refs. [31,49,52].

Table 70 Winter thermostat settings by audit, time-of-day, and fuel type: Portland, Oregon

(N=758)

	Day	Evening	Night	Average*
Electric space heat				
Weatherized	63.1°	66.2°	57.8°	62.4°
Non-weatherized	64.0	67.4	58.2	63.2
Wood space heat				
Weatherized	66.7	69.3	60.8	65.6
Non-weatherized	66.8	67.8	61.2	65.3

*All three temperature settings weighted equally.

Source: Portland General Electric, "Weatherization Within Single-Family Residences (Report I, July 1981)," Ref. [39].

Table 71 Winter thermostat settings by audit, time-of-day, and year: Sacramento, Calif.

	Winter Day (1981-82)		Winter Day (1980-81)		Winter Night (1981-82)		Winter Night (1980-81)	
	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*
Off	0%	0%	0%	0%	34.2%	39.2%	32.3%	37.7%
55° or lower	3.3	2.8	2.6	2.9	7.4	3.7	6.9	4.0
56 to 60°	7.7	6.9	5.9	7.3	13.6	11.7	12.9	11.6
61 to 64°	4.9	2.8	3.9	2.9	8.2	8.4	7.4	8.5
65 to 67°	22.5	22.8	20.4	24.1	15.6	13.5	13.4	14.6
68°	49.4	46.9	49.3	44.5	17.5	17.8	16.1	17.6
69 to 72°	0	0	0	0	0	0	0	0
73° or more	12.1	17.9	17.8	18.2	3.5	5.6	5.5	6.0
Don't Know	38.9	43.1	49.0	46.3	13.8	16.1	27.2	22.0

Source: Sacramento Municipal Utility District, "Analysis of the 1982 RCS Benchmark Follow-Up Survey," Ref. [47].

Table 72 Summer thermostat settings by audit and time-of-day: Florida

	Day		Night	
	Audit Homes *(N=284)*	Comparison Homes *(N=166)*	Audit Homes *(N=284)*	Comparison Homes *(N=166)*
80° or more	37%	26%	41%	32%
77 to 79°	47	52	38	38
76° or less	15	20	21	30
Don't know	0	1	0	0

Source: Florida Power and Light, "The Impact of RCS Class "A" Audits on Energy Conservation Among Large Usage Residential Customers," Ref. [10].

Table 73 Summer thermostat settings by audit and time-of-day: California

Day

	PG&E		SCE		SDG&E	
	RCS Participants *(N=198)*	Non-Participants *(N=114)*	RCS Participants *(N=295)*	Non-Participants *(N=82)*	RCS Participants *(N=106)*	Non-Participants *(N=25)*
Off	25%	21%	14%*	29%	42%	56%
78° or more	45	35	39*	28	18	12
76 to 77°	2	4	7	3	3	0
73 to 75°	10	11	14	13	11	8
70 to 72°	12	11	20	17	16	8
69° or less	7	9	3*	10	4	4
Don't know	1*	9	2	0	5	12

Night

	PG&E		SCE		SDG&E	
	RCS Participants *(N=198)*	Non-Participants *(N=114)*	RCS Participants *(N=295)*	Non-Participants *(N=82)*	RCS Participants *(N=106)*	Non-Participants *(N=25)*
Off	64%	66%	62%	64%	79%	80%
76° or more	21	13	19*	10	5	0
73 to 75°	8	4	6	9	2	4
70 to 72°	5	4	9	6	8	4
69° or less	4	6	2*	10	2	4
Don't know	0	9	2	0	3	8

*Statistically significant different from non-participants.

Source: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), "RCS Follow-up Survey," Refs. [31,49,52].

Table 74 Summer thermostat settings by audit and time-of-day and year: Sacramento, Calif.

	Day				*Night*			
	1982		1981		1982		1981	
	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*
Off	18.4%	20.3%	15.9%	17.5%	66.0%	60.5%	65.4%	58.1%
79° or more	33.3	33.2	30.1	32.2	12.9	18.3	11.1	20.0
78°	19.2	19.8	19.8	19.4	8.6	8.3	8.5	7.9
76 to 77°	6.3	5.5	6.6	6.2	2.3	2.7	2.6	2.8
73 to 75°	12.2	11.1	12.3	13.3	5.1	5.0	5.6	5.11
70 to 72°	6.7	7.8	9.7	9.0	2.3	2.3	4.3	3.4
69° or less	3.9	2.3	4.8	2.4	2.7	2.7	2.6	2.8
Don't Know	14.4	14.9	23.8	17.1	14.1	14.5	21.5	15.7

Source: Sacramento Municipal Utility District, "Analysis of the 1982 RCS Benchmark Follow-Up Survey," Ref. [47].

Table 75 Temperature control by audit: Nebraska

	Initiated Before the Audit	Initiated After the Audit	Total *(N=217)*
Lower daytime winter thermostat to 68°	49.8%	22.1%	71.9%
Lower nighttime winter thermostat to 55°	27.7	15.7	43.4
Raise cooling thermostat to 78° in summer	43.8	20.3	64.1

Source: Nebraska Public Power District, "Residential Conservation Service Program (RCSP) Energy Audit Customer Survey," Ref. [24].

Table 76 Temperature control by audit and time-of-day: Colorado

(N=297)

	Practiced Before Audit	Practiced as Result of Audit
Lower heating thermostat during sleeping hours	77.1%	11.4%
Lower heating thermostat when house is unoccupied for 4 hours or longer	73.7	12.5
Lower heating thermostat to a maximum of 68° or less	62.3	9.8
Turn air conditioner off when no one is home in the summer	34.7	2.4
Raise cooling thermostat to 78° or higher	17.8	3.0

Source: Public Service Company of Colorado, "1982 Residential Energy Audit Customer Survey," Ref. [42].

Table 77 Temperature control by audit and time-of-day: Oklahoma

	Already Did Before Audit		Started Doing After Audit
	Audit *(N=1506)*	Control *(N=980)*	Audit *(N=1506)*
Lower heating thermostat to 55° when gone at least 4 hours	43%	47%	15%
Lower heating thermostat to 55° when sleeping	37	42	11
Lower heating thermostat to 68° when awake	58	62	10
Raise cooling thermostat to 78° in summer	63	71	11

Source: Oklahoma Natural Gas Company et al, "Energy Conservation Survey: Report of Findings," Ref. [28].

Table 78 Temperature control by audit and time-of-day: Florida

	Audit Group (N=284)			Comparison Group (N=166)			
	A Before Sept 1980	B After Sept 1980	C =B-A	D Before Sept 1980	E After Sept 1980	F =E-D	G =C-F
Lower heating thermostat to 68°	56%	65%	9%	46%	50%	4%	5%
Raise cooling thermostat to 78°	63	78	15	60	65	5	10
Set heating thermostat back at night	63	67	4	60	62	2	2

Source: Florida Power and Light Company, "The Impact of RCS Class A Audits on Energy Conservation Among Large Usage Residential Customers," Ref. [10].

Table 79 Temperature control by audit, time-of-day, and year: Sacramento

	Winter				Summer			
	Day		Night		Day		Night	
	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N=298)*	Non-Participant *(N=255)*	RCS Participant *(N-298)*	Non-Participant *(N=255)*
Raised temperature	1.86%	1.00%	0.85%	0%	7.05%	3.32%	2.56%	0.47%
Lowered temperature	13.49	2.49	5.93	0	0	0.47	0	0
Turned off	0	0	3.81	1.82	0.88	2.84	1.28	2.33
No change	84.65	96.52	88.98	98.18	91.63	93.36	95.73	97.21

Source: Sacramento Municipal Utility District, "Analysis of the 1982 RCS Benchmark Follow-Up Survey," Ref. [47].

Table 80 Temperature control by audit, time-of-day, and income: Oklahoma

	$25,000 or less		More than $25,000	
	Audit *(N=420)*	Control *(N=440)*	Audit *(N=1016)*	Control *(N=476)*
Lower heating thermostat to 55° when gone at least 4 hours	63%	53%	54%	43%
Lower heating thermostat to 55° when sleeping	56	49	45	36
Lower heating thermostat to 68° when awake	66	61	68	63
Raise cooling thermostat to 78° in summer	75	71	73	72

Source: Oklahoma Natural Gas Company et al, in their "Energy Conservation Survey: Report of Findings," Ref. [28].

Table 81 Winter temperature control by audit: Rhode Island

	January 1, 1981 to October 31, 1981 (N=501)			
	Action Before Audit	Action After Audit	No Action	Not Sure
Lowered winter thermostat setting during day or night	65.5%	21.8%	12.4%	0.4%

	November 1, 1981 to July 31, 1982 (N=504)			
	Action Before Audit	Action After Audit	No Action	Not Sure
Lowered winter thermostat setting during day or night	68.1%	21.0%	10.7%	0.2%

Source: University of Rhode Island, "Homeowners' Reactions to RISE Energy Audits," Refs. [45,46].

Table 82 Winter temperature control by audit and age: Pacific Power

	18-34 Years *(N=82)*	35-54 Years *(N=130)*	55 or more Years *(N=110)*	Total *(N=335)*
Lower	40%	39%	41%	40%
About the same	48	48	51	50
Higher	6	2	2	3
Don't know	4	8	6	6
Don't have/ use thermostat	2	3	0	2

Source: Pacific Power and Light, "Conservation Actions of Home Energy Analyses: Customers Not Utilizing 6½% or 0% Financing," Ref. [35].

