Market Effects of Residential New Construction Programs In Southern California

Dr. Frederick Sebold, Regional Economic Research, Inc., San Diego, CA
Alan Fields, Regional Economic Research, Inc., San Diego, CA
Jennifer Smead, Regional Economic Research, Inc., San Diego, CA
Athena Besa, San Diego Gas & Electric Company, San Diego, CA

ABSTRACT

This study assesses the extent to which RNC programs implemented in the San Diego Gas & Electric (SDG&E) and Southern California Gas Company (SoCalGas) service areas induced sustainable market effects. The study design contains three major elements. First, *efficiency measure baselines* were developed for the measures covered by the study, including gas space and water heating equipment, high performance windows, and ceiling and wall insulation. Second, a characterization of the residential new construction market in Southern California was developed, including a description of the relationships among market actors and their roles and influences in determining efficiency levels in new homes. Third, a series of hypotheses about the market transformation effects attributable to the RNC programs were tested. The study concludes that although there is evidence of some market effects attributable to these RNC programs, the overall transformation effects of the programs appear to be minimal. It is important to recognize, however, that these RNC programs were not designed for market transformation *per se*, and were designed primarily to influence builders. While focusing on builders may have been the most effective means of inducing significant changes in installed efficiencies during the program period, long-term market transformation will clearly require significant changes in the perceptions and behavior of other market actors. The results of this study are being used by utilities, state agencies, and other organizations for planning market transformation initiatives and as a reference to more fully understand the residential new construction market and efficiency decision making practices and influences.

Overview

This paper provides an overview of an analysis of the market effects of residential new construction programs in Southern California. The study was funded by the California Board for Energy Efficiency (CBEE) and focused on the service areas of San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (SoCalGas). The following sections present background information on market transformation issues in California, enumerate study objectives, summarize the methodology used in the study, and provide a preview of the study's results and conclusions.

Background and Objectives

California's restructuring plan calls for continued attempts to stimulate the market for demand-side management (DSM) activities. Unlike previous programs, which focused primarily on resource acquisition, new programs will focus on market transformation. In the context of this study, market transformation denotes a long-lasting change in the market, or at least one that lasts beyond the life of DSM programs. Market transformation is typically characterized as the removal of market barriers that prevent the achievement of socially optimal levels of DSM activity. A taxonomy of these barriers has been developed in a recent report by Eto, Prahl, and Schlegel (1996).

Unfortunately, relatively little is known about market transformation attributable to DSM programs. Much of the work in this area has been conceptual rather than empirical. This study was a retrospective analysis designed to enhance our understanding of the market transformation effects of residential new construction (RNC) programs and focuses on the San Diego Gas & Electric (SDG&E) and Southern California Gas (SoCalGas) service areas. The study was designed to address six key questions:

- What changes in the market shares of the covered technologies have taken place over recent years?
- To what extent have utility programs influenced these changes in market shares?
- To what extent are these impacts of program stimuli long lasting?
- What market barriers were diminished by the programs in question?
- Which program features contributed to the mitigation of market barriers?
- To what extent are these impacts of program stimuli long lasting?

Methodology

Accomplishment of the objectives presented above required the completion of three major study elements: the development of efficiency baselines for the measures covered by the study – gas space heating, gas water heating, and windows, ceiling insulation and wall insulation; the characterization of the residential new construction market, including a full description of the relationships among market actors; and interviews with a variety of market actors and the use of these interview results to test a series of hypotheses about the market transformation effects of RNC programs.

The first objective above required the development of a database of gas equipment and shell measure efficiency levels installed in residential new construction before, during, and after RNC program implementation. These historical data are referred to as *measure baselines*. RER reviewed and used a wide variety of data sources to develop the measure baselines. Ultimately, the baselines were developed from a mix of sources.

The majority of information required for the characterization of the market and the assessment of market effects was obtained through in-depth interviews with market actors in the three areas covered by this study: the SDG&E service area, the SoCalGas service area, and a comparison area. The collection effort entailed both in-depth telephone interviews and structured telephone and mail surveys. Table 1 presents the total number of completed surveys and interviews with each market actor for each of the study areas.

