A Comparison of ENERGY STAR Labeled Homes Programs

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ABSTRACT

The EPA's ENERGY STAR program for labeled homes has now been operating for over six years. In that time, ENERGY STAR has gained significant momentum. Many utilities and several States have adopted the model for their public benefits market transformation programs. The logo is the same, but each program is different. This paper will compare and contrast the differences in program design and implementation for three distinct ENERGY STAR programs for new construction: the EPA's nationally focused effort, the NYSERDA funded New York State program, and Reliant Energy's program for ENERGY STAR labeled homes in the Houston area. The lead author has played a significant role in the design and implementation of each of these programs, and has learned many market transformation lessons along the way. This paper analyzes the similarities and differences in these programs, in an attempt to better understand the driving forces for market transformation in the residential new construction markets. Factors considered include funding available, market size and variability, marketing campaigns, verification approaches, market barriers faced, and program results to date. From this analysis, future program directions and challenges will be introduced, and methods of collaboration between programs are suggested.

Background

Since its inception in 1996, the ENERGY STAR Labeled Homes program has gained significant momentum. EPA's initial target markets are reaching impressive market penetration levels, and many utilities and several States have adopted the ENERGY STAR model for their public benefits market transformation programs. EPA's influence continues, as it highlights the achievements of the most successful partners, and works to address issues related to evolution of the program. Yet, a growing number of state and utility funded energy efficient new construction programs are taking ENERGY STAR Labeled Homes in new directions. These programs adopted ENERGY STAR as their performance benchmark (i.e. technical standard), and they use key ENERGY STAR Labeled Homes marketing strategies and messages in their program outreach activities. But, as these states and utilities develop and implement their ENERGY STAR programs, they adapt their programs to the specific needs of their constituents. They also sometimes carry with them baggage from previous programs.
Constituents that influence the design of these programs include the local building industry, the relatively new HERS (Home Energy Rating System) industry, home buyers, and the agencies and organizations that mandated and/or fund their programs. These influences are explored in this paper in the context of two very different ENERGY STAR Labeled Homes programs: Reliant Energy's utility funded program in Houston, TX, and NYSERDA's State funded program covering the majority of upstate New York. The EPA's overall program strategy and evolving role is briefly discussed as a backdrop for this comparison.