Table 83 Winter temperature control by audit and age of dwelling: Pacific Power

	0-7 Years *(N=70)*	8-13 Years *(N=61)*	14 or more Years *(N=196)*	Total *(N=335)*
Lower	26%	31%	43%	40%
About the same	57	54	46	50
Higher	6	3	2	3
Don't know	1	7	8	6
Don't have/use thermostat	0	5	2	2

Source: Pacific Power and Light, "Conservation Actions of Home Energy Analyses: Customers Not Utilizing 6½% or 0% Financing," Ref. [35].

Table 84 Winter temperature control by audit and education: Pacific Power

	High School or Less *(N=133)*	Some College *(N=97)*	College Grad or More *(N=96)*	Total *(N=335)*
Lower	37%	38%	36%	40%
About the same	52	51	45	50
Higher	2	2	4	3
Don't know	7	6	5	6
Don't have/use thermostat	2	3	0	2

Source: Pacific Power and Light, "Conservation Actions of Home Energy Analyses: Customers Not Utilizing 6½% or 0% Financing," Ref. [35].

Table 85 Winter temperature control by audit and income: Pacific Power

	Less than $15,000 *(N=62)*	$15,000-$25,000 *(N=117)*	$25,000 or more *(N=94)*	Total *(N=335)*
Lower	37%	39%	47%	40%
About the same	45	50	47	50
Higher	5	2	3	3
Don't know	10	8	3	6
Don't have/ use thermostat	3	2	0	2

Source: Pacific Power and Light, "Conservation Actions of Home Energy Analyses: Customers Not Utilizing 6½% or 0% Financing," Ref. [35].

Table 86 Winter temperature control by audit and time-of-day: California

	PG&E		SCE		SDG&E	
	RCS Participants *(N=503)*	Non-Participants *(N=475)*	RCS Participants *(N=487)*	Non-Participants *(N=372)*	RCS Participants *(N=401)*	Non-Participants *(N=178)*
Turn furnace off or lower at night during the winter	90%	87%	87%*	81%	88%	82%
Turn furnace off or lower at night during the winter of September 1981 to March 1982	18*	10	14	9	13	8

*Statistically different from non-participants

Source: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), "RCS Follow-up Surveys," Refs. [31,49,52].

Table 87 Winter temperature control by audit and time-of-day: Oregon

(N=403)

	Did Before the Audit	Did After the Audit	Have Not Done	Don't Know/ No Answer
Lower heating thermostat to 55° at night	78.5%	5.4%	14.7%	1.4%
Lower heating thermostat to 68° or less when the house is unoccupied during the day or evening	84.6	4.4	10.5	0.6

Source: Oregon Department of Energy, "State Home Oil Weatherization Program Participant Survey," Ref. [29].

Table 88 Winter temperature reduction by audit, fuel type, and time-of-day: Portland, Oregon

(N=758)

	Day	Evening	Night	Average*
Electric space heat				
Weatherized	-2.3°	-2.5°	-1.9°	-2.2°
Non-weatherized	-2.1	-1.1	-1.6	-1.6
Wood space heat				
Weatherized	-0.9	-0.4	0.1	-0.4
Non-weatherized	-0.2	-0.2	-0.8	-0.4

*All three temperature settings weighted equally.

Source: Portland General Electric, "Weatherization Within Single-Family Residences (Report I, July 1981)," Ref. [39].

Table 89 Winter temperature control by audit, year, and time-of-day: Michigan

	1979		1980	
	Participants (N=499)	Non-participants (N=516)	Participants (N=499)	Non-participants (N=516)
68^{o} or less during the day	70.7%	58.3%	69.4%	62.9%
62^{o} or less during the night	26.2	16.5	25.1	16.9

Source: Michigan State University, "Evaluation of Statewide Project Conserve in Michigan," Ref. [21].

CLIMATE

Table 90 Winter thermostat settings by climate, time-of-day, and dwelling size: United States

(N=6269)

	More than 5,449 HDD			3,950 to 5,449 HDD			Less than 3,950 HDD			
	Lower than 1,000 ft²	1,000-1,999 ft²	More than 1,999 ft²	Lower than 1,000 ft²	1,000-1,999 ft²	More than 1,999 ft²	Lower than 1,000 ft²	1,000-1,999 ft²	More than 1,999 ft²	Total
					Day - someone home					
Off	1.3%	0.6%	0.3%	1.1%	2.2%	0.6%	4.5%	5.9%	6.1%	2.4%
63° or lower	6.7	6.5	8.3	5.9	4.9	5.8	5.6	3.7	5.5	6.0
64 to 66°	16.6	15.6	16.4	14.4	13.0	17.7	10.5	9.9	7.1	13.9
67 to 69°	25.0	32.3	39.5	24.6	33.9	36.3	16.9	25.5	35.6	29.6
70°	26.3	25.2	20.5	30.7	29.3	22.9	29.3	23.9	23.1	25.2
71° or more	17.7	18.1	14.6	17.1	15.8	16.0	28.4	29.6	22.5	20.4
No answer/ Don't know	6.2	1.5	0.5	5.9	0.9	0.8	4.9	1.5	0.2	2.4
					Day - no one home					
Off	10.2%	4.2%	1.4%	21.4%	16.2%	11.3%	45.4%	36.5%	31.4%	16.2%
63° or lower	27.5	30.6	32.2	26.5	29.6	33.3	14.0	14.9	20.7	25.5
64 to 66°	22.2	25.4	24.9	16.6	21.2	21.0	13.0	12.5	7.4	19.5
67 to 69°	14.6	19.1	24.3	15.5	16.7	14.3	7.4	14.3	23.6	16.9
70°	12.8	11.8	9.6	6.3	9.6	9.6	7.5	8.7	9.2	9.9
71° or more	7.3	6.6	7.1	6.3	6.2	6.6	6.1	6.9	7.3	7.5
No answer/ Don't know	5.4	1.8	0.5	5.6	0.6	1.7	4.6	2.2	0.2	2.5
					Night					
Off	4.0%	2.0%	1.3%	12.7%	11.4%	8.7%	23.1%	20.5%	14.6%	9.6%
63° or lower	23.9	25.7	27.9	27.4	30.0	30.6	17.7	16.5	26.0	24.5
64 to 66°	23.7	26.6	26.1	16.4	21.9	23.4	16.0	14.1	12.6	21.6
67 to 69°	16.1	22.5	24.7	15.0	19.9	17.6	9.8	16.3	24.0	19.5
70°	14.6	13.5	10.7	12.3	9.7	11.9	16.7	12.8	12.0	12.9
71° or more	9.7	7.7	6.9	8.9	6.0	7.1	12.2	14.0	8.4	9.3
No answer/ Don't know	6.1	1.7	0.5	5.3	1.0	0.8	4.6	1.9	0.4	2.5

Source: U.S. Department of Energy, "Residential Energy Consumption Survey: Housing Characteristics, 1981," Ref. [54].

Table 91 Winter temperature control by climate and dwelling size: United States

(N=6269)

	More than 5,449 HDD			3,950 to 5,449 HDD			Less than 3,950 HDD			
	Less than 1,000 ft^2	1,000-1,999 ft^2	More than 1,999 ft^2	Less than 1,000 ft^2	1,000-1,999 ft^2	More than 1,999 ft^2	Less than 1,000 ft^2	1,000-1,999 ft^2	More than 1,999 ft^2	Total
Lowered heat at night	43.6%	51.7%	51.8%	46.3%	54.3%	53.3%	35.4%	38.0%	46.3%	46.6%
1 to 2°	4.6	7.6	9.0	5.7	6.7	6.0	3.1	4.5	5.6	6.2
3 to 5°	20.9	24.0	23.9	16.2	22.7	20.6	12.5	13.3	15.3	19.6
6 to 10°	13.5	16.5	15.6	19.2	18.4	21.6	12.0	14.4	18.6	15.6
11° or more	4.3	3.4	3.3	7.2	6.5	4.7	7.8	5.9	6.6	5.0
Kept same temperature at night	49.5	43.2	43.7	38.1	31.4	35.6	40.4	40.9	40.3	41.7
Turned heat off at night	3.1	1.6	1.3	12.3	10.6	8.2	21.6	17.6	10.6	8.5
Raised heat at night	3.1	3.3	3.1	3.3	3.5	2.7	2.2	2.6	2.8	3.0

Source: U.S. Department of Energy, "Residential Energy Consumption Survey: Housing Characteristics, 1981," Ref. [54].

YEAR

Table 92 Winter thermostat settings by year: Mississippi

	1982 *(N=497)*	1981 *(N=447)*
Off	5.2%	2.5%
Lower than 65°	6.0	13.0
65° - 68°	37.0	40.7
69° - 72°	32.6	33.8
73° - 78°	13.9	6.0
More than 78°	1.6	0.7
No thermostat	0.6	0.2
Don't know	3.0	3.1

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 93 Summer thermostat settings by year: Mississippi

	1982 *(N=414)*	1981 *(N=393)*
Off	2.7%	1.5%
More than 78°	19.6	15.8
75° - 78°	39.1	32.7
71° - 74°	16.9	22.7
68° - 70°	14.7	18.6
Lower than 68°	1.9	2.3
No thermostat	0.5	0
Don't know	4.6	6.4

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 94 Temperature setting reductions by year: Mississippi

Winter

	1982 *(N=107)*	1981 *(N=112)*
1^{o} lower	2.8%	5.4%
2^{o}	27.1	15.2
3^{o}	15.9	13.4
4^{o}	25.2	21.4
5^{o}	14.0	25.0
6^{o}	0.9	8.0
7^{o}	3.7	0
8^{o}	1.9	4.5
9^{o}	5.4	6.3
Don't know	0	0.9

Summer

	1982 *(N=85)*	1981 *(N=79)*
1^{o} higher	1.2%	2.5%
2^{o}	17.7	19.0
3^{o}	34.1	13.9
4^{o}	16.5	21.5
5^{o}	12.9	24.1
6^{o}	5.9	7.6
7^{o}	1.2	3.8
8^{o}	4.7	1.3
9^{o}	4.7	2.5
Don't know	1.2	3.8

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 95 Temperature control by year: Mississippi

	Winter		Summer	
	1982 *(N=469)*	1981 *(N=432)*	1982 *(N=382)*	1981 *(N=367)*
Using higher setting	9.2%	6.9%	20.7%	21.5%
Kept same setting	68.0	66.9	75.8	68.7
Using lower setting	22.8	25.9	3.5	9.8
Don't know	0	0.2	0	0

Source: Mississippi Department of Energy and Transportation, "1982 Market Penetration Study," Ref. [23].

