Energy Research and Development Division

FINAL PROJECT REPORT

Capturing Cultural Diversity in California Residential Energy Use and Conservation

An Energy Ethnography of Hispanic Households

California Energy Commission

Gavin Newsom, Governor

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PREFACE

The California Energy Commission's Energy Research and Development Division supports energy research and development programs to spur innovation in energy efficiency, renewable energy and advanced clean generation, energy-related environmental protection, energy transmission and distribution and transportation.

In 2012, the Electric Program Investment Charge (EPIC) was established by the California Public Utilities Commission to fund public investments in research to create and advance new energy solution, foster regional innovation and bring ideas from the lab to the marketplace. The California Energy Commission and the state's three largest investor-owned utilities – Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company – were selected to administer the EPIC funds and advance novel technologies, tools, and strategies that provide benefits to their electric ratepayers.

The Energy Commission is committed to ensuring public participation in its research and development programs that promote greater reliability, lower costs, and increase safety for the California electric ratepayer and include:

- Providing societal benefits.
- Reducing greenhouse gas emission in the electricity sector at the lowest possible cost.
- Supporting California's loading order to meet energy needs first with energy efficiency and demand response, next with renewable energy (distributed generation and utility scale), and finally with clean, conventional electricity supply.
- Supporting low-emission vehicles and transportation.
- Providing economic development.
- Using ratepayer funds efficiently.

Capturing Cultural Diversity in California Residential Energy Use and Conservation: An Energy Ethnography of Hispanic Households is the final report for the project (Agreement Number EPC-14-032) conducted by Inova Energy Group (Inova), a management consulting, strategic planning, and project delivery solutions firm, in partnership with Sustainable Design + Behavior, and Ghoulem Research (together "the research team"). The information from this project contributes to Energy Research and Development Division's EPIC Program.

For more information about the Energy Research and Development Division, please visit the Energy Commission's website at www.energy.ca.gov/research/ or contact the Energy Commission at 916-327-1551.

ABSTRACT

This study, funded under the Electric Program Investment Charge program, explored the question of whether and to what extent culture influences ideas, behaviors, and perceptions of energy use. The study used a combination of social research methods to gain a practical view of residential energy use and conservation among California Hispanics and identify cultural factors that may influence energy use and conservation behaviors and circumstances in this community.

The study uncovered several prevalent ideas among study participants, as well as noteworthy findings related to the Hispanic community's thoughts on energy use, some energy myths and misconceptions that repeatedly arose in the study, and common energy use practices among study participants. The study offers recommendations to help energy efficiency program administrators develop a better understanding of energy use among Hispanics, particularly barriers to community engagement and what opportunities exist.

Keywords: Hispanics, ethnography, energy efficiency, behavior, energy use, energy conservation

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EXECUTIVE SUMMARY

Introduction

Improving the efficiency of energy use in the residential sector has long been a focus of governments and an effort supported by utilities, market transformation organizations, and other market actors. According to the Energy Information Administration, this focus is well warranted since direct energy use in United States households accounts for approximately 21 percent of total primary energy consumption in the country. In California, while households use 31 percent less energy than the United States average household (EIA, 2010), the residential sector is still responsible for 32 percent of electricity consumption and 35 percent of natural gas consumption (Center for Sustainable Energy, 2017).

Consequently, residential energy use has been widely studied from various perspectives that help better understand the diversity of energy use, including exploring how different variables may influence consumption. For example, research has investigated how attributes such as the physical characteristics of the housing stock, the regional environmental differences due to climate, localized services such as tariffs and customer choice, and the lifestyle of occupants including their income and education levels, affect the variability in residential energy consumption patterns between different groups of households. Other efforts have instead focused on human behavior and the intersection of this behavior with the physical variables of building that is occupied.

Although research is limited, a few studies in recent years have suggested that culture can be a valuable lens through which to understand how energy is consumed in the residential sector. In short, groups of individuals with common cultural characteristics may differ from other such groups in their household practices, lifestyles, and circumstances, and thus energy use, in ways that cannot be explained by isolating other variables. The question of how culture influences ideas, behaviors, and perceptions of energy use, and to what extent it does so, becomes particularly interesting when approached with the aim of reducing residential energy use or improving living conditions through a variety of initiatives.

With the objective of investigating household energy use with a cultural lens, the research team turned to the one of the biggest and most recognized ethnic groups in the state: Hispanics. More than 14 million of California's residents identify as being of Hispanic origin, representing 38 percent of California's population. Hispanic generally refers to those populations who have historic ties to Spain and primarily speak Spanish. If culture does have an impact on energy consumption, then a targeted investigation could lead to a richer understanding of how Hispanics think about and approach energy, and how this differs from conventional assumptions about what "typical" households do and care about regarding energy use and energy efficiency. Findings could be applied to develop recommendations for energy efficiency program administrators so that they might tailor their initiatives in a way that they are more effective at understanding, reaching, and successfully connecting to the energy-related practices and concerns of Hispanic. Ultimately, the results of increased program participation by Hispanics could deliver a collection of social, economic and environmental benefits ranging

from improved social equity and improved living conditions, to greater level of achieved energy savings for program administrators.

Project Purpose

This study identified market facilitation projects that analyzed the role of society, culture, and behavior in adopting and using energy efficiency measures within California's residential sector, in the context of consumers voluntarily electing to participate in energy efficiency programs.

This study advanced the understanding of the diversity of energy use practices and conditions across households. Tying into this objective, this study was developed to:

- Gain a practical view of home energy use among California Hispanics.
- Understand factors that may influence energy use and conservation behaviors and circumstances in these households.
- Identify any evident energy beliefs and traditions that may exist in the Hispanic community.
- Inform the development of effective consumer education strategies tailored to work with current practices and beliefs, and, where appropriate, countermand inaccuracies that may currently exist.
- Identify critical insights for policymakers, researchers, and others to further advance the field of energy efficiency and conservation for residents of California.

Project Process

The research team combined social, scientific, and marketing perspectives with qualitative approaches to explore the cultural factors that shape electricity use and energy conservation within the California Hispanic community. The research team applied several investigative techniques that built upon each other and that, at a high-level, explored existing work that would help frame the issue, followed by a multi-layered field study that engaged individuals from within the community. Overall, the research study followed a qualitative approach grounded on ethnographic research methods.

The ethnographic approach to the study allowed compiling qualitative information, even from a small sample of participants, that could not have been compiled through other quantitative or "big data" methods. The stories, emotions, and interactions that surfaced through the study can help rescue context loss that comes from quantitative studies and to allow decision-makers to put them together to have a better picture that policy and program choices can be made.

Specific to the initial research activities, the research team performed a literature review to establish basic information that would be beneficial to the study such as Hispanic demographics and culture, and to uncover existing work on the topic. In addition, the research team conducted 11 interviews with subject matter experts consisting of fieldwork specialists, program managers, marketing experts, and policy leaders all working with Hispanic

communities in energy or environmental initiatives. These interviews helped inform the study hypothesis that was explored in later stages of the research.

For the fieldwork, the research team recruited study participants that self-identified as Hispanic, with the assistance of several community-based organizations that served as partners to this study. Overall, 46 households, primarily from San Diego and San Joaquin Counties, participated in the study by completing an energy use journal over a seven-day period. The journal instrument was developed by the research team to gain insight into the behaviors that relate to energy use routines, the energy conservation activities, and the energy-related problems, attitudes, and concerns of the participants.

As a follow-up to the energy use journal, a subset of 18 study participants was interviewed in their homes. The in-home interviews allowed the research team to ask complex questions in a setting that was comfortable to the interviewee, and to absorb the participant's physical environment. Asking "why" questions was at the heart of the research team's approach since they allowed the team to step out of any assumptions, truly understand the interviewee's thinking, and obtain a more systems-level view of everyday energy use in the homes studied.

Project Results

Prevalent information from every portion of the study was gathered and, overall, main themes came up repeatedly through the different research methods applied. These repeating themes confirm numerous ideas about Hispanic household energy use and conservation that, in the perception of the research team, exist as "hearsay" or anecdotes within the energy conservation community. In addition, the research team uncovered behaviors that, to the knowledge of the team, were not previously documented. These results speak directly to better understanding the diversity of energy use practices and conditions across households outlined in the original Program Opportunity Notice.

To analyze the information collected through the study, the research team adopted an ethnographic lens that allowed a nuanced analysis of the interviewee's cultural and social background. The team compared ideas from the diversity of the participants' homes, paying attention to common and repetitive messages of daily routines and behaviors, while also noting "interesting" or otherwise uncommon practices that may be common to the culture. The researchers also extracted sample "stories" about energy use behaviors, energy conservation behaviors; and beliefs and perceptions that participants had about energy.

Key Findings and Highlights

From the perspective of the research team, some of the most prevalent, unique, and note-worthy findings from the study include:

The influence of family and the community was always present in participants' energy-related behaviors. There are obvious effects of this cultural aspect, such as energy-use variances derived from extended families living under the same roof, and more subtle implications such as using energy as a mechanism to care for others, and the desire to help the community through conservation actions. The research team expected energy-use practices to be instilled

early and reinforced economically and culturally, and individuals seemed to learn from and rebel against their childhood experiences in saving and using energy. Generational issues were most noticeable; there was evidence of generational shifts from more conservative energy use in the older generations, to less conservative energy use for younger generations. While this is expected in any multi-person family, the prevalence of extended family members may make this more important in Hispanic households.

The research uncovered several energy use behaviors and practices that appear common within the California Hispanic community including leaving lights on all night or when away from home; not using central heating; not using air conditioning even when they have it; and reluctance to replace older appliances and devices.

Hispanics, generally, seem very attuned and attentive to energy conservation efforts. There are various reasons for this conservation, including saving money but also about, upbringing, general aesthetics, technological circumstances, and a desire to conserve resources or protect the environment. But, conservations efforts were oftentimes perceived as burdensome, and participants clearly identified the costs in terms of personal time, convenience, and effort. Conservation behaviors may also cause stress, which has a real consequence on people's lives, especially in low-income households.

Hispanics have a strong preference for natural indoor environments, and as a result display some energy-saving behaviors because of this preference. Passive cooling, day lighting, and fresh air preferences were often expressed or implied. Similar preferences were seen in household activities such as washing and drying dishes by hand and, in some cases, air drying laundry.

The research team hypothesized that Hispanic households would focus more on conservation actions rather than the technical efficiency of equipment and that was the case as evidenced by the insight offered by participants. Technical energy efficiency, in the form of energy-efficient equipment or home envelope improvements, seemed to have limited salience for study participants as a route to conservation, and instead, the focus was on behavior. In terms of maintenance and repair, it is common for people to rely on personal networks to identify an individual that could perform the repair. Self-fixing or do-it-yourself type of repairs were also common.

The research team also expected households to largely “know what to do” to manage their energy bill. This was not necessarily the case as overall knowledge and understanding of energy seemed low amongst participants. When it came to reducing the energy used in their homes, some of the actions taken were often not very logical from a conservation standpoint, for example, they may have not targeted high-energy using equipment or may not have been very effective at generating savings; yet, the actions made sense to participants in the internal logic of household routines. There also appeared to be a lot of confusion and misinformation about what equipment and end-uses in the home use the most energy, and the research team uncovered several beliefs and perceived ideas about home energy use that appear common to Hispanics.

Recommendations

Using the findings obtained from the study, the research team developed a series of recommendations to assist program administrators in engaging the California Hispanic community for participation in energy efficiency programs. The team also offers suggestions for policy- and decision-makers, and other researchers interested in the subject. The recommendations draw from suggestions offered by the subject matter experts that were interviewed as part of this project, as well as by study participants.

A summary of the recommendations is presented in Table ES-1, and organized around four areas: program design and delivery, marketing and outreach, education and training, and policy and research. A full description of the recommendations, with additional context for the reader, is included in Chapter 7.

Table ES-1: Summary of Recommendations

Program Design and Delivery	• Recognize cultural characteristics and approach Hispanics appropriately. • Understand the specific demographics of the Hispanic community within the service territory. • More focused attention to what renters can do to improve energy use in their homes and more programmatic opportunities for them. • Develop programs that are accessible to those that are just above the threshold for low-income programs. • Create targeted initiatives that provide a better fit to how Hispanics approach cooling and heating, including maintenance of the equipment. • Support do-it-yourself type of initiatives and installation. • For upstream programs, engage stores that Hispanics shop in. • Build a network of Hispanic contractors from within the community.
Marketing and Outreach	• Pursue partnerships with community based organizations that are more effective at eliciting action from the target group. • Orient messaging to better sync with Hispanic attitudes about environmental concerns, resource management, tight family values, and care for the communities. • Select the “right” messengers, preferably from within the community. • Use promotion tools such as development of case studies or success stories from within the community. • Recognize the degree to which lower-impact practices are already common, and the preference for natural environments. • Offer the option of Spanish language materials, wherever possible. • Use pictures and examples when providing energy information. • Leverage media channels that are frequented by Hispanics.
Education and Training	• Workshops and community gatherings will be more effective with this community than handouts and mass mailers. • Use education efforts to promote initiatives that are more relevant to Hispanics. • Offer trainings in Spanish language to Hispanic providers of energy products and services.
Policy and Research	• Continue funding ethnographic and other social science research on Hispanic households, and on household energy use and energy conditions in general, whether aimed at improving energy efficiency programs or at broader challenges such as community resilience and climate change adaptation. • Support integrated research that can facilitate combining technical information (such as on house conditions and energy use) with social scientific analysis.

Source: Inova Energy Group.

Knowledge Transfer

The primary users of this research are energy efficiency program managers, typically found at utilities, looking to increase energy efficiency technology adoption among Hispanic populations. These program managers may use the results of this study to inform their marketing and outreach efforts, communication strategies, or community partnerships to increase energy efficiency technology adoption among Hispanics. Other users of this research may include community based organizations looking educate their communities about the benefits of energy efficiency technologies and how to take advantage of rebate or incentive programs.

Project results were shared with members of the Technical Advisory Committee which was comprised of members representing California investor-owned utilities, academic institutions, and community based organizations. Project results were also shared with the 11 subject matter experts interviewed as part of this study who represented state regulatory agencies, environmental justice advocacy groups, and environmental and energy non-profits. All subject matter experts were encouraged to share the project results with their communities and contacts.

Additionally, the project team presented the project findings at webinars hosted by the Center for Sustainable Energy, and the Better Buildings Initiative hosted by the United States Department of Energy.

Benefits to California

Improved information and program quality, more face-to-face engagement, and a greater representation of Hispanics in energy, environment, and related policy fields can make a positive difference with a community that currently represents 38 percent of the California's population. The recommendations included in this study are intended to meet the specific needs of Hispanics, increase their participation in energy efficiency programs, and consequently reduce energy use. These recommendations can also be used by policymakers, researchers, and others to gain a deeper understanding of what the barriers of engagement might be and where real opportunities exist.

This project sets the groundwork for additional behavior-oriented research on the intersection of culture and energy use. Studies that contrast the energy consumption of a Hispanic consumer to a comparison group could be undertaken to quantify the potential of the opportunity, possibly lending validity to an argument of cultural segmentation for energy efficiency program purposes. The research approach used for this project can also be applied to the commercial sector, and particularly, to micro and small businesses for categories of enterprises where Hispanics have a high ownership presence. Finally, additional research can delve into specific behaviors or categories of equipment and how Hispanics use them. All of these approaches can also be extended to other ethnic groups within California.

In the energy efficiency field, where many of the initiatives are driven by cost-benefit requirements, research studies can help quantify the energy conservation potential of the

community, and identify benefits derived from these efforts. Ultimately, understanding the cultural characteristics that make Hispanics a distinct energy consumer group, and enhancing efforts to increase energy conservation within this community will be important to contribute to achieving California's climate change, zero net energy, and other energy-related goals. In addition, efforts of this nature will also lead to greater social equity, development of disadvantaged communities, and other associated environmental and economic benefits for the state.

CHAPTER 1: Introduction

Purpose

In September 2014, the California Energy Commission issued a solicitation (PON-14-306), under California's Electric Program Investment Charge (EPIC) program. The goal of the solicitation was to identify market facilitation projects that involved an analysis of the role of society, culture, and behavior in the adoption and use of energy efficiency measures within California's residential sector, in the context of consumers voluntarily electing to participate in energy efficiency programs. Through this solicitation, the Energy Commission awarded research funding to build an empirical, practical understanding of residential household heterogeneity and the niches within it, including current patterns of household energy use, the adoption of energy efficient measures, and messaging.

This report describes the results of one of the studies funded under this solicitation (Grant Award Number: EPC-14-032). The study was led by Inova Energy Group (Inova), a management consulting, strategic planning, and project delivery solutions firm, in partnership with Ghoulem Research and Sustainable Design + Behavior. The project began in spring 2015, with the bulk of research activities occurring in summer and fall 2016.

Background and Study Objectives

Improving the efficiency of energy use in the residential sector has long been a focus of governments and an effort that has been supported by utilities, market transformation organizations, and other market actors. This focus is well warranted as, according to the Energy Information Administration, United States households account for approximately 21 percent of total primary energy consumption in the country (EIA, 2015). In California, while households consume use 31 percent less energy than the United States average household (EIA, 2010), the residential sector is still responsible for 32 percent of electricity consumption and 35 percent of natural gas consumption (Center for Sustainable Energy, 2017).

Consequently, residential energy use has been widely studied from various perspectives, including an exploration of how different variables may influence consumption. For example, research has investigated how attributes such as the physical characteristics of the housing stock, the regional environmental differences due to climate, the realities of localized service such as tariffs and customer choice, and the lifestyle of occupants including their income and education levels, affect the variability in residential energy consumption patterns between different groups of households. Other efforts have instead focused on human behavior and the intersection of said behavior with the physical variables of building that is occupied.

Although research is more limited, a few studies performed in recent years have suggested that culture might be an additional variable that influences how energy is consumed in the residential sector, and that in fact, groups of individuals with common cultural characteristics

may differ in their energy use in ways that cannot be explained by isolating other variables. For example, in 2006 Choudhury and Ramakrishnan conducted a statistical study comparing Hispanic, White, and Black cooling energy consumption for a sample of Texas single-family households. This study found significant cooling consumption differences between these groups. As a potential explanation for these differences, the authors suggest the possibilities of differences in thermoregulation related to ethnicity as well as other income effects. Another study conducted in 2008 for a sample of households located in northern California (Lutzenhiser and Bender, 2008) found that social factors, including whether the household identified as Latino, had substantial effects on total energy use, distinct from those that could be captured in corresponding dwelling and environmental variables alone.

The question of how culture influences ideas, behaviors, and perceptions of energy use, and to what extent it does so, becomes particularly interesting when approached with the aim of reducing residential energy use or improving living conditions through a variety of initiatives, including energy efficiency programs.

To offer a basic explanation, energy efficiency programs are initiatives through which utilities or other program administrators offer some type of incentive to their customers, typically a financial incentive, if they pursue various efforts that result in reduced energy use within a home or business. These efforts may include the replacement of inefficient energy-using equipment for more efficient equipment, the modification of energy use behaviors to promote conservation, and/or improvements to a building's envelope. Energy efficiency programs have been in existence since the 1970s and are available to customers of gas and electric utilities across the country. In some jurisdictions, like California, the programs can be mandated by public utility commissions or state laws for regulated utilities, while in others, utilities might implement these programs voluntarily. The theory behind the programs is that efficiency can be a relatively inexpensive and more quickly deployable energy resource that can assist in deferring the need for building new generation capacity.

In California, as in many other locations, multi-family, mobile, low-income, senior, non-English speaking, rural, and renter households are often difficult to engage in energy efficiency programs targeting the residential sector (TecMRKT Works, 2001; Evergreen Economics 2013). These hard-to-reach groups experience a variety of barriers that include, but are not limited to, household purchasing power, availability of cash flow, linguistic isolation, owner-renter arrangements, and low awareness of the existence of program opportunities. Recent research, echoing the idea that culture influences energy use, has further suggested that cultural differences in how energy is conceived and consumed can also be a potential barrier to energy efficiency program participation (Novie, 2014).

With over 14 million of California's residents identifying as being of Hispanic origin, an opportunity was identified to explore the topic of cultural influences on energy use and conservation in the context of this specific community that ultimately represents 38 percent of

California's population.[1] If culture does indeed have an impact on energy consumption, then a targeted investigative effort could lead to an ampler understanding of how Hispanics think about and approach energy. Furthermore, any findings could be applied to develop recommendations for energy efficiency program administrators so that they might tailor their initiatives in a way that they are more effective at reaching, and successfully engaging the Hispanic community. Ultimately, the results of increased program participation by Hispanics, would deliver a collection of social, economic and environmental benefits ranging from improved social equity to greater level of achieved energy savings for program administrators.

This study was developed to:

- Gain a practical view of home energy use among California Hispanics.
- Understand factors that may influence energy use and conservation behaviors and circumstances in these households.
- Identify any evident energy beliefs and traditions that may exist in the Hispanic community.
- Inform the development of effective consumer education strategies tailored to work with current practices and beliefs, and, where appropriate, countermand inaccuracies that may currently exist.
- Identify critical insights that can be used by policymakers, researchers, and others to further advance the field of energy efficiency and conservation for residents of California.

Overview of Research Approach

To undertake this study, the research team combined social, scientific, and marketing perspectives and used a variety of research techniques that were primarily qualitative in nature (Table 1). The research methods applied built upon each other to obtain deeper insights about how Hispanic study participants use energy in their everyday lives, and what they think of energy.

To include a good representation of other variables that impact energy use, such as weather, utility territory, combination of rural and urban settings, and income-levels, the research team initially focused its participant recruiting efforts on three main areas of California with large concentration of Hispanics. The first focus area was the city of San Diego and its surroundings, serviced by San Diego Gas & Electric (SDG&E). The second area consisted of the city of Stockton in the upper central valley, serviced by Pacific Gas & Electric (PG&E). The third study area centered on San Bernardino covered by Southern California Edison. The research also purposely sought to obtain a mixture of lower-income and middle-income households, living both in owned and rented properties.

1 The United States Census definition of Hispanics used for this project is not related to race, ancestry, or ethnicity, but rather to origin. In fact, Hispanics can be Caucasian, mestizos, mulattos, African Blacks, and even Asian. Generally speaking, the term Hispanic generally refers to those populations that have historic ties to Spain and primarily speak Spanish, while Latino refers to the Latin America geographical region and includes countries such as Brazil that may speak a different language.

Table 1: Research Methods Used in the Study

Research Methods	Description
Literature review	A review of various literature sources including academic journals, books, newspaper articles, industry white papers, and government and industry websites. The review was conducted to (1) develop better background of Hispanic households in California and (2) to identify existing literature relating to social, cultural, and behavioral aspects that influence energy usage patterns, as well as energy efficiency technology adoption and behaviors that are specific to the Hispanic population.
Interviews with subject matter expert	Independent interviews with 11 subject matter experts including energy efficiency program administrators, and leaders in community housing and energy organizations who work closely with Hispanic households in the energy space.
Energy use journals	Energy use journals were completed by 46 study participants over a seven-day period, detailing how energy was used in their homes and answering questions about their attitudes towards energy.
In-home interviews	A follow-up to the energy use journals, 18 interviews were conducted in participants' homes and included deeper questioning as well as a brief survey of household energy-using equipment.
Energy data review	Electricity use data files were made available by participants. Files were downloaded directly from utility websites through the Green Button Data portals.

Source: Inova Energy Group

The research was not designed to be statistically representative of the California Hispanic population, nor was it intended to provide comparative findings between study participants and a control group of non-Hispanic households. In presenting these findings, the research team is also not suggesting that results are entirely replicable or statistically correct. Instead, the qualitative nature of the study can help understand participant actions, needs, and behaviors, and obtain rich and valuable insights that can be used for a variety of decisions and applications.

Critical to recruitment of study participants, were the efforts and relationships of on-the-ground community-based organizations that served as partners to this study. This assistance was instrumental in securing participation for the areas of San Diego and Stockton. However, because efforts in San Bernardino were slow to take off and ultimately failed due to conflicting priorities and lack of human and economic resources, the research team was unable to successfully recruit participants from this area. To recruit participants from a third region of the state, the research team underwent additional efforts in partnership with community-based organizations and community leaders. These efforts were targeted around the San Francisco Bay Area and Sacramento and proved successful in securing additional participation.

Tables included in Appendix E and Appendix F provide a characterization of study participants, their homes, and their households. However, participant identities have been anonymized throughout the study to protect their privacy.

Organization of the Report and Clarifications

Chapter 2 provides information based on a literature review to give the reader a general level of understanding of Hispanic demographics and cultural attributes that make this community unique. To the extent information was available in the literature review, the report provides past research findings about how Hispanics use energy at home and thoughts that they have about conservation.

Chapter 3 describes various research methods used by the research team and provides more detailed information on recruitment of study participants. Chapters 4 through 6 include an analysis of the information obtained and offers specific findings supported by quotes and photographs provided by study participants. Findings for each method are largely presented independent of the subsequent methods. Insights are provided from the interviews with subject matter experts, followed by discoveries from specific items of the Energy Use Journals and, concluding with intricate insights from journal entries and in-home interviews.

In Chapter 7, the research team synthesizes the high-level findings, identifies overall conclusions from the study, and provides recommendations for energy efficiency program administrators, as well as researchers and policy makers.

This report uses primarily the term “Hispanic” to refer to the individuals and communities that associate with Latin American countries where Spanish is the primary spoken language. However, where the term “Latino” is used, it is in the context of specific quotes offered by study participants and their interpretation of this term, or in the context of other studies and how those studies define the term.[2] Additionally, unless otherwise specified, any references to Hispanics represent those communities or individuals that live in the United States, whether native-born or immigrants, and not populations that may live in another country.

The research team acknowledges that grouping various ethnicities into the umbrella term “Hispanic” leaves out the intricacies that exist between people with different countries of origin. In providing recommendations, this report acknowledges this issue and recommends individuals wishing to engage with a specific community take the time to correctly characterize that specific community and understand how it might be unique from other Hispanic groups. Also, the research team did not qualify or classify insights gathered by level of acculturation that study participant might have shown to American culture. Instead, the study treated recent immigrants who might have stronger associations with a different country in the same way as second or third generation individuals with Hispanic ancestry.

2 Technically, Hispanic is a term that is used for individuals that come from nations where Spanish is the primary spoken language, while the term Latino represents a denomination of origin associated with people from Latin America. Practically, speaking Hispanic origin can be viewed as the heritage, nationality, lineage, or country of birth of the person or person’s parents or ancestors before arriving in the United States.

CHAPTER 2:
Research Background

This chapter provides a background to the reader on insights that the research team gleaned from a literature review conducted early in the project. The purpose is to establish a general level of awareness on topics such as Hispanic demographics, culture, and energy use for later understanding of research findings.

American Hispanic Demographics

National Level

According to the United States Census Bureau, in 2013 approximately 51.7 million Hispanics lived in the United States and represented at that time 16.6 percent of the total population of the country. Hispanics living in the United States are the second largest Spanish-speaking market in the world after Mexico, making them an important consumer group with strong representation and purchasing power. The population continues to grow, primarily driven by births, three and a half times faster than that of non-Hispanics, and government forecasts estimate that by 2050 the United States Hispanic population will represent a third of the country (27 percent).

The United States Hispanic population is anchored in a few geographic areas and tends to be heavily concentrated in certain cities and neighborhoods. In fact, the geographic settlement patterns are to some degree aligned with the diverse origin groups of the Hispanic population (Brown, 2013). More than half (55 percent) of the United States Hispanic population resides in the states of California, Texas, and Florida. While United States Hispanics represent individuals from more than 20 countries of origin, Mexicans are the dominant group (63 percent), particularly across the border states of California, Arizona, New Mexico, and Texas.

Almost two-thirds of Hispanics (64 percent) living in the United States were born in the United States. Of the remainder that are immigrants, about two-thirds (63 percent) arrived in the United States before the year 2000, 33 percent entered between 2000 and 2009, and only 4.6 percent entered after 2010. Other key statistics and figures are shown in Table 2.

State Level

California has the nation's largest population of Hispanics, with nearly 14.5 million living in the state in 2013. The composition of California Hispanics is different than the national average: California has more Hispanic immigrants (5.3 million) than any other state and it also has a greater percentage of Hispanics of Mexican origin (82 percent) than the national average (63 percent). While Mexicans are clearly the main group represented in the state, there are other groups with large populations such as Nicaraguans, Peruvians, and Hondurans (Table 3).