Table 1: Completed Samples

Market Actor	SoCalGas	SDG&E	Control	Total
Manufacturers	na	Na	na	14
Distributors	na	Na	na	15
HVAC Contractors	4	4	4	13
Plumbing Contractor	1	3	2	6
Architects	6	3	5	14
Title 24 Consultants	7	2	2	12
Builders and Developers	15	15	15	45
Building Inspectors	7	2	2	12
Real Estate Agents	1	9	0	10
Sales Agents	16	14	15	45
Lenders	5	5	5	15
Government Staff	na	na	na	12
Consumers – Participants	460	96	na	556
Consumers – Nonparticipants	425	183	301	909

Market data from manufacturers, developers, HVAC contractors, distributors, lenders, building inspectors, government staff, and Title 24 consultants were collected through the open-ended interview medium. Sales and real estate agents were interviewed with a more structured, quantitative telephone survey format. Finally, data from residential gas customers (program participants and nonparticipants) from all areas were collected with a combined mail and telephone survey.

The qualitative and quantitative information obtained from the interviews and surveys enabled RER to characterize the RNC market and to identify key decision makers and decision influences with respect to the energy efficiency levels of gas equipment and shell measures installed in new homes.

Results

The following sections present the results for the three major elements of this study:

- A characterization of the residential new construction market and key market actors,
- Measure efficiency baselines, and
- Tests of market effects hypotheses.

Characterization of the Residential New Construction Market and Key Market Actors

One of the primary products of this research effort was an in-depth characterization of the key market actors and their interactions in the residential new construction market. The market for shell measures and high efficiency gas equipment consists of transactions among a variety of actors, some acting as suppliers to the market and others acting to create demand for these products. The following industry participants are considered to be key market actors: equipment manufacturers, equipment distributors and wholesalers, builders, architects, Title 24/energy consultants, HVAC contractors, plumbing contractors, building inspectors, sales and real estate agents, lenders, consumers, and government and nongovernment agencies. Each industry participant exerts some influence on decisions relating to market transactions, including decisions ranging from production, stocking, distribution, and pricing of the products to decisions pertaining to home design, equipment and measure specification, cost effectiveness, regulatory requirements, and consumer preferences.

Figure 1 depicts the general structure of the residential new construction market and the links and interactions among key market actors. The *supply side* of the market consists of equipment manufacturers and distributors and wholesalers. The government has a substantial influence on equipment manufacturing through the implementation of federal equipment manufacturing standards. Manufacturers sell product to distributors and sometimes directly to the contractors who install the equipment. Manufacturers' primary links to contractors and builders (those that demand the product), however, are through equipment advertising and marketing. Manufacturers influence these market actors through many channels of communication, including in-person contact, trade literature, and trade shows and conferences.

As shown in Figure 1, the *demand side* is comprised of the remaining market participants, including builders, HVAC and plumbing contractors, architects, Title 24 energy consultants, building inspectors, real estate and sales agents, lending institutions, and, of course, residential consumers. Builders are linked to nearly every key market actor, and are clearly the primary decision makers in most aspects of residential new construction. Builders have the most influence and make nearly all final decisions pertaining to the energy efficiency levels of equipment and shell measures of new homes.