Table 96 Temperature control by year: Tennessee

(N=2644)

	1979	1981	1982
Kept living quarters cooler in winter within the past five years	73.3%	62.4%	37.7%
Kept living quarters warmer in summer within the past five years	44.1	54.1	28.4

Source: Tennessee Valley Authority, "1982 Interim Residential Survey," Ref. [53].

Table 97 Temperature control by year: Potomac Edison

	1979	1981 *(N=519)*
Lowered heating thermostat to below 69°	71.9%	66.6%
Raised cooling thermostat to 78° or higher	57.1	49.0
Turned off air conditioner when not at home	77.3	76.0

Source: Potomac Edison, "1981 New Home Survey," Ref. [40].

Table 98 Temperature control by year and time-of-day: San Diego

	1979 *(N=239)*	1980 *(N=316)*	1981 *(N=286)*	1982 *(N=301)*	1983 *(N=305)*
Kept heating thermostat at 68°, or used heater less, or did not use heater	77%	75%	73%	72%	66
Set heating thermostat back at night	60	60	55	49	51
Turned off furnace pilot light during the summer	50	64*	56*	50	52
Turned furnace off at night during the winter	42	41	49*	47	47
Kept cooling thermostat at 78° or higher	14	19	12*	14	10

*Significantly different from preceding wave.

Source: San Diego Gas and Electric, "1983 Conservation Tracking Study," Ref. [48].

Table 99 Winter temperature control by year: California

	PG&E		SCE		SDG&E	
	1981 *(N=926)*	1982 *(N=510)*	1981 *(N=749)*	1982 *(N=403)*	1981 *(N=410)*	1982 *(N=200)*
Turn furnace off or lower at night during the winter	87%	87%	83%	82%	83%	82%

Source: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), "RCS Follow-up Surveys," Refs. [31,49,52].

Table 100 Winter temperature control by year and time-of-day: Oregon

	1979 *(N=384)*	1980 *(N=423)*	1981 *(N=385)*	1982 *(N=384)*
Turn heating thermostat down at night	88%	84%	69%	80%
Lower heating thermostat when not at home	--	--	74	78

Source: Pacific Power and Light, "Energy Conservation Study of Electric Heat Customers in Oregon," Ref. [34].

TIME-OF-DAY

Table 101 Winter thermostat settings by time-of-day: Pacific Northwest

Daytime

	California (N=1097)	Montana (N=522)	Oregon (N=1105)	Washington (N=1070)	Wyoming (N=1051)
Turned off	11%	5%	11%	5%	5%
Lower than 66°	12	18	18	20	27
66 to 72°	32	45	37	44	45
More than 72°	5	4	4	3	3
Varied - no normal setting	32	24	24	21	16
Unknown	8	4	6	7	4

Evening

	California (N=1097)	Montana (N=522)	Oregon (N=1105)	Washington (N=1070)	Wyoming (N=1051)
Turned off	4%	2%	4%	1%	1%
Lower than 66°	8	14	13	13	16
66 to 72°	37	50	47	53	58
More than 72°	8	4	4	5	4
Varied - no normal setting	35	26	26	21	17
Unknown	8	4	6	6	4

Night

	California (N=1097)	Montana (N=522)	Oregon (N=1105)	Washington (N=1070)	Wyoming (N=1051)
Turned off	28%	9%	26%	12%	6%
Lower than 66°	32	49	42	47	52
66 to 72°	8	16	11	17	27
More than 72°	1	1	1	2	1
Varied - no normal setting	22	20	14	16	10
Unknown	9	5	6	7	4

Source: Pacific Power and Light, "Household Energy Study Results," Ref. [33].

Table 102 Winter thermostat settings by time-of-day: Idaho

(N=592)

	Daytime	Evening	Night
Turned off	6%	7%	14%
Lower than 65°	10	9	36
65 to 75°	59	57	26
More than 75°	1	1	0
Varied - no normal setting	20	21	19
Unknown	4	5	5

Source: Pacific Power and Light, "Results of the Household Energy Study for Customers of Pacific Power and Light in Idaho," Ref. [32].

Table 103 Winter thermostat settings by time-of-day: Pacific Northwest

Daytime

	Wash. *(N=1429)*	Oregon *(N=1141)*	Idaho *(N=803)*	Montana *(N=561)*	Pacific Northwest *(N=3934)*
Turned off	1%	2%	0%	0%	1%
Lower than 65°	20	23	18	17	21
65 to 67°	22	22	22	23	22
68°	21	20	20	22	22
69 to 71°	23	23	27	27	24
Varies	4	2	1	3	3
Mean temperature	66°	64°	67°	67°	66°

Evening

	Wash. *(N=1425)*	Oregon *(N=1145)*	Idaho *(N=806)*	Montana *(N=559)*	Pacific Northwest *(N=3935)*
Lower than 65°	11%	11%	6%	6%	10%
65 to 67°	22	20	18	21	21
68°	22	22	21	24	22
69 to 71°	31	31	37	33	32
Varies	3	2	1	3	3
Mean temperature	68°	68°	69°	69°	68°

Night

	Wash. *(N=1418)*	Oregon *(N=1133)*	Idaho *(N=804)*	Montana *(N=559)*	Pacific Northwest *(N=3914)*
Turned off	2%	7%	0%	0%	3%
Lower than 60°	22	23	13	13	21
60 to 64°	30	31	31	29	31
65 to 67°	21	20	27	29	22
68°	10	8	12	14	10
More than 68°	10	8	16	11	10
Varies	5	4	1	3	4
Mean temperature	62°	62°	64°	63°	62°

Source: Bonneville Power Administration, "Pacific Northwest Residential Energy Survey," Ref. [4].

Table 104 Winter thermostat settings by time-of-day: Oregon

(N=1032)

	Daytime	Evening	Night
Lower than 57°	6%	0%	27%
57 to 60°	11	4	33
61 to 64°	4	4	8
65 to 68°	40	37	27
69 to 72°	34	46	6
73 to 76°	3	8	0
More than 76°	2	0	0
Average setting	67°	69°	60°

Source: Oregon Department of Energy, "Oregon Residential Energy Study: An Update," Ref. [30].

Table 105 Winter thermostat settings by time-of-day: Minnesota

(N=27,806)

	Day	Night
55 to 58°	1.3%	2.6%
59 to 62°	5.0	13.3
63 to 65°	11.8	24.0
66 to 68°	38.0	35.2
69 to 70°	31.1	17.9
71 to 72°	11.1	17.9
73 to 74°	1.5	6.1
75 to 77°	0.3	0.2
Over 77°	0	0
Mean temperature	67.3°	65.7°
Standard deviation	3.0°	3.5°

Source: Minnesota Energy Agency, "Analysis of Single-Family Home Characteristics and Energy Use in Minnesota," Ref. [22].

Table 106 Winter thermostat settings by time-of-day: Nebraska

(N=1628)

	Day	Night
Lower than 60°	1.2%	4.8%
60 to 65°	14.9	49.3
66 to 68°	31.6	23.7
69 to 70°	32.1	15.1
71 to 73°	13.4	4.8
74 to 77°	5.8	1.8
78 to 89°	1.0	0.5
Mean	68.7°	65.3°

Source: Nebraska Public Power District, "1982 Customer Appliance Saturation Survey," Ref. [25].

Table 107 Winter thermostat settings by time-of-day and year: California

Day

	PG&E		SCE		SDG&E	
	1981 (N=814)	1982 (N=439)	1981 (N=627)	1982 (N=347)	1981 (N=334)	1982 (N=168)
Heat normally off	23%	27%	26%	24%	43%	49%
55° or lower	3	3	2	2	2	1
56 to 60°	8	9	6	5	6	7
61 to 64°	6	8	3	4	4	3
65 to 67°	21	18	15	15	17	14
68°	20	19	20	20	12	11
69 to 72°	16	13	24	24	14	11
73° or more	2	2	3	3	1	0
Don't know	0	1	0	1	1	5

Night

	PG&E		SCE		SDG&E	
	1981 (N=814)	1982 (N=439)	1981 (N=627)	1982 (N=347)	1981 (N=334)	1982 (N=168)
Heat normally off	36%	42%	28%	28%	48%	51%
55° or lower	7	7	4	0	4	5
56 to 60°	16	15	9	9	11	8
61 to 64°	6	7	5	6	6	4
65 to 66°	14	15	17	19	12	11
67 to 69°	11	8	16	14	10	9
70 to 72°	8	5	15	16	8	7
73° or more	1	1	5	3	1	1
Don't know	1	0	1	4	0	4

Source: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), "RCS Follow-up Survey," Refs. [31,49,52].