EPA's ENERGY STAR Program

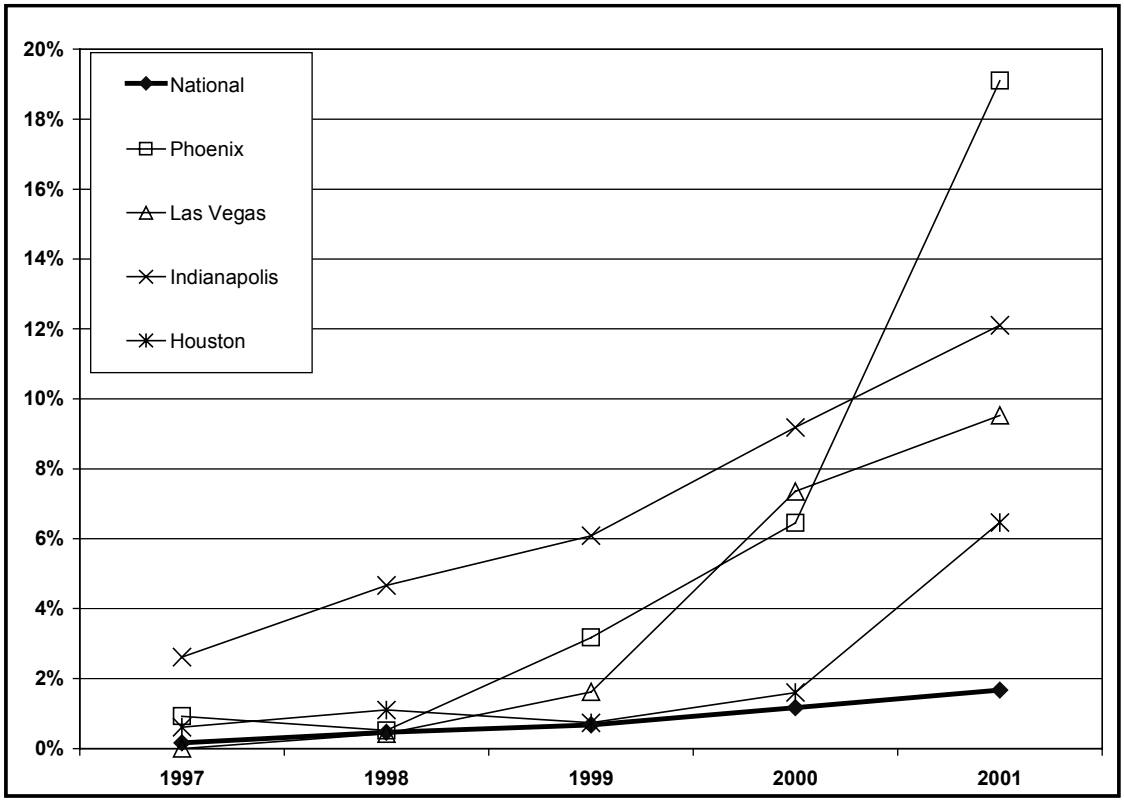
As the EPA's ENERGY STAR Labeled Homes program has grown, and taken on a life of its own, the EPA has continued to focus on helping program participants succeed by marketing and selling the merits of energy efficiency. The program does not rely on financial incentives to influence consumers' purchasing decisions. In fact, the EPA discourages incentive-based program implementation, because incentives tend to encourage participant reliance on program subsidies. From EPA's perspective, this sends the wrong signal. If energy efficiency is inherently valuable to consumers in its own right, then consumers should pay for it. This is a particularly compelling argument in the case of new homes, since the total costs to own a typical ENERGY STAR labeled home (i.e. monthly mortgage + utility costs) are lower than total ownership costs for a comparable house built to minimum code requirements for energy efficiency. But, builders sell on price, and they have little time in the sales process to educate their customers about the technical merits of their products. As it is, they fight hard to get their potential customers' attention regarding the highly visible features of their homes. Thus, the cost barrier has been a difficult hurdle to overcome in the marketplace. EPA's strategy to overcome this market barrier has been to focus attention on influential, mainstream builders who are willing to use the ENERGY STAR messages in their sales and marketing strategy as a differentiating factor, then to leverage that influence in the highly competitive builder marketplace. EPA focuses attention on the participating influential builders using a co-op advertising campaign for each initial target market, by assisting in promotional events (e.g. Parade of Homes) that feature ENERGY STAR Labeled Homes, and by providing marketing support to key raters and builders. As these builders benefit from the increased media and advertising attention, their competitors notice and are often influenced to join the program in this way (the "band wagon" effect).

The strategy is working. In the EPA's initial target markets (Phoenix, Las Vegas, Indianapolis, plus Houston was added in 2001), market penetration of ENERGY STAR labeled home sales has approached 20%. And, the number of ENERGY STAR labeled homes sold has exceeded recent program targets. In 2001, over 26,000 homes were labeled ENERGY STAR, over 85% growth from the previous year, and greater than the program goal for the year. More important than the numbers, there are now clear examples in the marketplace of builders who pay for the costs of the upgrades and the program requirement for third party verification, and who use the ENERGY STAR logo in their marketing. These builders are increasing their commitments to building to the ENERGY STAR performance level, and marketing the value of energy efficiency.

While some of this success began with the assistance of grants or national and local funded programs that seeded the initiative, there are now signs that sustainable program success is possible, without on-going subsidies (beyond the start-up phase for these programs). In Phoenix, for instance, no financial incentives have ever been available for participating builders. Phoenix builder participation was initially spurred by technical support from DOE's Building America program and by marketing support from Southwest Gas. But, that support has waned in recent years. Yet, builder participation has grown significantly. Las Vegas has followed suit, showing impressive growth without financial incentives. These markets highlight the market transformation success possible when the right market conditions exist, and when an effective approach to program support is

delivered. **Figure 1** shows the market penetration statistics for the four EPA target markets for the ENERGY STAR Labeled Homes program to date.