Table 2: United States Hispanic Demographics

Language Spoken	Two-thirds (67 percent) of Hispanics ages five and older speak English proficiently, while the remaining report speaking English less than very well.
Median Age	The median age of United States Hispanics is 27 years compared to 37 for the general United States population.
Household Size	The average Hispanic household includes at least one more individual than a non-Hispanic household (3.53 average Hispanic household size vs. 2.52 average non-Hispanic household size). Immediate families are also bigger for Hispanics with an average of four individuals per family while non-Hispanic families average 3.13.
Education Level	Overall, Hispanics have lower levels of education than the average United States individual. • Approximately 63 percent of Hispanics ages 25 and older have obtained at least a high school degree, compared to 89 percent for non-Hispanics. • Approximately one-third of Hispanics (32 percent) have obtained a bachelor's or associates degree, while this value is 50 percent for the non-Hispanic population.
Income Level and Poverty	The median annual household income for Hispanics is three-fourths that of the non-Hispanic household, with $41,475 per year compared to $55,249. Poverty rates are also higher within Hispanic households with 22.8 percent of Hispanic families falling under the federal poverty level compared to 9.9 percent for non-Hispanics.
Homeownership	The rate of homeownership (46 percent) among Hispanics is lower than the rate for all non-Hispanics (66 percent).

Source: United States Census Bureau, (2009–2013) *5-Year American Community Survey*. Retrieved from: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

Main Study Areas

The researchers conducted this study in two main geographic areas: San Diego County (41 percent of participants), and the upper Central Valley in San Joaquin County (41 percent of participants). The remaining participants (18 percent) were in the San Francisco Bay Area, Sacramento, Greater Los Angeles, and Woodlake.

The San Diego area straddles areas of Mediterranean climate to the north and semi-arid climate to the south and east. Tourism and agriculture play a large part in the economics of San Diego County. The county has a very high proportion of immigrants, especially from Mexico which borders the county. All households in the area are provided electricity by SDG&E.

San Joaquin County is in California's Central Valley, the nation's most productive agricultural region just east of the San Francisco Bay Area. The City of Stockton, the county seat, has struggled in the past. The city filed for bankruptcy in 2012, and had the highest foreclosure rate in the United States in 2013. In 2015 Stockton emerged from bankruptcy and real estate is booming because of strong demand fueled by high prices in the Bay Area (Fujii, 2016). Like San

Diego County, San Joaquin County has a very high proportion of immigrants, especially from Mexico. Electricity is mostly provided to this area by PG&E.

Table 3: California Hispanic Demographic Characteristics, 2013

	California Hispanics	Californians (General)
Total Hispanic Population	14,507,619	
Mexican	82.15 percent	
Salvadoran	4.55 percent	
Puerto Rican	1.36 percent	
Guatemalan	2.66 percent	
Nicaraguan	0.76 percent	
Peruvian	0.70 percent	
Cuban	0.61 percent	
Honduran	0.59 percent	
Colombian	0.48 percent	
Other	6.13 percent	
Total Immigrants	5,331,978	
Median Age	27.7	
Speak English Proficiently	66.40 percent	
Average Household Size	3.91	2.97
With High School degree or higher	59.5 percent	81.3 percent
Median Household Income	$45,558	$60,190
Below Federal Poverty Level	21.3 percent	16.8 percent
Homeownership	42.2 percent	53.8 percent

The table reflects the following definition of Hispanic used by the United States Census Bureau: Hispanic origin can be viewed as the heritage, nationality, lineage, or country of birth of the person or the person's parents or ancestors before arriving in the United States. People who identify as Hispanic, Latino, or Spanish may be any race.

Source: American Community Survey 2013 Data. United States Census Bureau

To provide some background information to the reader, Table 4 on the following page provides a broad overview of a few demographic characteristics of the two main areas where study participants resided.

Hispanic Culture

The concept of culture is complicated and it is beyond the scope of this study to provide a detailed explanation of Hispanic culture that accounts for the multiple nuances associated with unique countries of origin and interactions with other cultures that result in changes in traditions and values. However, by providing basic information, it is the intent of the research

team to create a general sense of awareness and understanding for the reader that provides context for the rest of the study. This information can also help clarify some of the issues around stereotypes that may be particularly relevant to energy efficiency programs in which attention to culture and ethnicity has generally been marginal.

Table 4: Demographic Characteristics for San Joaquin and San Diego Counties

	San Diego County	San Joaquin County
Hispanic (2011–2015)	33 percent	40 percent
Speak Spanish in home	25 percent	26 percent
Foreign born (2011–2015)	24 percent	23 percent
High school degree or greater (2011–2015)	All: 86 percent Hispanic: 66 percent	All: 81 percent Hispanic: 60 percent
Bachelor's degree or higher (population 25 and older)	All: 36 percent Hispanic: 16 percent	All; 18 percent Hispanic: 7 percent
Families whose income in the past 12 months is below the poverty line	11 percent Among female households, no husband present: 25 percent	15 percent Among female householders, no husband present: 34 percent

Source: US Bureau of the Census: QuickFacts; American Community Survey (ACS) 2011–2015; Decennial Census 2010.

Rather than seeing United States Hispanics as somewhere on a continuum between an "American" culture and generalized cultural traits from their or their families' countries of origins, it is more logical to consider that Hispanics in the United States transform existing cultures while creating new subcultures and practices (Vallejo, 2012). Any immigrant moving to a new country goes through a process of acculturation that is gradual and progressive. For Hispanics, studies have shown that immigrants selectively adapt to the American culture while still maintaining strong roots in their unique ethnic identity (Singh, 2008 and Valdes, 2000) that may never completely fade, even for third generation immigrants (Brodie, 2002). This implies that Hispanic communities in the United States exhibit some common cultural elements that allow them to identify as a group which may be closer to the culture of their country of origin than mainstream American culture.

A valuable tool that is often used to understand cultures is the framework developed by the Dutch social psychologist Geert Hofstede. Hofstede's model, which was first created in the 1970s and continues to be maintained and improved through the Hofstede Center, scores national cultures based on six primary attributes that are called cultural dimensions and are evaluated on a zero to 100 scale (Hofstede, 2011). These dimensions are explained in Table 5.

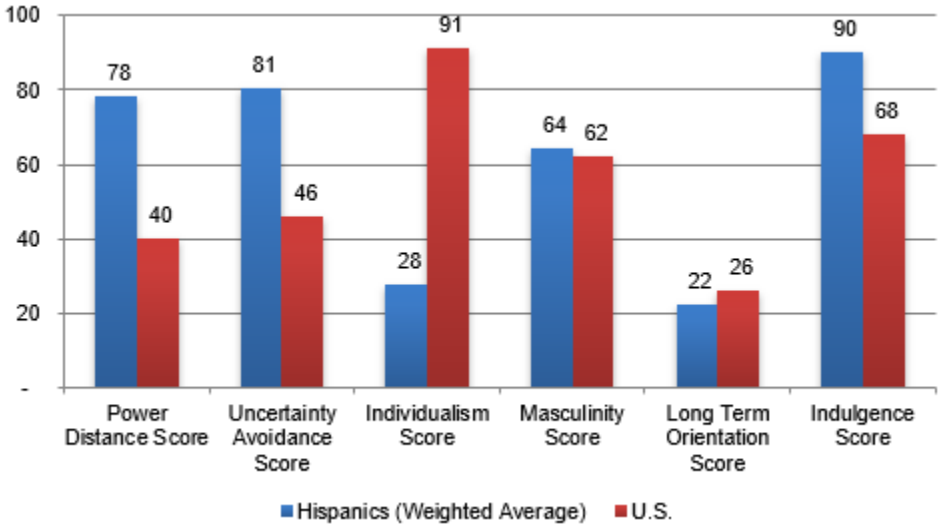
Table 5: Hofstede's Cultural Dimensions

Power Distance	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. People in societies exhibiting a high Power Distance score accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low Power Distance scores, people strive to equalize the distribution of power and demand justification for inequalities.
Uncertainty Avoidance	Related to the level of stress in a society in the face of an unknown future. Countries with a high Uncertainty Avoidance score maintain rigid codes of belief and behavior and are intolerant of new behaviors and ideas. Societies with low scores maintain a more relaxed attitude in which practice counts more than principles.
Individualism versus Collectivism	Related to the integration of individuals into primary groups. The high side of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty.
Masculinity versus Femininity	Related to the division of roles between women and men. A high score represents a masculine society in which there is a preference for achievement, heroism, assertiveness and material rewards for success. A low score represents feminine societies, which have a preference for cooperation, modesty, caring for the weak, and quality of life.
Long Term versus Short Term Orientation	Related to the choice of focus for people's efforts: the future or the present and past. Societies who score low on this dimension prefer to maintain traditions and norms while viewing societal change with suspicion. Those with a culture which scores high, on the other hand, encourage thrift and efforts in modern education as a way to prepare for the future.
Indulgence versus Restraint	Related to the gratification versus control of basic human desires related to enjoying life. A high Indulgence score represents a society that allows relatively free gratification related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.

Source: The Hofstede Centre, National Culture, 2015. Retrieved from: https://geert-hofstede.com/national-culture.html

Hofstede's analysis is designed for individual national cultures, and is not specific to ethnic groups living within another nation—as is the case of United States Hispanics. However, studies have found that culture persists across generations, and some general inferences from Hofstede's analysis can still illuminate cultural patterns in United States Hispanic households. Figure 1 shows the weighted average of the cultural dimension scores of the Hispanic nations most represented in California. The figure also compares these averages against Hofstede's scores for the United States.

Figure 1: Comparison of Cultural Dimensions Scores for Hispanic Nations vs. the United States[3]



Source: The Hofstede Centre, National Culture, 2015. Retrieved from: http://geertLhofstede.com/countries.html

As can be seen in Figure 1,the most significant differences between Hispanic nations and the United States can be found in the categories of Power Distance, Uncertainty Avoidance, and Individualism, and so it is worth describing these differences further. With a high Power Distance score, Hofstede's model suggests that Hispanic societies are highly hierarchical, and individuals tend to have well-defined roles that are thoroughly accepted and embraced. In these cultures, there is strong reverence for tradition and older relatives and ancestors influence behaviors (Korzenny, 2012). The high Uncertainty Avoidance score for Hispanics represents rigid codes of beliefs that make Hispanics more intolerant of innovation and change than Americans. This includes a resistance to adoption of new technologies or processes, and the tendency to wait until others have tried and tested a product or practice before adopting it, which could have implications for the uptake of energy-using technologies that are perceived as "new" and untested by the community.

Lastly, with a low individualism score, Hofstede's model suggests that Hispanics are a collectivistic culture. To this point, the concept of "familismo" places the family as the primary unit within Hispanic culture, and characterizes the family by being inclusive to encompass members of the extended family and many times other close friends (Korzenny, 2012). In collectivistic cultures, networks of extended families are established resulting in individuals

3 To attain the Hispanic scores shown in this figure, the research team calculated a weighted average of the scores of several nations, by the corresponding percentage of population representation for California Hispanics: Mexico (82.15 percent of California Hispanics), El Salvador (4.55 percent of California Hispanics), Peru (0.76 percent of California Hispanics), Honduras (0.59 percent of California Hispanics), Guatemala (2.66 percent of California Hispanics) and Colombian (0.48 percent of California Hispanics). Hofstede scores were unavailable for Nicaragua, Puerto Rico, and Cuba that respectively represent, 0.76 percent, 1.36 percent and 0.61 percent of California Hispanics. For this reason, these countries of origins were excluded from the analysis. United States scores may include influences from other ethnic groups living within the United States.

frequently living on the same block or in the same neighborhood as their relatives (Galanti, 2003).

The potential implication of collectivism to energy use and behaviors include the fact that Hispanic households will often be larger in size than other ethnic groups and therefore result in higher use per dwelling unit than a comparable property. In addition, Hispanic households that include multiple generations under one roof, each with different daily routines and habits, will have unique usage patterns. Finally, it can be theorized that strong community and family ties will result in increased efforts to "care" for the well-being of others through increased consumption of products and activities that require energy, that is frequent cooking, and watching television as a family. To this point, scholars have developed psychological theories to explain how collectivist cultures consume products when compared with individualistic cultures and suggest that consumption can be a group phenomenon, and that most people use goods to communicate with others, express feelings, and convey solidarity (Wilk, 2002).

Hispanics and Energy

Thoughts on Conservation and the Environment

Numerous surveys and studies have largely found that, across the United States, Hispanics have a clear and consistent perspective on conservation and environmental issues. According to these studies, Hispanics are highly pro-conservation, pro-energy efficiency, and pro-renewable energy, particularly when compared to other non-Hispanic groups. For example, a survey focused on Hispanic voters in Florida, Nevada, and Colorado, reported that four out of five voters expressed a willingness to pay higher energy prices to "increase the amount of our energy needs which are met by renewable energy sources like wind and solar power" (NLCCC, 2010); and a similar query undertaken four years later found that 70 percent of Hispanic voters would be willing to pay a premium to reduce pollution (NRDC, 2014). Other poll results show that Hispanics support energy efficiency initiatives, finding that 42 percent of Hispanics were very interested in making their homes more energy efficient (KSV Survey, 2015), and that they support statements such as "instead of building more power plants, customers should use less electricity" (KVD, 2004).

On the topic of the environmental impacts of energy use, research conducted has overwhelmingly found that most United States Hispanics believe in climate change, attribute it to human activity, and feel that they have a role to play to alleviate this issue (Pew Research Center, 2014; Sierra Club, 2012; Gallup Poll, 2012).

Energy-Use and Conservation Behavior

In performing the literature review, the research team found few anthropological and sociological studies that touched upon the particularities of energy use in Hispanic households. Of the studies that were uncovered—summarized below—the majority of the studies explored low-income customers and included findings relevant to Hispanics within this context. Other studies were narrow in their focus but tracked the relationships between customer ethnicity or race with respect to specific research topics.

An early study conducted on energy efficiency program participation reports on the results of focus group-based research with Hispanics—one group of Mexican origin and two groups of Puerto Rican origin—and other low-income utility customers in Illinois (Hall, 1989). The study was oriented to understanding why these groups were so unlikely to participate in utility energy efficiency programs. The resulting paper provides insights both for low-income customers in general and for Hispanic groups specifically. In summary, Hall notes that "conservation programs designed to serve the low-income population must be planned to overcome problems associated with very short planning and decision horizons, little available cash, strong suspicions about which conservation actions work, and lack of trust in organizations providing conservation services." Some of the key findings reported in this study follow:

- Non-low-income participants seemed to be interested in energy conservation as it directly affected their lives. Participants voiced their interest in personal comfort, safety, convenience, and having some control over their lives and utility bills.
- For Mexican participants in particular, reducing energy use to make themselves uncomfortable did not make sense.
- Participants tended to examine their energy bills monthly, but did not relate the amount of the bill to their energy use or the weather. Rather they related bills to the utility's interest in making money.
- Most participants, but especially the Hispanic groups—and even most strongly the participants of Mexican origin—tended to have low levels of trust for people outside their peer group. Hispanic participants expressed that utilities "don't care" and reported poor interactions with the utility. Hall suggests that with this marked dislike of utilities these participants are unlikely to want to engage in utility energy conservation programs.
- Programs were seen as requiring high levels of bureaucracy, which was also a barrier to participation.
- Even for those participants with fairly good English skills, written information provided on energy conservation and energy efficiency was poorly understood.
- Participants often reported being discouraged by the effects of energy conservation efforts, and reported that they saw no positive impact on their bills or even bill increases.
- Hispanic groups were especially concerned with safety (for example, fumes and fire hazards from heating). The quality of participant housing was often poor and required various coping mechanisms (for example overheating one room to provide heat for another).

The research team also found a California Public Utilities Commission-sponsored ethnographic study of nearly 150 Californians to determine the drivers and barriers to positive energy behaviors that included 26 interviews in Spanish as well as 110 in English (Dougherty, Mitchell-Jackson, and Wellner, 2010). The study covered the use of language, probed how people made sense of their energy use practices in the home, and interpreted results in terms of their implications for energy programs, energy-related communications, and the context of energy

use and energy saving in the home. Specific to Spanish speakers that participated in the study, the researchers found a prominent sentiment that machines are wasteful and that energy conservation is something that people do. For instance, participants suggested that "letting a machine do something that could be done manually was seen as antithetical to Spanish speakers' sense of cultural identity." The study further found that the concept of making a purchase to "save" energy was foreign to Spanish speaker participants, and therefore that energy efficient purchases, to replace equipment that still worked, were widely viewed as wasteful by this group.

On the topic of energy efficiency awareness, a study conducted by Murray and Mills (2011) found that Hispanic households had lower awareness of the ENERGY STAR® label and were less likely to purchase ENERGY STAR products than non-Hispanics. Ledesma-Rodriguez (2014) investigates a similar question based on the 2009 Residential Energy Consumption Survey data set, finding that Hispanic households were less likely to purchase ENERGY STAR refrigerators compared to others who had purchased refrigerators in the previous five years and had some education past high school.

Finally, though focused on low-income households and not specifically on Hispanics, a small-sample field study by Dillahunt et al. (2009) provides additional insight as to energy use and energy conservation among low-income residential users. This study used a "photo-diary" approach combined with photo-elicitation interviews and found that low-income households conserved energy for non-financial reasons, even when they were not responsible for paying energy bills—because of subsidies and other utility assistance programs. The motivations mentioned by participant included habit, spiritualty, and a concern for future generations as much as financial and comfort motivations.

A recent study aimed at examining energy-related behavioral intention among us Hispanics found that Hispanics living in the western United States had higher levels of intention to save energy than those in another region.

CHAPTER 3:
Research Approach and Methods

This chapter describes the research methods used in the study. Overall, the research approach draws from industry expertise, and combines ethnographic investigation with program- and market-aware sensibilities to understand Hispanic household energy usage, concerns, purchase decision-making and general attitudes about energy use and conservation. As shown in Table 2 (Chapter 1), the research approach involved gathering quality information via subject matter expert interviews, detailed energy use journals fielded to study participants, and in-home interviews.

It is important to note that the intent of the research was to provide in-depth examination of energy use in a wide selection of Hispanic households, and not to sample a statistically representative sample of Hispanic households or to render a comparison to a group of non-Hispanic households. Therefore, the conclusions included in this report should not be construed to be true representations of the entire California Hispanic group, but rather findings that are applicable to study participants and that can be considered by the reader for future initiatives.

As is expected in qualitative research, in designing and implementing the research methods the research team was mindful of potential sources of bias and careful to minimize them to enable the truest participant perspectives possible. Issues that were primarily under the control of the researchers, such as leading question bias and cultural bias, were addressed by being conscious of these concerns when designing the interview guides and research tools, and also during participant interviews. However, other research biases were less possible to control such as social desirability bias that could have led to study participants to answer questions in a manner that they thought would be viewed favorably by the researchers. The research team's strategy to overcome this bias was to be mindful of it when summarizing observations and making conclusions.

Interviews with Subject Matter Experts

Purpose

The intent of the interviews was to gain initial insights from subject matter experts that would help the development of hypothesis to explore in later stages of the study. Several individuals that worked with Hispanics on topics such as energy efficiency, conservation, and environmentalism participated in the interviews. Findings from these conversations helped inform the development and implementation of the Energy Use Journals and the in-home interviews applied in a later stage of the research.

Approach

The interviews were structured as one-on-one conversations with subject matter experts covering topics such as observations on Hispanic household activities and cultural characteristics related to energy use. Other topics explored included barriers to Hispanic household participation in various energy efficiency programs, expert assessment on what is missing from current program offerings, and "stories from the field" that serve as clues to what needs to be better understood for better engagement of this community. Interviews were conducted by phone and lasted approximately one hour.

Energy Use Journals

Purpose

Individuals do not act on energy as a series of isolated decisions; rather they carry out daily routines as shaped by schedules, family roles and responsibilities, social relationships, the characteristics of their homes, devices, and other elements of the physical environment. One strategy to drill more closely into actual energy behaviors is to use diaries or journals where a group of study participants record daily their energy-related activities along with some explanation of the context of the activity. This approach has been used previously in the energy field, although sparsely, to glean insights into energy conservation behaviors.

For this study, the purpose of the journals was two-fold: (1) to gain insight into behaviors that relate to the energy use routines, the energy conservation activities, and the energy-related problems, attitudes and concerns of study participants; and (2) to help participants become aware of and document their daily energy use practices prior to an in-depth home interview.

Approach

The research team developed a journal instrument to obtain information from study participants on daily energy use and conservation behaviors. From past experience and research conducted into effective journaling methodologies, the research team understood that journaling methods can be tricky in the sense that the information collected can sometimes be so mundane that it is not useful. However, various creative strategies can be used to make the diary approach more useful in delivering insights, and less burdensome for the diarist.

In designing the journal instrument, the research team incorporated innovative elements in the design, with the intent of making the writing process more engaging for the diarists and obtaining access to information that they might not be top-of-mind when completing their entries. For example, the journals incorporated photography and question prompts that were meant to be engaging, break the monotony of daily activities, and provide another channel for the diarists to share their thoughts with the research team.

Other considerations for the journals included the language preferences of the participants (English or Spanish), ensuring that questions were not mundane and repetitive, and avoid leading questions and statements within the journal. Ultimately, the Energy Use Journal was structured into different sections as shown in Table 6. The research team also ensured that an

adequate financial incentive was offered to diarists to compensate them for their time and effort in completing the journals.

Table 6: Structure of the Energy Use Journal

Journal Instructions and Introduction	A short description of the study purpose, participation and financial incentive rules, as well as contact information for questions. Instructions for the participant on how to complete the journal.
Basic Information Form	A form for collecting basic household information (house type, number and ages of household members, special energy-using features).
Main Journal Entries	Daily entries on energy-use activities for a consecutive period of seven days.
Question of the Day	Specific open-ended questions that varied by day and that sought to get insightful information about the diarists' ideas and beliefs about energy use and conservation.
Photograph of the Day (Optional)	Prompts requesting that the participant take photographs to supplement written journal responses. The photos provide insights on household's energy literacy and illustrate energy-related equipment in the home. Photos could be submitted either via a text messaging service or via an email address.
Additional Thoughts	Space for additional thoughts and comments from diarists.

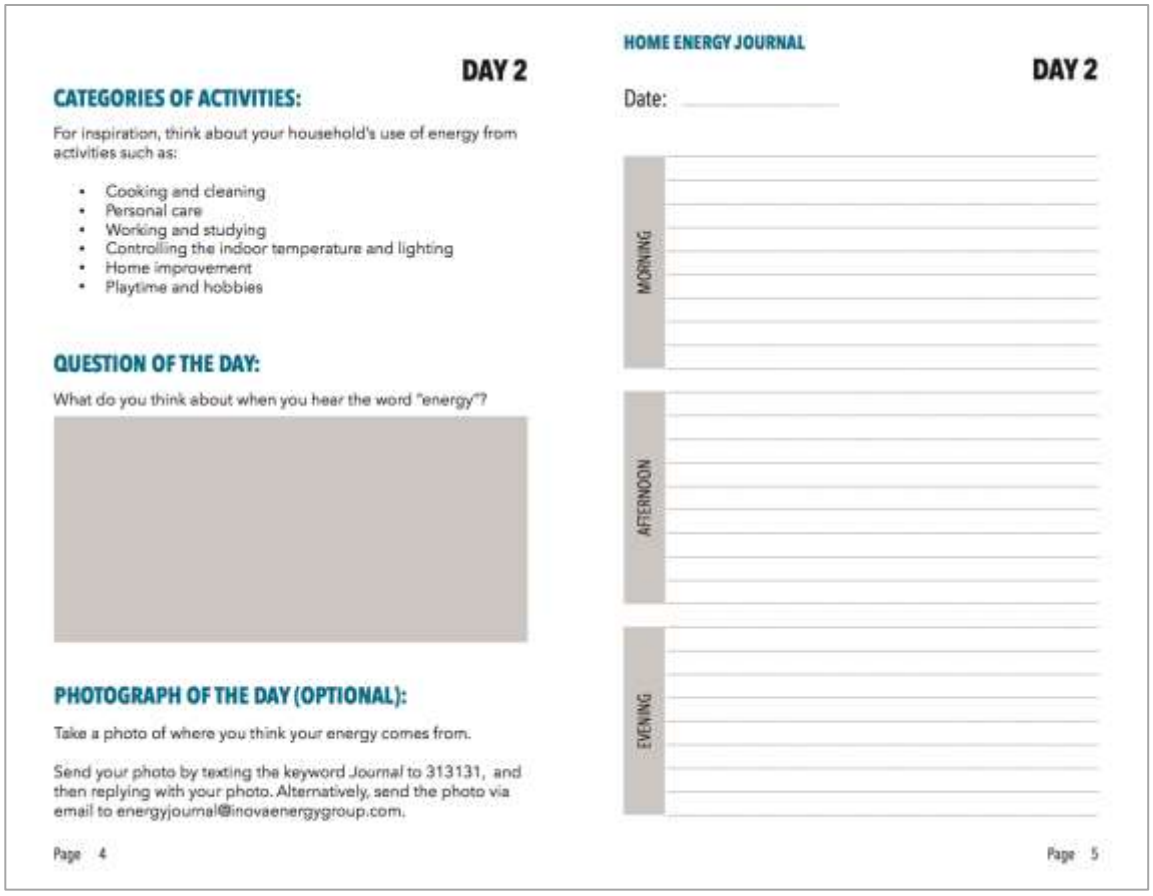
Source: Inova Energy Group

Prior to full deployment, the Energy Use Journal was piloted with a test group, in both English and Spanish to identify any challenges with the instrument and improve upon the design and fielding mechanisms. Ultimately, the journals were fielded in both electronic and printed versions, as well as Spanish and English languages, to accommodate the preferences of the participants. Copies of the paper version of the journal, in English and Spanish, are included in Appendix A and Appendix B, and a sample journal page is shown in Figure 2.

To gain access to individuals that would participate in the study, the research team used a grassroots recruitment approach that involved partnering with several community-based organizations that provide services to the Hispanic community, and that had operations in California counties with a significant percentage of Hispanic population. Our partners in this endeavor included The League of United Latin American Citizens, which focused outreach efforts through its local council in San Diego County, as well as El Concilio and Fathers and Families of San Joaquin, two nonprofit organizations located in Stockton that work to address the varying needs of Hispanic families in the area. These organizations helped recruit study participants by using their existing networks, connections, and outreach channels while lending validity to the study by leveraging their brand name.

While more than 30 organizations were approached for assistance in the study, only the three entities mentioned above ultimately assisted in the study by graciously donating their time and efforts. The lack of assistance by other organizations is not seen as a failure of the study, but rather as a reality associated with limited organization budgets and other competing priorities.

Figure 2 Sample Daily Journal Entry



DAY 2

CATEGORIES OF ACTIVITIES:

For inspiration, think about your household's use of energy from activities such as:

- Cooking and cleaning
- Personal care
- Working and studying
- Controlling the indoor temperature and lighting
- Home improvement
- Playtime and hobbies

QUESTION OF THE DAY:

What do you think about when you hear the word "energy"?

PHOTOGRAPH OF THE DAY (OPTIONAL):

Take a photo of where you think your energy comes from.

Send your photo by texting the keyword Journal to 313131, and then replying with your photo. Alternatively, send the photo via email to energyjournal@inovaenergygroup.com.

Page 4

HOME ENERGY JOURNAL

DAY 2

Date: _____

MORNING

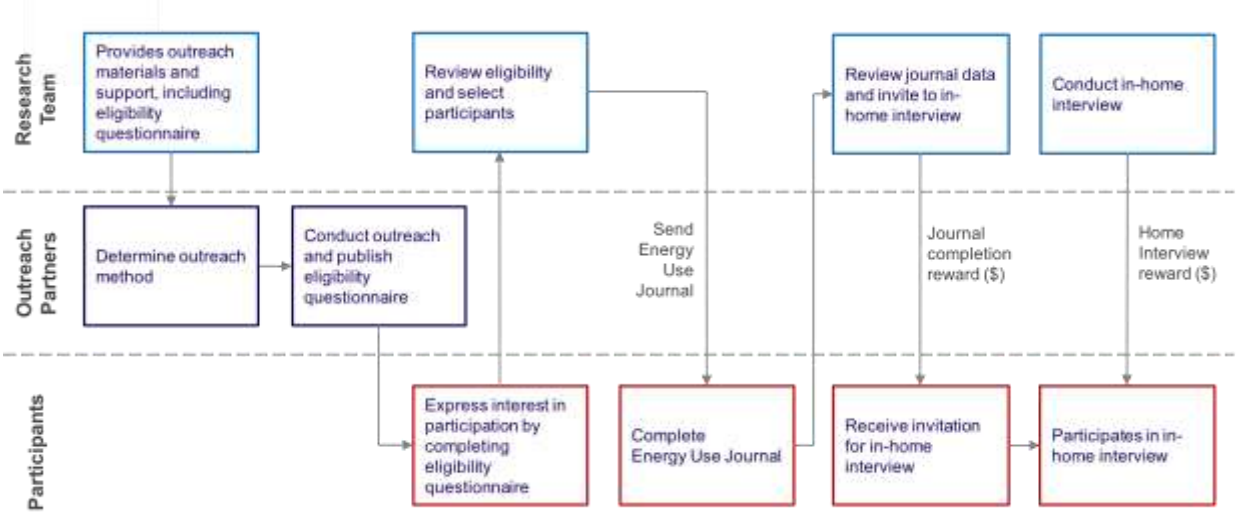
AFTERNOON

EVENING

Page 5

Source: Inova's design of the Energy Use Journal

Figure 3 Recruitment and Journal Fielding Process



Source: Inova Energy Group

To assist the recruitment partners, the research team developed marketing and outreach materials that the organizations could distribute to their membership using existing outreach platforms. All outreach materials were available in both English and Spanish and were distributed between spring and fall of 2016 through social media, electronic platforms, and in-person events. As a motivator for participation, and a key piece of the recruitment message, the research team offered a $75 financial incentive for participants who completed the Energy Use Journals in their entirety.