Table 108 Winter thermostat settings by time-of-day and year: Maine

(N=3519)

	1981		1983	
	Day	Night	Day	Night
Not occupied in winter	1%	0.9%	0.5%	0.5%
Lower than 60°	3.3	24.7	3.9	16.8
60 to 65°	26.3	49.8	20.9	48.3
66 to 70°	44.2	17.6	44.8	24.2
71 to 75°	18.8	2.8	23.3	6.4
76 to 80°	2.9	0.6	3.7	1.1
More than 80°	0.2	0.1	0.5	0.1
Don't know	3.2	3.5	2.4	2.5

Source: Central Maine Power, "1981 Residential Energy Survey," Ref. [7].

The data for 1982-83 were collected in an interview with Dick Spelman, Central Maine Power, February 23, 1984.

Table 109 Winter thermostat settings by time-of-day and year: Philadelphia

(N=3864)

	1977		1978	
	Day	Night	Day	Night
Lower than 64°	13.3%	22.7%	16.5%	27.0%
65 to 67°	23.0	33.0	24.3	32.4
68 to 70°	48.4	34.0	48.0	33.5
71 to 73°	13.9	8.4	10.2	5.5
74° and above	1.3	1.7	1.0	1.5

Source: Philadelphia Electric Company, "1979 Residential Conservation Survey," Ref. [38].

Table 110 Summer thermostat settings by time-of-day: Minnesota

(N=27,806)

	Day	Night
More than 80°	3.4%	5.3%
79 to 80°	8.7	8.6
77 to 78°	19.0	16.6
75 to 76°	27.2	27.1
73 to 74°	14.3	13.3
71 to 72°	13.5	12.6
69 to 70°	8.6	9.1
67 to 68°	3.2	3.4
Less than 67°	2.1	4.0
Average temperature setting	75.1°	75.0°
Standard Deviation	3.5°	3.9°

Source: Minnesota Energy Agency, "Analysis of Single-Family Home Characteristics and Energy Use in Minnesota," Ref. [22].

Table 111 Summer thermostat settings by time-of-day and year: California

Day

	PG&E		SCE		SDG&E	
	1981 *(N=289)*	1982 *(N=125)*	1981 *(N=212)*	1982 *(N=99)*	1981 *(N=57)*	1982 *(N=27)*
Off	23%	22%	17%	27%	39%	59%
78° or more	26	35	20	28	26	11
76 to 77°	4	3	4	2	0	0
73 to 75°	12	11	15	15	9	7
70 to 72°	9	11	11	17	18	7
69° or less	5	10	4	11	4	4
Don't know	20	7	28	0	5	11

Night

	PG&E		SCE		SDG&E	
	1981 *(N=289)*	1982 *(N=125)*	1981 *(N=212)*	1982 *(N=99)*	1981 *(N=57)*	1982 *(N=27)*
Off	51%	65%	59%	65%	81%	81%
76° or more	18	14	14	11	7	0
73 to 75°	6	4	5	9	0	4
70 to 72°	3	4	6	5	4	4
69° or less	4	5	3	10	4	4
Don't know	17	8	15	0	2	7

Source: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), "RCS Follow-up Survey," Refs. [31,49,52].

Table 112 Summer thermostat settings by time-of-day and year: Philadelphia

(N=3864)

	1977		1978	
	Day	Night	Day	Night
79° and more	9.5%	7.9%	12.0%	9.8%
77 to 78°	20.2	18.2	27.6	24.9
75 to 76°	41.6	39.9	40.1	42.9
74° or less	28.7	34.0	20.3	22.4

Source: Philadelphia Electric, "1979 Residential Conservation Survey," Ref. [38].

APPENDIX B

ANNOTATED BIBLIOGRAPHY

ANNOTATED BIBLIOGRAPHY OF REFERENCED SURVEYS

DEFINITIONS

"N.A." indicates information is not available.

"Objectives" are the objectives described by the authors of the report.

"Sample size" indicates the final sample size used in the analysis.

"Questionnaire included" indicates a questionnaire is either attached to or is part of a report when an affirmative response is given.

ALABAMA POWER COMPANY

Report: 1981 Residential Customer Survey
Publication date: May 1981
Author: Energy Services Department, Alabama Power
Objectives: Monitor changes in residential electrical use patterns
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices, and energy use
Survey method: Primarily face-to-face interviews, some telephone interviews
Survey period: May 1981
Sampling method: Sequential random sample of residential customers
Sample size: 1006
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

This was the thirteenth survey in a series of surveys conducted since 1955. Comparisons were made to survey data collected since 1960. This survey contained extensive questions about energy conservation measures and practices in the home as well as several questions about thermostat settings during the winter and summer months. The data were analyzed on the basis of sample sub-groups and the total sample. Sub-group classifications included, but were not limited to: type of dwelling, age of dwelling, type of air conditioning, and total household income.

ARIZONA ENERGY OFFICE

Report: Survey of Current and Potential Home Energy Management Activities Among Urban Homeowners in Arizona
Publication date: March-April 1979
Author: Behavior Research Center, Inc. (prepared for the Energy Programs Division of the Arizona State Office of Economic Planning and Development)
Objectives: Investigate urban community attitudes and behavior relating to energy management practices
Data collected: Dwelling characteristics, demographics, knowledge of energy management practices, sources of energy information, state tax credits, and energy management measures and practices taken
Survey method: Face-to-face interview
Survey period: February 27 to March 12, 1979
Sampling method: Multistage probability cluster sample
Sample size: 812 homeowners in the metropolitan Phoenix and Tucson areas
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: No

ARIZONA PUBLIC SERVICE COMPANY

Report: 1983 Residential Conservation Tracking Survey
Publication date: N.A.
Author: Arizona Public Service
Objectives: N.A.
Data collected: Appliance saturation, dwelling characteristics, demographics, and recent conservation actions
Survey method: Telephone interview
Survey period: Summer 1983
Sampling method: Quota sample per town
Sample size: 695
Response rate: 33%
Comparisons made: Across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: No

Data were compared to 1982 survey data.

BONNEVILLE POWER ADMINISTRATION (BPA)

Report: The Pacific Northwest Residential Energy Survey, Volume 1: Executive Summary, and Volume 2: Technical Appendix
Publication date: August 1980
Author: Elrick and Lavidge, Inc. (prepared for the Bonneville Power Administration (Portland, Oregon) and the Pacific Northwest Utilities Conference Committee)
Objectives: Provide information on residential customers with individually metered electric service
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices taken, and fuel consumption data
Survey method: Face-to-face interview
Survey period: October 25, 1979 to January 31, 1980
Sampling method: Stratified cluster random sample
Sample size: 4030 electric customers
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

The customers were stratified by utility service area.

BOSTON EDISON COMPANY

Report: 1980 Appliance Survey of Residential Customers
Publication date: N.A.
Author: Rate Research and Forecasting Department, Boston Edison
Objectives: Detect energy usage patterns of residential customers
Data collected: Appliance saturations, dwelling characteristics, energy conservation practices and measures taken, and future plans to add or replace appliances
Survey method: Mail questionnaire
Survey period: Fall 1980
Sampling method: Stratified random sample
Sample size: 4300
Response rate: 50%
Comparisons made: Across groups and across time
Statistics used: Frequencies, cross-tabulations and discriminant analysis
Questionnaire included: Yes

Data were compared to 1978 survey data. The sample was stratified by customer class (electric water heater, electric furnace, electric water heater, and furnace).

CALIFORNIA ENERGY COMMISSION

Report: RCS Follow-Up Survey Analysis
Publication date: April 1983
Author: Conservation Division, California Energy Commission
Objectives: Measure changes due to the Residential Conservation Service (RCS) program and analyze the effectiveness of specific program components
Data collected: Dwelling characteristics, demographics, attitudinal assessment of the program, energy conservation measures and practices taken, financial assistance, energy usage, and reasons for requesting an audit
Survey method: Telephone interview
Survey period: March 5-30, 1982
Sampling method: Quota sampling
Sample size: 1898 (audited) and 1632 (non-audited)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

This report summarized data on the first year of California's RCS program. Both statewide and utility-specific data were presented. Audit participants received an RCS audit during September to December, 1981. The cross-section included both people who did not receive an audit and those who claimed to have received an audit but were not found on the utility list. Quotas were based on sex and house type (single-family and multi-family).

CENTRAL MAINE POWER COMPANY

Report: 1981 Residential Energy Survey
Publication date: December 1981
Author: Central Maine Power
Objectives: N.A.
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices, and energy usage
Survey method: Mail questionnaire
Survey period: July to August, 1981
Sampling method: Stratified random sample of residential customers
Sample size: 3519
Response rate: 64%
Comparisons made: Across time
Statistics used: Frequencies
Questionnaire included: Yes

Comparisons were made to survey data collected since 1965. The sample was stratified into five residential sub-classes: general, electric water heating, electric space heating, electric space and water heating, and seasonal and short term. Extensive data were collected on wood use and thermostat settings. Multiple tenant accounts were excluded from sample selection. Multiple tenants were multiple-family dwellings served by one electric meter, usually where the owner of the dwelling payed the electric bill for the dwelling's occupants. There were 6902 multiple tenant accounts out of a total of 343,703 residential customers.