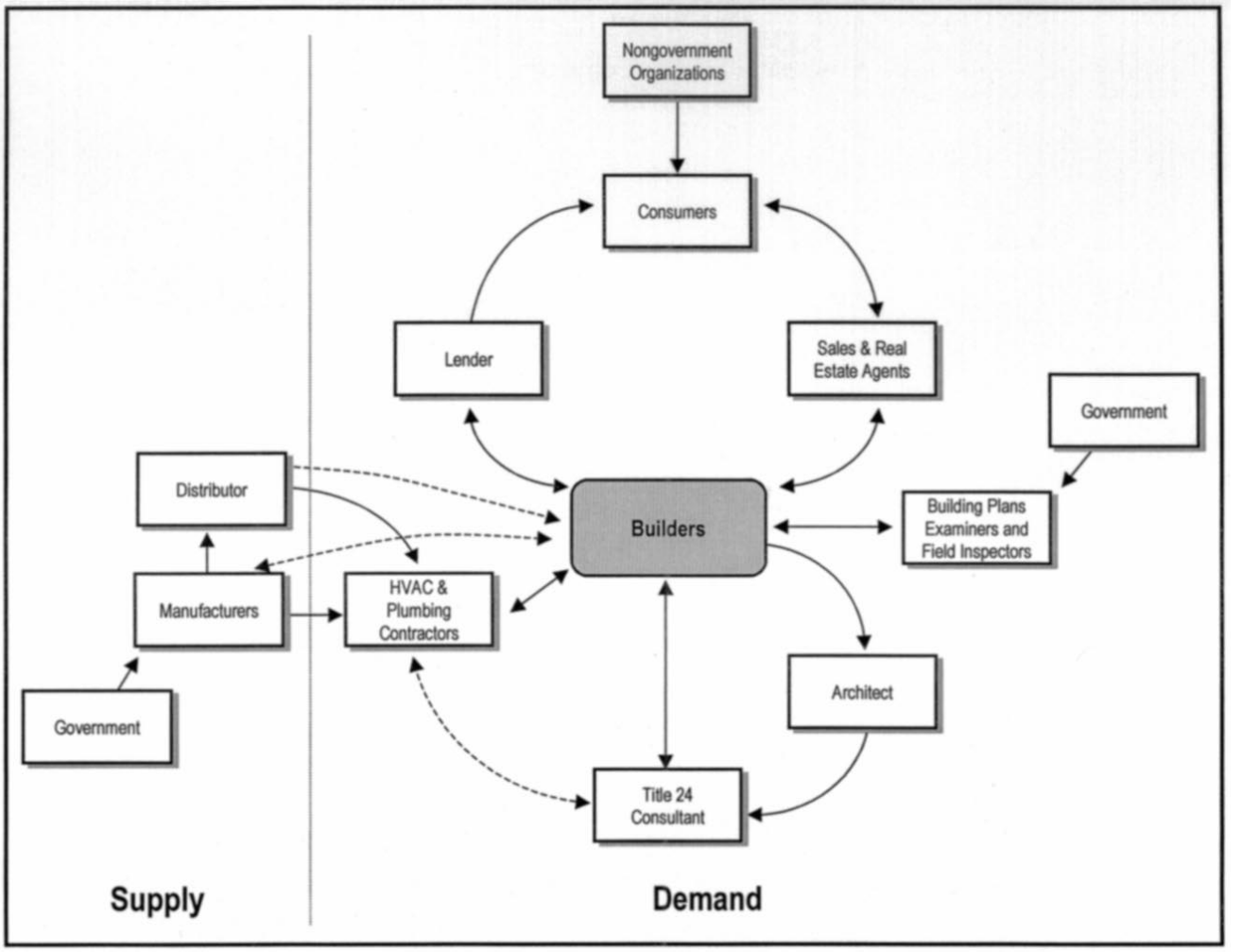

Figure 1: General Structure and Market Interactions

The builder works with the architect(s) during the project planning and design phase of construction. After the basic plans of the house are finalized, the plans are "elevated" to include all other specifications, including HVAC and plumbing system design and specification, and the specification of all shell measures. At this point, there is a great deal of interaction that occurs between the HVAC contractor, the builder, and the Title 24 consultant until the builder approves of all specifications and until the plans meet all building code and Title 24 requirements. A building plans examiner reviews the plans and Title 24 documents and issues the necessary building permits upon approval. [1]

The builder solicits bids for various aspects of construction, including HVAC and plumbing equipment installations, based upon the final specifications. The chosen contractors are responsible for purchasing and installing all equipment and materials as per the building plans. Building inspection occurs at various stages of construction to ensure that all material and equipment coincide with the building plans and that all equipment has been installed according to the manufacturers' guidelines.

---

[1] It is interesting to note that all of the intermediaries are state licensed except for the Title 24/energy consultant, for whom no license is required.

Sales and real estate agents are responsible for selling the property to consumers. They not only work with consumers in finding homes that are compatible with their lifestyles and needs, but also relay homebuyer preferences to the builder during project planning and market research. Note that the sales agents are the most direct link between the builder and consumers.

Finally, Figure 1 reveals that government agencies and nongovernment organizations interact with several market actors. As explained in the following sections, the roles of government and nongovernment agencies involve implementing standards and regulations in the market, as well as supplying information to key market actors.

Key results relating to key market actors are summarized below.

Supply-Side Market Actors

- Gas space and water heating *equipment manufacturers* are sensitive to demand from market actors downstream, mainly distributors and builders. The efficiency levels of the equipment they produce are most strongly influenced by equipment efficiency standards mandated by government agencies and by competition among manufacturers.
- *Equipment distributors* have little influence in the market and are not a primary source of information for other market actors.
- The strongest link between the supply- and demand-side market actors is the information flow from manufacturers to builders, contractors, and other industry participants.