Figure 1. Market Penetration in ENERGY STAR Target Markets



A Tale of Two Programs

However, the question still remains, will this success spread like wildfire nationwide by itself? So far, ENERGY STAR Labeled Homes participation has only been strong where some initial focused local or national support has been present. Can EPA afford to continue transforming the nation's housing markets one at a time? And, would the successes to date in Phoenix and Las Vegas have been possible without the initial support of the local utilities and the Building America Program? Even without clear answers to these questions, the movement towards local customized application of ENERGY STAR programs seems to be picking up momentum. With this kind of local focus on a successful market transformation approach (i.e. ENERGY STAR), many more markets can be transformed than EPA could transform by itself. The critical questions now include:

- How can local initiatives be structured to achieve similar successes?
- Can incentives help to move market transformation more quickly, or will they always stifle competitive forces?
- Can the ENERGY STAR successes to date be achieved in markets without large production builders?

In the remainder of this paper, two local ENERGY STAR Labeled Homes programs are described and compared, in an attempt to address these questions.

Reliant Energy's ENERGY STAR Labeled Homes Program

Houston Light and Power (HL&P), a subsidiary of Reliant Energy, has implemented energy efficiency new construction programs for over 10 years. In the 1990's, HL&P's Good Cents Program helped improve the efficiency of nearly 20% of the new homes built in the Houston metro area[1]. The HL&P program was particularly strong in helping to improve the efficiency of the HVAC & duct systems installed in participating new homes. The Good Cents program was based on incentives for preferred energy efficiency features and a utility-funded home inspection protocol. The driving influence in the development of HL&P's Good Cents program was the need to meet Public Utility Commission (PUC) requirements for energy efficiency, and a parallel business need for electric utilities to control demand (kW) growth. Many utilities in the country have adopted similar programs for similar reasons.

In 2000, Reliant changed its new construction program to ENERGY STAR in order to meet new legislative requirements for rate-payer funded programs to include a "market transformation" (MT) component[2]. Reliant chose an ENERGY STAR based program because of the higher performance standard[3], and the brand momentum achieved by the ENERGY STAR program through successful marketing of energy efficient products, including new homes. The Reliant ENERGY STAR Labeled Homes Program focused its attention on many of the same builders who participated in the Good Cents program, but shifted a significant portion of its program resources to ENERGY STAR focused builder marketing and advertising support. While Reliant continued to offer financial incentives to builders for program participation, the incentives were significantly less than those offered under Good Cents, and they came with a requirement that builders commit financial resources to marketing using the ENERGY STAR logo.

In addition, much of the technical verification required for program support was shifted to the private sector HERS industry. One HERS provider, Guaranteed Watt Saver Systems, had a head start with some of the builders in the Houston area, through its contract based production builder sales approach. Reliant took full advantage of this head start, with the aim of developing a diversified and competitive technical support industry[4] for participating builders. Reliant provided training and certification support to enlist the involvement of two more HERS rating providers in 2001.

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[1] The HL&P Good Cents Program began in 1988, and continued through 1999. By 1999, approximately 7,000 homes were certified per year – about 25% market penetration. Overall, the HL&P Good Cents program certified approximately 50,000 homes, and was successful at phasing out program incentives toward the end of the program, achieving measurable market transformation.

[2] In 2000, Texas Senate Bill 7 was passed, requiring Texas utilities to achieve 10% of their demand growth through energy efficiency savings.

[3] The ENERGY STAR performance requirement is approximately 15% more stringent than the Good Cents program, measured by HERS guidelines. Good Cents certified homes were determined to be roughly equivalent to a home with a HERS score of 83.

[4] HERS Rating and BOP (Builder Option Package) Providers.

The driving factors behind program design for the Reliant ENERGY STAR program were the need to meet PUC kW demand reduction goals, and a desire to minimize Reliant's risk of missing this key goal. These objectives led to development of a unique "bid" process for builder participation in 2001. To receive incentives of $150 to $300 per qualified home, interested builders were required to submit a bid at the beginning of the year which included the number of homes committed, planned marketing activities, and a financial commitment to advertising with the ENERGY STAR logo. Each bid received by the bid-closing date was evaluated and scored based on these criteria, then program incentive funds were allocated to the builders based on their scores. Reliant also set intermediate milestone dates when builder performance to date was evaluated and program incentive awards for under-performing builders were re-allocated. Reliant also facilitated builder advertising through a successful ENERGY STAR Builder Co-op Ad Group. The first year Co-op Ad Group contributed $240,000 to the ads, which was roughly matched by Reliant program funds.