EL PASO ELECTRIC COMPANY

Report: Results of Home Energy Audit Service Survey for New Mexico
(not a report, just a survey form with responses)
Publication date: February 2, 1983
Author: El Paso Electric
Objectives: N.A.
Data collected: Installation of energy conservation or solar energy measures since audit, rating of audit, and adoption of no-cost and low-cost energy conservation practices
Survey method: Mail questionnaire
Survey period: June 1981 to November 1982
Sampling method: N.A.
Sample size: 376
Response rate: 22.5%
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

FLORIDA POWER AND LIGHT COMPANY

I.

Report: 1980 Home Energy Survey
Publication date: July 1, 1981
Author: Energy Management and Research Department, Florida Power and Light
Objectives: Obtain appliance saturation and demographic data of residential customers
Data collected: Appliance saturation, demographics, installed energy conservation measures, and summer and winter thermostat settings
Survey method: Mail questionnaire
Survey period: N.A.
Sampling method: Random sample of residential customers
Sample size: 6683
Response rate: 50%
Comparisons made: Across groups
Statistics used: Frequencies
Questionnaire included: Yes

II.

Report: The Impact of RCS CLass "A" Audits on Energy Conservation Among Large Usage Residential Customers
Publication date: September 1982
Author: Energy Management and Research Department, Florida Power and Light
Objectives: Estimate the effects of Residential Conservation Service (RCS) computer-assisted Class A Energy Audits on energy consumption and conservation actions among large usage residential customers; determine barriers which prevent customers from taking conservation actions; and determine attitudes of customers toward energy audits
Data collected: Energy use, and energy conservation measures and practices
Survey method: Face-to-face interview
Survey period: November and December 1981
Sampling method: Random samples of audited and non-audited residential customers
Sample size: 284 (audited) and 166 (non-audited)
Response rate: 85% (audited) and 50% (non-audited)
Comparisons made: Across groups
Statistics used: Frequencies and t-tests
Questionnaire included: Yes

This sample consisted of residents of single-family homes whose energy consumption exceeded 1700 kWh in any one of the previous 12 months and who had been audited during March to September, 1980. In the Class A Energy Audit, the customer is provided with an on-site inspection and analysis of the home and a computer analysis of specific measures which could improve the energy efficiency of the home. Included are the initial cost for each measure and payback period based on expected annual energy savings. Auditors also discuss conservation practices which could help the customer save energy. The control sample did not receive any type of audit. In the sampling procedure, multi-family homes and low energy users were excluded from the non-audit sample. Conservation measures that had been installed were visually inspected whenever possible.

FLORIDA POWER CORPORATION

Report: 1982 Home Energy Checkup Follow-up Study
Publication date: October 1983
Author: Load Forecasting and Research Department, Florida Power
Objectives: Evaluate the impact of the Home Energy Checkup (HEC) program on customer conservation behavior by (1) determining what actions were taken by customers as a result of the HEC, (2) comparing post-HEC actions with pre-HEC actions, (3) assessing future conservation intentions, and (4) assessing customer reactions to and acceptance of the program provisions
Data collected: Demographics, energy conservation measures and practices (taken and planned), barriers to energy conservation, and rating of audit program
Survey method: Mail questionnaire
Survey period: December 1982 to February 1983
Sampling method: All participants sampled
Sample size: 4705
Response rate: 61.8%
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

This sample consisted of households who had received an HEC during April 1, 1981 to June 30, 1982. The HEC was Florida Power Corporation's most comprehensive residential audit program. The program provided the customer with an on-site inspection and analysis of the home and a computer report on the cost and savings of recommended energy conservation practices and measures.

GENERAL PUBLIC UTITLITIES (GPU) CORPORATION

Report: 1982 Customer Energy Characteristics: Summary Results
Publication date: October 15, 1982
Author: Conservation and Load Management Department, GPU
Objectives: N.A.
Data collected: Appliance saturation, dwelling characteristics, demographics, water thermostat settings, and energy conservation measures and practices taken and/or planned, and energy usage
Survey method: Mail questionnaire
Survey period: May 1982
Sampling method: N.A.
Sample size: N.A.
Response rate: N.A.
Comparisons made: Across time and across groups
Statistics used: Frequencies
Questionnaire included: Yes

Three groups of households were compared: all residential customers, new housing (two years old or less), and electric heat customers. Comparisons were made to data collected since 1975 in five previous surveys. This study contains data for three utilities: Jersey Central Power and Light, Pennsylvania Electric, and Metropolitan Edison.

GEORGIA POWER COMPANY

I.

Report: 1983 Residential Customer Survey: Preliminary Report
Publication date: October 12, 1983
Author: Economic and Market Research Department, Georgia Power
Objectives: Determine the main factors that influence the conservation of energy; compare customer beliefs about electricity, natural gas and gasoline with respect to future availability, cost and conservation; and evaluate renters' conservation attitudes and their perception of their landlord's conservation behavior
Data collected: Appliance saturation, dwelling characteristics, demographics, energy attitudes, and energy conservation practices
Survey method: Mail questionnaire
Survey period: June to August 1983
Sampling method: Random sample
Sample size: 1564
Response rate: 52.1%
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

Variations in survey procedures were tested for differences in response rate.

II.

Report: 1979 Single-Family Retrofit Survey
Publication date: February 1980
Author: Rates and Research Department, Georgia Power
Objectives: Determine the magnitude of customer retrofit actions and gauge the degree of completion of planned actions by customers from the previous year's survey
Data collected: Appliance saturation, demographic data, and energy conservation actions
Survey method: Primarily telephone interviews, some face-to-face interviews
Survey period: February 1979
Sampling method: Systematic random sample of residential customers and selective sampling of customers surveyed in 1978
Sample size: 490 residential customers
Response rate: N.A.
Comparisons made: Across time and across groups
Statistics used: Frequencies
Questionnaire included: Yes

The focus of this study was on single-family homes. There were 151 customers from the 1978 Residential Retrofit Study resurveyed in this survey.

LAWRENCE BERKELEY LABORATORY

I.

Report: Davis energy survey (not a report; unpublished data)
Publication date: N.A.
Author: Edward Vine
Objectives: Construct household energy use models; determine the principal determinants of energy use; analyze the effect of occupant behavior on energy use; and compare model results with DOE-2 estimates
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices, attitudes, and energy usage
Survey method: Face-to-face interview
Survey period: Summer 1980
Sampling method: Random sample
Sample size: 241
Response rate: 80%
Comparisons made: Across groups
Statistics used: Frequencies and multiple regression analysis
Questionnaire included: Available from author

II.

Report: Lodi energy survey (not a report; unpublished data)
Publication date: N.A.
Author: Edward Vine
Objectives: Construct household energy use models; determine the principal determinants of energy use; and analyze the effect of occupant behavior on energy use
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices, attitudes, and energy usage
Survey method: Face-to-face interview
Survey period: Summer 1981
Sampling method: Random sample
Sample size: 253
Response rate: 43%
Comparisons made: Across groups
Statistics used: Frequencies and multiple regression analysis
Questionnaire included: Available from author

III.

Report: Pensacola energy survey (not a report; unpublished data)
Publication date: N.A.
Author: Edward Vine
Objectives: Construct household energy use models; determine the principal determinants of energy use; and analyze the effect of occupant behavior on energy use
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices, attitudes, and energy usage (total household energy use and sub-metered energy use)
Survey method: Telephone interview
Survey period: Summer 1983
Sampling method: Non-random sample of sub-metered households
Sample size: 52
Response rate: 85%
Comparisons made: Across groups and across time
Statistics used: Frequencies and multiple regression analysis
Questionnaire included: Available from author

Comparisons were made to 1979 survey data. Energy data were collected in 1979-81 while telephone interviews were conducted in 1983. Energy data included whole house energy use and energy used in air conditioning and heating.

LINCOLN ELECTRIC SYSTEM (Lincoln, Nebraska)

I.

Report: T.H.E. Audit Customer Survey
Publication date: N.A.
Author: Rates, Forecasting and Load Research Department, Lincoln Electric
Objectives: Determine energy conservation measures and practices customers installed or implemented specifically as a result of an energy audit
Data collected: Demographics, and energy conservation measures and practices taken as a result of the home energy audit
Survey method: Mail questionnaire
Survey period: June 4 to July 5, 1982
Sampling method: Sampled all customers who received energy audits between March 1, 1981 and December 30, 1981
Sample size: 347
Response rate: 41%
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

II.

Report: 1980 Residential Customer Survey
(not a report, just a survey form with responses)
Publication date: N.A.
Author: Rates, Forecasting and Load Research Department, Lincoln Electric
Objectives: N.A.
Data collected: Demographics, and energy conservation measures and practices taken as a result of the home energy audit
Survey method: Mail questionnaire
Survey period: December 1980
Sampling method: Stratified random sample
Sample size: 598
Response rate: N.A.
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

Sample was stratified by their annual kWh usage.

MICHIGAN ENERGY ADMINISTRATION

Report: An Evaluation of the Michigan Residential Conservation Service Program: Procedures and Results
Publication date: August 1982
Authors: Energy Administration, Michigan Department of Commerce
Objectives: Evaluate the energy savings of the Residential Conservation Service (RCS) program
Data collected: Dwelling characteristics, demographics, attitudes, energy usage, reactions to the audit, energy conservation measures and practices (taken or planned)
Survey method: Telephone interview
Survey period: November 3 to December 4, 1981
Sampling method: Random sample of single-family homeowners (audited and non-audited)
Sample size: 764 (audited) and 357 (non-audited)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies, cross-tabulations, and bivariate regression analysis
Questionnaire included: No

The audited sample consisted of households that had been audited during June to October, 1981.