Demand-Side Market Actors

- Builders are the central decision makers in all aspects of construction, including specification of energy efficiency levels of gas space heating equipment and shell measures. Because tract developers attempt to minimize construction costs subject to code compliance, tract homes rarely exceed the minimum Title 24 requirements.
- Builders rely on the expertise of other market actors in the decision-making process. During the specification stage of product development, architects, Title 24 energy consultants, and HVAC contractors participate in and influence the builder's decisions regarding equipment and shell measure specification.
- Builders' sales agents are the only link between builders (the central decision maker) and consumers. They work with consumers in finding a home that satisfies their lifestyle, and provide input to builders regarding consumer preferences during the preliminary stages of development. The extent to which sales agents provide information to consumers on energy efficiency levels of new homes is limited by the builders' willingness to train the agents and supply such information as well as consumers' interest in energy efficiency levels of new homes.
- Lenders play no meaningful role in influencing efficiency choices. They do not generally consider efficiency levels in the process of qualifying buyers for loans, and do not feel qualified to provide advice on efficiency.
- Consumers tend to think that if a home meets building code requirements the home is energy efficient. Consumers rarely opt to upgrade the energy efficiency levels of a

new home. (It is also important to note that builders rarely offer upgrades of energy-related equipment and features.)

- Even though consumers feel that energy efficiency is more important now than in the past, they have little influence on the energy efficiency levels of new homes. The flip side of this point is that most builders do not give consumers the opportunity to choose the efficiency of the equipment installed in their new home. Most builders offer upgrades to the consumers, but these upgrades rarely pertain to energy-related features, especially gas space and water heating equipment. (Most energy efficiency upgrades offered by builders are for air conditioning units with a higher SEER rating.) Even though builders are willing to build anything the consumer wants, homebuyers rarely request energy efficiency upgrades.

Government Agencies and Nongovernment Organizations

- The quality and extensiveness of building plan review and field inspection varies among municipalities.
- Although RNC programs could potential influence building energy code revisions, builders typically have a strong presence in energy efficiency code revision processes and generally lobby for the maintenance and simplification of standards.
- Nongovernment organizations provide informational services to consumers and other market actors about the energy efficiency of residential buildings. These organizations are reactive rather than proactive. In particular, their strategy is to "fit into" the market mechanism (i.e., the home purchasing process), rather than target a specific market actor. As such, they respond to questions and requests for information rather than disseminate information to industry participants.

While the discussion points presented above are generalizations about residential tract development, it is important to understand that market features differ by project type, project value, residence type and consumer type. First, for instance, the consumer is the primary decision maker in custom home projects and relies heavily on the expertise of other market actors in decisions related to energy equipment and measures. Second, homes of higher value are more likely to be specified with high efficiency features than those of lower value (sometimes for energy conservation purposes and sometimes for other reasons, such as aesthetics, noise mitigation, and just for "higher quality"). Third, the goals and objectives of multi-family housing regarding energy-related features are often different than those of single family homes. Fourth, , there are differences between first-time homes buyer and repeat buyer preferences for energy efficiency. First-time homebuyers generally do not consider the operating costs of a new home, while repeat buyers are more likely to conceptualize (or have experienced) the benefits of high efficiency equipment. Repeat buyers are also more likely to ask sales agents questions about the energy-related features of a home. Such inquiries send signals to the sales agents (and therefore the builder) that homebuyers are interested in energy efficiency.

Measure Baselines

Overall Efficiency Histories. Measure baselines were derived for gas furnaces, gas water heaters, and ceiling and wall insulation. Gathering historical data on the efficiency levels of installed equipment and shell measures in residential new construction was the most difficult challenge of the study. The measure baselines developed for this study were derived from four primary information sources, including the following:

- The California Energy Commission's Post-Occupancy Residential survey project,
- SDG&E and SoCalGas residential new construction DSM program records,
- The RER Study Database from the analysis of the 1994 SoCalGas Energy Advantage Home Program, and
- Title 24 compliance forms obtained from building departments throughout the SDG&E and SoCalGas service areas.

In general, these sources provided adequate historical data for gas furnace, water heater, and shell insulation efficiency levels. However, historical data from existing sources on high efficiency windows (U-values) were sparse, at best.