The outreach materials invited interested individuals to complete an eligibility questionnaire as a first step of the participation process. The eligibility criteria required that individuals participating in the study:

- Were at least 18 years of age.
- Were a customer of one of the three electric investor-owned utilities funding the EPIC program.
- Self-identify as Hispanic, regardless of what language is spoken at home.
- Confirmed that they lived in their home for a period of more than six months.
- Participated in household decision-making processes related to energy.

Participation eligibility was not verified by the research team. Instead, the research relied on the self-identification of participants as Hispanic and confirmation that they met the other criteria. While some of these criteria were easier to confirm, particularly at the time of the interview, the possibility does exist that some participants were not truthful about their identification with the Hispanic community and instead provided this answer to increase the likelihood of participation and benefit from the financial incentive that was offered.

Once an individual was deemed eligible to participate in the study, and their commitment was confirmed via a phone call, a copy of the Energy Use Journal was sent in their preferred format and language. Journal distribution began in the late spring of 2016 and continued through February 2017.

Diarists were asked to complete the Energy Use Journal for seven consecutive days, with three time-related entries per day. Additionally, each day diarists were asked a specific question that probed deeper into their thoughts around energy and they were also given the option of sending a photograph to the research team for a chance to participate in a drawing for an additional $100 financial prize. To minimize participant dropout rates, the research team sent frequent non-intrusive reminders to participants to complete their journals.

After diarists completed their Energy Use Journals, they either returned physical copies in a postage-paid envelope or submitted their answers electronically. The research team then sent the promised financial reward along with a thank you letter and an invitation to participate in the home interview phase of the study. A total of 46 completed journals were received by the research team, along with 119 photo submittals. Further information on the Energy Use Journals received is included in Chapter 5.

Home Interviews

Purpose

Building on what was learned from an initial review of the Energy Use Journals, the research team designed the in-home interview approach to obtain deeper insights into the practices, circumstances, perceptions, and beliefs that Hispanic households have around energy use and conservation (Table 7). The in-home interviews allowed the research team to ask complex questions in a setting that was comfortable to the interviewee, and to absorb the participant's physical environment. Asking "why" questions was at the heart of the research team's approach since they allowed the team to step out of any assumptions, truly understand the interviewee's thinking, and obtain a more systems-level view of everyday energy use in the homes studied.

Approach

The in-home interviews were conducted in-person for a subset of 18 households that had successfully completed the journals and that agreed to participate in the interview. To ensure that the interview process was conducted in a structured manner and consistently across all interviewees, the research team identified four components that would form the framework of the interview: (1) follow-up questions derived from an analysis of the interviewee's Energy Use Journal responses; (2) main interview questions organized by different topic areas; (3) a walkthrough of the property to record observations on energy-using equipment and take photographs; and (4) collection of Green Button Data for analysis.

As the name implies, in-home interviews were conducted in the participants' homes. Interviewers used the Interview Guide to maintain consistency in the approach and to be able to compare responses. However, the interviewer tailored some aspects the interview based on each participant's completion of the Energy Use Journal, and deviated from the script when probing deeper into some answers given by the participant.

All in-home interviews were conducted by two interviewers hired by the research team for this purpose. The interviewers included a mix of Spanish- and English-speakers to accommodate language preferences and capture lose words or sentences that the interviewees might say in Spanish. In addition, one interviewer was of Hispanic descent which aided in establishing quick connections with the interviewees and ensuring that the research team had a means of being culturally attuned to what the interviewee might say or do during the interview session.

A first round of interviews took place around San Diego in October 2016 and subsequent rounds occurred in the Stockton and Sacramento areas in December 2016 and early 2017. Each interview was conducted by two members of the research team and, though the option was given to conduct the interview in Spanish, most participants chose to conduct the interview in English. Interviews lasted from one and a half hours to three hours, depending on the interviewee's availability, how much information the interviewee had to share, and their level of comfort with having the interviewers at their home. With the permission of the interviewee, all sessions were recorded.

Table 7: Interview Guide Structure and Topics

Follow-up Questions from Energy Use Journal	
Ice Breaker	Household composition and highlights of personal history—e.g., birthplace.
Energy Use Journal Follow-up Questions	Follow-up questions to further clarify or dig deeper into the answers provided by the interviewee in their Home Energy Use Journal. These questions varied by interviewee and were developed by the research team prior to the interview session.
Main Interview Questions	
Home: understand the participants living situation and real or perceived energy issues with their homes.	• Energy use and home comfort problems perceived by the interviewees. • Household schedules and the role of visitors in discussing home energy use patterns. • The what, how, and why of heating and cooling: how fans are used, degree and nature of passive cooling, whether available main heating equipment is used, the degree to which costs are an issue, how habits and practices developed.
Energy Habits: understand how energy habits are learned, maintained, and eroded.	• Linguistic and cultural probes on conservation, scarcity, efficiency, waste, community, and acculturation. • Potentially "characteristic" behaviors and practices such as leaving lights on overnight, long showers, relatively high focus on food preparation, and retaining old equipment. • How energy conservation and energy habits are learned, maintained, or eroded. • How children are taught about energy use and participate in energy conservation activities.
Utilities: understand the participants' relationship with utilities and their perception of their role.	• Perspectives on utilities. • Interactions with utilities and experience with utility or other energy programs: what doubts, skepticism, or difficulties does the household have about the energy program and energy use information they receive, both in terms of technical quality and cultural, lifestyle, economic, and overall relevance? What positive interactions have they had with energy programs and energy information?
Main Interview Questions	
Purchasing and Home Improvements: understand how participants make purchasing decisions involving energy using equipment.	• How appliances and energy-using equipment are purchased. • How energy-relevant repairs, upgrades, and maintenance are completed, is do-it-yourself preferred where possible? • How are contractors identified and retained to do work.
Energy Costs: identify perceptions around the cost of electricity.	How utility bills are interpreted and paid.
Walkthrough Checklist and Photographs	
Energy Equipment and Habits	A sufficiently detailed assessment of the end uses and equipment present in the household, such as the type/age/number of refrigerators, heating equipment, cooling equipment.
Data Collection	
Green Button Data Collection	An opportunity to collect hourly energy-usage data that would reveal insights into how energy is used in the home.

Source: Inova Energy Group's interview design

To establish rapport and set the interviewee at ease, all interviews began with five to ten minutes of a casual 'ice breaker' conversation that often revolved around the personal story of the interviewee. Then, the interviewers explained the purpose and approach of the interview and asked the participant to sign a consent form allowing the research team to record the interview and take photographs. The interviewer then asked a series of questions as established in the interview guide. Each interview was followed by a brief walkthrough of areas of the home that the participant was comfortable sharing, to view examples of energy-using equipment and record any observations of the status and age of existing energy-using equipment, any unusual appliances, duplicate items, and other household features. During this walkthrough, the interviewers also took photographs to further document equipment for analysis.

The main interview questions were designed to focus on the household's practices and perceptions; the household's energy-biography (for example household members past experiences with energy services and use); and their experiences with utilities and energy-related home improvement. As shown in Table 7, the interview guide was structured based on the topic areas that included: home, energy habits, utilities, purchasing and home improvements, and energy costs. In accordance with EPIC's goals, data collection and analysis were designed to focus on electrical end uses rather than natural gas, which is a typical central space heating and water heating fuel throughout most of California. The complete interview guide is included in Appendix C.

The interview ended with the collection of "Green Button Data from those participants who were willing and able to deliver it and providing the participant with a $100 gift card reward for their participation.

Green Button Data Collection

Purpose

The Green Button Data initiative, launched in 2012, is an industry-led effort that responded to a White House call-to-action to provide utility customers with easy and secure access to their energy usage information in a consumer-friendly format for electricity, natural gas, and water usage (Green Button Data Alliance, 2017). The initiative has resulted in standardized formats for downloading and sharing utility energy usage information with third parties by providing a route for utility customers, energy efficiency vendors, researchers, and others to access energy use data at a modest (such as hourly) granularity.

For purposes of this study, the research team sought to collect electric energy-usage data from homes that participated in the in-home interview to see if it was possible to draw objective insights about the energy usage practices of the household. The data was to be used to compare the insights provided by participants, in their energy use journals, on specific end-uses (that is, air conditioning) to their actual energy use as shown by the data. Ideally, the data would also to inform overarching questions about energy efficiency potential in Hispanic households.

Approach

Based on the research team's examination of multiple factors such as the review of Green Button Data protocols, utility websites, other researchers' experience with Green Button Data collection, and discussion with Green Button Alliance staff, researchers decided that the best time to collect the data would be during the in-home interview to improve the research team's chances of obtaining the data while reducing concerns on the part of the interviewee.

Prior to the in-home interview, a member of the research team contacted the interviewee to explain what the Green Button Data was and its value to the study. A brief informational flyer was sent to each interviewee to ease any concerns they might have about sharing this data and to assist in understanding its intent. During the in-home interview, interviewers again explained the purpose of and process for the Green Button Data acquisition, and sought to obtain written and verbal permission. For those who agreed, the interviewers assisted the participant in downloading the data from their electric utility web portal (a one-time download in XML format) at the time of the interview, or provided instructions for the participant to download the data and then submit to the research team.

Despite efforts to explain the process and alleviate any participant concerns about sharing their data, the research team was only able to obtain Green Button Data from seven households. In addition, while the goal was to collect data for a one-year period, several of the datasets obtained were for a more reduced length of time, as the occupant was new to the property.

Given the incomplete data sets, as well as difficulties associated with the application of Green Button Data analysis tools to the file formats obtained, the analysis of the data was inconclusive and therefore not useful to this study. For this reason, no additional information is shared in this report as it relates to the data obtained.

As to the implications for other studies that hope to obtain Green Button Data by working directly with residential utility account users, the research team first observes that collecting Green Button Data, albeit challenging, is not impossible. In many cases it may involve the researcher sitting down in-person with an account-holder to help them overcome a number of the expected barriers, such as forgotten passwords, changing user interfaces and the like. Second, researchers should clearly articulate the value to the household in sharing their Green Button Data, which, after all, is password-protected and thus considered private information. For example, will they learn something about their energy use in return?

An alternative approach to obtaining interval data for a sample of consumers would be to request advanced metering infrastructure data directly from utilities for accounts where a data release consent form was obtained for the account holder. While feasible for large efforts such as utility program evaluations, in smaller research studies such as this one, experience suggests that this pathway could be time-consuming.

Continued development of the Green Button Data applications, interfaces, and data collection protocols, complete with clear and non-burdensome legal protections for the data, may improve its prospective use for future projects.

CHAPTER 4:
Research Findings: Expert Interviews

This chapter summarizes findings from the interviews with subject matter experts. Subsequent chapters summarize discoveries from the Energy Use Journals and in-home interviews.

The ideas listed here are not intended to represent absolute facts or "truths" about Hispanic households in California. Rather, they summarize what was learned from the subject matter experts. Lending strength to these results, however, it is important to mention that the research team found resonance across the expert interviews, and results from other research methods applied in this project.

Characteristics of Subject Matter Experts

A total of 11 individuals from different organizations and with different subject matter expertise were interviewed during November and December 2015 (Table 8).

Table 8: Name, Organization, Role and Location of Subject Matter Experts Interviewed

Name	Organization and Role	Location
Victoria Arellano	Community Action Marin, Bilingual Outreach Specialist	San Rafael, CA
Leticia Ayala	Environmental Health Coalition, Leadership Development Director	San Diego, CA
Linda Escalante	Natural Resources Defense Council, Policy Advocate	San Francisco, CA
Adrianna Quintero	Natural Resources Defense Council, Director of Partner Engagement	San Francisco, CA
Silvia Leon	Community Organizer	San Diego, CA
Jorge Madrid	Environmental Defense Fund, Coordinator, Partnerships and Alliances, California Climate and Energy Team	Los Angeles Area, CA
Miriam Peña Garcia	Denver Office of Strategic Partnerships, Director	Denver, CO
Liz Perez	CG Green Incorporated, President	San Diego, CA
Kayla Race	Climate Action Campaign, Director, Operations and Programs	San Diego, CA
Catherine Sandoval	Commissioner, California Public Utilities Commission (2011–2016)	San Francisco, CA
Maria Stamas	Natural Resources Defense Council, Attorney, Energy and Climate	San Francisco, CA

Source: Inova Energy Group

The panel included fieldwork specialists, program implementers, marketing experts, social justice workers, and policy leaders all working with Hispanic communities in energy or environmental initiatives. While not intentional, most of the interviewees were of Hispanic origin themselves and they also contributed experience from their own life histories during the interviews. A complete interview guide is included as Appendix D. However, questions were selected from the guide depending on the expertise of the interviewee, with the interviews branching out when a different approach was warranted.

Major Themes Identified

The following are the major themes and cross-cutting observations obtained from the interviews with subject matter experts:

- Most experts mentioned a lack of documented information and data related to the topic of energy use and conservation by United States Hispanics.
- Energy use and costs are of considerable interest to many Hispanic households and communities, for a variety of reasons ranging from controlling household costs, homemaking in a broad sense, to a general attention to avoiding waste, conserving resources, and environmentalism.
- While Hispanic households may not particularly invest in energy efficiency, there was a strong perception amongst the experts that they avoid wasting energy and are often quite skilled in doing so. Poll results show that Spanish speakers are much more likely to endorse the statement that "instead of building more power plants, customers should use less electricity" (KVD, 2004). Especially for households where members were born outside of the United States, or otherwise grew up with a greater sense of scarcity than is typical in middle- and higher-income United States households, not squandering resources is integrated into everyday life and expertise, both to reduce costs and in a more general sense of not wasting.
- Community and family are extremely important for Hispanics and there is often a much stronger sense of collectivism than among most non-Hispanic households. Families are close, children matter a lot, as does making things better for the community. As evidence of this collectivism, according to several experts, Hispanics have the reputation of being the most responsive to calls to conserve energy or water when the message is tied to the betterment of a community.
- Hispanic households largely believe in climate change and that it is human-caused. The overall impression obtained from the interviews is that Hispanic households are willing—maybe particularly willing—to act to contribute to reducing greenhouse gas emissions, but information on how to do so is poor.
- Overall, there is a sense of frustration in how well current energy programs serve Hispanic communities, ranging from a lack of attention to energy concerns in rental properties, failure to appreciate the circumstances of lower-income households, frequently poorly-crafted outreach, poor experience with existing programs, a widespread sense that information provided by utilities is irrelevant or unusable, difficulties in paying bills along with the threat of service cutoff, lack of trust in utilities,

and lack of rapport between Hispanic households and utility and related energy programs.

- Community-based organizations and other non-profits are critical intermediaries linking Hispanic households to energy utilities and energy programs. These organizations are more skilled and able to do ground-level work, to craft outreach messages that fit the community, and to engender trust and understanding compared to larger, more anonymous, institutions. The latter may be conceived of as being fundamentally about making money or exerting other types of control.
- As to communications about energy use and energy programs, experts agreed that just providing information in Spanish is not enough. Well-crafted content is important, but other issues greatly shape the efficacy of energy efficiency programs at engaging Hispanics, including the technical, economic, and cultural relevance of the programs and recommendations, trust of the information source, the way that things are stated in outreach materials, and the administrative complexity of the programs.

Detailed Observations

Following are more detailed findings from the expert interviews.

Identity

Community and family are important, and Hispanics focus on the future of their children. This community orientation has multiple implications. First, requests by utilities to conserve are heard by the Hispanic community. Second, people trust others in the community and learn from them but trust within the Hispanic community is hard-earned. Experts identified a general, low level of trust for utilities and government. For some immigrants, particularly those from Mexico where the government owns the one electric utility, utilities and government may be perceived as the same entity. According to the experts interviewed, Hispanics overall do not trust utilities and seem to be frustrated with them, as detailed previously.

Gender issues and family decision-making styles matter. A couple of the interviewees mentioned that most Hispanic women will only make decisions about moving forward with energy program participation or household repairs with the approval of their husband. Also, for programs that involve in-home visits, some families may not be comfortable with a male contractor visiting the home when the husband is not there. This concern appears to be well-understood by program administrators and oftentimes results in visits being conducted in pairs, and including a female visitor when possible.

Conservation Values

The expert interviewees expressed conflicting stereotypes about Hispanic households and their energy use. One interviewee hinted at a strong culture of conservation while another portrayed Hispanics as unaware of activities related to saving energy or to efficiency in energy and water use.

Conservation is a way of life and is distinct from what the industry usually means by “energy efficiency.” A couple of experts commented that for many immigrants, the idea of scarcity is

ingrained in their lifestyles. In addition, people who grew up in scarcity know how to conserve resources as a practical matter. But this notion of scarcity and interest in conserving resources degrades the longer the immigrants have been in the United States, and more so with second- and later-generation immigrants. One expert suggested that Hispanic communities have the reputation of being particularly responsive to calls for conservation.

Interviewees also suggested climate change and energy efficiency are topics of concern for the Hispanic community, contrary to popular belief that these are more of the concern of wealthier households.

Behavior and Equipment

Interviewees identified several energy use practices and circumstances that are common in Hispanic households. Among those mentioned: leaving lights on all night or when away from home for safety reasons, that is giving the impression that the house was not unoccupied; not using central heating; not having air conditioning; not using air conditioning even when they have it; reluctance to replace older appliances and devices; eating more home cooked meals; multi-generational living situations; and having visitors in the home. All or some of these can be common set of practices showing up on the energy record.

According to a few interviewees, Hispanics suspect there is a connection between energy use habits and energy bills but they are not always necessarily sure why their bills were so high, except during winter and summer months when their bills increased due to heating and cooling. Some interviewees mentioned that if bills continue to go up because of rate changes, the simplistic economic argument that conserving energy lowers bills will not make sense in terms of what households observe.

Experts repeatedly described how connecting with households on energy use could be a gateway to a variety of other issues, such as such as treating mold, general home improvement, water leaks, connecting households to food programs, etc.

Housing Structure and Energy Equipment

Within Hispanic communities, housing conditions can be poor, equipment may be old and relatively inefficient, and conditions may be quite uncomfortable. Renting in this community is common, with 57.8 percent of California Hispanics being renters (American Community Survey, 2013). This results in a limited amount of control that Hispanics renter households have over the physical conditions of the home and the equipment installed. Still, experts suggested that there are things that can be done to save energy in areas such as: hot water, unplugging ‘vampire’ loads, weatherization, product replacements, and forgotten end uses such as fish tanks.

According to the experts, there appears to be a substantial used and refurbished market for appliances and equipment. The experts mentioned that lowest-income Hispanic households, especially those who do not speak English, may not buy new appliances but rather look for used appliances—at swap meets, online marketplaces such as Craigslist, refurbished appliance stores, yard sales, or resale shops such as Goodwill, for example. Households may be quite

reluctant to get rid of appliances that still work, even if energy savings and other purchase conditions are compelling.

On the topic of smart meters, interviewees suggested that they are less than thoroughly welcomed, especially considering recent rate changes. Some experts spoke positively about the promises of smart meters to provide households more detailed energy use data. However, one mentioned that in the communities they were familiar with, smart meters were distrusted and considered to be a way to charge more rather than to provide value to residential customers.

Energy Bills

Experts mentioned that utility bills can often be off-putting and complicated, and energy efficiency programs can have too many requirements. The general opinion of the interviewees was that utility bills are difficult to understand for Hispanic households.

Paying the bill can also be difficult for some households that may struggle with limited monthly cash-flows and limited incomes. One of the experts interviewed worked in a community organization that provided Hispanic households with financial assistance to pay overdue energy utility bills, mentioned using any meeting opportunity not only to find ways to help get the energy bills paid, but also to provide general energy education that would reduce the risk of future problems—required as a condition of the assistance. In addition, the expert's organization aided in understanding bills, connections to other energy programs, and information on lead, radon, and other health hazards.

Experts had much to say about utility energy efficiency programs. While praising some programs and efforts, the overall message was that there was a huge disconnect between established programs and the Hispanic community. First, there was a perception that most programs and information available are oriented to homeowners and not renters. Second, the connections to the community were perceived weak, with poorly crafted outreach poorly.

Communications and Outreach

Subject matter experts mentioned that some energy efficiency messaging may particularly inspire or engage Hispanics, especially if outreach materials are in Spanish. But, they also mentioned that it must be the "right" Spanish. Common industry terms used in the energy efficiency field may have different meanings to Hispanics—and to others as well—than for those who create and produce such material. "Energy efficiency," for example, hardly means anything outside of the industry, one expert commented. As another example, in Spanish it is common to refer to an electricity bill as a "light bill" (cuenta de luz, in Spanish), which to an English-speaker could seem as exclusive of other energy-using equipment. It is therefore important to engage individuals and firms with the proper cultural awareness and understanding of detailed technical terms to ensure a correct translation of content.

Beyond the technical aspects of language, outreach materials and communications should be relevant to Hispanic lives, lifestyles, and concerns. Standard program literature often may not meet the needs of the reader, either in obvious ways such as a focus on higher-income

homeowners, or in less obvious ways such as failing to use culturally-relevant strategies that the target person can relate to.

Experts also mentioned that who delivers the message matters. For example, experts suggested that when the message is conveyed by individuals of Hispanic origin, the likelihood of successful interactions with other Hispanic households increases. One of the strongest ideas on communications that the research team received was that face-to-face communication can be much more effective than written communication for Hispanics. But when face-to-face communication is not an option, organizations should focus on communication channels that are frequently used by Hispanics. The channels recommended by subject matter experts included: television news from Hispanic networks, radio, Pandora, and Facebook.

Education and Workforce

Experts who worked directly with Hispanic households often mentioned the role of children in energy conservation. Kids can teach the household based on what they learned about energy at school.

Another issue mentioned was the lack of workforce connections and labor pipelines, and according to the experts, developing a trade ally network is particularly critical for reaching the Hispanic community. As one interviewee pointed out, qualified Hispanic contractors do exist but utilities are not recruiting them into their trade ally programs, primarily because of insufficient and ineffective outreach. Furthermore, utility trade ally training programs are not offered in Spanish which is an issue for some contracting businesses that have skilled personnel and are well connected to Hispanic communities. A more robust Hispanic trade ally network could translate into better outreach and engagement for this community.

Several experts did speak positively about progress in getting more Hispanics into the energy and environmental fields. The examples they cited ranged from youth going door to door to install CFLs in local communities, green businesses created by Hispanics, and energy utility jobs. However, they also referenced the need for more Hispanic leaders in this field. One interviewee commented that there is a deficit of Hispanic representation at all levels: at utilities, as advocates, and in elected positions.

Hypotheses

Based on the information obtained from the interviews with subject matter experts, the research team developed the following hypotheses to be investigated in subsequent phases of the study:

- Hispanic households differ in important ways from the presumed typical energy consumer.
- There are specific energy-related behaviors that Hispanics do in their homes and that could be targeted for increased behavioral savings.
- Practices intended to conserve energy are instilled early and reinforced both economically and culturally.
- Household focus is on conservation actions rather than technical efficiency.

- Households largely “know what to do” when it comes to conservation but this knowledge is incomplete and could be improved with more knowledge transfer efforts.
- Improved information and program quality, more face-to-face dissemination, and increased representation of Hispanics in energy, environmental, and related policy fields can make a positive difference.

CHAPTER 5:
Research Findings: Energy Use Journals

This is the second of three chapters that summarize findings from the different research methods used in the study. Specifically, this chapter presents an overview of the participation metrics associated with Energy Use Journal completion, as well as results from the analysis of the following specific elements of the journals: "Question of the Day" and "Photograph of the Day". Because the journal entries were used to inform and even structure the conversations held during the in-home interview phase of the study, they are analyzed and presented in combination with the interviews in Chapter 6.

Where relevant, quotes from diarists are included throughout this chapter to support certain conclusions and ideas. The quotes are accompanied by an ID corresponding to a specific individual, to allow the reader to match the comment to the characteristics of the participant – Appendix E. However, to protect the privacy of the study participants, their identities are kept confidential throughout the study, and their personal information is anonymized.

Participation Metrics

Of a total of 113 Energy Use Journals that were distributed, 68 participants submitted at least one day of journal entries, and 46 journals were completed in their entirety and returned to the research team.[4] While both the electronic and paper versions of the journal were offered in both English and Spanish, all but ten completed the journal in English, and all but six were completed electronically. Those who preferred Spanish were more likely to complete a paper copy (55 percent of the Spanish journals, versus 8 percent of English journals).

In general, most of the study participants were thorough in providing a complete account of their daily energy use, with decent level of detail surrounding expected energy-using activities such as cooking, conditioning space, and use of lights, but also other less common uses such as ironing, straightening hair, and using power tools. In spite of this detail, it is likely that the Energy Use Journals received by the research team contained blind spots and gaps in information, resulting in some key energy end uses being overlooked. To bridge these gaps where they might have existed, the research team used the in-home interviews as an opportunity to uncover other energy using and consumption behaviors.

Table 9 provides a summary of metrics, including the number of journals completed by study area, while Figure 4 shows the locations of the diarists. As mentioned in the introduction to this chapter, a full characterization of the diarists and their homes is available in Appendix E.

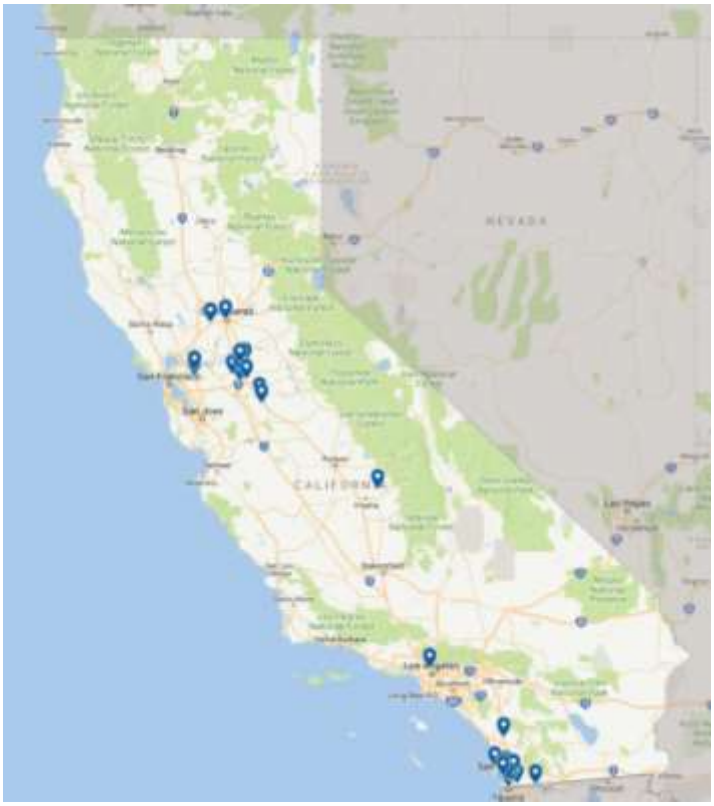
4 The research team defined six days as a "complete" journal. Information from the incomplete journals was still used for analysis, particularly answers submitted for each Question of the Day.

Table 9: Disposition for Energy Use Journals

Study Area	Journals Completed				
	English		Spanish		Total
	Print	Electronic	Print	Electronic	
San Diego County	0	11	4	4	19
San Joaquin County	2	15	0	2	19
Other areas	0	8	0	0	8
All locations	**2**	**34**	**4**	**6**	**46**

Source: Inova's analysis of Energy Use Journal data.