MICHIGAN STATE UNIVERSITY

Report: Evaluation of Statewide Project Conserve in Michigan: A Computerized Residential Energy Audit Program
Publication date: December 18, 1981
Authors: Institute for Family and Child Study, Michigan State University (prepared for the Energy Administration of the Michigan Department of Commerce)
Objectives: Evaluate Project Conserve
Data collected: Appliance saturation, dwelling characteristics, demographics, energy-related knowledge and attitudes, energy conservation measures and practices taken, and energy consumption
Survey method: Primarily telephone interviews, some mail questionnaires
Survey period: June 1979 and December 1980
Sampling method: Stratified random sampling
Sample size: 2016 (499 had participated in Project Conserve, 516 received the audit by direct mail but did not participate; the remaining households formed a control group)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies, cross-tabulations, and multiple regression analysis
Questionnaire included: Yes

This report was an evaluation of Project Conserve, a Type B computerized household energy audit available to Michigan residents between November 1978 and August 1980. Project Conserve emphasized space heating and secondarily water heating. This audit was available to all Michigan residents and was distributed by direct mail to randomly chosen households The specific target areas selected for direct mail were all those areas throughout the state where an energy audit was not available through a utility company or through a state-supported community-based energy program.

MINNESOTA ENERGY AGENCY

Report: Analysis of Single-Family Home Characteristics and Energy Use in Minnesota
Publication date: January 1980
Author: Eric Hirst and Mar Haller (prepared for the Minnesota Energy Agency)
Objectives: Present and analyze the information collected and developed by Northern State Power's Project Conserve audit offer
Data collected: Appliance saturation, dwelling features, demographics, weather, and fuel prices
Survey method: Mail questionnaire
Survey period: January to April, 1979
Sampling method: N.A.
Sample size: 27,806
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies and crosstabulations
Questionnaire included: Yes

This information was collected as part of Northern States Power Company's offer of a computerized home energy audit (Project Conserve) to its Minnesota residential customers living in structures with 1-3 dwelling units.

MISSISSIPPI DEPARTMENT OF ENERGY AND TRANSPORTATION

Report: Market Penetration Study
Publication date: N.A.
Authors: Multi Quest International, Inc. (prepared for the Mississippi Department of Energy and Transportation)
Objectives: Track energy-saving actions taken by households, and determine the results from new promotional efforts
Data collected: Appliance saturation, demographics, attitudes toward energy costs, and energy conservation practices
Survey method: Telephone interview
Survey period: May 1-31, 1982
Sampling method: Stratified random sample
Sample size: 1014
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

NEBRASKA PUBLIC POWER DISTRICT

I.

Report: RCSP Energy Audit Customer Survey
Publication date: April 1982
Author: Nebraska Public Power District
Objectives: Assess the usefulness of the residential energy audit program
Data collected: Dwelling characteristics, demographics, energy conservation actions taken as a result of the audit, and evaluation of the usefulness and value of information received from audit
Survey method: Mail questionnaire
Survey period: December 1981 to January 1982
Sampling method: All audited households
Sample size: 217
Response rate: 46%
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: No

The Residential Conservation Service Program (RCSP) was initiated in 1981, and was based on the U.S. Department of Energy's RCS program. The sample in this study was composed of households who had received an audit in 1981.

II.

Report: 1982 Customer Appliance Saturation Survey
Publication date: August 1982
Author: Nebraska Public Power District
Objectives: Update and expand earlier data bases; ascertain what actions customers have taken during the 1976-81 period which will affect electricity consumption; and obtain information about customer plans to change appliance stock or to add insulation during the next year
Data collected: Appliance saturation, dwelling characteristics, and demographics
Survey method: Mail questionnaire
Survey period: Early 1982
Sampling method: Stratified random sample
Sample size: 1628
Response rate: 43.5%
Comparisons made: Across groups and across time
Statistics used: Frequencies
Questionnaire included: Yes

The sample strata included a basic sample that was randomly selected from all residential customers, and oversamples of electric space heating customers and electric water heating customers. Comparisons were made to survey data collected since 1976.

NEW HAMPSHIRE GOVERNOR'S COUNCIL ON ENERGY

Report: Energy Survey of New Hampshire Homeowners
Publication date: September 1, 1981
Authors: Department of Political Science, University of New Hampshire (prepared for the New Hampshire Governor's Council on Energy)
Objectives: Ascertain the various patterns of energy use of homeowners and their attitudes and actions related to energy conservation
Data collected: Dwelling characteristics, demographics, heating systems, home energy inspection/audits, energy conservation measures and practices taken, energy efficiency of homes, and awareness of conservation
Survey method: Telephone interview
Survey period: June 7-12, 1981
Sampling method: Random sample of homeowners
Sample size: 502
Response rate: 70%
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

NEW YORK STATE ELECTRIC AND GAS CORPORATION

Report: Residential Appliance Inventory: Preliminary Findings
Publication date: March 1983
Author: Urban Systems Research and Engineering, Inc. (prepared for New York State Electric and Gas)
Objectives: Provide data on the potential for increased electricity conservation through improvements in residential appliances
Data collected: Appliance saturation, dwelling characteristics, demographics, appliance purchase decisions, and energy conservation measures taken in the past two years
Survey method: Face-to-face interview and mail questionnaire
Survey period: January to February, 1983
Sampling method: Random sample of residential customers under the electric heating rate and under the standard residential rate
Sample size: 4585 (mail) and 788 (face-to-face)
Response rate: 58% (mail) and 61% (face-to-face)
Comparisons made: Across groups
Statistics used: Frequencies
Questionnaire included: Yes

Master-metered apartment buildings were excluded. The focus of this study was on space heating and water heating. This study was conducted for the following New York utilities: Central Hudson Gas and Electric Corporation, Long Island Lighting Company, New York State Electric and Gas Corporation, Niagara Mohawk Power Corporation, Orange and Rockland Utilities, Inc., and Rochester Gas and Electric Corporation.

OKLAHOMA NATURAL GAS COMPANY

Report: Energy Conservation Survey: Report of Findings
Publication date: October 1982
Author: Elrick and Lavidge, Inc. (prepared for Oklahoma Natural Gas)
Objectives: Analyze the effectiveness of the ECHO Home Energy Auditing Program in promoting energy conservation by residential gas and electric customers
Data collected: Dwelling characteristics, demographics, and energy conservation measures and practices taken before and after the audit
Survey method: Mail questionnaire
Survey period: June to August, 1982
Sampling method: Surveyed all households who had ordered audits in 1981, and a random sample of residential customers
Sample size: 1506 (audited) and 980 (non-audited)
Response rate: 33% (audited) and 16% (non-audited)
Comparisons made: Across groups
Statistics used: Frequencies, Chi-squared, one-way analysis of variance (ANOVA), and multivariate discriminate analysis (MDA)
Questionnaire included: Yes

These samples consisted of households who had conducted an audit in their home within the previous year and of households who were not on record as having had an audit. The audit was conducted at the customer's request by sending an auditor from the utility company to the residence and inspecting the home for potential energy conservation deficiencies. The customer was given a report outlining physical improvement which could be made and their estimated cost. Energy conservation practices were also suggested.

OREGON DEPARTMENT OF ENERGY

I.

Report: State Home Oil Weatherization Program: Participant Survey
Publication date: November 1983
Author: Oregon Department of Energy
Objectives: Measure how well the State Home Oil Weatherization Program has helped increase the energy-efficiency of oil- heated homes in Oregon
Data collected: Dwelling characteristics, demographics, energy conservation measures and practices (taken or planned), satisfaction with audit, reasons for not adopting measures or practices, and sources of funding
Survey method: Telephone interview
Survey period: Early 1983
Sampling method: Stratified random sample of owner-occupied households that received audits during 1982
Sample size: 403
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

Comparisons were made between customers who obtained state-subsidized low interest loans to weatherize and those who did not obtain a loan. The Home Oil Weatherization Program offers free home energy audits and 6.5% interest weatherization loans to homeowners who heat with oil. During the audit, auditors provide estimated costs of weatherization measures, energy and dollar savings, and payback time. The audit also provides information on low-cost/no-cost actions that could reduce fuel oil consumption from 5 to 25%.

II.

Report: Oregon Residential Energy Study: An Update
Publication date: April 1983
Authors: Planning Program, Oregon Department of Energy
Objectives: Determine changes in energy conserving behavior in households
Data collected: Appliance saturations, dwelling characteristics, demographics, and energy conservation measures and practices taken
Survey method: Face-to-face interview and mail questionnaire
Survey period: 1979 and August 1982
Sampling method: Random sample of residential customers
Sample size: 1200 (1979 sample) and 1032 (1982 sample)
Response rate: N.A. for 1979 sample and 86% for 1982 sample
Comparisons made: Across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

This study was based on data collected in two surveys: 1) a 1979 survey of 1200 randomly selected households on space heat systems, water heaters, and other appliances, and 2) a mail survey sent to the same people who had participated in the previous survey.

PACIFIC GAS AND ELECTRIC (PG&E) COMPANY

Report: RCS Follow-Up Study
Publication date: June 1982
Author: Marylander Marketing Research, Inc. (prepared for PG&E)
Objectives: Measure changes among the general public between the times of the Residential Conservation Service (RCS) Benchmark and Follow-Up Studies; and compare participants in the RCS program to non-participants
Data collected: Appliance saturation, dwelling characteristics, demographics, awareness and interest in the RCS program, attitudes toward the energy situation, energy conservation measures and practices taken, and awareness of and participation in the Zero Interest Plan program
Survey method: Telephone interview
Survey period: March 1982
Sampling method: Selective sampling
Sample size: 503 (audited) and 510 (non-audited)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

The audit sample consisted of households who had an RCS audit during September to December, 1981. The non-audit sample was drawn from utility records and was screened for several characteristics.