The measure baselines for gas space and water heating equipment, windows, and wall and ceiling insulation reveal the following trends:

- The average gas furnace annual fuel utilization efficiency rating (AFUE) steadily increased from the late 1980s and early 1990s, with a sharp increase observed in 1993 due to the increase in the AFUE standard to 78%. The AFUE peaked at just above 80% in 1995 and has decreased slightly since then.
- The average gas water heater energy factors (EF) has been historically well above the national standard of .54. The average EF has increased from .58 in 1989 to .61 in 1997.
- The average wall insulation R-value ranged from 13.11 in 1989 to 13.04 in 1997. Aside from a noticeable dip from 1993 to 1994, efficiency levels of wall insulation have remained somewhat constant over the past nine years.
- The average ceiling insulation R-value ranged from 29.74 in 1989 to 29.81 in 1997. Efficiency levels dropped significantly between 1989 and 1990, increased and peaked at 32.07 in 1994, then decreased again.

As this effort is the first attempt to integrate baseline data from several sources, it is imperative that efforts continue to derive more accurate measure baselines.

Program Influences on the Market. One application of the efficiency histories is the assessment of overall effects of the RNC programs on efficiency levels. First-year impact studies have been done for both of the programs in question, and we made no attempt to replicate these evaluations. Instead, we focused on the more central question relating to the *permanence* of these program impacts, the characteristic that distinguishes market transformation programs from their traditional predecessors. There are two ways to attempt to address this fundamental question. First, we can attempt to correlate changes in efficiency levels with the absence/presence of the program. In this approach, we essentially attempt to observe directly whether or not lasting changes in market shares

have occurred. Second, we can look for some intermediate indicators that programs have changed basic attitudes, perceptions and behaviors in a way that can be assumed to have lasting impacts. These market effects will be considered below in the next section. Here, we focus on the observed changes in overall market efficiency over time.

While the true test of market transformation is a more or less permanent change in the efficiency levels targeted by a program, it is difficult to observe such changes directly. Unfortunately, the data for non-program years is insufficient to support any definitive conclusions on the impacts of the RNC programs. However, changes in efficiency levels since the end of 1995 may offer some insights with respect to permanence, insofar as the SDG&E program was converted to a maintenance program and the SoCalGas program was changed to an information only program at that time. The following changes occurred after 1995:

- **Gas Furnaces.** Gas furnace AFUEs peaked in 1995 and have diminished slightly each year since then. While these AFUEs have not yet returned to their mandated minimum, there does appear to be some attrition in the program impacts over time. Clearly, though, more data need to be collected before this slight trend can be interpreted more clearly.
- **Gas Water Heaters.** Average water heater efficiencies (EFs) continued to rise in 1996, then fell slightly in 1997. They continue to remain considerably higher than the standard, but it is unclear that this is a long-lasting situation or that it attributable to the programs in question. Again, more data need to be collected over time before we will be able to see a clearer picture.
- **High Efficiency Windows.** Given the problems of collecting adequate data on window U-values, there are no measure baselines for this measure. Considerably more work needs to be done to collect sufficient data to track historic and subsequent years' data.
- **Wall Insulation.** The wall insulation baselines suggest that wall insulation has never exceeded standards significantly. The overall average R-value has stayed very close to R-13, the minimum requirement in most weather zones. This should not be surprising, given that the installation of greater R-values would most likely involve the use of considerably more expensive 2 × 6 studs or expensive sheathing. When given the option, builders typically find other less costly ways to increase efficiency.
- **Ceiling Insulation.** Ceiling insulation levels appear to have dipped in 1996 but to have risen in 1997. No clear tendencies have emerged to suggest that program effects have been short-lived. Again, more data will have to be collected to ascertain any such tendencies.

It should be noted that all of these trend analyses are complicated not only by the short period of post-program experience, but also by the inherent variability in the distribution of construction across CEC weather zones. Moreover, comparisons across years are also complicated by the variation in market conditions over this period. Further, construction activity started to pick up in 1997 and may have influenced efficiency choices.