Figure 4: Locations of Participating Households by Zip Codes - Diarists

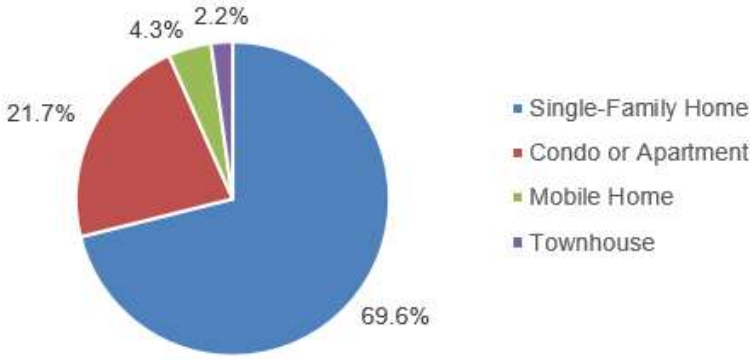


Source: Inova Energy Group

Each diarist completed a short form providing basic background information on the physical characteristics of the home (Figure 5). Of those who completed the journals, the majority were women (87 percent) and over two-thirds (70 percent) lived in single-family homes. On average, participating households included 4 individuals per home, 2.6 of which were adults, and 1.4 were children under 18 years of age, however, a wide variety of familial structures were represented (Figure 6). In addition, the average household consisted of 2.8 bedrooms and 1.94 baths.[5]

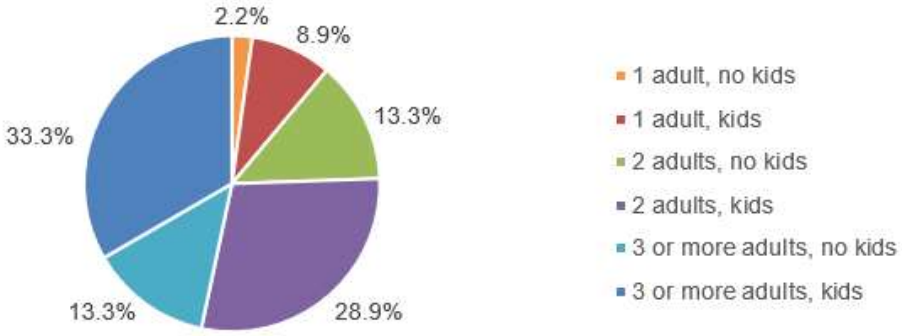
5 The research team intentionally did not collect income information from study participants. However, many of the diarists and interviewees lived in zip-codes with lower than average middle-incomes.

Figure 5: Housing Type of Participating Households



Source: Inova's analysis of Energy Use Journal data.

Figure 6: Family Structures of Participating Households



Source: Inova's analysis of Energy Use Journal data.

Table 10 provides additional details of the technical characteristics of the homes in the sample.

All diarists were also asked to report the amount of their household's latest electricity bill, regardless of what month the bill corresponded to. This information was used to provide some context for the researchers of the level of energy use of each particular household, and was later referenced during the in-home interviews when the interviewee was asked about their electricity bills. Figure 7, Figure 8, and Figure 9 show the diversity in the reported electricity bills across the main study areas and for the different months that were reported in the Energy Use Journals. These figures, however, do not reflect the impact associated with number of household occupants or the type of home, that is apartment or single-family home.

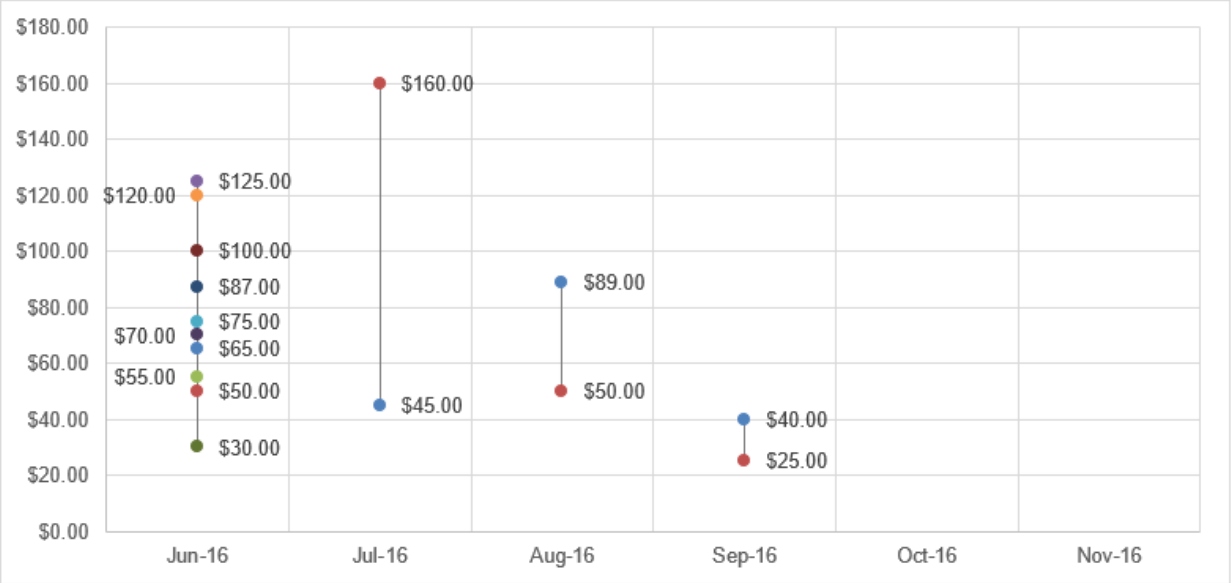
Overall, the median reported bill for completed Energy Use Journals was $80, but seven households showed a bill of $150 or higher—two of these had pools at their properties. Average bills for single-family homes were far lower in the San Diego County area ($74) than in the San Joaquin County area ($127), where more participants completed their Energy Use Journals in the hot summer months.

Table 10: Additional Technical Characteristics of Diarist Homes by Study Area

Technical Characteristics	San Diego County	San Joaquin County	Other areas	Percentage of Sample
Number of participating homes in each area	19	19	8	46
Homes with a swimming pool	6 percent	6 percent	10 percent	7 percent
Homes with central air conditioning	50 percent	78 percent	80 percent	67 percent
Homes with window air conditioning unit(s)	33 percent	28 percent	0 percent	24 percent
Homes with septic system	11 percent	0 percent	20 percent	9 percent
Homes with in-law unit	17 percent	0 percent	0 percent	7 percent
Homes with detached garage	11 percent	28 percent	0 percent	15 percent

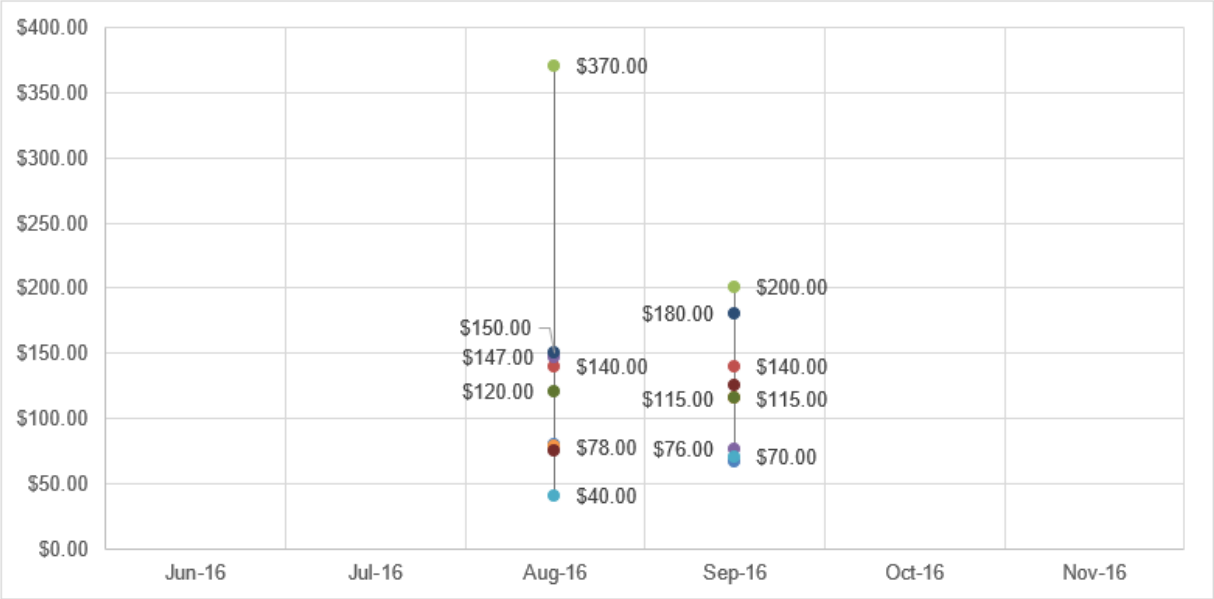
Source: Inova's analysis of Energy Use Journal data.

Figure 7: Electricity Bill Distribution - San Diego County



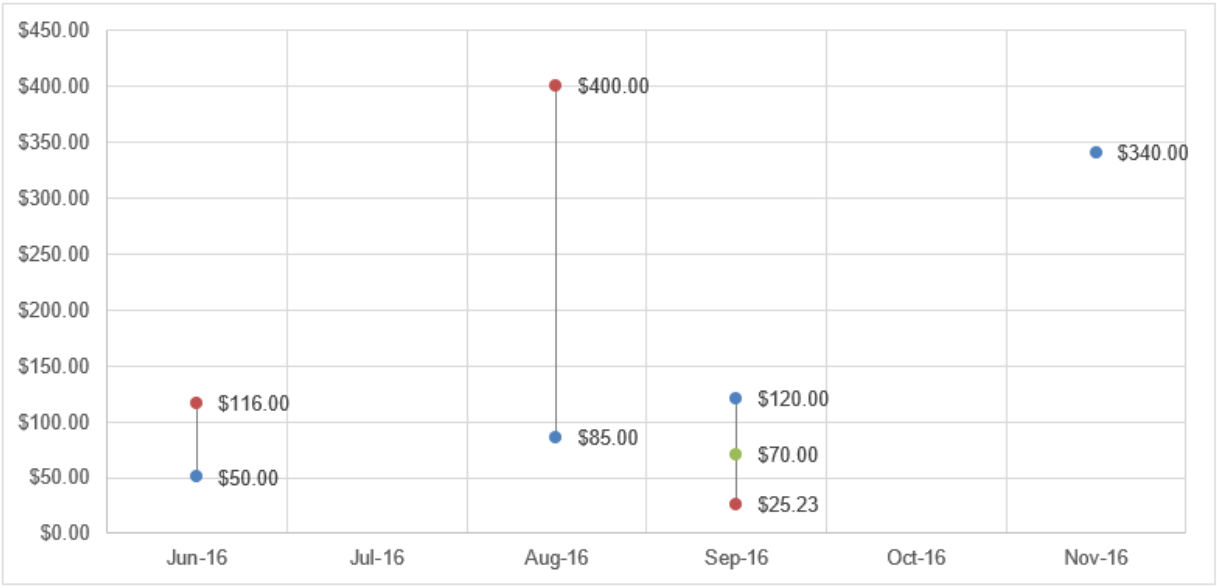
Source: Inova's analysis of Energy Use Journal data.

Figure 8: Electricity Bill Distribution - San Joaquin County



Source: Inova's analysis of Energy Use Journal data.

Figure 9: Electricity Bill Distribution - Other Areas



Source: Inova's analysis of Energy Use Journal data.

Question of the Day

The daily questions were intended to nudge diarists further toward expressing their reflections about energy and to invite reporting on a broader scope of thoughts and experience. This element, not usually included in energy journals, helped elevate the Energy Use Journal instrument to beyond an activity-only exercise focused on daily routines.

Table 11: "Question of the Day" for Each of the Seven Journal Days

Day	Question of the Day
1	What is your general attitude towards energy use?
2	What do you think about when you hear the word "energy"?
3	If energy were free, would you use it differently?
4	What surprises you about how other people use energy
5	If you could change one thing about energy use in your home, what would it be?
6	What activities did you do today to conserve food, energy, or water?
7	Who fixes things at home? For example, when an appliance breaks is it repaired or do you purchase a new one? If repaired, who does the repairing?

Source: Inova Energy Group

To analyze the information obtained from the journals, the research team developed a categorization scheme for the open-text answers provided under each question. This method organized the information to identify trends and patterns, for example in the number of mentions or repetitions or in the diversity of the responses. The rest of this section presents the results for each Question of the Day listed in Table 11, along with illustrative quotes drawn from the journal entries.

For each table showing the researcher's analysis of responses, the number of mentions were quantified. Because the responses from some diarists sometimes fell in more than one category, or sometimes the diarist skipped an answer, the total number of mentions will vary for each Question of the Day, and may not match up with the total number of journals received in completion.

Question of the Day #1: What is your general attitude towards energy use?

Of the 66 open-text responses received and coded into eight categories, the basic finding is that nearly two-thirds (63 percent) of the diarists said that they either conserved (38 percent) or (in our paraphrase) "conserved lots" (24 percent). The latter group, for example, mentioned actions such as being very attentive to turning things off or unplugging things when not in use, or to minimizing energy use overall. For example: [O04][6] "Don't use lights unless you absolutely have to. Unplug appliances and chargers when not in use. Generally speaking, I do not watch TV." Lighting seemed to be a focus among the conservers and several responses discussed turning off lights when not in use.

Table 12: Summary of Journal Responses to "What is Your General Attitude Toward Energy Use?"

Code Assigned	Number of Responses	Percent
Conserve	25	38 percent

6 These IDs have been made available for the reader to match the quote to the characteristics of the diarist that made the statement. Detailed information on the characteristics of each diarist and their properties is available in Appendix E.

Conserve lots	16	24 percent
Should conserve more	7	11 percent
Normal or average	6	9 percent
Use it when needed	5	8 percent
Differences in household	4	6 percent
Use lots	1	2 percent
Grateful	2	2 percent
Total	66	100 percent

The "normal or average" category reflects answers where the diarist described his or her own use in this manner. "Differences in household" refers to instances where the diarist described some members of the household using energy in a certain way and others using it differently.

Source: Inova's analysis of Energy Use Journal data

Beyond these "conserving" groups, an additional 10 percent (the "should conserve more" group), spoke more to their belief that they could do more even if they already conserved: [O17] "Though I try to be conscious of energy use, I find myself using a lot of energy unintentionally. I'd like to be better at conserving."

Other groups ("normal or average", "use when needed") however, implied that they were comfortable with how much energy is used in their household, and that conservation was not a concern. Although the reason was not always specified, this could be interpreted as a statement that they do not want to or have to worry about costs, or that additional conservation efforts are not practical, not worth the effort, or just not of interest. It is also possible that some households stress "using what they want" as a symbol or luxury. These perspectives provide a counterpoint to the common assumption in some studies that people always should want to save more. Some simply do not, and so it is useful to start from that understanding rather than delegitimize it.

Most of the remaining diarists indicated that they thought their household use was normal or average in energy use (9 percent) while a few (7 percent; the "use it when needed" group) stated that they used what they needed. For example: [O15] "I try to conserve energy, but I have to be comfortable during the summer. I will have my AC all day if needed." One diarist "talked back" to the implied moral pressure to use less by stating: [SJ18] "I don't see anything wrong with it."

Some diarists pointed to differences on energy conservation within their household, mostly that others (usually children or husbands) were not as careful with their energy conservation. Two diarists mentioned that they were grateful for energy use and conscious that others, primarily in other countries, did not have as easy of an access to this resource. This was a theme that came up several other times in the journal entries—more often in the San Diego area than in Stockton area, and presumably linked to generational or their families in another country did not have reliable access to electricity. [SD15] "We are really fortunate to have electricity and we should be more conscientious about how we use it."

Question of the Day #2: What do you think about when you hear the word "energy"?

Table 13: Summary of Responses to "What Do You Think of When You Hear the Word Energy?"

Code Assigned	Number of Responses	Percent
Money or saving money	15	27 percent
Power/capacity to do work	12	22 percent
Light (quality) or lights (item)	10	18 percent
Electricity/gas	4	7 percent
Conservation	4	7 percent
Personal or social energy	3	5 percent
Vital force	3	5 percent
Health	2	4 percent
Environment and resources	3	5 percent
Total	56	100.0 percent

Source: Inova's analysis of Energy Use Journal data

When asked about their thoughts when they hear the word "energy" most diarists answered in a pragmatic manner as shown in Table 14: money or saving money (27 percent), light/lights (18 percent), electricity/gas (7 percent), and conservation (7 percent). However, some answers were more theoretical in nature, referring to power or vital force (21 percent) or biological, referring to personal/social energy and health (5 percent). Only a handful mentioned environment or resources.

Question of the Day #3: If energy were free, would you use it differently?

This question was aimed to better understand diarist motivations behind energy conservation, in particular how much conservation was about saving money. Of the 42 usable responses to this question, more than half said that they would not use energy differently if it was free, as shown in Table 14.

Table 14: Summary of Journal Responses to the Question of the Day "If Energy were Free, Would You Use It Differently?"

Code Assigned	Number of Responses	Percent
No	22	52 percent
Yes	17	41 percent
Do not know	3	7 percent
Total	42	100.0 percent

Source: Research team's analysis of Energy Use Journal data

"No" answers were clarified by diarists in two different ways. One was "We are already conserving for reasons other than money" such as environmental protection, sharing scarce resources, habit, etc. The other, was "We are using what we want, without regard to cost."

For those that answered “No”, the most common explanation given was that they already conserve and would continue to do so even if energy were free: [SJ01] “If it were free, I would probably use it the same because it's what I'm used to.” Five diarists referred to the environmental consequences of energy use, for example: [O12] “Our department (work) is conscious about the environment, so I think we should still do anything possible to conserve energy.” Others commented on their preference for more natural environments, including natural light and a dislike of the cooling provided by air conditioning: [SD11] “Not really, I try to use as much natural lighting as possible, or candle lighting. Air dry laundry when possible.” While another referred to a visceral aversion: [O09] “I have been in a house where someone didn't care about the [energy] bill. It annoyed me that they left everything running all the time in all the rooms. It was almost grotesque. I would hope we wouldn't change much more [our energy use] than we are now.”

The “Yes” answers to this question are interesting because they reveal sensitivities to energy costs and as well as the burdens felt in the performance of conservation. While most diarists were somewhat cautious in their response as to how energy use would change, a few said that, if free, they would use it with abandon. Many also referred to specific things they did to conserve energy where they would be happy to reduce vigilance if energy were free. For example, the most quoted area would be turning off lights when not in use, but some diarists even mentioned that they would buy more electronics because they would not have to worry about subsequent electricity costs. Only four diarists mentioned that they would use more air conditioning if energy were free, especially for longer periods of time (versus at lower temperatures). This is nearly the same frequency as specific mentions for lights and for electronics, though central air conditioning can be far more expensive.

1. [O11] “I feel like we would probably not care about leaving lights on or off.”
2. [SD04] “I think we would be less conscious of how we used it. Currently, we make sure we turn lights off that are on in empty rooms, but we don't unplug anything that's not in use. I think that if it were free, we would use electricity more decoratively (especially around the holidays).”
3. [SJ22] “I would not have any concern of unplugging every unused electronic.”
4. [O15] “I would also not worry about running the heater and AC when we are not at home. I always make sure to adjust temp when no one is home. Basically, I would not care if I conserved energy.”

Question of the Day #4: What surprises you about how other people use energy?

Table 15: Summary of Journal Responses to the Question of the Day "What Surprises You About How Other People Use Energy?"

Code Assigned	Number of Responses	Percent
Do not care about leaving lights on	18	38 percent
Leave other equipment on	4	9 percent

Code Assigned	Number of Responses	Percent
Are different even within my own household	6	13 percent
Do not care about it	4	9 percent
Use it like its free, do not care about saving energy, general waste	6	13 percent
Other specific types of waste	7	15 percent
Do not use much energy/do things I would not do conserve	2	3 percent
Total	47	100.0 percent

Source: Inova's analysis of Energy Use Journal data

For this question, the top answer (38 percent) was that other people left lights on unnecessarily. Lighting was clearly top of mind as an energy use for many diarists and also the easiest form of "waste" to detect in observing others' behavior. Four other diarists pointed to being surprised at how people leave equipment on, especially televisions. One respondent mentioned that others sometimes have the heater or air conditioner on with the windows open, and another mentioned a dripping faucet, which was relevant from the standpoint of associating water use with energy. Interestingly, there were no mentions of air conditioning use or setting low air conditioning temperatures. [O04] "It surprises me when people leave all their house lights at once. Before I paid for my own electricity, I was the same way and would leave all my lights on at once. I've become more mindful because I realize that every minute costs me money."

A few diarists broached the topic of what was worth doing. For example, one commented that the fact that other people ironed every morning surprised her. Others offered an opposite viewpoint, commenting on how little people used energy or what they did to save energy. One said that they were surprised that some people went around unplugging things in their home. Another remarked on the energy services that people did not use: [SJ02] "Some people don't wash and dry clothes like I do. Some people don't have a bunch of children to take a shower and dry their hair." This comment seems to point to the energy costs of additional people and caring for them, as well as, perhaps, standards of upkeep.

Question of the Day #5: If you could change one thing about energy use in your home, what would it be?

Table 16: Summary of Responses to the Question of the Day: "If You Could Change One Thing About Energy Use in Your Home, What Would It Be?"

Code Assigned	Number of Responses	Percent
Behavior	**22**	**51 percent**
Reduce specific uses	9	21 percent
Turn lights off	7	16 percent
Reduce use general	6	14 percent
Energy-using equipment (or structure)	**9**	**21 percent**

Code Assigned	Number of Responses	Percent
Air conditioning	2	5 percent
General efficiency of the home	2	5 percent
Other efficient appliances	2	5 percent
Tankless water heater	1	2 percent
Fans	1	2 percent
Insulation	1	2 percent
Other technology	**15**	**35 percent**
Solar panels	4	9 percent
Solar lights	1	2 percent
Automatic lights or other auto off	4	9 percent
Reduce cost	1	2 percent
Nothing	1	2 percent
Other	4	9 percent

Source: Inova's analysis of Energy Use Journal data

When asked if there was anything they would change related to energy use in their homes, there were a variety of suggestions offered by diarists. Over half mentioned a desire for implementing energy conservation behaviors, such as washing dishes by hand, reducing television or other electronics use, and turning off lights. In contrast, only approximately one-fifth of diarists brought up energy-using equipment in their home and commented around technical energy efficiency, and there was a single specific mention of structural efficiency (insulation) as something they wanted to change. Solar panels and automation received fewer mentions, but were still present.

With this question, the research team had anticipated that people might say something more specific about their home (such as a heater did not work well or that certain rooms were too hot, etc.), but this was rarely the case. These problems were not at the forefront of participants' thinking when it came to energy, nor was technical efficiency identified as a means to improve energy conservation.

Question of the Day #6: What activities did you do today to conserve food, energy, and water?

When asked to describe what they did to conserve resources many diarists focused their responses on food, mentioning activities such as saving leftovers for a later meal, but also eating cold meals which they explained as not requiring any energy for preparation, or cooking for more than one meal at a time, presumably to use energy more efficiently. A few mentioned what seemed like relatively extreme measures, such as taking a cold shower, or using disposable plates to eliminate the need of using water for dishwashing.

Question of the Day #7: Who fixes things at home? For example, when an appliance breaks is it repaired or do you purchase a new one? If repaired, who does the repairing?

The final Question of the Day asked diarists about their approach to fixing broken equipment or choosing to purchase new equipment. This question was motivated by the popular expectation that Hispanic households might be more likely to fix things when they are broken, rather than purchasing new, whether due to income restrictions, expertise and access to expertise, or cultural practices. The answers received obviously depend on what problems are imagined in answering the question, and sometimes whether the home is owned or rented.

Overall, as shown in Table 17, there was a tendency among most households to try to fix things first, usually by themselves (24 percent) or by someone else in the close family or friends' circle (22 percent).

Table 17: Responses to the Question of the Day: "Who Fixes Things at Home? If an Appliance Breaks, Do You Purchase a New One?"

Code Assigned	Number of Responses	Percent
Myself/Ourselves	9	24 percent
Family/Friends	8	22 percent
Landlord or property maintenance	6	16 percent
It depends	5	14 percent
Purchase	3	8 percent
Home warranty or insurance	2	5 percent
Repair (generally)	2	5 percent
Handyman or professional	1	3 percent
Has not happened	1	3 percent
Total	**37**	**100.0 percent**

Source: Inova's analysis of Energy Use Journal data.

Some diarists living in rental properties even mentioned that they would first try to fix the appliance or equipment themselves, before going to the property manager or owner. Strikingly, only one person said that they would start by hiring a handyman or professional; others mentioned that they would do so, but only after they tried to fix it themselves or through personal networks first.

Only three diarists (8 percent) said that they started by buying a new appliance and some pointed out their evaluation process, for example, if it was a better idea to buy a new one versus bothering trying to repair—so the convenience of replacement may often play a role.

Photograph of the Day

The research team requested specific photos from the diarists to further engage them in thinking about energy use in their home. For instance, the photos attempted to uncover associations that diarists had with the concept of energy, to gage how well diarists understood

how energy is comparatively required for end-uses and activities, to learn more about their energy behavior for a critical load (cooling), and to discover what people understood about energy sources.

Photography requests were posed as optional in the sense that they were not required to receive the journal completion financial incentive, and though several were received, they are less than the total number of journal responses. It is important to mention that some photography prompts received more submittals than others and, although the image quality was oftentimes the low, the research team was still able to glean insights from what the diarist chose to photograph. In total, 119 photographs were submitted by 39 diarists.

The nature of the photograph requests, as shown in Table 18, varied and therefore the analysis approach also varied. For example, photographs for Days 1 through 4 were analyzed with a "correct/wrong" lens, while the rest of the photographs were interpreted as an illustrative example. In general, the number of photographs of energy-consuming devices or equipment (lights, computer, fan) was recorded to identify patterns for each day's request. The remainder of this section summarizes the results for the Photo of the Day requests.

Table 18: Photograph of the Day Requests Made of Diarists for Each of the Seven Journal Days

Day	Photo of the Day Prompt	Number of Photographs Submitted
1	Take a photo of an activity that you think uses the most energy in your home	30
2	Take a photo of where you think your energy comes from	20
3	Take a photo of the appliance or equipment that you think uses the most energy in your home	18
4	Take a photo of something that reminds you of conserving energy	15
5	Take a photo of something you do or use to stay cool	16
6	Take a photo of your thermostat	7
7	Take a photo of an appliance in your home that is on the older side or needs replacing	13

Source: Inova Energy Group

Take a Photo of an Activity that You Think Uses the Most Energy in Your Home

The first request was for a photograph of the activity in the home that diarist thought used the most energy. Of the 30 photographs received under this prompt, one-third (N=10) of diarists took photographs of their television, leading the researchers to think that watching television was perceived as the most energy-consuming activity, even in some cases when the photographs showed a small typically-efficient flat screen. Although in their responses diarists often mentioned watching television for an hour or two, it was not possible to gage from journal entries an approximate time that televisions were on in a household, especially when multiple TVs were available or the practice of keeping the television on in the background but not actively watching it. However, according to market research figures available Hispanics

spend an average of 117 hours per month watching TV, which is less than the average American at 141 hours per month (Nielsen, 2014).

The next most common photographs received were of cooking or cooking appliances (N = 5), followed by photographs that suggested cooling or heating (N = 3).

Figure 10: Selected Responses to the Photograph of the Day Request: "Take a Picture of an Activity that You Think Uses the Most Energy in Your Home"

Source: Photographs submitted by study participants.