PACIFIC POWER AND LIGHT COMPANY

I.

Report: Results of the Household Energy Study for Customers of Pacific Power and Light in Idaho (not a report, just a survey form with responses)
Publication date: 1981
Author: Pacific Power and Light
Objectives: N.A.
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices (taken or planned), wood heating, and winter thermostat settings
Survey method: Mail questionnaire
Survey period: 1980
Sampling method: Systematic random sample
Sample size: 592
Response rate: 54%
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

II.

Report: Household Energy Study Results (not a report, just survey forms with responses for each state)
Publication date: Summer 1982
Author: Pacific Power and Light
Objectives: N.A.
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures and practices (taken or planned), wood heating, and winter thermostat settings
Survey method: Mail questionnaire
Survey period: Fall 1981
Sampling method: Systematic random sample
Sample size: California (1097), Montana (522), Oregon (1105), Washington (1070), and Wyoming (1051)
Response rate: California (61%), Montana (58%), Oregon (61%), Washington (59%), and Wyoming (58%)
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: Yes

Sample was stratified by their annual kWh usage.

III.

Report: Energy Conservation Study: Electric Heat Customers - Oregon
Publication date: April 1982
Author: GMA Research Corporation (prepared for Pacific Power and Light)
Objectives: Determine how residential customers reacted to the absolute and relative changes in energy prices, what kinds of energy conservation steps have been taken, and how many have utilized the company's weatherization programs
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures taken and planned, energy conservation practices, and energy attitudes
Survey method: Telephone interview
Survey period: February to March, 1982
Sampling method: Random sample of electric heat customers
Sample size: 384 electric heat customers in Oregon
Response rate: N.A.
Comparisons made: Across time and across groups
Statistics used: Frequencies
Questionnaire included: Yes

Data were compared to 1979, 1980, and 1981 survey data.

IV.

Report: Conservation Actions of Home Energy Analyses Customers Not Utilizing 6.5% or 0% Financing
Publication date: October 1981
Author: GMA Research Corporation (prepared for Pacific Power and Light)
Objectives: Determine what actions have been taken by customers utilizing only the Home Energy Audit (HEA) program which have caused electric energy use to decrease
Data collected: Appliance saturations, dwelling characteristics, demographics, and energy conservation measures
Survey method: Telephone interview
Survey period: August to September, 1981
Sampling method: N.A.
Sample size: 335 residential customers
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

V.

Report: Northern California Energy Conservation Study
Publication date: June 1981
Author: GMA Research Corporation (prepared for Pacific Power and Light)
Objectives: Establish a baseline of information about energy conservation and weatherization for residential customers in the Northern California service area
Data collected: Appliance saturations, dwelling characteristics, demographics, energy conservation measures taken and planned, energy conservation practices, and energy attitudes
Survey method: Face-to-face interview
Survey period: April 1981
Sampling method: Random survey of electric heat customers
Sample size: 106
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

Data were compared to a previous survey conducted in Oregon in the winter of 1981. Actual measurements were taken of insulation in attics, walls and floors.

PENNSYLVANIA GOVERNOR'S ENERGY COUNCIL

Report: Pennsylvania Housing Stock and Energy Conservation Study
Publication date: April 1983
Author: Urban Systems Research and Engineering, Inc. (prepared for the Pennsylvania Governor's Energy Council)
Objectives: Provide a complete description of the physical condition of the single-family housing stock in Pennsylvania and collect data on attitudes about energy policies
Data collected: Appliance saturation, dwelling characteristics, demographics, energy conservation measures taken, fuel use, and energy attitudes
Survey method: Face-to-face interview
Survey period: October 1982
Sampling method: Stratified sampling
Sample size: 478 weatherized households and 961 other households
Response rate: 8% of weatherized households and 17% of other households
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

The survey included only single-family detached homes and attached rowhouses. Weatherization customers were recipients of the U.S. Department of Energy's low-income weatherization assistance and had been weatherized between January 1, 1981 and August 31, 1981. Sample was stratified by utility service area, statewide climate zones, and density classifications (rural, suburban, and urban) of counties.

PHILADELPHIA ELECTRIC COMPANY

Report: 1979 Residential Conservation Survey
Publication date: June 1980
Author: Technical Services Department, Philadelphia Electric
Objectives: Determine how the company's customers may be altering their use of energy (by either a change in life style or by improvement in the thermal integrity of the living unit)
Data collected: Appliance saturations, dwelling characteristics, demographics, and energy conservation practices (especially winter and summer thermostat settings)
Survey method: Mail questionnaire
Survey period: April 1979
Sampling method: N.A.
Sample size: 3864
Response rate: 40%
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

Data were compared to 1977 and 1978 survey data.

PORTLAND GENERAL ELECTRIC (PGE) COMPANY

Report: Weatherization Within Single-Family Residences: Overview of General Survey Results
Publication date: July 1981
Author: Load Management and Research, Portland General Electric
Objectives: Assess the degree and scope of weatherization activities within PGE's service area; compare weatherization actions under PGE's program with those of other financing means; determine customer profiles for selected electric heat groups; assess the impact of an up-front cash rebate program; assess the impact of wood in displacing electricity for space heating; and determine the number of customers installing shower flow restrictors
Data collected: Appliance saturation, dwelling characteristics, demographics, and energy conservation measures and practices taken
Survey method: Face-to-face interview
Survey period: January to March, 1981
Sampling method: N.A.
Sample size: 758 single-family customers
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

Since July 1978, PGE has offered a zero interest deferred payment weatherization program (ZIP) to its single-family, electrically heated residential customers. Under this program, PGE has financed the insulation of ceilings, walls, and floors, the installation of storm windows and doors, and weatherstripping and caulking. In addition, PGE has wrapped the customer's electric water heater free of charge. Comparisons were made between weatherized and non-weatherized households. This classification was based on the nature of the weatherization jobs performed and, at a minimum, included wall, floor, or ceiling insulation, a storm door, and/or window insulation.

POTOMAC EDISON COMPANY

Report: 1981 New Home Survey
Publication date: February 1983
Author: Customer Services Deparment, Potomac Edison
Objectives: Determine appliance saturation, type of heating systems, insulation qualities, and conservation measures being practiced by the new home owner
Data collected: Appliance saturation, dwelling characteristics, and energy conservation measures and practices
Survey method: Mail questionnaire
Survey period: April to October, 1982
Sampling method: Random sample of housing connections for 1981
Sample size: 253 customers using electric heat and 266 customers using other forms of heat
Response rate: 57%
Comparisons made: Across time and across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

This survey was conducted on a biennial basis. Homes over two years old were not used in this survey. Data were compared to 1979 and 1981 survey data. New homes were compared to existing homes.

PUBLIC SERVICE COMPANY OF COLORADO

I.

Report: 1981 Residential Energy Use Survey
Publication date: December 1981
Author: Marketing and Analysis Department, Public Service Company of Colorado
Objectives: Collect data about residential gas and electric customers on appliance saturations, home characteristics and demographics, and conservation practices in the home
Data collected: Appliance saturation, dwelling characteristics, demographics, and energy conservation measures and practices
Survey method: Mail questionnaire
Survey period: February 1981
Sampling method: Stratified random sample
Sample size: 2959 (electric) and 3329 (gas)
Response rate: 64.6% (electric) and 64.9% (gas)
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: No

This survey was a follow-up to the 1979 Residential Energy Use Survey. Survey results for residential gas and electric customers were reported separately.

II.

Report: 1982 Residential Energy Audit Customer Survey
Publication date: February 1983
Author: Marketing and Analysis Department, Public Service Company of Colorado
Objectives: Create a profile of residential home energy audit customers
Data collected: Appliance saturation, dwelling characteristics, demographics, conservation measures and practices, perception of the audit, and energy usage
Survey method: Mail questionnaire
Survey period: August to September, 1982
Sampling method: Random sample of customers who had received a computerized Home Energy Audit
Sample size: 297
Response rate: 56%
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

Data from this survey were compared with responses from previous surveys and various customer data bases to determine similarities in demographics, trends in the energy habits of residential customers, value perceptions of audit customers, and the impact that the audit and similar programs might have on each of these customer characteristics. The energy analysis included weather corrections.

PUBLIC SERVICE COMPANY OF NEW MEXICO

Report: Residential Conservation Service Survey - Phase I
Publication date: June 1982
Author: Load Management and Forecasting Department, Public Service Company of New Mexico
Objectives: Collect information about the acceptability and efficiency of the company's Residential Conservation Service (RCS) Energy Audit program; and discover if those residential customers who have been audited are making use of the energy conservation practices and measures and renewable resource measures recommended by the energy consultants
Data collected: Demographics, energy conservation measures and practices (taken or planned), and renewable resource measures
Survey method: Telephone interview
Survey period: N.A.
Sampling method: N.A.
Sample size: 190
Response rate: N.A.
Comparisons made: None
Statistics used: Frequencies
Questionnaire included: No

The sample was selected from the RCS audit data base.