Tests of Market Effects Hypotheses

As noted above, another means of assessing the market transformation effects stimulated by RNC programs is to examine induced changes in market barriers, or market effects. While these effects are only intermediate indicators of program success, they nonetheless offer useful insights into the permanence of program impacts as well as the mechanism through which permanent impacts are promoted. The market barriers investigated in this study include product unavailability, organizational practices, performance uncertainties, information costs, hassle costs, bounded rationality, and split or misplaced incentives. Impacts on these barriers were assessed using information obtained from surveys completed by consumers, and in-depth interviews with builders, manufacturers, distributors, sales agents, and a variety of other market actors. Surveys were conducted in three areas: the SDG&E service area, the SoCalGas service area, and a control area consisting of the Austin/San Antonio corridor.

Our conclusions with respect to the effects of the RNC programs on these barriers are not particularly positive. They are presented below, organized by major classes of market actors as well as specific hypotheses.

Effects on Manufacturers

- ***Hypothesis 1a:*** RNC Programs increase production of affected measures and improve product availability.

  Conclusion: This hypothesis is not generally supported by the manufacturer interviews. While the efficiency mixes of both water heaters and furnaces have improved considerably over time, these improvements are primarily attributable to standards rather than DSM programs. Manufacturers also report fairly dramatic improvements in window efficiencies, but they attribute these changes to "competition among manufacturers." On the other hand, the fact that efficiency is perceived as a competitive tool may indicate that efficiency programs have been somewhat responsible for this trend.

- ***Hypothesis 1b:*** RNC programs change manufacturing practices and stimulate retooling, thus leading to higher efficiency levels in the product mix.

  Conclusion: This hypothesis is not strongly supported by the data. For the most part, changes in manufacturing practices are ongoing and reportedly attributable to the manufacturers' long-term outlooks and competition in the industry, rather than to DSM programs. However, it is possible that some changes in practices relating to gas heaters and windows could be attributed to DSM programs in general.

Effects on Builders and Other Decision Influencers

- ***Hypothesis 2a:*** RNC programs increase the effective product availability by increasing builders' and other decision influencers' product awareness.

  Conclusion: These programs do seem to have increased builders' awareness of efficiency options. Southern California participants appear to be significantly more aware of these options than Southern California nonparticipants and builders in the

control area. The programs also seem to have increased awareness levels of architects. There is no evidence to suggest that programs have made HVAC contractors more aware, but comparisons with the control area were confounded by differences in weather conditions between Southern California and the control area.

- ***Hypothesis 2b:*** RNC programs affect the business strategies and standard organizational practices of builders, architects, distributors, and other decision influencers.

  Conclusion: Participation in the RNC programs does seem to have affected some organizational practices of builders and HVAC contractors.

- ***Hypothesis 2c:*** RNC programs lead to lower effective DSM prices by lowering information and hassle costs incurred by builders, distributors and other industry participants.

  Conclusion: The results are mixed on this generally negative. Participating builders are generally no less likely than either nonparticipating builders or control area builders to consider lack of information, unavailability of products, difficulty of choosing among options, or hassle costs important, no are HVAC contractors in Southern California less likely to consider these barriers important than their counterparts in the control area. Results for architects are mixed.

- ***Hypothesis 2d:*** RNC programs stimulate changes in the promotional practices used by contractors and distributors.

  Conclusion: Again, we find no real support for this hypothesis. Participating builders are actually less likely than nonparticipants to market high efficiency homes differently than homes that just meet code. On the other hand, both participants and nonparticipants from Southern California are more likely than control area builders to do so. Nearly all builders expressed the opinion that energy efficiency is "low down on the [consumer's] list of reasons to buy [a home]."

Effects on Customers:

- ***Hypothesis 3a:*** RNC programs increase customers' awareness of and knowledge about energy-efficient appliances. This lowers information and hassle costs and diminishes asymmetric information barriers.

  Conclusion: The customer survey results suggest that participants are only slightly more aware of energy efficiency standards than Southern California nonparticipants, but considerably more aware of efficiency standards on gas equipment than control area respondents. They are also only marginally more aware of energy efficiency options than nonparticipants. In comparison to control area respondents, California participants are considerably more aware of differences in available efficiency levels for gas furnaces, but less aware of differences in window efficiencies. This latter result is undoubtedly related to the importance of window integrities for cooling requirements in the control area.

- ***Hypothesis 3b:*** To the extent that energy-efficient appliances perform well, promotion of their use should improve customers' satisfaction with these products and diminish performance uncertainties.

  Conclusion: While the data are somewhat mixed on this issue, RNC programs seem to have had limited effects on consumers' perceptions. First, households in participating homes are only slightly more likely to think their homes are energy efficient than households in nonparticipating homes. Second, perceptions of energy savings are relatively modest. Third, participating and nonparticipating consumers express very similar intentions to purchase energy efficiency in their next homes.