Take a Photo of Where You Think Energy Comes From

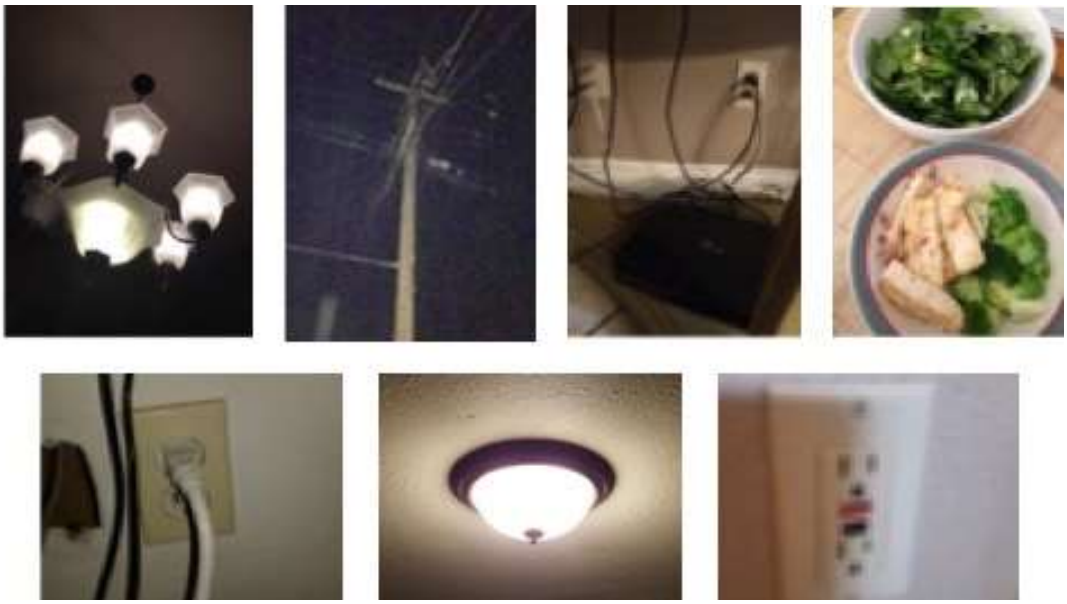
The research team asked diarists to send a photo of where they thought energy came from with the intent of engaging diarists on sources of energy, and getting some insights into their mental associations triggered by this concept. Although the prompt did not specify that the sources of energy should be electric, all but one of the responses received alluded to electricity. The single response that did not show an association to electricity depicted a plate of food, and more specifically what looked like a healthy meal of greens and protein. In addition, while the prompt did not restrict individuals to take photos of a location within their homes, all but one of the photographs received were taken inside a home, presumably the diarists' properties.

In total, the research team received 20 photographs under this prompt, and the concepts shown were so varied that there were no clear stand-outs. Even so, the most common photographic response (N = 4) was lighting, probably indicating an association of light as a source of energy, and the second most common response (N = 3) showed electric outlets and power cords. One diarist also submitted a photograph of an electric pole at night (Figure 11).

Recognizing that this photography prompt was abstract and therefore challenging in itself, the photographs submitted should not be interpreted to mean that diarists lacked awareness of

where their energy came from[7]. The question was designed more as an engagement prompt, rather than a scientific one. The research team did observe that almost all photographs were taken inside the home.

Figure 11: Selected Responses to the Photograph of the Day Request: "Take a Picture of Where You Think Energy Comes From"



Source: Photographs submitted by study participants.

Take a Photo an Appliance or Equipment that you Think Uses the Most Energy in Your Home

The 18 photography submittals for this question were diverse in what they depicted, but two appliances tied for the most common response: refrigerators (N = 3) and laundry equipment (N = 3). A few respondents took pictures of lighting and only one household submitted a photo of air conditioning equipment (Figure 12).

7 However, it should be noted that during the in-home interviews, some interviewees struggled with a similar question when given an opportunity to verbally describe where energy comes from.

Figure 12: Selection of Photograph of the Day Responses to "Appliance or Equipment that Uses the Most Energy in your Home"

Source: Photographs submitted by study participants

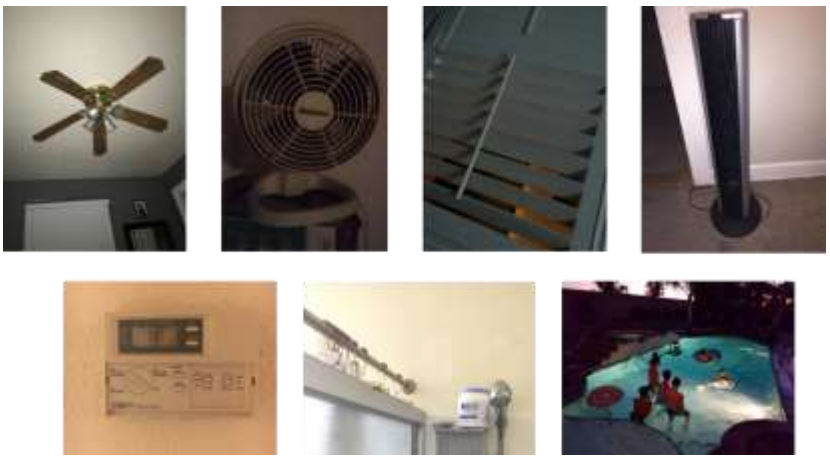
Take a Photo of Something that Reminds You of Conserving Energy

This request was to show something that reminds the diarist of conserving energy. Of the 15 photographs received, a few were easy to interpret: a utility bill, compact fluorescent lights, and LEDs. Another showed a cloth reusable shopping bag, presumably referring to resource conservation and environmentally-friendly habits. The interpretation of several other photos was not clear.

Take a Photo of Something You Do or Use to Stay Cool

The fifth photography request was for a photo of something the respondent did or used to stay cool. Of the 16 photographs received, nearly half (N=7) showed either ceiling fans or portable fans (Figure 13).

Figure 13: Selection of Photograph of the Day Responses to "Something You Do or Use to Stay Cool"



Source: Photographs submitted by study participants

Only three additional photographs suggested air conditioning by depicting thermostats, and other photos (N=5) implied alternative ways of cooling, such as closing the blinds, swimming in a pool, taking a shower, or laying down in a couch to cool the body down.

Take a Photo of Your Thermostat

These photographs are informative in terms of illustrating a level of sophistication of the thermostat technology (especially programmable versus not) available in the diarists' homes. The selection of photos shown in Figure 14 illustrates the wide variety of thermostats and temperature controls, from very old and possible broken to various levels of programmability. Of the seven thermostat photos received, four were programmable. In one case the photo appeared to be that of the controls on a portable fan (not shown).

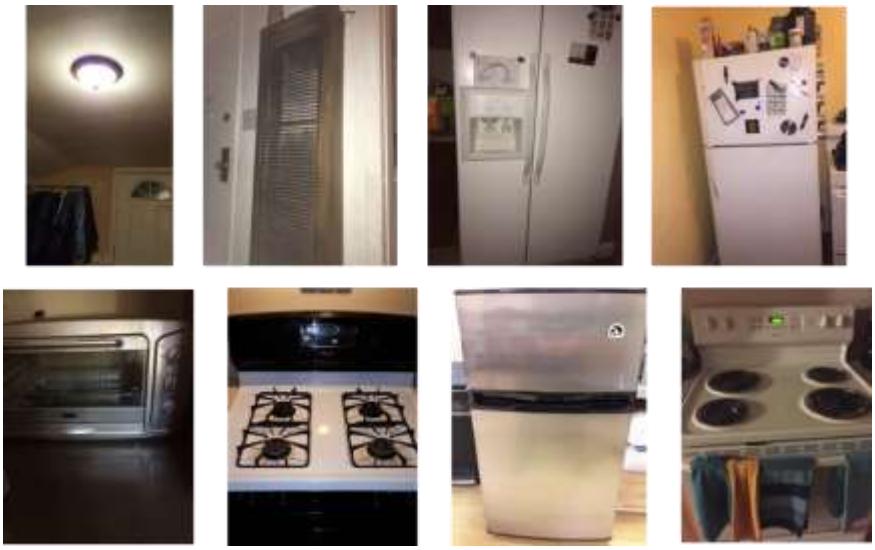
Figure 14: Selection of Photograph of the Day Responses to "Take a Photo of Your Thermostat"

Source: Photographs submitted by study participants

Take a Photo of an Appliance in your Home that is on the Older Side or Needs Replacing

The final photography prompt asked diarists to send a photograph of an old appliance or one that needs replacing. Of the 13 photographs that were received, all but two showed a kitchen-related appliance (Figure 15). Most showed refrigerators (N =5), but whether the refrigerators were not working well, or whether there were other reasons for replacement such as desire for a different design, a more efficient model, or a bigger appliance was not specified and cannot be deducted from the photos. Other responses showed a gas stove, an electric stove, and a small portable oven. Finally, three of the photographs did not depict appliances, but rather showed a wall heater, a lighting fixture, and a couch.

Figure 15: Selected Responses to the Photograph of the Day Request, "Take a Photo of an Appliance in Your Home that is on the Older Side or Needs Replacing"



Source: Photographs submitted by study participants

CHAPTER 6:
Research Findings: In-Home Interviews

This chapter presents the research team's detailed analysis of the information obtained through the Energy Use Journals entries, as well as from 18 detailed interviews. As mentioned in the previous chapter, because the interviews drew from the journal entries of a sample of diarists, the research team decided that a combined analysis of both research methods would be the best way to present findings to the reader.

Where relevant, quotes from diarists and interviewees are included throughout this chapter to support certain conclusions. All quotes are accompanied by a unique ID to allow the reader to match the comment to the characteristics of the participant, shown in Appendix E and Appendix F. As with the diary analysis, the identities of the participants are kept anonymous and confidential, however, the detail of the information presented in these appendices was retained to relate to the reader the specific circumstances that may have had a bearing on the participants' contributed thoughts and ideas.

The analysis included in this chapter is organized around three topic areas: (1) energy use behaviors, arranged by end-use categories, and including the approach to repairing or buying an appliance; (2) energy conservation behaviors; and (3) beliefs and perceptions about energy.

Interview Process and Analysis

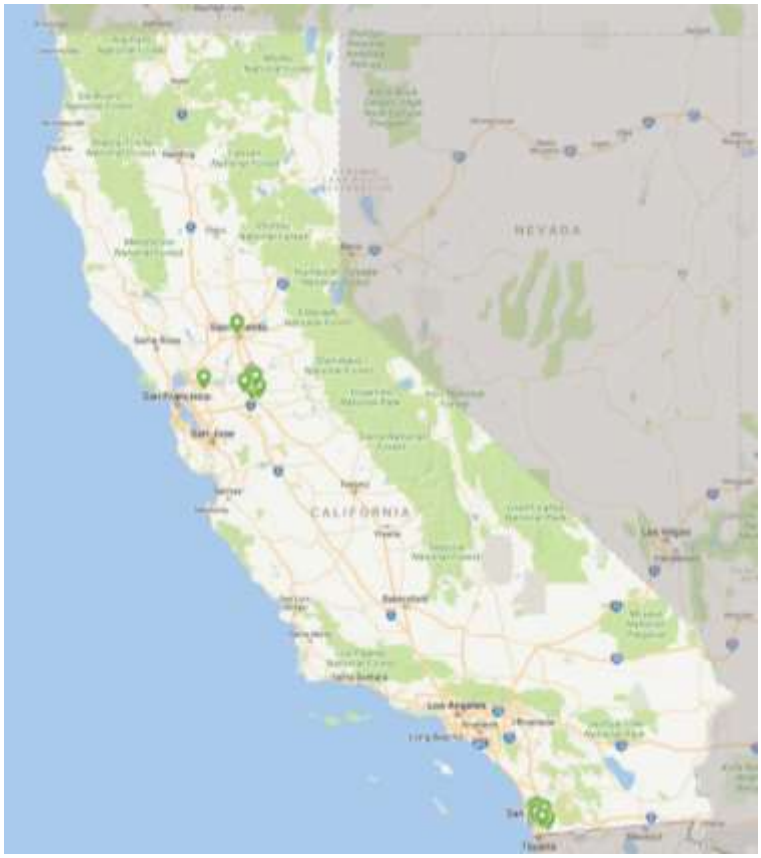
Using the completed diaries as a springboard, the research team went into the homes of 16 diarists to talk to them further about how they used, conserved, and thought about energy. Two more diarists participated in interviews that were conducted over the phone, for a total of 18 comprehensive conversations. In-home interviews were conducted in two phases – first in the San Diego area in late October 2016, and then in Stockton in December 2016.

Interviewees were selected based on their willingness to participate in the in-home interview, and other practical considerations that included travel logistics and scheduling. Ultimately, the interviewees represented a mix of immigrants as well as first-, second-, and third-generation Americans of Hispanic ascendance. Interviewees identified with Mexican, Ecuadorian, Guatemalan, Salvadorian, and Puerto Rican ethnicities. Of the 18 households, two-thirds included extended family members living at the property, and seven were renters with the remaining being homeowners. The homes visited were located in urban and suburban areas, and consisted of properties ranging widely in size, from single-family households, to mobile homes, and apartments within multi-family complexes (Figure 16).

To analyze the information provided by diarists and interviewees, the research team adopted an ethnographic lens that allowed a nuanced analysis of the interviewee's culture. In doing so, the team compared ideas offered across the diversity of the participant's homes, paying attention to common and repetitive messages of daily routines and behaviors, while also noting "interesting" or otherwise uncommon practices that may be common to the culture. The

researchers also extracted sample “stories” which are embedded throughout the discussion that follows.

Figure 16: Locations of Participating Households by Zip Codes - Interviews



Source: Inova Energy Group

Before discussing the main findings from the interviews, however, it is important to address the issue of language and how this was approached through the interview process. For all interviewees, the option was given to conduct the interview in Spanish, and even though all project materials were also produced in Spanish, very few individuals took advantage of this offer. In the end, all interviews were conducted in English but several interviewees chose to insert Spanish words for additional context, or often defaulted to Spanish when they did not know how to convey something in English.

Through the conversations, interviewees described how in their daily life they advantageously chose Spanish or English depending on the context of the circumstances. One interviewee gave an example of how she would strategically choose the Spanish option in phone trees to get through more quickly. Another said that while she spoke Spanish in her home, she always used English for technical information, because the Spanish language translations of technical material were, in her opinion, often poor. This echoes a comment from one of the subject matter experts interviewed earlier in the project, where he pointed to the often-amateurish quality of energy efficiency program material that is translated to Spanish.

Energy Problems in the Home

To foster an expansive view of energy versus simply behaviors, and to obtain an understanding of the living situations of the participants, interviewees were asked to identify any problems with how their home operated and any parts of their home that were uncomfortable to them. The questions were meant to draw answers that could point to energy-related problems that were experienced in the home, such as a lack of insulation, moisture issues, drafts, and poor air conditioner performance.

Energy problems mentioned by participants are listed in Table 19 and can hint at possible entry points for energy efficiency programs. Most of the mentions revolved around uncomfortable temperatures and air flow due to a poor building envelope.

Table 19: Mentions of Home Problems

Attribute	Number of Mentions	Examples
Uncomfortable Temperature	9	• Old house poorly insulated in general; walls are thin • There is a hole in the ceiling of the kitchen that makes it uncomfortable • Lights get the room very hot • Old house lacking insulation • Due to poor insulation because it is a rental property
Appliances	3	• If you hook up two appliances at the same time the power goes off* • AC unit has issues during high temperatures; rated too low for the load required for the size of the house • Central AC system is too small for their home
Stuffy	2	• Only one window opens and the air conditioning unit is there. No other operable windows to let air in, and it gets stuffy
Drafts	2	• Living room is drafty
Others	1	• Mildew and other moisture-related problems • Electrical problems such as circuit overloads, non-grounded outlets, or air conditioner switch • A feeling of insecurity limiting how much the outdoors could be used

*** Denotes a safety issue**

Source: Inova's analysis of information provided by interviewees

In this line of questioning, what counts as a problem will naturally depend on the individual and their expectations. Interviewees who had grown up or lived elsewhere with limited access to electricity or energy services were more accepting of the shortcomings. This can hint at an evolution of expectations over historical time and "family time" scales (for example affluence) may bring increased energy use (Shove, 2003; Garabuau-Moussaoui, 2011).

In discussing how these problems would be tackled, interviewees suggested that they might undertake these projects in the future, but only if they were paired with other aesthetic or

functional home improvements, such as room additions or kitchen renovations. Overall, there was a sense that several of the projects were perceived as complicated by the interviewees. For example, several interviewees thought their home did not have enough insulation, but the process for resolving this issue seemed unclear to them, and the value of the effort unknown.

Energy Use Behaviors

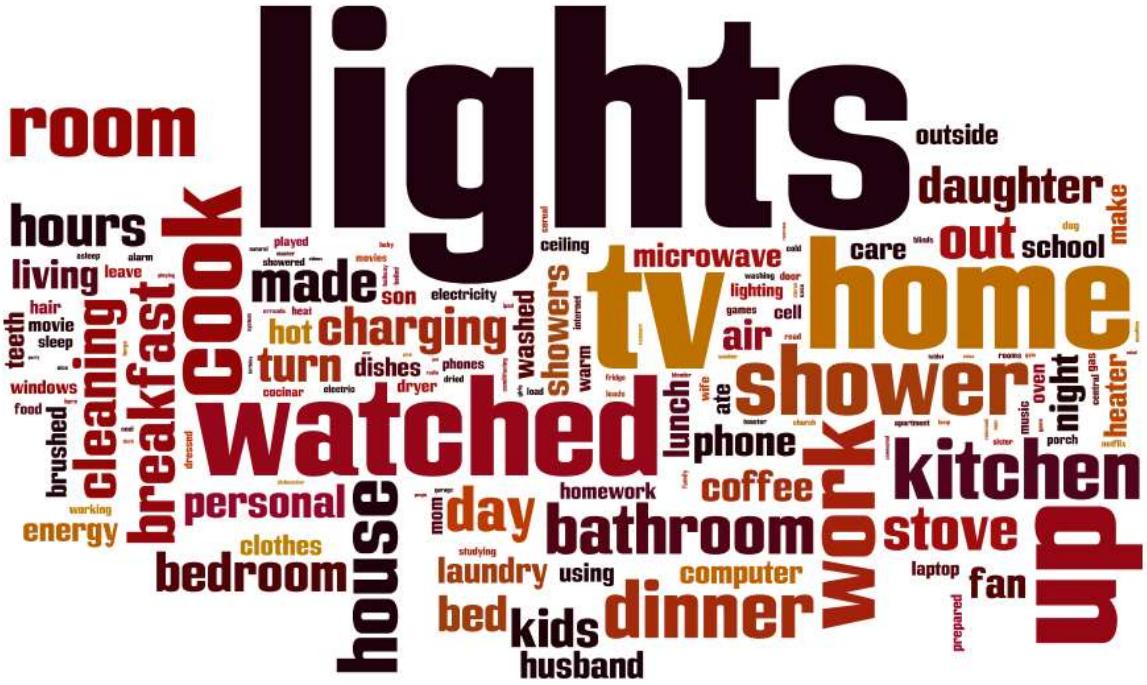
The in-home interviews conducted uncovered substantial information on how interviewees utilized the various energy-using equipment that was available in each of their homes, as well as their preferences for equipment settings and usage. Many of the ideas shared by interviewees focused on what they did, or did not do, to remain comfortable inside their homes and to execute their daily responsibilities. The conversations often touched upon cultural practices and the influence of other household members, family members, and other individuals within the community. Overall, the discussions gave a sense of how these habits were learned and maintained or eroded.

Both the interviews and the Energy Use Journals covered a wide variety of energy use behaviors that were brought up by study participants both with and without a prompt from the interviewer. Though it is difficult to assess from the in-home interviews whether some behaviors occur more frequently than others, or are more intentional than others, the written entries from the Energy Use Journals can be used to identify the frequency of mentions of certain activities. Figure 17 presents a word cloud of the words most frequently used in the journals in aggregate to provide an insight into what concepts were "top-of-mind".[8] The height of the words is proportional to their frequency in the text, and, as can be seen, lights and lighting dominates; watching movies and television or TV is next most commonly-referenced activity, followed by cooking, showering, bathroom use for personal care, and then cleaning.

Interestingly, there were a significant number of mentions for equipment that was not anticipated by the authors such as hair tools, vacuum cleaners, radios, irons, and various other kitchen appliances like coffee makers, blenders, and toasters. From the journal entries, some of the top activities mentioned, for example cooking, and watching television were frequently brought up in the context of a family activity. Similar ideas were conveyed during the interviews, where interviewees associated certain energy-using activities something with taking care of the family.

8 Stem words (for example light, lights, lighting) were grouped and Spanish was translated to English.

Figure 17: Analysis of Word Frequencies from Journal Entries



Source: Inova's analysis of Energy Use Journal data

The following subsections organize the findings from the review of the journal entries and the in-home interviews around specific end-uses within a home. These end-uses are presented in no particular order.

Cooling

In the Energy Use Journals and during the interviews, participants were asked how they and their families kept cool during the summer or periods of hot temperatures.[9] This line of questioning is important because, particularly for some parts of California that experience higher temperatures, cooling the home can be a significant energy burden for families. The thoughts received about participants' cooling practices largely fell into two categories: ideas about mechanical cooling provided by some type of air conditioning unit, and other cooling practices such as ventilation and passive or natural cooling. These ideas shed some light into what Hispanics may do for cooling their homes that may be different from common assumptions energy efficiency program assumptions.

Regarding mechanical air conditioning, while 14 interviewees had some form of air conditioning in their homes, whether central or window units, only a third of them mentioned using it as their primary means of cooling. When asked to describe their behavior further, the thoughts were polarizing; most declared a somewhat conservative usage for reasons of personal

9 Although all interviewees were asked the same questions about cooling behaviors, it should be noted that this line of questioning was perhaps more relevant for the interviews conducted in the San Diego area, as they took place during the cooling season. For the San Diego area, the average mean temperature during the journaling and interview period (August 13 – December 7, 2016) was 70 degrees, and the area experienced 97 Heating Degree Days and 639 Cooling Degree Days (base 65˚F) during this timeframe (Weather Underground, 2017).

preference as well as from a cost-consideration standpoint, in fact, many interviewees make the connection between higher air conditioning usage and higher electricity bills. However, a few others mentioned using it liberally, and described unique behaviors such as leaving it on for their pets when they leave their homes. This later group described keeping the house cool as a priority, whether out of personal comfort or referring to the needs of other household members, particularly children and older adults, and did not seem particularly concerned with energy efficiency, though they may have regretted the costs or been unaware of them.

Drawing from both the journal data and the in-home interviews, it was the perception of the interviewers that overall knowledge about central air conditioning use seemed to be low. There also appeared to be little attention to technical efficiency, whether through the use of thermostats or through the equipment itself, and more focus on behavior. Where air conditioning was used, it was apparent that most households actively managed their cooling through on-off operations rather than automatic management through use of a programmable thermostat, even when they did have such a thermostat.

A very common theme that came out in the conversations related to air conditioning is that interviewees often stated that they did not like air conditioners, as they had a preference for "natural" environments, and thought that this method of cooling was "fake." As one interviewee said: [SJ05] "I rarely turn on window AC. It annoys me - I don't know why I don't care for it. I prefer fresh air." The resistance to using air conditioning is interesting on several levels. First, it suggests that interviewees saw other viable alternatives to air conditioning, whether they were a matter of different expectations and preferences, or different methods of keeping cool. Second, for some interviewees, using air conditioning represented, or aligned with succumbing to artificial environments, which had a negative connotation.

The second category of thoughts circled around ventilation, as well as natural cooling methods. Many interviewees and diarists, regardless of whether or not they had air conditioning in their homes, relayed routines that they had developed to keep the home cool through shading, opening windows and doors to create drafts, and by using fans to create ventilation. Interviewees also described a variety of other natural cooling techniques, including taking a shower, swimming, or going to a shopping mall with air conditioning to keep cool. Some of these methods were also illustrated in the Photograph of the Day with the prompt 'take a photo of something you do or use to stay cool', where over half of the photos submitted represented cooling methods such as increased ventilation from fans, closing window blinds, swimming in a pool, and showering. One interviewee living in San Diego described using what her father called the "California Cave Method" to cool her household: [SD08] "We have layers of dark curtains everywhere, then we have blinds and then in the exterior of the house, there is a screen in the porch. To cool down, I close the windows, turn on the fans, and then close all three layers."

Fans were mentioned in almost all interviews and present in most households. In the San Diego area, ceiling fans were common in use and were sometimes left on throughout the day. The interviewers observed typical desktop and floor fans in the properties that were visited, but also some tower floor models. The degree to which the use of fans was a matter of habit, preference, cost-consciousness, equipment performance, or simply the only available

alternative was not clear. However, in houses that had both fans and air conditioning, fans were often preferred to air conditioning citing more natural environments, as previously described.

Heating

Interviewees and diarists were also asked about how they kept their home warm during winter. Questions about heating were primarily relevant in the Stockton area, where energy use journals were completed during the fall and interviews conducted in early December 2016.[10]

In general, using central heating was not the norm among study participants. Eight of the 18 households interviewed mentioned having central heating but described their preference to wait as long as possible to use it. Reasons cited for this delay included not liking the feeling of over-heated and dry air, the perception that central heating aggravated existing medical conditionings such as allergies, and in one case, an interviewee simply mentioned that their furnace did not function properly. When these households did rely on central heating most used it for short periods of time instead of a "set and forget" approach driven by a thermostat—a similar strategy to that found for central air conditioning use.

Of the interviewees that did not have central heating, the options listed for heating purposes included relying on wall heaters (gas), portable electric heaters, electric or wood-burning fireplaces, and electric blankets to keep warm in cold temperatures. Other households also mentioned low or no energy ways of staying warm such as closing windows, layering clothes or blankets, and at least two mentioned cooking as a way of keeping the house warm: [SJ09] "We sometimes use the oven, rather than central heating, if we have to cook." In general, there seemed to be an ambiguity amongst interviewees about whether it was cheaper or "better", however they may have defined this, to use portable heaters instead of a central furnace. But one interviewee mentioned that through experience they learned that portable units often not cheap: [SJ01] "I bought a fan for heat at Costco. Big mistake. I got my bill and thought 'what?' I called PG&E and told them I thought I would be saving money. No, they said that's the worst thing to do. Now my son is in the habit of having the heating fan on when he dresses."

The interviewers also notice widespread use of gas or electric fireplaces, and a preference for these units by household occupants of the older generation, who might have especially liked fireplaces because of their more natural and cozier aspects. However, there was also the recognition that electric fireplaces in particular could drive the electricity bill up: [SD18] "The house felt so cold I really wanted to turn on our electric fireplace but I could just think of the electricity bill how high it was going to be if I turned it on."

Lighting

As evidenced by the responses to Question of the Day #2 What do you think about when you hear the word "energy"? Lighting was top of mind for most study participants and interviews often touched upon various behaviors related to the use of indoor and outdoor lights. However,

10 For the Stockton area, energy use journals were completed from August 25th through December 12th, 2016, and interviews took place in late fall. During the entire journaling period, the mean average Stockton temperature was 63 degrees, and there were 25 Heating Degree Days and 16 Cooling Degree Days (Weather Underground, 2017).

in all conversations there was little to no mention of the technical efficiency of the lights themselves.

Before describing the behaviors identified, it should be noted that the interviewers observed that most households visited had both compact fluorescent lightbulbs (CFLs) and incandescent bulbs, although the exact ratio was not determined because the walkthroughs oftentimes did not cover the entire home and a true lighting count was not performed. Halogen lightbulbs were in occasional use and no LEDs were observed. Additionally, per the observations of the interviewers, many of the visited properties seemed to keep a relative, overall low light, but natural, level in their homes. When asked about this, most participants identified a preference for natural lighting, and one simply described their family as “dark people”, preferring obscure environments. One interview said that they even liked to use candles for lighting at night, because they made the room look cozier and because the halogen lamps in the property emitted heat.

Turning off lights when they were not in use was the top light-related behavior mentioned in the both the Energy Use Journals and the in-home interviews. Interviewees frequently stated that they kept after their children to turn off lights—as their own parents did when they were growing up—or went around turning off lights left on by others in the household. This behavior was performed regardless of the efficiency of the light bulb, and could be a result of habit or, as mentioned, because past generations taught the behavior. However, interviewees also indicated that oftentimes the vigilance required to turn off lighting was tiring, and expressed some level of resentment for household members that were responsible for the transgression, particularly when they were not children: [SJ04] “My husband will leave one of the lights on and I will go and turn it off.” or [SD01] “My husband grew up privileged so he has no concept of turning off lights.” Regardless of whether or not households were actually very vigilant about turning off lights, and whether or not turning off higher-efficiency lamps, such as CFLs, actually saved much energy, the behavior is still iconic as it was widely prominent amongst study participants.

Another common practice identified involved leaving certain interior lights on when away from home, or when asleep, for security and safety reasons. Interviewees mentioned that leaving interior lights on would suggest that the home was occupied, and also would allow a household member arriving home after dusk to comfortably see what they were stepping into. Porch and yard lights were also often left on at night, or when the house was vacant for longer periods of time. As one interviewee mentioned: [SD18] “When we leave the house, we leave the lights outside on all the time. We don’t want people to see a dark and empty house, and when we return, we don’t want a dark house. I thought everyone did this and that we are all the same way.” But on this topic interviewees did imply a sense of guilt about leaving lights on for long periods of time, and suggested that technology that may automate the process (that is controls or sensors) might be beneficial to their situation.