PUGET SOUND POWER AND LIGHT COMPANY

Report: Alternative Energy Project Report.
Publication date: May 1983
Author: Puget Sound Power and Light Company (Bellevue, Washington)
Objectives: Assess ownership and usage of wood-burning stoves, fireplaces and fireplace inserts; and provide a better understanding of the circumstances that lead households to make particular wood-burning device adoption decisions
Data collected: Appliance saturation, dwelling characteristics, demographics, purchase and installation of wood-burning devices, wood device usage habits and associated problems, purchase considerations for wood stoves, energy conservation measures and practices taken, household energy and wood-burning attitudes, household knowledge and perceptions of conservation devices owned by others, and energy usage
Survey method: Telephone interview
Survey period: December 1981
Sampling method: Stratified random sample of single-family households in Northwest Washington
Sample size: 1001
Response rate: N.A.
Comparisons made: Across groups
Statistics used: Frequencies, cross-tabulations, and multiple regression analysis
Questionnaire included: Yes

RHODE ISLAND, UNIVERSITY OF

I.

Report: Summary Report II: Homeowners' Reactions to RISE Energy Audits
Publication date: January 1983
Authors: Research Center in Business and Economics, College of Business Administration, University of Rhode Island (prepared for RISE)
Objectives: Determine audited homeowners' reactions to the RISE energy audit program; and determine what actions were taken on recommended energy conservation measures and practices
Data collected: Dwelling characteristics, demographics, energy conservation measures and practices taken, decision to request an audit, perceptions of RISE, and reactions to the audit process
Survey method: Telephone interview
Survey period: October 20 to November 12, 1982
Sampling method: Random sample of audited households
Sample size: 504
Response rate: 92%
Comparisons made: Across time and across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

The sample consisted of households who were audited during the period November 1, 1982 to July 31, 1982. Data were compared to data collected in an earlier survey of households who had been audited during the period January 1-October 31, 1981.

II.

Report: Summary Report: Homeowners' Reactions to RISE Energy Audits
Publication date: June 1982
Authors: Research Center in Business and Economics, College of Business Administration, University of Rhode Island (prepared for RISE)
Objectives: Determine audited homeowners' reactions to the RISE energy audit program; and determine what actions were taken on recommended energy conservation measuress and practices
Data collected: Dwelling characteristics, demographics, energy conservation measures and practices taken, decision to request an audit, perceptions of RISE, and reactions to the audit process
Survey method: Telephone interview
Survey period: March 1-16, 1982
Sampling method: Random sample of audited households
Sample size: 501
Response rate: 92%
Comparisons made: Across time and across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

This sample consisted of households who were audited during the period January 1 to October 31, 1981.

SACRAMENTO MUNICIPAL UTILITY DISTRICT (SMUD)

Report: Analysis of the 1982 RCS Benchmark Follow-up Survey
Publication date: February 1983
Author: Conservation Department, SMUD
Objectives: Determine what impacts Residential Conservation Service (RCS) audits have on customer behavior in order to assess the program's cost-effectiveness and impact on the company's operations; find what differences exist between participants and nonparticipants so that customer participation can be more effectively encouraged; and evaluate the audits themselves by determining what participants found effective or ineffective and what they liked or disliked about the audit
Data collected: Dwelling characteristics, demographics, energy attitudes, awareness of and interest in the program, reasons for requesting an audit, participant assessment of the audit, energy conservation measures installed, and energy conservation practices taken
Survey method: N.A.
Survey period: June 1982
Sampling method: Random sample of audited customers and, for non-audited sample, random sample of residential customers
Sample size: 298 (audited) and 255 (non-audited)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies, cross-tabulations, Chi-Square, T-Test, Mann-Whitney U-Test
Questionnaire included: Yes

Comparisons were made between 1) RCS participants and nonparticipants; 2) SMUD participants and Pacific Gas and Electric (PG&E) participants; and 3) customer responses on the follow-up Survey (June 1982) and the Benchmark Survey (May 1981). The participant sample was taken from a random sample of customers who received an audit between September 1981 and February 1982. The sample represented about 44 pecent of all participants between those months. The nonparticipant sample was selected from a random listing. All customers in both groups were homeowners; renters were dropped from sample.

SAN DIEGO GAS AND ELECTRIC COMPANY (SDG&E)

I.

Report: 1983 Conservation Tracking Study
Publication date: July 1983
Author: Marylander Marketing Research, Inc. (prepared for SDG&E)
Objectives: Track residential customer awareness, attitudes, and behavior relating to all key areas of energy conservation
Data collected: Appliance saturation, dwelling characteristics, demographics, attitudes toward the energy situation, energy costs and energy conservation, reported household consumption of energy, information about energy conservation, reported efforts to conserve energy at home, and awareness of, ownership of, and attitudes toward conservation products
Survey method: Face-to-face interview
Survey period: April 1983
Sampling method: Random sample of residential customers
Sample size: 508
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies
Questionnaire included: Yes

Comparisons were made to survey data collected since 1979. Focus was on single-family homeowners and renters. Renters whose utility bills were included in the rent were excluded from the survey.

II.

Report: RCS Follow-Up Study
Publication date: July 1982
Author: Marylander Marketing Research, Inc. (prepared for SDG&E)
Objectives: Measure changes among the general public between the times of the Residential Conservation Service (RCS) Benchmark and Follow-Up Studies; and compare RCS participants to non-participants
Data collected: Appliance saturation, dwelling characteristics, demographics, awareness and interest in the RCS program, attitudes toward the energy situation, and energy conservation measures and practices taken
Survey method: Telephone interviews
Survey period: March 1982
Sampling method: Selective sampling
Sample size: 401 (audited) and 200 (non-audited)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

The audit sample consisted of households which had an RCS audit during September to December, 1981. The non-audit sample was drawn from utility records and was screened for several characteristics.

Report: 1979 Residential Customer Characteristics Survey
Publication date: June 1981
Author: Rates and Consumer Research Department, Seattle City Light
Objectives: Obtain basic energy-related information on residential customers; and determine whether changes had occurred between the 1978 and 1979 surveys
Data collected: Appliance saturation, dwelling characteristics, demographics, and energy conservation measures and practices
Survey method: Mail questionnaire
Survey period: Fall 1979
Sampling method: Nonproportional stratified sample
Sample size: 2748
Response rate: 54.9%
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations.
Questionnaire included: Yes

Sample was stratified by monthly electricity usage. Data were analyzed for the whole residential class and for single-family and multi-family dwellings separately, further broken down into electric-heat and non-heat customers. Data were compared to 1978 survey data. Another report, ***1979 Residential Customer Characteristics Survey: A Collection of Tables*** (April 1983) contains tables summarizing the data collected in this survey.

SOUTHERN CALIFORNIA EDISON (SCE) COMPANY

I.

Report: 1982 Residential Electrical Appliance Saturation Survey
Publication date: N.A.
Author: Harbicht Research Inc. (prepared for SCE)
Objectives: Monitor the ownership and use of home appliances
Data collected: Appliance saturation, dwelling characteristics, and demographics
Survey method: Primarily mail questionnaires, some telephone interviews
Survey period: November 1982 to January 1983.
Sampling method: Stratified random sample
Sample size: 15,526
Response rate: 46.1%
Comparisons made: Across time and across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

Data were compared to 1979, 1980, 1981, and 1982 survey data. Sample was stratified by service district and by house type: single-family residences, multi-family residences, and mobile homes.

II.

Report: RCS Follow-Up Study
Publication date: July 1982
Author: Marylander Marketing Research, Inc. (prepared for SCE)
Objectives: Measure changes among the general public between the times of the Residential Conservation Service (RCS) Benchmark and Follow-Up Studies; and compare RCS participants to non-participants
Data collected: Appliance saturation, dwelling characteristics, demographics, awareness and interest in the RCS program, attitudes toward the energy situation, and energy conservation measures and practices taken
Survey method: Telephone interview
Survey period: March 1982
Sampling method: Selective sampling
Sample size: 487 (audited) and 403 (non-audited)
Response rate: N.A.
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

The audit sample consisted of households which had an RCS audit during September to December, 1981. The non-audit sample was drawn from utility records and was screened for several characteristics.

TENNESSEE VALLEY AUTHORITY (TVA)

Report: 1982 Interim Residential Survey: Customers of Municipal and Cooperative Distributors of TVA Power
Publication date: June 1983
Author: Division of Energy Use and Distributor Relations, TVA
Objectives: Provide information about the residential customers served by the municipal and cooperative distributors of TVA power
Data collected: Appliance saturation, dwelling charateristics, demographics, and energy conservation efforts
Survey method: Primarily mail questionnaires, some telephone interviews
Survey period: N.A.
Sampling method: N.A.
Sample size: 2644
Response rate: 92.7%
Comparisons made: Across groups and across time
Statistics used: Frequencies and cross-tabulations
Questionnaire included: No

This survey was the third in a series of surveys designed to furnish information about residential customers served by the municipal and cooperative distributors of TVA power. Comparisons were made to data collected in 1979 and 1981.

U.S. DEPARTMENT OF ENERGY (DOE)

Report: Residential Energy Consumption Survey: Housing Characteristics, 1981
Publication date: August 1983
Author: Energy Information Administration, DOE
Objectives: Provide information on how energy is used by households living in all types of housing units
Data collected: Appliance saturation, dwelling characteristics, demographics, and energy conservation measures and practices taken
Survey method: Primarily face-to-face interviews, some mail questionnaires
Survey period: September 1981 to January 1982
Sampling method: Cluster sampling and selective sampling
Sample size: 6269
Response rate: 91.6%
Comparisons made: Across groups
Statistics used: Frequencies and cross-tabulations
Questionnaire included: Yes

This report was the fourth national survey of households and their fuel suppliers conducted by the Energy Information Administration.