- ***Hypothesis 3c:*** RNC programs influence customers' decision-making processes relating to the choices of energy efficiency. This might take the form of reductions in bounded rationality.

  Conclusion: Again, the survey data reveal no evidence that consumers' decision-making processes have been affected by the programs.

Effects on Split Incentives

- ***Hypothesis 4a:*** Program promotions make consumers aware of the energy savings associated with shell and equipment efficiencies, and increase the prices these customers are willing to pay.

  Conclusions: At best, the evidence offers only weak support for this hypothesis. Households now living in participating homes are actually less likely to be willing to pay for increased energy efficiency in their next home, although those who *are* willing express greater willingness to pay.

- ***Hypothesis 4b:*** Program participation makes customers more aware of the benefits of efficiency, and makes them more likely to opt for high efficiency levels when they purchase another home.

  Conclusions: The data do not support this hypothesis. Participating and nonparticipating consumers express roughly equal willingness to purchase opt for high efficiency when they purchase their next home.

Effects on Government:

- ***Hypothesis 5a:*** RNC programs lead to improvements in appliance efficiency standards and building codes.

  Conclusions: This hypothesis is weakly supported. Assuming that RNC programs increase efficiency levels of equipment and shell measures in the marketplace, RNC programs could influence energy efficiency standards to the extent that market conditions are accounted for in the revision process.

- ***Hypothesis 5b:*** RNC programs encourage greater compliance and enforcement of appliance and building energy efficiency codes.

  Conclusions: Again, this hypothesis is weakly supported. While RNC programs can encourage compliance by offering performance-based and prescriptive incentives, it is unclear whether the programs induce long-lasting market transformation. There is no evidence that RNC programs encourage enforcement of energy codes.

General Conclusions

Our conclusions with respect to transformation are not particularly positive. Although there is some evidence of partial market transformation attributable to these RNC programs, the overall transformation effects of the programs appear to have been minimal. It is important to recognize, however, that these RNC programs were not designed for market transformation *per se*, and they were designed primarily to influence builders. While focusing on builders may have been the most effective means of inducing significant changes in installed efficiencies during the program period, long-term market transformation will clearly require significant changes in the perceptions and behavior of other market actors.

The more distant market actors are from the targeted decision point, the less likely they are to be aware of the program and the less likely they are to be affected by it. While builders (and probably HVAC contractors) exhibited some potentially long-lasting changes in behavior as a result of participation in these programs, other actors do not seem to have been influenced in any significant way. The most significant and notable permanent affects attributed to the programs pertained to duct sealing practices. Some of the HVAC contractors interviewed for this study recognized the importance of improved duct sealing methods and the use of high quality sealing materials in helping homes become more energy efficient. Regardless, even the observed changes in builder and HVAC contractor awareness and organizational practices are unlikely to be strong enough to sustain the effects of these programs on efficiency levels. Only a handful of participating builders reported that they continued to install high efficiency measures after program participation ended.

It seems clear that programs designed specifically for market transformation should target all market participants driving demand for high efficiency features in the market. It is especially important that these programs focus on the consumer, whose behavior tends to drive the actions of all other actors. Split incentives and asymmetric information are almost certainly the most significant (and the most difficult to mitigate) market barriers in residential new construction. These barriers exist primarily because builders (the primary decision maker) and consumers (the primary market driver) have different incentives in their market transactions and have different levels of and sources for information. Because they are the only direct link between builders and consumers, and because they are fairly influential with consumers with respect to energy-related features in new homes, sales agents could play a pivotal role in future programs.

Market transformation may be particularly difficult to induce in Southern California, where weather conditions are mild. The majority of builders, architects, HVAC contractors, building plans examiners, and other market participants cited the moderate climate in Southern California as a major reason for complacency toward increasing energy efficiency, and the reason why consumers do not appear to be more concerned. This does not mean that it is not important to reduce barriers

in Southern California, but rather that the lower returns to efficiency will require more significant reductions in these barriers than would otherwise be the case.

References

Eto, J., R. Prahl, and J. Schlegel. *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs.* Prepared for the California Demand-Side Measurement Advisory Committee (Project 2091T). LBL-39058. UC-1322. July 1996.