Televisions

Most households interviewed had more than one television and, particularly in households with younger children, televisions often were located in the family gathering area. Speaking about his family and televisions, one interviewee said: [SD19] “They are a nice way to be together. They are on 80 percent of the time if somebody is home.” This sentiment was often echoed by other interviewees, and in fact, when asked to describe their preferred room in the house, most interviewees selected a room with television in it, often where the family would spend time together.

One common behavior that was identified, from both the Energy Use Journals and the interviews, involved keeping the television on in the background for noise, even when it is not being actively watched. In fact, some interviews conducted actually took place in the living room area with the television on in the background. The behavior is sometimes automatic, as one interviewee said: [SJ05] “We turn on the TV immediately when I get home from work.” Another interview mentioned: [SD05] “I keep the TV on and fan on all day while I am in the house. Maybe it is too quiet without them. It is comforting to hear something going on”.

The overall perception that the interviewers formed was that televisions were an important electronic, that households were unwilling to compromise on their use, and that not much attention was paid in terms of energy conservation. Only one interviewee pointed to their television’s auto-off features, which the family could use as they fell asleep with the television on. A few other “vigilant” households did seem to associate the television more closely with energy use, but the conservation was focused on moderating viewing time and no mentions were made of the efficiency of the equipment.

Kitchen

According to cultural experts, cooking and food are important cultural mediums in traditional Hispanic values. The act of cooking is associated with a sentiment of bringing the family together and expressing love and care for others (Culturati Research & Consulting, 2013; Hadjiyanni & Helle, 2015). Underscoring the connection between cooking and identity, an interviewee said: [SD19] “The kitchen is the heart of the home, it is where people gather. Cooking is definitely a big part of who we are. When you think about Latinos, you think about entertaining: tamales, enchiladas, etc.” Whenever interviewees talked about cooking or the kitchen, the thought would be followed by a description of several food items or prepared meals. Often, this description was quite detailed, suggesting a deep relationship with food.

While some interviewee households appeared to operate on a more “improvised” microwave-and-takeout dining style, with different household members dining at different times, for most, cooking for the family, communal mealtimes, or hobby cooking, was the norm. Studies have found that Hispanics are engaged cooks who like preparing meals and tend to use fresh ingredients. Compared with non-Hispanics, Hispanics are slightly more likely to really enjoy cooking (50 Hispanic, 47 percent non-Hispanics), and Hispanics are less likely than non-Hispanics to prefer easy-to-prepare foods (41 percent Hispanic, 52 percent non-Hispanic)

showing an interest in complex and traditional recipes that allows them to add personal touches to dishes (Experian Simmons, 2012).

The perception that cooking used a lot of energy seemed common amongst interviewees, especially in the case of electric cooking appliances where some interviewees understood that electric stoves resulted in higher cost when compared to gas stoves due to the cost of the energy sources. While the Energy Information Administration estimates that cooking accounts for only 2 percent of household electricity use at the national level, (EIA, 2017), this percentage can vary for each household depending on the primary fuel used for cooking, and the volume of meals that are prepared in the home. To save energy while cooking, one woman emphasized that she had developed shortcuts such as using canned beans rather than cooking them on the stovetop, or preparing cold meals that do not require any heating.

In terms of kitchen equipment, gas stoves were observed to be common in the households visited. One interviewee commented on her preference for a gas stove over electric: [SD05] "I've always had a gas stove. I feel like for the electric stove I heat it and the grill starts smoking. It seems like it is dirty." This preference for gas stove has been previously documented and can be related to staples of the Hispanic diet such as tortillas, which heat better in a gas stove than in an electric stove, and cultural traditions such as cooking over open fires (Abala, 2002).

Numerous small electric appliances such as microwaves, toasters, and blenders were observed. However, while the researchers expected to find a high presence of second refrigerators[11] given the understanding of the importance of cooking in Hispanic families, this was not the case. Subsequent investigations in literature showed that Hispanics have a preference for eating fresh meals as opposed to relying on ready-to-make or pre-cooked (Experian Simmons, 2012), which would reduce the need for additional refrigerator space.

An interesting behavior that was identified related to kitchen appliances, involves a disinterest in the dishwasher. This disinterest was remarkably consistent across many of the interviewees and diarists: people who had one did not seem to use it, preferring to wash dishes by hand, and even unplugging the dishwasher or removing it. Some interviewees said they did dishes by hand because they thought the dishwasher wasted energy, water, or money, but others just said it was what they did, culturally, or even used it as a chore for children in the family. One interviewee said: [SJ04] "I don't use the dishwasher and instead I do the dishes by hand. That's how I was raised." And another echoed the sentiment by saying: [SJ16] "that just the way I grew up." Other studies have found similar behaviors within the American Hispanic population and have quoted several reasons for the low reliance on dishwashers including a perception that dishwashers did not get dishes clean (Hadjiyanni & Helle, 2015). The low use of dishwashers, however, may not be something unique to Hispanics, as a national survey on household energy use conducted by the Energy Information Administration found that dishwashing machines are the most commonly "unused" residential appliance, with 20 percent of households that had a dishwasher mentioning that they did not use it (Energy Information Administration, 2017).

11 A report prepared for the California Energy Commission shows that in 2008 18-26% of California homes serviced by investor-owned utilities and Los Angeles Department of Water and Power had a second refrigerator (CEC, 2010).

Housekeeping

Diarists frequently mentioned cleaning and housekeeping activities in their journal entries and often hinted about a certain pride that they took in having a clean house for their family members. For interviewees, housekeeping activities seemed to be primarily performed with old-fashioned methods and without the need to rely on energy-using equipment. This finding parallels the conclusions of recent study that the research team found that investigated the idea of cleaning in the context of Hispanic cultures. One of these studies, commissioned by Clorox, claimed that cleaning was a "rite of passage" for Latinas, and that the process was taught by mothers and grandmothers to younger generations (Clorox, 2010). The study mentions that keeping the house clean is an important cultural value for Hispanics and, resonating with the findings of this research, concludes that "more than half of Latinas prefer certain elements of old-fashioned cleaning, such as washing dishes by hand instead of dishwasher (83 percent), and mopping the floors with a regular mop or by hand (73 percent)."

Most interviewees participating in this study seemed to use both the washer and dryer rather than line dry clothes. There was a sensitivity identified about how much energy was used by doing laundry, and some interviewees mentioned that they were careful to only do full loads. Interestingly, several interviewees also mentioned that they did laundry during off-peak periods because they "heard" it was cheaper. None of these interviewees, however, confirmed an impact to their utility bills.

For at least some of the women interviewed, the interviewers sensed a tension between maintaining standards of cleanliness and avoiding unnecessarily using water, energy, and money. In one case, an interviewee who received an annual energy-efficiency visit (apparently from their utility) mentioned that she knew that with the new detergents one could use cold water for the clothes washer instead of hot and that she had passed this information along to others. In the Energy Use Journals, there were also several mentions of ironing clothes, even daily, which was a chore that both men and women took on.

Personal Care

While the in-home interviews themselves rarely touched on bathing and personal care, the entries in the Energy Use Journals often did. When describing these activities, diarists often provided frequency and estimates of bathing time, however, these are probably not reliable. Worth noting is the fact that in their journal entries, diarists often mentioned "showering" (N=243) and only nine mentions were recorded for "bathing". Whether the diarists meant to explicitly differentiate between the two activities or not, is unclear.

One result that did come through clearly in the interviews and journals was the prevalence of hair grooming equipment amongst interviewees, particularly flat irons for women; some diarists suggested that these could be left on for an hour or more.

Uncommon End Uses

Though the research was not intended to provide a fully detailed inventory of the equipment in interviewees' homes, there were a few pieces of equipment that stood out from the information

provided in the energy use journal entries, photos submitted, or the home walk-through. For example, medical equipment, such as respirators and nebulizers, was observed in a few households and mentioned by the interviewees. In some cases, the presence of this equipment reflected larger environmental issues such as poor air quality in the Central Valley, for example. The researchers also learned that several households had water coolers, and one Stockton interviewee, mentioned that the reason for having a water cooler was the recognition that the local water quality was poor (Community Water Center, 2017).

In one home in the San Diego area, an interviewee revealed having a plug-in electric vehicle that was purchased in recent years. When asked why this vehicle was chosen over conventional equivalents, the interviewee mentioned that the decision was purely driven by a desire to be "trendy" and not influenced at all by environmental reasons or considerations for potential operational cost-savings. However, the interviewee did admit that since getting the car, the family had seen a reduction in monthly expenditures associated with driving a vehicle, when compared to their previous gasoline-fueled vehicle.

The interviewers also observed swimming pools at two of the homes, a well at one home, and an outdoor kitchen at another property.

Equipment Repair and Purchases

In addition to some of the whole-home problems that were identified earlier in this chapter, most interviewees could point to some equipment or appliance that needed to be repaired or replaced in their home.

In terms of their approach to repairing equipment, many interviewees stated that when equipment breaks they primarily relied on personal networks to identify an individual that could perform the repair, regardless of whether the individual was a professional. Most people's first call was to a friend or family member. Also common was a reliance on their own personal skills for fixing the problem, and a "do it yourself" attitude was also evident in the conversations. When unfamiliar with the process for fixing a problem, interviewees mentioned visiting Google and YouTube for information.

In addition to probing on repair and maintenance issues, the in-home interviews included questions about purchases of energy-using equipment, including how purchases are made and where interviewees usually shopped for household appliances and other equipment. Overall, study participants mentioned shopping for energy-using equipment at the following stores (in no particular order): Home Depot, Sears, Lowes, Walmart, Best Buy, Costco, and Target. When asked about the criteria that they considered in their purchases, most interviewees mentioned practical issues such as price, size or fit in a location, appliance features, and aesthetics. But others also mentioned attributes of the equipment manufacturer such as brand reputation, expected reliability, and warranties, as well as characteristics of the retail store or vendor such as customer service, and opportunities for returns (for smaller electronic equipment). Some households also referred to broader cost-considerations as part of their decision-making process, for example choosing a gas stove over electric because electric cooking was more expensive than gas.

Only three interviewees mentioned ENERGY STAR® or other energy efficiency ratings (for example, "yellow tags"), but efficiency of the equipment was rarely expressed as a priority. In one instance, an interviewee said the main reason she renovated her kitchen was to install energy efficient appliances, but in the end, she found them too expensive to purchase: [SJ01] "I want to buy energy efficient appliances but boy they are expensive. That was my whole purpose behind remodeling the kitchen to get energy efficient appliances but I didn't buy them. If they want people to buy this stuff they should make it more affordable especially for people on a budget."

Interestingly, a few interviewees mentioned that rather than seeking more efficient models, they went with simpler, more old-fashioned, and sometimes smaller appliances, similar to the decades-old appliance they were replacing. This was expressed as being due to ease of use and familiarity with the equipment, and it was unclear whether or not these appliances had some type of efficiency rating.

One interviewee, who believed she had good shopping skills, described her shopping process as follows: [SJ01] "I do research before I shop, and generally I go to Sears. Service is good… I negotiated with them by saying I was getting several appliances so give us a good deal. Sears had good customer service, and they deliver the appliance." Though only somewhat evident from the in-home interviews, market research firms that study how Hispanics make shopping decisions suggest that cultural heritage is a large influence on how they buy and consume goods, including big ticket items. One recent study proposes that the Hispanic shopping experience is inherently social, and that in fact, before making any purchase Hispanics are more than twice as likely as non-Hispanics to ask family members for their opinions and feedback (Lapiz, 2012). The process of shopping itself is often a family affair, where the entire family visits a store and makes joint decisions on the purchase of an item (Kebler & Associates).

As is to be expected, renters had different responses than homeowners based on their recognition that decisions about repairs or equipment purchases had to be deferred to their landlords or maintenance companies. These renters mentioned not always being satisfied with the results of repairs, and expressed concern that landlords might replace an appliance with a lower quality and cheaper equipment. One interviewee mentioned a specific experience where the landlord replaced a clothes dryer and stated, [SD08] "It is awful. It gets so hot that it shrinks all of our clothes. So, we have resorted to air drying things."

Electricity Bills

The majority of households interviewed did not seem to monitor their electricity bills with frequency, and few, if any, households had existing Green Button Data accounts illustrating the lack of sophisticated ways to monitor energy use. With few exceptions, women were in charge of paying and monitoring energy bills. This awareness and interaction might be the reason why out of all our interviewees women were more generally portrayed as the "conservationist" in the household.

Few interviewees mentioned that they talked with family or friends about their bills and speculated on whether their bills were higher or lower and why. These speculations did not

necessarily provide enough information for the research team to draw conclusions from. In two cases, households said that they tried to get explanations from their utility for unexpectedly higher-than-usual bills, but without resolution—underscoring the fact that explaining bill differences is often not easy, even for trained professionals and experts.

In terms of the interviewees' level of satisfaction with their utility bill, most were indifferent about the cost of their electricity bills. Only one interviewee was especially critical about "hidden charges" and pointed to the increasing range of free services such as WhatsApp and Twitter to make the argument that electricity should also be free. Several households knew that their bills were low, and appeared to have taken some pride in this fact. For example, one participant stated: [SD08] "Cost doesn't really affect my energy use in the summertime on the West Coast since it doesn't really change too much. Even if energy were "free" there are plenty of non-monetary "costs" associated with energy, so no, even if it were free I would not use it differently."

Energy Conservation Behaviors

What Participants Did and Why

One of the research hypotheses explored by this study and derived from the Subject Matter Expert interviews was that Hispanic households are largely interested in, attentive to, and already skilled at conserving energy. As one expert said: "They conserve, they conserve so much."

In reading the diaries, visiting households, and hearing about their often relatively-low energy bills, the researchers sensed that many households were quite sensitive to energy waste and vigilant about conservation, both to save money and to avoid wasting resources. Most interviewees also quoted a high level of consciousness towards conservation. In their study on energy use in low-income homes, Dillahunt et al. (2009) similarly found that households usually said they saved energy for non-financial as well as financial reasons.

For a goal of conserving energy, an economics-based model would see people taking actions according to a balance of the potential monetary savings that can be achieved from any action against the costs of performing said action. In describing how they conserved, many of the diarists and interviewees described conservation as natural and effortful, making it clear that there were costs to conservation including the level of effort and vigilance required, for example, to turn lights off, especially if one person took on the bulk of the work. A Norwegian study that highlighted the effort of conservation argued that the costs of conservation and load-shifting (such as doing the dishes late at night) were considerable (Carlsson-Kanyama & Lindén, 2007). The study also noted that these costs often fell to women, in their caretaking and home-keeping roles, rather than men.

This is not to say that these actions are always costly, and some clearly have benefits other than energy savings. For example, one interviewee described a feeling of calm that she had when the computer was in sleep mode. Others noted preferences for natural light and dislike of artificial cooling. Discomfort from lost amenities is on the one hand obvious. However, on the other, the

personal costs of conservation in terms of discomfort or effort are rarely directly discussed in the conservation literature.

Another theme that came through was the household tensions around conservation, with one family member typically being more conservation-minded and reminding other family remembers to change their behaviors. Such differences came up periodically throughout the journals and in the interviews, raising questions about how people living together influence each other, or otherwise negotiate their differences.

For many participating households, conservation was largely accomplished by turning things off or unplugging them, or reducing the need for or expectation of them. This was particularly true for cooling and lighting. Households were creative, even ingenious, about some of their conservation activities, even when they required a fair amount of effort that was not always welcomed. In addition, some of the conservation activities were probably not effective, while other activities or even minor technical upgrades might have made more sense.

For households that had higher energy bills, people still spoke about conserving in small ways, such as turning off lights or monitoring device charging. However, for them some uses were considered non-negotiable. For example, one interviewee described how for her, cool indoor temperatures in the summer were non-negotiable for her comfort, as well as for that of her pet.

Learning Conservation and Consumption

Interviewees thought about, theorized on, and necessarily acted on energy use, but rarely with much formal education or research involved. Rather, individuals learned from their parents, other occupants in the home, experimentation and observation, or acted on the basis of expectations or mental models.

When interviewees were specifically asked how they learned their energy use and energy conservation habits, most people spoke of their childhood, often their parents heating and cooling practices, or their mother telling them to turn off lights. Sometimes the lessons were less direct, such as a general household conservativism and deep awareness that there was not money to waste, or the fact that there was very little in the house, for example, very little or no hot water, no appliances, no television, and restricted running water.

A few diarists and interviewees mentioned unreliable electricity growing up therefore, having power cut off may have accentuated their awareness of electricity. Others mentioned that they learned from visiting other countries as adults, commenting on the lower quality power available elsewhere and a general wastefulness they noticed in the United States. Finally, others pointed out that their house itself influenced their behavior.

Sometimes more formal messaging was apparent, in particular concerning plug loads, “leaking” electricity, and instructions to unplug or turn off. There was widespread understanding amongst interviewees that devices could use energy even if they were not in active mode. However, this was also a topic of ambiguity, with some interviewees mentioning that they were not entirely sure that was true and little sense of how much energy was at stake. Another formal message mentioned several times concerned time of use, that is using things in the

evening rather than mid-day, whether they thought it was cheaper for them or just less resource-intensive overall.[12]

Several interviewees gave examples of conservation fading with generations. For example, they commented on their adult children who they felt were less careful with energy use than they were, or on their parents and their childhood home, in which there was stronger emphasis on energy conservation. Social scientists have discussed the process of changing norms of household energy use over time, in general involving a "ratcheting up" of energy services to deliver comfort, cleanliness, or convenience (Shove, 2003). There are at two dimensions at play here: changes with generation that depend on the history of family circumstances, and changes in the general landscape of energy use, such as the proliferation of electronic devices designed to be always on. One particularly energy-conserving interviewee said of her adult daughter: [SD18] "My daughter is very technology dependent, and doesn't seem to appreciate enough to do anything to change her energy costly habits. She is of the younger generation and wastes by using the television and the washing machine a lot. She doesn't know anything else and expects this is the norm, even though I tried to instill good practices and counted every penny."

Other interviewees, however, seemed to consciously react against an overly-conserving experience growing up or other deprivations. For example, one interviewee said: [SJ01] "Growing up we shared everything. I don't want to do that when I get older. I want freedom. I work hard … I have worked outside, inside, extreme heat and extreme cold. So, if I want heat I will turn it on and if I want cold I will turn it on… [after some talkback from his wife]: … my selfish mind."

And in partial explanation of this trajectory, a woman who had grown up in Latin America mentioned: [SD15] "Here in the U.S., everybody wants more and more things. I fall on that sometimes, but I am trying to cut down on consumption be careful with the world."

Finally, although interviewees may not have consciously noticed this, it was evident to the researchers that energy was widely used as a means to care for others, and that behaviors of use and conservation were shaped around this. For instance, if the interviewee noticed that others had certain needs to achieve a level of comfort or even health, such as air conditioning for a young child, lighting for a pet, or an electric fireplace for the mother-in-law's bedroom, their behavior would be modified to meet those needs.

Energy Efficiency Programs

Households that had reached out to the utility for reasons such as coming to check on a possible gas leak, or coming to the home to check why the bill had gone up so much in a given month, generally seemed to find their energy providers responsive. However, the most enthusiastic thoughts were from a few individuals who had had more elaborate interactions with the utilities through participation in energy efficiency programs. Surprisingly, 14 of the 18 interviewees mentioned having participated in at least one utility or state-sponsored energy

12 The research did not determine whether the extent to which attention to time of use was linked to being on a time of use tariff, or more general messaging (for example the old Flex Your Power Now! Alerts).

efficiency program, the majority of them having to do with low-income rates and weatherization programs. Most of the time, the exact name of the program could not be recalled, but the interviewee could recall what was done. Some of the initiatives mentioned were:

- Home audits and direct-installation of some energy efficiency measures. These home audits, in at least two cases, seemed correlated with higher household knowledge about energy use.
- Appliance rebates.
- Special rates for qualifying low-income individuals under the California Alternate Rates for Energy (CARE) program.
- Home energy reports, comparing energy use to neighbors.
- Special time-of-use rates for electric vehicles.[13]
- Other load-shifting programs.
- Weatherization.

In only a few cases were explicitly negative experiences about energy efficiency program participation expressed. One interviewee commented, for example, on an experience with a contractor, apparently arranged through a utility program, who made energy efficiency recommendations that she thought were priced too high and required, as she understood it, a lien on her home, which she was not interested in at all.

Four interviewees mentioned that they had not participated in any energy efficiency programs and the interviewers probed further to understand the reasons. Of course, some interviewees were not aware they existed or had simply not considered it, but two reasons for not participating were cited more than once. First, interviewees mentioned that they thought most programs available were for low-income customers and those that fall above a qualifying threshold did not have any available options. Second, those that were renters mentioned the challenge in working with their landlord, where the landlord would have to pay to implement the energy efficiency improvements, but the tenant would be the sole beneficiary of the immediate benefits in the form of reduced energy use. The conflict between landlords and tenants stemming from "split incentives" to install upgrades is frequently identified in the energy efficiency industry as one of the top barriers to capturing energy savings in buildings. On this topic, one interviewee explicitly mentioned reviewing material she had received from her utility on assistance for energy efficiency, but mentioning that there was little, if anything, for which renters qualified. This focus on homeowners seemed alienating to her.

Lastly, another reason mentioned for not participating in energy efficiency programs was a distrust of utilities and government and the feeling that these programs had "strings attached". One individual expressed skepticism commenting: [SD15] "We don't go to the government and ask for favors." This statement, echoed by other interviewers, alluded to the perception of some study participants that utilities are tied to the government, which is the case in some Latin-American countries. Suspicion of the government by Hispanics is well-documented, and it

13 Mentioned only once for a home with an electric vehicle.

applies not only to foreign governments in their countries of origin, but also to the United States government stemming from a fear that some undocumented Hispanics might have for their immigration status to be found, and then a transfer of this fear to other community members that may feel protective of their own (Evans, 2008). The researchers also heard one interviewee suggest that rebates are a form of charity that should not be lightly accepted.

As to the information provided by utilities, most interviewees were not necessarily impressed with the information that they received from their utility. Few seemed to think of the utility as a source of information, per se, although certain households were quite connected, calling their utility to ask specific questions about the efficiency of portable heaters versus the central heater, or when they were thinking of window replacements.

Energy Beliefs and Perceptions

Energy Literacy and Knowledge

The research broached three different elements of energy knowledge: what people understood about energy sources; how well people seemed to understand how much energy was comparatively required for particular end-uses and activities; and how people acted on energy conservation and management activities.

In terms of energy sources, interviewees often struggled with the question on where they thought their energy came from. A few responded with power plants, coal, or wind turbines but for the most part, it was not something they had thought much about: [SJ05] "Now that you asked me where it comes from I want to know. I have never even wondered where it comes from." And [SJ04] "I don't even know, honestly. I haven't thought about it." Diarists also struggled with this concept as evidenced by their submittals in the Photograph of the Day (prompt: Take a photo of where you think your energy comes from).

From information received in the journals and through the photographs received, it also seemed that many households might not have had a very accurate perception of the relative levels of energy use in their home.[14] This echoes the findings from another study that asked people about the most effective thing they could do to conserve energy and found that turning off lights was the most-mentioned action, and that curtailment actions were mentioned far more often than efficiency actions (Attari et al., 2010). The same study also found that their research participants were poorly informed about relative energy use and savings.

Table 20 offers estimates of monthly energy costs for a selection of lighting, electronics, and miscellaneous end uses that are not influenced by weather conditions, for residential customers in California. This table was developed by the research team by applying some example use assumptions and using standard residential rates for the three-major investor owned utilities in the state.

14 The accuracy is complicated to judge, however, since households used their equipment in very different ways, for example, from not using the central air conditioner at all to keeping a 70 degree temperature on summer days.

Table 20: Example Energy Use Estimates for Selected Electrical Appliances and Devices

End Use	Use Assumptions	Costs per Month, in Dollars (@ $0.19/kWh)[1]
Lighting, with energy-efficient lamps	3, 14-watt CFLs for 8 hours per day	1.91
Lighting, standard incandescent lamps	3, 75-watt bulbs for 8 hours per day	10.26
50" plasma television	5 hours per day (300 watts)	8.67
42" LED television	5 hours per day (80 watts)	2.31
Dishwasher	1 load/hour per day (1800 watts)	10.40
Electric fireplace or portable heater	3 hours per day, 10 days per month (1500 watts)	8.55
Phone charger	8 hours per day, 30 days per month (5 watts)	0.23
Hot/cold water dispenser	United States ENERGY STAR estimate [2]	6.84
Clothes dryer	2790 Watts, 1 hour per load, 12 loads per month[3]	6.36

(1) San Diego standard residential rates for up to 130 percent baseline are roughly comparable for Pacific Gas & Electric (San Diego Gas & Electric: 0.208 cents/kWh in Summer and 0.193 in Winter for San Diego Gas & Electric) (Schedule DR as of 3/1/2017), compared to 0.200 (up to 100 percent of baseline) for Pacific Gas & Electric rates E-1, EM, ES, ESR, and ET; rates differ within the PG&E service territory. CARE rates are about 63 percent of the full rates.

(2) Energy Star estimate (according to http://www.mnenergysmart.com/putting-the-plug-on-water-cooler-costs/).

(3) Energy.gov estimate (https://energy.gov/energysaver/estimating-appliance-and-home-electronic-energy-use).

Source: Inova's analysis

As can be seen from the table above, for end-uses that are not affected by weather, there are only modest costs per month for any single end-use. For a household that has CFLs installed, lighting costs are probably going to add up only a few dollars per month (less than $2, in this example).[15] Thus, in spite of all the attention to turning off lights, the behavior in itself may have little effect on the households' utility bill—though switching from standard incandescent lightbulbs to CFLs or LEDs for the most-used lamps can be quite effective. In terms of electronics, even if the sample for this study was small, many of the respondents indicated that watching television was the most energy-using activity in their home. While this might be true for large plasma television equipment, LCD and LED televisions are generally less expensive to run.

Energy Beliefs and Existing Questions

One of the objectives of this research was to identify any energy-related beliefs or perceived discrete ideas about home energy use that may circulate among Hispanic households. Table 21 lists some of these ideas that were mentioned by diarists and interviewees, and includes an

15 The assumption of 3 lamps for 8 hours per day is an approximation; households often have many lamps (for example, 30 in a modest single-family home), only a few of which are used much.

assessment of their level of prevalence as found during this study. It is important to note that some of the perceived ideas listed within the table are conflicting between each other, for instance, the research team heard both ideas around portable heaters being very expensive, and very economical.

Table 21: Beliefs and Perceived Ideas about Home Energy Use

Belief	Estimated Prevalence
Heating and Cooling	
Using portable heaters is cheaper or otherwise preferable to central heater	Common
Using portable heaters can be very expensive	Occasional
Air conditioned air is unnatural	Common
Turning the central air conditioning on before the temperature gets very hot (inside the house) uses less energy, than doing so after the temperature is already high	Occasional
Certain individuals need more cooling for health reasons	Common
Electronic and Appliances	
Keeping electronic devices plugged in uses more energy	Very common
Washing clothes off peak hours is better	Occasional
Keeping appliance doors closed helps them operate better (for example, refrigerator, oven, dryer)	Occasional
Overstuffing refrigerator, washer, or drier makes them less efficient	Occasional
Keeping the refrigerator full (for example by jugs of water if necessary) helps it work better	Occasional
Putting warm food in the refrigerator deteriorates performance	One mention
Using a dishwasher uses more energy than handwashing	Very common
Cooking uses a lot of energy, especially with electric appliances	Common
Leaving fans on when away from home keeps the home cool	Occasional
Social and General	
Leaving lights on when leaving the house for security and safety reasons	Very common
Leaving television on for background noise is normal and common	Common
Using energy is a way of caring or showing caring for others	Common

Source: Inova's analysis of interview and Energy Use Journal information.

A few of these incorrect beliefs are, in practice, easy to dispel (for example, clothes may dry more slowly when the unit is too full), but most are not. While many of these beliefs are clearly subjective, some might be informed by providing technical or other educational information. For example:

- Guidance on when and why to use a central furnace rather than portable heater, and on efficient and safe portable heaters.
- Information on the efficiency of handwashing dishes versus using the dishwasher.

- Good practices for using and maintaining central air conditioners. Many of the households in our study did not grow up with central air conditioning.
- What devices are worth unplugging, and what sorts of devices can reduce the burden of manually managing these loads? As mentioned above, unplugging is not just about energy use, for example, people may unplug phones and laptops because they think it is better for the device or battery performance, and one interviewee mentioned a feeling of calm that she had if the internet was off.

In addition to the beliefs listed, reading through the diary entries and supplemented by observations from the interviews, it was apparent that interviewees had many questions surrounding energy use. Whether these questions are unique to Hispanics or not, they are important because they identify knowledge gaps that exist within the community and that may be addressed by utilities by providing information or training. A partial list follows:

On heating and cooling:

- Is it cheaper to use portable heaters than the central heater?
- Are all portable heaters the same in terms of their efficiency?
- Is it more energy-conserving to "pre-cool" the home, for example, to keep the air conditioner on in the middle of the day even when nobody is home, so that is easier or cheaper for the air conditioner to handle the late-afternoon demands when people are home?
- Can fans pre-cool the home? And do they keep the home cool?
- What should be done to maintain the central air conditioner? The furnace?
- What matters more, the temperature set-point for the air conditioner, or how long is it on?
- Are there cheaper ways of mechanical cooling that might be more effective than fans and cheaper than a central air conditioner?

On plug loads:

- What is worth unplugging? How much energy is saved by doing so?

On lighting:

- How much is lighting costing me?
- Are there easier ways of controlling lights and electronics, for example, through motion sensors or smart power strips? This could serve both to reduce the burden of manually managing power and perhaps for security as well.

On renewable energy:

- Would solar panels make sense for my household? how much would it cost, and what sort of rebates and rates are applicable?

On other end-uses:

- Does hand-washing dishes save energy?
- How can I reduce the cost of doing laundry?

On load shifting and time-of-use:

- Does doing things off-peak save me money?[16]

Environmental Attitudes

Energy conservation was sometimes about keeping bills low, but also often about the collective management of resources, and sometimes more explicitly about protecting the environment. One interviewee said: "Saving the world begins with helping your neighbors". This sense of conservation to save resources for others, regardless of whether these "others" are part of an immediate circle of relations or complete strangers, echoes comments from the Subject Matter Expert Interviews obtained early in the project: that Hispanic households were particularly responsive to special calls to conservation.

Emphasizing community, one interviewee said that he felt there should be a way to keep the electricity generated from a neighborhood home's solar panels in the community; the solar could be routed to somebody else nearby who needed it, thus benefiting the community first rather than the utility. [SJ09] "If someone in the neighborhood has solar panels, they should be able to choose where the energy they generate goes; if someone in neighborhood needs energy (like a stay at home father or home day care during day) they should be able to route energy to these homes." The interviewees often referenced their experience or knowledge of energy and water scarcity elsewhere—gratefulness for what they had and awareness that others do not.

Specific to California, where severe drought has been experienced over the past few years (2015, 2016) and water use and water rights have long been debated, the message of water conservation seemed widespread amongst interviewees. Though none of the questions asked in the Energy Use Journals and during the interviews directly probed at thoughts around water use and conservation, this topic was often brought up by the interviewees themselves, in part related to the general idea of conserving resources as opposed to making a direct connection between water use and energy.

Similar to water, neither the interviewers nor the Energy Use Journals directly asked about climate change or environmental concerns, and although climate change itself was rarely mentioned by the study participants, there were occasional references to the planet and the environment. There also seemed to be a frequent perception of Americans as wasteful, and some interviewees indicated that they thought immigrants were especially good at managing with low resources and under duress, potentially because of constrained resources in other countries. One interviewee commented:

[SD15] "The way things are now in the U.S, the trend of being green and conserving, is the way that we grew up. It was the way to do things but it was not conscious. It was out of necessity. What is normal in poor areas now is becoming 'in' in the U.S."

16 A few diarists mentioned doing some energy-use activities off peak. It was unclear whether this was to save money (and if so, if they were actually on a time-of-day rate) or for more altruistic or environmental reasons.

Perception of Utilities

Interviewees were also asked about their opinions of utilities and the services they provided. Most of the comments received suggested either ambivalence or a negative feeling towards utilities, related to a feeling of powerlessness, or a sense of distrust. Those interviewees that had grown up elsewhere seemed particularly skeptical of utilities and frequently mentioned a lack of trust. For example: [SD08] "I feel there is a 'monopoly' in the market and you don't really have a choice. It seems so arbitrary how costs go up and down." [015] "Utilities have the upper hand and can charge what they want"

Yet interviewees also recognized that electricity was a necessity in their daily lives, and described their expectation to receive service so long as they paid their bills. One interviewee commented on the topic of bills and rate changes: [SD08] "I don't really understand utilities. I see my bills with a lot of fees and rates but I don't understand it. There isn't a class and nobody has explained this to me."

Those that mentioned a relatively favorable opinion of their utility company, said that their customer service was comparable, and sometimes better, to other service providers, for example, [SD16] "The energy utility is not as bad as cable and phone".

When asked about the role that utilities should have, interviewees offered several thoughts. Beyond providing reliable and consistent service, interviewees suggested that utilities should:

- Provide education and training opportunities to their customers on general home energy use.
- Offer information on how energy use impacts the environment.
- Educate customers on how energy is generated and delivered to a home.
- Offer financial assistance to struggling customers to help to pay for utility bills or energy efficiency improvements.
- Devise a plan to allocate energy generated from solar energy to all customers, and offer access to technologies such as solar panels.
- Ensure customers have energy efficient appliances in their homes.

Of course, some of these services are already provided by some utilities and to some degree, but it appeared that interviewees were not aware of it or otherwise assumed this was not being done.

CHAPTER 7:
Synthesis of the Analysis and Recommendations

This chapter combines findings from all applied research methods and synthesizes the most prominent and otherwise important observations obtained through the research project. These key findings aim at helping the reader obtain a clearer picture and understanding of the factors that may influence energy use and conservation behaviors and circumstances in Hispanic households. The hypothesis derived through the interviews with subject matter experts are also revisited in this chapter and conclusions are presented to the reader.

The chapter ends by offering specific recommendations for energy efficiency program design and implementation that California utilities and other market actors can implement to better engage the Hispanic community.

Summary of Findings

Prevalent information was obtained from every portion of the study, and while some of these findings came to light through a single unique research method, overall, main themes came up time and time again through the different methods applied. As intended, these research methods proved to be complementary to each other and sequentially provided opportunities for "deeper dives" and discovery of meaningful information. These repeating themes confirm a number of ideas about Hispanic household energy use and conservation that, in the perception of the research team, exist as "hearsay" or anecdotes within the energy conservation community. In addition, the research team uncovered behaviors that, to the extent that the team is aware, have not been previously documented. The results obtained speak directly to the aims of better understanding the diversity of energy use practices and conditions across households outlined in the original Program Opportunity notice, which has hitherto been allocated limited research attention.

As mundane as home energy use may seem, the research methods applied, and particularly the in-home interviews helped recognize constellations of practices that depend on personal history, identity, and culture, and that show what current energy efficiency programs and assumptions might be missing or misunderstanding. The ethnographic approach to the study allowed compiling qualitative information, even if from a small sample of participants, that could not have been compiled through other quantitative or "big data" methodologies. The stories, emotions, and interactions that surfaced through the study can help rescue context loss that comes from quantitative studies and to allow decision-makers to put the two together to obtain a better picture upon which policy and program choices can be made.

From the perspective of the research team, the following findings obtained through the varied research methods stood out as the most prevalent, unique, and noteworthy:

- The influence of family and the community was ever present in participants' energy-related behaviors. The impact of this cultural aspect can be seen in obvious ways such as energy-use variances derived from extended families living under the same roof, as well as more subtle implications such as the use of energy as a mechanism to care for others, and the desire to help the community and the world through conservation actions.
- There are several energy use practices that appear common in Hispanic households. Among the practices identified are leaving lights on all night or when away from home; not using central heating; not using air conditioning even when they have it; and reluctance to replace older appliances and devices. In terms of "top of mind" concepts and associations, "lighting" and "light" seem to be the way that participants most thought about energy and "leaving lights on" was the most common association with wasteful behavior. Other prominent energy-related concepts included watching television and cooking, both activities frequently expressed in the context of family events. The association between energy use and money spent was also very present within study participants.
- There was a strong emphasis on preference for natural indoor environments. Passive cooling, day lighting, and fresh air were often expressed or implied. Households were creative and attentive to managing shading and ventilation to provide passive cooling, and fresh air. Similar preferences were seen in household activities such as washing and drying dishes by hand, and sometimes even drying laundry. Most notably, households that had central air conditioning often did not use it, even calling it "fake." Individuals had learned how to manage shading, air flow, fans, and other elements to their advantage, paying attention to what worked and what did not work.
- Home energy problems identified mostly had to do with poor envelope conditions and uncomfortable temperatures primarily due to insufficient or inadequate cooling and heating. The quality of housing can be poor and require coping mechanisms to solve problems. Specific to cooling, although most participants had the means to cool their homes through some type of air conditioning equipment, participants showed a preference for methods of cooling that were perceived to be "more natural"—fans, in particular, were very prominent, but opening the windows to achieve greater ventilation and taking showers to cool down were also frequently mentioned. Some households had a limited ability to keep their homes cool, whether because of limitations in cooling equipment or inability or unwillingness to use the cooling equipment they had. Poor quality building envelopes, such as inadequate insulation, was also an issue in terms of heating. This raises questions for health and thermal comfort during winter months and extreme heat events.
- In general, there was a significant level of thought and attentiveness to conservation and waste avoidance in most of the households that participated in the study. There are various reasons for this conservation, including saving money but also about, upbringing, general aesthetics, technological circumstances, and a desire to conserve resources or protect the environment. Lower-income households, in particular, seemed

to adopt an overall "saving" mentality, at least as described by the households. While study participants regularly saw benefits from their conservation activities, the conservation efforts were oftentimes perceived as burdensome, and participants identified associated costs in terms of personal time, convenience, and effort.

- Generational issues were salient, there was evidence of generational shifts from more conservative energy use in the older generations, to less conservative energy use for younger generations. Among these generations, and even within a generation, there were often differences in preferences and ideas of how energy should be managed. While this is to be expected in any multi-person family, the prevalence of extended family members may make this more important in Hispanic households. In addition, individuals seemed to both learn from and rebel against their childhood experiences in saving and using energy. Not surprisingly, for many immigrants the idea of scarcity is ingrained in their lifestyles, but interviewees often implied that the next generation was becoming more wasteful.
- Technical energy efficiency, in the form of energy-efficient equipment or home envelope improvements, seemed to have limited salience as a route to reducing energy use, and instead, the focus was on behavior. Even when participants had access to regulating controls such as thermostats, the norm was to actively manage cooling through on–off operations rather than automatic management through use of a thermostat, specifically "set and forget".
- For study participants, buying appliances or equipment rated as having higher efficiency was not a priority. When asked about how they considered energy efficiency in their purchases, most interviewees mentioned practical issues such as price, fit, appliance features, aesthetics, brand reputation, expected reliability, warranties and trusted vendors, as the primary criteria for selection of the new appliance. In terms of maintenance and repair, it is common for people to rely on personal networks to identify an individual that could perform the repair, regardless of whether the individual was a professional. Self-fixing or do-it-yourself type of repairs were also common. There also appears to be a substantial used and refurbished market for appliances and equipment.
- Formal education on energy efficiency was weak and overall understanding of energy seemed low amongst participants. It was apparent that interviewees had many questions surrounding energy use. Whether these questions are unique to Hispanics or not, they are important because they identify knowledge gaps that exist within the community and that may be addressed by utilities by providing information or training.
- There seemed to be a lot of confusion and misinformation about what equipment and end-uses use most energy in the home and, for that reason, conservation efforts were not necessarily very effective in saving energy. When it came to reducing the energy used in their homes, participants did what they thought would work, but they were not always sure about the outcome. Some of the actions taken were often not very logical from an economics and conservation standpoint, for example, they may have not

targeted high-energy using equipment or may not have been very effective at generating savings; yet, the actions made sense to participants in the internal logic of household relationships and routines. Efforts frequently mentioned including turning off lights, reducing the use of electronics and specifically the time spent watching television, washing dishes by hand, and even cooking cold meals. The perception that cooking used a lot of energy seemed common amongst interviewees, as did the perception that the costs of using electronics are substantial. This vague notion of which end-uses consume the most energy can be problematic as individuals can be discouraged when energy conservations activities are not effective in yielding results.

- Households may not have had high trust in the utilities, but overall, most were ambivalent and recognized that their services were needed. Trust within the Hispanic community is hard-earned. A few participants who had participated in energy efficiency programs or received special rates seemed quite pleased with the support. However, there were many "disconnected" households who could not find their way to these services. Utility bills may also be difficult to understand. Most interviewees were not necessarily impressed with the information that they received from their utility and few seemed to think of the utility as a source of information.
- Overall, there is a sense of frustration in how well energy efficiency programs serve Hispanic communities, ranging from a lack of attention to energy concerns in rental properties, failure to appreciate the circumstances of lower-income households and those that fall just above the low-income participation threshold, and frequently poorly-crafted outreach.

Hypothesis Testing and Conclusions

Earlier in the project, and by conducting interviews with subject matter experts and members of the Hispanic community, the research team arrived at several hypotheses, listed previously, that were to be proven, disproved, or teased-out further through subsequent research methods applied. These hypotheses are revisited in Table 22 along with the research team's conclusions.

Study Recommendations

As can be perceived from the synthesis above, some current energy efficiency program offerings may not sync well with actual energy use, circumstances, or interests in Hispanic households. To assist in bridging the gap, the research team offers the following recommendations for energy program administrators, policy- and decision-makers, and other researchers interested in the subject. These recommendations draw from suggestions offered by the subject matter experts interviewed, as well as by study participants.

A summary of the recommendations is presented in Table 23, and is organized around four areas: program design and delivery, marketing and outreach, education and training, and policy and research. A full description of the recommendations, with additional context for the reader, follows the table.

Table 22: Conclusions from Developed Hypotheses

Hypothesis	Conclusions
Hispanic households differ in important ways from the presumed typical energy consumer.	While this depends on a definition of a "typical energy consumer", the research team did find important nuances to the Hispanic community. For instance, the community is more attune with conservation efforts, and there are several energy use practices that appear common in Hispanic households.
There are specific energy-related behaviors that Hispanics do in their homes and that could be targeted for increased behavioral savings.	The study found several common behaviors amongst Hispanic households. Although some behaviors are not likely effective, opportunities to target behaviors and educate consumers do exist.
Practices intended to conserve energy are instilled early and reinforced economically and culturally.	This may be true for some Hispanics but not all. The study found two different attitudes. For some families of recent immigrants, or those that grew up with limited economic power, conservation can be ingrained in the family values. However, there is another group that instead feels that they are entitled to use more now that their economic circumstances have improved when compared to previous times.
Household energy management is focused on conservation actions rather than technical efficiency.	This was a prevalent theme throughout the study. Hispanics think more about how they can conserve through appropriate behaviors rather than considering purchasing and using more energy efficiency equipment.
Households largely "know what to do" when it comes to conservation, but this knowledge is incomplete and could be improved with more knowledge transfer efforts.	Hispanics in the study exhibited many conservation focused behaviors; but many were not effective at saving energy. Educating and training customers on how the best conservation practices can result in better outcomes.
Improved information and program quality, more face-to-face dissemination, and increased representation of Hispanics in energy, environmental, and related policy fields can make a positive difference.	There is a need to bridge the disconnect that currently exists by engaging Hispanics in all aspects of policy-making and program delivery.

Source: Inova Energy Group

Table 23: Summary of Recommendations

Program Design and Delivery	• Recognize cultural characteristics and approach Hispanics appropriately. • Understand the specific demographics of the Hispanic community within the service territory. • More focused attention to what renters can do to improve energy use in their homes and more programmatic opportunities for them. • Develop programs that are accessible to those that are just above the threshold for low-income programs.

	• Create targeted initiatives that provide a better fit to how Hispanics approach cooling and heating, including maintenance of the equipment. • Support do-it-yourself type of initiatives and installation. • For upstream programs, engage stores that Hispanics shop in. • Build a network of Hispanic contractors from within the community.
Marketing and Outreach	• Pursue partnerships with community based organizations that are effective at eliciting action from the target group. • Orient messaging to better sync with Hispanic attitudes about environmental concerns, resource management, tight family values, and care for the communities. • Select the "right" messengers, preferably from within the community. • Use promotion tools such as development of case studies or success stories from within the community. • Recognize the degree to which lower-impact practices are already common, and the preference for natural environments. • Offer the option of Spanish language materials, wherever possible. • Use pictures and examples when providing energy information. • Leverage media channels that are frequented by Hispanics.
Education and Training	• Workshops and community gatherings will be more effective with this community than handouts and mass mailers. • Use education efforts to promote initiatives that are more relevant to Hispanics. • Offer trainings in Spanish language to Hispanic providers of energy products and services.
Policy and Research	• Continue funding ethnographic and other social science research on Hispanic households, and on household energy use and energy conditions in general, whether aimed at improving energy efficiency programs or at broader challenges such as community resilience and climate change adaptation. • Support integrated research that can facilitate combining technical information (for example, on house conditions and energy use) with social scientific analysis.

Source: Inova Energy Group

Program Design and Delivery

Program administrators must recognize that the cultural characteristics of Hispanics make them a distinctive consumer group that should be approached with adequate and culturally-relevant strategies. Other industries have recognized this and, aware of the sheer size of the market, have established dedicated efforts to reach this group. The energy industry needs to catch up with this trend and, in locations where the Hispanic market is significant and relevant, develop strategies that make more sense within the Hispanic cultural framework.

From this cultural standpoint, some of the key attributes to keep in mind, and that may directly or indirectly impact the way energy is used in households, include:

- Strong ties to the family and the community. For these reasons, energy program approaches that identify the community as a beneficiary, for instance neighborhood challenges, or community-based renewables, will be well-received.

- A "live in the present" attitude that results in less planning and considerations for a future, including an economic tendency to spend instead of saving. This is important in two ways: first, Hispanics may not be planning for future home renovations or equipment replacement and second, they may not have money set aside for these activities. Of course, the issue of monetary savings is also directly related to the income level of the family and their economic possibilities.
- An innate resistance to change and fear of innovation. This resistance could be countered through education, and in particular, the sharing of benefits from members within the community that have previously tried the technology.

A word of caution to program administrators: as new culturally-relevant strategies are developed for Hispanics, program administrators must keep in mind the subtle differences that exist between Hispanic communities of different national origin. The recommendation, echoed by several studies, is for program administrators to first understand the specific demographic characteristics of the Hispanic community within their service territory so as to develop initiatives that are relevant to these conditions. Where are individuals originally from?[17] What is the average income level of the community? Is the neighborhood composed of newly immigrated families, or are they well established? Are most households owner-occupied, or are they renters? From census data, what is the average size of the households in the area? Understanding these factors can assist to better-customized strategies that are relevant to the specific community that utilities are trying to reach. For example, Hispanic households with larger than average household size are more likely to have several generations living together, and extended family situations that result in a higher occupancy during the day, and therefore more energy use through cooking, washing, and space conditioning.

Following these thoughts, in California, where most Hispanics are renters, program administrators require more focused attention to what renters can do to improve energy use in their homes, and thus create more programmatic opportunities for them. For multi-family programs that operate through landlords, care should be taken to take advantage of any opportunity to provide education to the tenants as well. In addition to renters, study participants mentioned the need for programs that are accessible to those that are just above the threshold for participation in low-income programs. These individuals usually fall in a gap: as mentioned, they might not qualify for low-income programs, but they may not have the economic means to participate in other mainstream programs while still having issues of high energy burden. As supported by other studies energy costs and usage can often be higher for households that are just above the threshold than those just below, but with only slightly higher incomes (Evergreen Economics, 2016).

From a program delivery standpoint, three recommendations stand out. First, programs targeting Hispanics should support do-it-yourself type of initiatives and installation, as the culture accommodates them very well. Second, for upstream programs that provide rebates and

17 Because Hispanics tend to form tight-knit communities, oftentimes neighborhoods will consist of families and individuals that have some connection to each other, are ethnically tied to the same country, and to the same city or town.

discounts at point of purchase, program administrators should engage stores that Hispanics shop in. Numerous consumer reports exist that list retail store preferences for big ticket purchases done by Hispanics, and study participants mentioned shopping at Home Depot, Sears, Lowes, Walmart, Best Buy, Costco, and Target. Third, and perhaps most important, for uptake of energy efficiency initiatives to happen, program administrators must focus efforts on building a well-trained network of contractors and trade allies that come from within the community.

As a reminder, Hispanics often rely on their personal networks to identify individuals that can perform the work in their homes, and a lack of trained and program-certified contractors simply leads to Hispanics not participating in energy efficiency programs. The reason for this is that, more often than not, program rules require that customers wishing to participate in some comprehensive retrofit programs must select a contractor from a vetted list that the utilities publish. To get on this list, contractors must comply with some qualification requirements and complete training that helps them become aware of program rules and processes, acceptable customer service levels, and acceptable quality levels of the worked performed.

Suggestions to program administrators include placing intentional and dedicated efforts to reach out to Hispanic contractors for participation in training or certification workshops that are required by the program rules. These efforts include conducting recruitment of contractors within the community by clearly explaining the benefits that their businesses would get from participation in energy programs, and providing adequate training that allows contractors to explain to customers the benefits of installing energy efficient equipment in their homes and help overcome concerns about the incremental cost of the equipment when compared to less efficient models.

If interested in looking at specific initiatives that address the efficient use of cooling and heating equipment, which are considered high-impact measures in California, the recommendations involve creating targeted initiatives that provide a better fit to how Hispanics approach cooling and heating, as well as opportunities that discuss maintenance of the equipment. For example, program administrators can develop and market passive cooling programs with messaging on ‘natural’ and ‘fresh air’, as well as initiatives focused on window air conditioners or portable air conditioners as a replacement to central air conditioning, to cool individual spaces instead of entire homes. This would help alleviate some of the issues found around individuals having different personal preferences for temperature and comfort. For heating measures, the focus could be on building envelope improvements, as this was the most common source of home energy problems that was observed during the study.

Marketing and Outreach

As identified by study participants and experts interviewed, some of the most critical failures of energy efficiency programs in engaging the Hispanic community fall on the strategies currently used for marketing and outreach. Perhaps the most important recommendation this study can make around this topic is the need to use appropriate and relevant channels to engage Hispanic communities. This means that program administrators should, as a low

hanging fruit, use media channels that are frequented by Hispanics. Experts interviewed as part of this study suggested leveraging local news channels as well as large Hispanic television networks such as Univision and Telemundo, and mentioned that the use of radio advertisement and Facebook pages tends to be effective with this community.

Community-based organizations and non-profits providing services to Hispanic families are critical intermediaries linking Hispanic households to energy utilities and energy programs. Drawing from a solid base of trust and experience, these organizations are often more skilled and able to do ground-level work, craft outreach messages that fit the community, and, most importantly build connections that engender trust and understanding. In California, there are already numerous organizations that assist Hispanic communities and that act as a source of information about home management, energy assistance, and other matters. These mission-driven organizations have an existing infrastructure and network that they have developed through the years and can be extremely effective at reaching the target audience, primarily because they benefit from a high level of trust that they have cultivated with the communities that they serve. As proven by some pilot programs around the country, partnerships between program administrators, implementers, and these community-based organizations are effective at eliciting action from a target group. It should be noted that building these partnerships takes time and requires a decent level of commitment from program administrators.

As a direct lesson learned from the recruitment efforts of this study, chances of a successful partnership are increased when: (1) the mission of the organization aligns with the objectives of the energy efficiency program; (2) there is an adequate balance of the effort required by the partner organization to support the program, and the resources that program administrators can make available to their partner, whether economic or human; and (3) a champion is identified within the partner organization to push forward the initiatives. As a final note, oftentimes these organizations have unique perspectives and insights into what works within their community, and therefore their feedback can be a valuable component of program design and result in an effective model.

One implication for energy efficiency programs is that messaging could be oriented to better sync with Hispanic attitudes about environmental concerns and resource management. Furthermore, marketing efforts should incorporate the notion of tight family values, and care for the communities, children and future generations, as an opportunity to make a successful and compelling pitch. When encouraging energy conservation, it may be more effective to begin by recognizing the degree to which lower-impact and conservation practices are already common among many Hispanic households, and the preference that this community might have towards natural environments. As suggested by the experts interviewed during this study, program administrators should also take care to select the “right” messenger for this target group. Program administrators should enlist leaders and influencers from within the Hispanic community to help promote the programs, and ensure that they have the right (and accurate) information to share with others. Some of the suggested messengers uncovered through this study include spiritual organizations and their leaders, teachers and school administrative

personnel, community leaders, celebrities and personalities, or even professionals such as engineers or doctors – titles that are highly respected within this community.

The tightness of Hispanic communities can also be a great asset that program administrators can leverage for success. Word of mouth, referrals, and personal networks are a powerful mechanism for engagement. Program administrators can also use tools such as case studies or success stories from within the community as a means to share how people have benefited from the programs and to explain the possibilities to other potential participants. Program administrators should recognize that positive practices identified through the case studies could be proliferated within the community, and could also be leveraged to support the promotion of conservation activities that are already well-received. Though these grassroots approaches are oftentimes time consuming, the results speak for themselves. According to experts, a powerful in-person engagement with a single individual often results in referrals to other family members or friends within the community.

The question of whether energy efficiency programs should lead communications in English, Spanish, or both, is complicated and may greatly depend on personal preference, and of course, whether an individual is fluent or not in the language. In this case, the recommendation is to offer the option of Spanish language materials wherever possible to reach those that are not comfortable in English. Bilingual households will appreciate the fact that Spanish materials are available, even when they may prefer to do business in English in most cases. It is important to note that there are regional dialectical language variations within Latin America which must be considered. For example, the Spanish that Puerto Ricans speak is different than that of Mexicans or Colombians. While Hispanic ethnic groups can understand each other, the subtleties in the formal and informal tone of the language, as well as differences in words, terms, and concepts should be acknowledged and considered when developing written materials or campaigns that include a verbal component. In addition, for less-educated people, whether English-speaking or Spanish-speaking, program administrators should use pictures and examples when providing energy information, since less-educated people may have trouble absorbing written technical information.

Education and Training

The amount of open questions around energy use, the prevalence of incorrect assumptions, and the misinformation found on the impact to the energy bill by different end-uses, present several opportunities for clarification that could lead to “easy wins” and immediate changes to improved behavior and use patterns. Education should be culturally-relevant and address the misconceptions that already exist. For example, through education, program administrators can help households recognize the most important energy-problems they have within their homes and develop a better understanding of what equipment uses the most energy. The energy beliefs collected through this study can serve as a starting point for program administrators to develop education programs that offer valid suggestions for low/no-cost upgrades.

Since the default in the Hispanic community is to focus conservation on behaviors and not on equipment efficiency, there is also an opportunity for program administrators to use education

efforts to promote initiatives that might be more relevant to Hispanics. For instance, building envelope issues seem to be common with the community, and promotion of air conditioning equipment could instead be approached via maintenance opportunities. As mentioned previously, education is not only needed for the individual owning or renting a home, but also for contractors within the community so that they understand the opportunities available through energy efficiency programs and how they, and their customers, can benefit from participation.

Workshops and community gatherings will be more effective with this community than handouts and mass mailers. They not only provide an opportunity for people to come together and share their own personal stories, but also exchange ideas amongst themselves, further energy and climate change conversations, and start building trust and a sense of community. An incentive for participating in the session can be the suggestion that attendees will learn how to reduce their bills, but also a call to help improve the community and the environment through better management of resources. Community training sessions that help a neighborhood or group obtain practical learning about a topic, for example weather-stripping or installation of solar panels, and then enlist trainees to implement what was learned within the community, have proven to be successful in the past.

Finally, specific to contractors and trade allies, program administrators should recognize that the efforts to build a Hispanic contractor network should not end at recruitment, but that the approach should be holistic. Important to this effort is the recommendation that training sessions should be offered in Spanish for contractor organizations and their workers. This approach not only accommodates the language preferences of the contractors, but also those of their customers, some of whom may not be fluent in English or simply not comfortable handling technical information related to energy and equipment in that language. Offering training sessions in Spanish involves not only identifying a Spanish-speaking instructor but also translating any required testing material to measure retention of content or technical knowledge, and making program materials available in both languages. The training workshops should be conducted at locations convenient to the Hispanic community, and can be done in partnerships with other organizations doing vocational training and providing information on energy conservation—for example with Rising Sun, California Community Colleges and local high schools. Trainings should also be offered frequently to account for staff turnover.

Policy and Research

The most obvious recommendation applicable to policy-makers and researchers is to continue to pursue policies, market facilitation and pilot opportunities, and carve-outs that are specific to the Hispanic community, and to do so in a way that the community itself becomes part of the conversation. For instance, energy innovation workshops can be held where Hispanics themselves, and the community-based organizations that represent them, attend and share their ideas and suggestions for better service to this community. Incorporating this feedback from the users themselves will surely lead to the development of initiatives that better meet critical needs.

In many ways, the sector is still obscure because little research has been done on the intersection of culture and how it influences energy use and conservation. Additional research is needed in this area to further investigate the value of engagement of the Hispanic community. In the energy efficiency field, where a lot of the initiatives are driven by cost-benefit requirements, research studies can help quantify the energy conservation potential of the community, and identify benefits derived from these efforts.

This project sets the groundwork for additional behavior-oriented research on the intersection of culture and energy use. First, studies that contrast the energy consumption of a Hispanic consumer to a comparison group could be undertaken with the intent of quantifying the potential of the opportunity, thus possibly lending validity to an argument of cultural segmentation for energy efficiency program purposes. Second, the research approach used for this project can also be extended to the commercial sector, and particularly, applied to micro and small businesses for categories of enterprises where Hispanics have a high ownership presence. Finally, additional research can delve into specific behaviors or categories of equipment and how Hispanics use them, for example, one potential area of investigation is where California Hispanics go to purchase appliances and whether there are stores for refurbished appliances that are visited often by this group. Needless to say, all of these approaches can also be extended to other ethnic groups within California.

Ultimately, understanding the cultural characteristics that make Hispanics a distinct energy consumer group, and enhancing efforts to increase energy conservation within this community will be important to contribute to achieving California's climate change, zero net energy, and other energy-related goals. In addition, efforts of this nature will also lead to greater social equity, development of disadvantaged communities, and other associated environmental and economic benefits for the state.

GLOSSARY AND ACRONYMS

Term	Definition
Cooling degree days	The number of positive degrees that a day's average temperature (defined as the midpoint between the maximum and minimum hourly temperatures) is above 65° Fahrenheit.
Culture	The cluster of intangible and tangible aspects of life that groups of humans pass to each other from generation to generation. It includes attributes such as language, worldview, traditions, holidays, music, aesthetics, values, as well as food ways and other household practices.
Demographics	Statistical data about the characteristics of a population, such as the age, gender and income of the people within the population.
Diarist	For purposes of this study, diarist means an individual who participated in the research by completing an Energy Use Journal.
Energy conservation	Any behavior that results in the use of less energy, such as turning lights off when leaving the room.
Energy efficiency	Any technology that requires less energy to perform the same function, such as using a compact fluorescent instead an incandescent bulb.
Energy efficiency programs	Initiatives through which utilities or other program administrators offer some type of incentive to their customers, typically a financial incentive. These efforts may include the replacement of inefficient energy-using equipment for more efficient equipment, the modification of energy use behaviors to promote conservation, and/or improvements to a building's envelope.
EPIC	The Electric Program Investment Charge, created by the California Public Utilities Commission in December 2011, supports investments in clean energy technologies that benefit electricity ratepayers of Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company.
Ethnography	A qualitative research process to study and record human cultures using an "insider's point of view".
Heating degree days	The number of positive degrees that a day's average temperature (defined as the midpoint between the maximum and minimum hourly temperatures) is below 65° Fahrenheit.
Interviewee	For purposes of this study, interviewee means an individual who participated in the in-home interview portion of the study.

Term	Definition
PG&E	Pacific Gas & Electric Company
SDG&E	San Diego Gas & Electric Company
Smart grid	Smart grid is the thoughtful integration of intelligent technologies and innovative services that produce a more efficient, sustainable, economic, and secure electrical supply for California communities.
Thermoregulation	The ability of an organism to keep its body temperature within certain boundaries, even when the surrounding temperature is very different.
Time of use	Under time-of-use, rates are higher at periods of peak demand and lower off-peak.

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APPENDIX A:
Energy Use Journal – English Version

APPENDIX B:
Energy Use Journal – Spanish Version

APPENDIX C:
In-Home Interview Guide

Instructions for Interviewer

Allow interviewee to stray from interview question especially if they are addressing a different question. However, if their responses are consistently off topic, rambling, or in the weeds gently bring them back to questions at hand.

Be prepared to skip questions if they seem redundant. Be prepared to ask supplementary questions. Be prepared with neutral "probes" (for example: Can you please elaborate? Or ask Why?) The non-moderator should act as timekeeper and note-taker.

Text in italics is provided as sample script for interviewer.

Introduction

1. Introduce interviewers.
2. Provide overview of project and goals:
    a. Overview: The California Energy Commission is sponsoring research to help develop policies and programs that better suit how people actually use energy. Our study focuses specifically on Latino households.
    b. Goals: Our goal is to use the information you provide to help create energy services, programs, and policies that better serve Latino households.
3. Explain ground rules: Hand over a letter explaining ground rules and confidentiality statement. Then explain the letter.
4. Describe the sections of the interview:
    a. ***Main Interview***: We already have your Energy Use Journal and have reviewed your entries. This interview will follow-up on some of your answers and we will ask additional questions not included in the journal.
        i. As we go through the interview keep in mind that there are no right or wrong answers.
        ii. You do not have to answer a question if you would prefer not to.
        iii. We are going to record the interview so we can better remember what you said, is that ok?
    b. ***Walk through***: At the end of the interview we would like to walk around your house with you and observe energy-using equipment and ask you questions. We might also take some pictures of your equipment. Would that be ok?
    c. ***Utility data***: We would also like to obtain a year's worth of utility data that tells us how much energy you use at different times of the day and of the year. We will help you download this information from your utility portal. (Explain Green Button Data)
    d. The interview and walk-through will last 1.5 -2 hours, and when we are done we will give you a $100 reward.

e. Confidentiality: We respect your privacy and will not disclose your name or any personal information in our study, such as your home address. However, we reserve the right to use any information or photographs provided to us in the final report.
f. Any questions before we get started?

Ice Breaker

Intent: to establish trust, rapport, and a level of comfort, as well as to obtain information about how they identify with respect to ethnicity and culture, and, for immigrants, when they moved to the United States and how long they have lived in California. If possible, try to identify what ethnic origin the interviewee associates with (Mexican, Puerto Rican, Spaniard, etc.)

Do you mind telling us a little bit about you and your family? Where are you originally from? How long have you lived in this house? Who lives with you?

Journal Review

Intent: if their journal included cultural beliefs or behaviors, follow up questions allow us to mine this vein.

Thank you for completing the journal. To get started I have a few follow-up questions about your some of the information you provided.

[Questions to be formulated prior to interview]

Now I am going to ask you additional questions about your home and your daily activities.

Interview

Home

Intent: (1) understand their living situation and if they have problems in their house that may relate to energy. Identify what makes their living situation unique to other communities (2) understand what Latinos do for heating and cooling their homes that may be different from common assumptions about home cooling and heating.

- *Are there particular rooms or areas of your house that you like most? Why?*
- *Are there any parts of your home are uncomfortable? Why?*
- *Are there any problems with how your home operates?*
- *How do you and your family usually stay cool in the summer? [Drill down on questions about how they cool, what they do when it is hot, how it compares to what they did when they grew up, the extent to which they wish things were different, etc.]*
- *How do you and your family usually stay warm in the winter?*
- *How did you learn habits or ways to cool and heat your home? [Probe whether habit stems from upbringing or their home/environment.]*

Energy Habits

Intent: understand how energy habits are learned, maintained, or eroded.

- *Think about growing up, are there any experiences related to energy that you recall and that have shaped the way you use energy?*
- *How would you describe energy use in the house(s) you grew up in?*
- *Do you remember any important lessons that your parents taught you about energy? Anything that the community taught you?*
- *How are your children taught about energy use? Do your children teach you about this as well?*
- *What kind of messages (from outside the home) do you hear about energy use? How did you hear these messages?*
- *Have you had any interest in these messages and have the suggestions had any applicability in your own case?*
- *Would you say you tend to be mindful of wasteful energy use? Why yes or why not?*

Utilities

Intent: understand Latinos' relationship with utilities and their perception of their role. Understand why they have certain perceptions.

- *What do you think of utilities in general?*
- *What do you think is the role of utilities?*
- *Have you ever called or contacted your utility?*
    - *If YES: About what? Was it a positive experience?*
    - *If NOT: Why not?*
- *Have you tried any utility or state-run energy programs, rebates, etc. (including solar)?*
    - *Do you recall what program it was?*
    - *How did you hear about the program?*
    - *How did it work and what could have worked better?*

Purchasing and Home Improvements

Intent: understand how Latinos make purchasing decisions about energy-using equipment.

- *Have you bought any new equipment in the last three years?*
    - *If YES:*
        - *What did you purchase? Why did you purchase it?*
        - *How did you decide to buy that particular equipment over another? What attributes where you looking for?*
        - *Who was involved in making the decisions? Did anybody give you advice?*
        - *Who installed the equipment? Why?*
    - *If NO: move on.*
- *Have you done any major upgrades to your home in the last three years?*
    - *If YES:*
        - *What did you do? Why did you decide to make these improvements?*
        - *Who made the improvements? Did you hire anybody or did you make it yourself?*
        - *Who was involved in making the decisions? Did anybody give you advice?*

        - *How did you pay for your home improvements? Did you take a loan? Why yes or why not?*
    - *If NO: move on.*
- *Otherwise generalize: Where do you usually shop for appliances for your home? Anyplace else? Who is in charge, generally, of deciding what equipment to buy and when?*

Energy Costs

Intent: find out whether Hispanics think their energy costs are high.

- *How much would you say that you think about your energy use in day to day life?*
- *What do you think about your electricity costs?*
- *Do you ever compare your costs to others?*
- *How much attention do you pay to the bill itself? (Prompts: like how much does it vary from month-to-month or why costs change?). Or does somebody else in the household do that?*
- *Does the amount of your utility bill affect your use of energy? In what ways?*

Wrap Up Questions

- *Can you share any ideas about energy that you have often wondered if they are correct?*
- *Is there anything you would like clarification on about your energy use?*
- *Do you think it is important to study you or anyone's energy use behavior? Why or why not?*
- *Anything we left off or that you would like to tell us?*

Green Button Data Download

Now we would like to obtain your utility data as we mentioned earlier. I brought this guide to help us navigate green button data at _____ (fill in utility name) website.

If download is not possible during interview (for whatever reason), would it be possible to send us your data in the next week or so? Here are instructions.

Post Walk-Through

Thank you for your time. We really appreciate it.

Hand envelope with letter, gift card, business card/contact info.

APPENDIX D:
Subject Matter Expert Interview Guide

Instructions for Interviewer

The research team interviewer will provide a brief introduction to the project and communicate that the expert's input is extremely valuable to the project and will benefit California's Hispanic community. Information gained during the interview will increase the research team's understanding of energy issues as they relate to the Hispanic community and will allow us to improve the design of the study.

a. Name, affiliation, and any pertinent past experience – for example, how did you get started in this field?
b. How would you characterize the Hispanic population that you are most familiar with – for example, first-generation immigrants, country of origin, immigration status, income, facility with English, etc.?
c. What kind of energy-, housing-, environment-related programs targeting Hispanics are you familiar with?

Interview Questions

Anthropology, Sociology, and Culture Questions

1. Are you aware of any stereotypes around Hispanics and their energy use?
2. How do you think Hispanics might interpret these words differently than the general public (choose 2-4)?
   - waste
   - savings
   - comfort
   - energy efficiency
   - conservation
   - environment or climate change
   - future
3. One of the things we are interested in is the degree to which Hispanics may have important energy-related beliefs, behaviors, or myths that are different than what utility programs, marketing, or other general outreach efforts may suppose. What are your thoughts here for the groups that you work with?
4. It is often said that Hispanics are more oriented to family and community than most non-Hispanics. Do you agree? (If yes): How do you think these affect their views on energy consumption or energy efficiency?

Specific End Uses and Behavior Questions

1. Do you believe certain appliances or electronic equipment are more "desirable" or important to daily life in the Hispanic community? Which ones?
2. Do you believe certain appliances or electronic equipment symbolize status within the Hispanic community? For example, TVs, game consoles, Nest thermostat.
3. In your experience, are there any electricity-using behaviors that occur in Hispanic homes and that may be different than non-Hispanic homes? Name them.
4. In your opinion, do Hispanics see a connection between equipment or appliance use and energy bills?

Decision Making and Interview Questions

1. Have you noticed any characteristic style of deliberation among the Hispanic population you know about how energy-using equipment is purchased?
2. Who do Hispanics consult with when making an energy-using equipment purchase?
3. Do you know where Hispanics shop for energy-using equipment (type of store)?
4. Have you noticed any trends in Hispanics buying refurbished appliances vs. new?
5. What variables influence purchasing processes for this community? (Income, trends, needs, etc.)
6. Who do Hispanics go to when they have a problem with an appliance? A professional contractor? A friend? Do they do it themselves? Do they look within their Hispanic community?

Energy Program Questions

1. How would you characterize Hispanics and their relationship with utilities?
2. What is the biggest problem you see related to Hispanics and their perception of utilities?
3. What is the biggest opportunity you see related to Hispanics and their perception of utilities?
4. Have you perceived any problems or misunderstandings with Hispanic's interpretation of utility bills?
5. What do you think are the barriers to participation in energy efficiency programs for this community? Can you name them in order of importance?
6. What do energy program managers and implementers need to know about Hispanics that may improve engagement of this community in energy programs?
7. Are you aware of any programs (energy or other) targeting Hispanics that are particularly effective or novel?

Marketing and Communications Questions

1. Can you provide any general advice on what methods work and those that do not work for reaching Hispanic households of various types (for example, new immigrant vs. second-generation, etc.)?
2. Who do people trust in the Hispanic community as conveyors of important information?
3. Based on your experience, what energy-efficiency messaging/words/phrasing inspires or engages Hispanics?

Climate Change and the Environment Questions

1. What are your thoughts on the numerous surveys (cite one for the interviewee) recently published that conclude that Hispanics care about the environment and climate change, which is contrary to the general assumption that these topics are of concern to white, upper-middle class families?

Final Questions

A subset of these questions may be asked of each interviewee as appropriate based on the discussion.

1. Do you have any anecdotes about your work with Hispanics that might shed light into our topic of interest?
2. What should we have asked you about? Do you think we are misunderstanding or misrepresenting something?
3. Is there anybody else that you think we should talk to?
4. What are the most significant ways our work can contribute to increasing Hispanic awareness and adoption of energy programs? To help Hispanic households create better living conditions with respect to energy use and energy costs?
5. Do you have any practical suggestions for connecting with and building rapport with Hispanic households in San Diego, San Bernardino, and San Joaquin counties? Do you have practical suggestions for what works well for various components – access to the house, getting households to fill out an energy diary, Green Button data, overall trust, or even questions to ask – that we can use.
6. Is there anything else you would like to tell us?

APPENDIX E:
Characterization of Diarists

ID	Journal Language	Journal Format	Sex	Zip Code	City	County	House Type	Household Members	Home Attributes
SJ01	English	Electronic	M	95204	Stockton	San Joaquin	Single-family Home (2 bedrooms, 1 bathrooms)	3 adults 2 children	• Central air conditioning • Detached garage
SJ02	English	Electronic	F	95206	Stockton	San Joaquin	Single-family Home (5 bedrooms, 2 bathrooms)	2 adult 4 children	• Central air conditioning
SJ04	English	Electronic	F	95206	Stockton	San Joaquin	Single-family Home (3 bedrooms, 3 bathrooms)	2 adults	• Central air conditioning
SJ05	English	Electronic	F	95205	Stockton	San Joaquin	Single-family Home (2 bedrooms, 1 bathrooms)	1 adult 2 children	• Window air conditioning
SJ06	English	Electronic	F	95207	Stockton	San Joaquin	Condo or Apartment (1 bedrooms, 1 bathrooms)	2 adults 1 child	• Central air conditioning
SJ07	English	Electronic	F	95212	Stockton	San Joaquin	Single-family Home (5 bedrooms, 3 bathrooms)	4 adults 3 children	• Central air conditioning • Above ground pool
SJ09	English	Electronic	M	95330	Lathrop	San Joaquin	Single-family Home (3 bedrooms, 2 bathrooms)	6 adults 2 children	• Central air conditioning

ID	Journal Language	Journal Format	Sex	Zip Code	City	County	House Type	Household Members	Home Attributes
SJ10	English	Electronic	F	95205	Stockton	San Joaquin	Single-family Home (3 bedrooms, 2 bathrooms)	4 adults	• Central air conditioning • Detached garage
SJ12	English	Electronic	F	95206	Stockton	San Joaquin	Single-family Home (4 bedrooms, 2 bathrooms)	3 adults 2 children	• Central air conditioning
SJ13	English	Electronic	M	95336	Manteca	San Joaquin	Single-family Home (3 bedrooms, 2 bathrooms)	2 adults 1 children	• Central air conditioning
SJ14	English	Electronic	F	95212	Stockton	San Joaquin	Single-family Home (3 bedrooms, 2 bathrooms)	3 adults 3 children	• Central air conditioning
SJ16	English	Electronic	F	95207	Stockton	San Joaquin	Condo or Apartment (2 bedrooms, 2 bathrooms)	3 adults 2 children	• Central air conditioning
SJ18	English	Electronic	F	95204	Stockton	San Joaquin	Single-family Home (4 bedrooms, 1 bathrooms)	3 adults 3 children	• Window air conditioning • Detached garage
SJ22	English	Electronic	F	95207	Stockton	San Joaquin	Single-family Home (3 bedrooms, 3 bathrooms)	1 adult 2 children	• Central air conditioning • Window air conditioning
SJ24	English	Electronic	F	95207	Stockton	San Joaquin	Single-family Home (3 bedrooms, 2 bathrooms)	2 adults 1 child	• Central air conditioning

ID	Journal Language	Journal Format	Sex	Zip Code	City	County	House Type	Household Members	Home Attributes
SJ25	Spanish	Electronic	F	95203	Stockton	San Joaquin	Single-family Home (2 bedrooms, 1 bathrooms)	2 adults 2 children	• Window air conditioning
SJ26	Spanish	Electronic	M	95336	Manteca	San Joaquin	Condo or Apartment (2 bedrooms, 1 bathrooms)	3 adults 1 child	• Central air conditioning
SJ27	English	Paper	M	95210	Stockton	San Joaquin	Single-family Home (3 bedrooms, 2 bathrooms)	4 adults	• Central air conditioning
SJ28	English	Paper	F	93576	Tracy	San Joaquin	Single-family Home (2 bedrooms, 1 bathrooms)	6 adults 2 children	• Window air conditioning
SD01	English	Electronic	F	92115	San Diego	San Diego	Single-family Home (2 bedrooms, 1 bathrooms)	2 adults	• Window air conditioning units • Detached garage
SD02	English	Electronic	F	91915	Chula Vista	San Diego	Condo or Apartment (2 bedrooms, 2 bathrooms)	3 adults 1 child	• Central air conditioning
SD03	English	Electronic	F	91910	Chula Vista	San Diego	Condo or Apartment (1 bedrooms, 1 bathrooms)	1 adult	• Central air conditioning • Above ground pool
SD04	English	Electronic	F	92105	San Diego	San Diego	Single-family Home (3 bedrooms, 1 bathrooms)	3 adults 1 child	• Window air conditioning

ID	Journal Language	Journal Format	Sex	Zip Code	City	County	House Type	Household Members	Home Attributes
SD05	English	Electronic	F	91910	Chula Vista	San Diego	Condo or Apartment (1 bedrooms, 1 bathrooms)	1 adult 2 children	
SD07	English	Electronic	M	92037	La Jolla	San Diego	Townhouse (2 bedrooms, 3 bathrooms)	2 adults 2 children	• Central air conditioning
SD08	English	Electronic	F	92104	San Diego	San Diego	Single-family Home (2 bedrooms, 1 bathrooms)	2 adults	• Window air conditioning
SD09	English	Electronic	F	92173	San Ysidro	San Diego	Single-family Home (3 bedrooms, 2 bathrooms)	3 adults 3 children	• Septic system
SD11	English	Electronic	F	91910	Chula vista	San Diego	Condo or Apartment (3 bedrooms, 2 bathrooms)	1 adult 2 children	
SD12	English	Electronic	F	92154	San Diego	San Diego	Single-family Home (3 bedrooms, 3 bathrooms)	3 adults	• Central air conditioning
SD13	English	Electronic	F	92026	Escondido	San Diego	Single-family Home (4 bedrooms, 3 bathrooms)	2 adults 3 children	• Central air conditioning
SD14	Spanish	Electronic	M	91913	Chula Vista	San Diego	Single-family Home (4 bedrooms, 4 bathrooms)	3 adults 1 child	• Central air conditioning • Window air conditioning
SD15	Spanish	Electronic	F	91913	Chula Vista	San Diego	Single-family Home (4 bedrooms, 4 bathrooms)	3 adults 1 child	• Central air conditioning

ID	Journal Language	Journal Format	Sex	Zip Code	City	County	House Type	Household Members	Home Attributes
									• Window air conditioning
SD16	Spanish	Electronic	F	91950	National City	San Diego	Condo or Apartment (2 bedrooms, 1 bathrooms)	3 adults	• Septic system
SD17	Spanish	Electronic	F	91950	National city	San Diego	Single-family Home (3 bedrooms, 1 bathrooms)	2 adults 1 child	•
SD18	Spanish	Paper	F	91978	Chula Vista	San Diego	Casa Individual (3 bedrooms, 2.5 bathrooms)		• Central air conditioning
SD19	Spanish	Paper	F	91910	Spring Valley	San Diego	Mobile home (3 bedrooms, 2 bathrooms)		• Central air conditioning
SD20	Spanish	Paper	F	91980	National City	San Diego	Mobile home (2 bedrooms, 1 bathrooms)	2 adults 3 children	
SD21	Spanish	Paper	F	92113	San Diego	San Diego	Condo or Apartment (3 bedrooms, 2 bathrooms)	4 adults 1 child	• Window air conditioning
O01	English	Electronic	F	94596	Walnut Creek	Contra Costa	Single-family Home (3 bedrooms, 2 bathrooms)	2 adult	• Central air conditioning
O04	English	Electronic	F	90027	Los Angeles	Los Angeles	Condo or Apartment (0 bedrooms, 1 bathrooms)	2 adults	• Septic system

ID	Journal Language	Journal Format	Sex	Zip Code	City	County	House Type	Household Members	Home Attributes
O08	English	Electronic	F	94518	Concord	Contra Costa	Single-family Home (4 bedrooms, 3 bathrooms)	2 adults 3 children	• Central air conditioning
O10	English	Electronic	F	93286	Woodlake	Tulare	Single-family Home (3 bedrooms, 2 bathrooms)	2 adults 2 children	• Central air conditioning
O11	English	Electronic	F	95351	Modesto	Stanislaus	Single-family Home (4 bedrooms, 2 bathrooms)	5 adults 2 children	• Central air conditioning • Septic system
O12	English	Electronic	F	95616	Davis	Yolo	Condo or Apartment (4 bedrooms, 2 bathrooms)	4 adults	• Central air conditioning
O15	English	Electronic	F	95691	West Sacramento	Yolo	Single-family Home (4 bedrooms, 3 bathrooms)	2 adults 2 children	• Central air conditioning • Below ground pool
O16	English	Electronic	F	95307	Ceres	Stanislaus	Single-family Home (3 bedrooms, 2 bathrooms)	2 adults	• Central air conditioning

Source: Research team's analysis of information provided by diarists.

APPENDIX F:
Characterization of Interviewees

ID	Sex	Ethnicity (1)	City	County	Zip Code	Median Household Income (based on zip code)(2)	Household Members	House Type	Renter or Owner	Home Attributes	Observations from interviewer(3)
SJ22	F	Mexican descent	Stockton	San Joaquin	95207	$38,923	1 adult 2 children	Single-family home (3 bedrooms; 3 bathrooms)	Owner	* Central air conditioning * Window air conditioning	Recently flipped home in a suburban, busy neighborhood.
SJ16	F	Unknown	Stockton	San Joaquin	95207	$38,923	3 adults 2 children	Apartment (2 bedrooms; 2 bathrooms)	Renter	* Central air conditioning	Sparsely furnished apartment in suburban neighborhood. Participating in California Alternate Rates for Energy program.
SJ25	F	Mexican descent	Stockton	San Joaquin	95203	$38,219	2 adults 2 children	Single-family home (2 bedrooms; 1 bathroom)	Renter	* Window air conditioning	
SJ09	M	Mexican descent	Lathrop	San Joaquin	95330	$62,731	6 adults 2 children	Single-family home (3 bedrooms; 2 bathrooms)	Owner	* Central air conditioning	Home has been remodeled (living room addition).

ID	Sex	Ethnicity (1)	City	County	Zip Code	Median Household Income (based on zip code)(2)	Household Members	House Type	Renter or Owner	Home Attributes	Observations from interviewer(3)
SJ01	M/F	Ecuadorian immigrant and Mexican descent	Stockton	San Joaquin	95204	$43,511	3 adults 2 children	Single-family home (2 bedrooms; 1 bathroom)	Owner	* Central air conditioning * Detached garage	Large, remodeled kitchen in older home. Neighborhood located on the fringe of a busy commercial and residential area.
SJ26	M	Mexican descent	Manteca	San Joaquin	95336	$56,651	3 adults 1 children	Apartment (2 bedrooms; 1 bathroom)	Owner		
SD08	F	Unknown	San Diego	San Diego	92104	$48,716	2 adults	Single-family home (2 bedrooms; 1 bathroom)	Renter	* Window air conditioning	Small home in new neighborhood.
SD18	F	Mexican immigrant	Chula Vista	San Diego	91910	$53,890	3 adults 2 children	Single-family home (3 bedrooms; 3 bathrooms)	Owner	* Central air conditioning	Multi-generational living under one roof.
SD12	F	Puerto Rican descent	San Diego	San Diego	92154	$60,380	1 adult	Studio in rear of single-family home (1 bedroom; 1 bathroom)	Renter		Small studio consisting of room and bathroom (no kitchen) at the rear of a single-family home.
SD01	F	Mexican descent	San Diego	San Diego	92115	$44,334	2 adults	Single-family home (2 bedrooms; 1 bathroom)	Owner	* Window air conditioning * Detached garage	Recently-renovated home with modest-sized lot, in transitioning neighborhood.

ID	Sex	Ethnicity (1)	City	County	Zip Code	Median Household Income (based on zip code)(2)	Household Members	House Type	Renter or Owner	Home Attributes	Observations from interviewer(3)
SD19	F	Mexican Immigrant	Spring Valley	San Diego	91978	$53,890	5 adults	Mobile home (3 bedrooms; 2 bathrooms)	Owner	* Central air conditioning	Large mobile home (two separate living rooms) in mobile home park in the suburbs of San Diego.
SD05	F	Hispanic descent (not-specific)	Chula Vista	San Diego	91910	$53,890	5 adults 2 children	Apartment (1 bedroom; 1 bathroom)	Renter		Small apartment in a suburban area of San Diego.
SD16	F	Guatemala immigrant	National City	San Diego	91950	$41,403	2 adults	Apartment (2 bedrooms; 1 bathroom)	Renter		Modest-sized apartment with modest furnishings in a suburban area of San Diego. Participating in California Alternate Rates for Energy program.
SD15	F	Guatemalan and Salvadorian immigrants	Chula Vista	San Diego	91913	$84,469	3 adults 1 children	Single-family home (4 bedrooms; 4 bathrooms)	Owner	* Central air conditioning	Large, well-appointed home in suburban area of San Diego.

ID	Sex	Ethnicity (1)	City	County	Zip Code	Median Household Income (based on zip code)(2)	Household Members	House Type	Renter or Owner	Home Attributes	Observations from interviewer(3)
SJ06	F	Unknown	Concord	Contra Costa	94518	$73,372	2 adults 3 children	Single-family home (4 bedrooms; 3 bathrooms)	Owner	* Central air conditioning	Home was constructed in 1960's or 1970's but was fully renovated prior to being sold. Home has dual-pane windows and new appliances.
SJ05	F	Mexican descent	Daly City	San Mateo	95205	$32,588	1 adult 2 children	Single-family home (2 bedrooms; 1 bathroom)	Renter	* Window air conditioning	Sparsely furnished casita in mother's backyard. Just moved in 2016.
SJ04	F	Mexican descent	San Pablo	Contra Costa	95206	$42,277	2 adults	Single-family home (3 bedrooms; 3 bathrooms)	Owner	* Central air conditioning	Large home in suburban neighborhood.
O15	F	Unknown	West Sacramento	Yolo	95691	$60,747	2 adults 2 children	Single-family home (4 bedrooms; 3 bathroom)	Owner	* Central air conditioning * Below grade pool * Whirlpool * Outdoor kitchenette area	Large home in suburban neighborhood.

Table notes: (1) Ethnicity was not always provided by interviewees; when not provided, it is marked as Unknown. (2) Median Household Income by Zip Code as reported by the United States Census Bureau, American Fact Finder https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml. (3) Observations were recorded by the interviewers and offer additional detail on the property and the interviewee.

Source: Inova's analysis of information provided by interviewees