After program design, and its first full year of implementation, the Reliant program is picking up significant momentum. In 2001, the Reliant program resulted in 1,409 ENERGY STAR labeled homes, built by six participating builders, and rated by three rating providers. Successful print advertising was conducted in the Houston area through the Co-op Ad Group. The prospects for 2002 include over 4,000 homes, built by 15 participating builders, and rated by five rating providers. Builder contributions to the Co-op Ad Group increased from $240,000 in 2001 to $550,000 in 2002, which has expanded into billboards, TV, and radio, in addition to continuing print advertising. Builder enthusiasm for the program and the advertising campaign are high.

New York's ENERGY STAR Labeled Homes Program

New York State also has a significant history of implementing energy efficiency programs. However, New York's programs have been more focused on low-income applications through DOE assisted weatherization programs, like its Residential Energy Affordability Program (REAP). The NYSTAR Program was the closest predecessor to the current Energy STAR Program in New York. However, NYSTAR was strictly a home energy rating and labeling program, with little or no marketing assistance to participating builders. The NYSTAR program standard was aggressive, requiring 25% energy savings compared to the New York State energy code, as measured by NYSTAR program inspectors. High quality field support and training were included. However, the lack of marketing support for builders, and the perceived lack of consumer demand for energy efficient homes led to the end of the program in the late 1990's.

The New York ENERGY STAR Labeled Homes Program was launched by the New York State Energy Research and Development Authority (NYSERDA) in 2001, and is funded through the New York Energy $mart^{SM} program. New York Energy $mart^{SM} is a broad family of programs designed to benefit New Yorkers, through low-income family assistance, research and development, and voluntary programs. These programs are paid for by System Benefits Charges (SBC) on the electricity transmitted and distributed by the State's investor-owned utilities, and they focus on providing public benefits to New York rate-payers during the State's transition to electric retail competition.

The New York ENERGY STAR Labeled Homes Program was launched in the Spring of 2001, a few months after the launch of the New York Home Performance with ENERGY STAR

Program, which promotes the services of certified home energy performance professionals to improve the energy performance of existing homes. Both programs were designed as market transformation programs, based on the ENERGY STAR concept. They share an aggressive advertising campaign, centered around ENERGY STAR messages, and feature the popular home improvement personality Steve Thomas of the Emmy Award winning PBS series "This Old House". The program ads, aired on prime time TV, radio, and print advertising in six targeted New York markets, highlight the benefits of energy efficient products and services associated with the ENERGY STAR logo, and direct interested New York consumers to a program hotline for assistance. This aggressive consumer outreach effort is a key element of NYSERDA's market transformation strategy.

NYSERDA's ENERGY STAR program strategy is also strongly driven by a desire to promote and facilitate new construction and existing home upgrades that not only improve energy efficiency and reduce peak demand, but also increase the safety and comfort of their occupants. To this end, the NYSERDA program developed aggressive performance standards that reach beyond the ENERGY STAR performance level to address Indoor Air Quality (IAQ), combustion safety, and lighting and appliance efficiency.

Homes that meet the New York ENERGY STAR performance standards are eligible for financial incentives, including a $1,000 builder incentive and a $500 home buyer incentive awarded for each qualified ENERGY STAR labeled home. In addition, a $5,000 Model Home incentive is awarded to qualified builders for a limited number of homes branded with ENERGY STAR materials for 60 days of public viewing. Since very few homes are built by large production builders in New York, the incentives were set high to help smaller custom builders advertise and promote these homes and to maximize consumer exposure to ENERGY STAR messages and the ENERGY STAR logo in New York. In exchange for these generous incentives, builders must build to the aggressive New York ENERGY STAR performance level, advertise their homes with the ENERGY STAR logo and messages, and pay a private sector HERS Rater[5] to verify the performance level of a qualified home. Since small custom builders do not build large volumes of homes, the HERS rating service is significantly more expensive per home than with large production builders eligible for the sampling approach to performance verification.

Since the program was not launched until the middle of the New York building season, the focus of the first year was on establishing program processes, training & certifying HERS raters (who by and large did not exist in New York prior to 2001), and recruiting builders into the program. The program only achieved about 80 labeled homes in 2001. However, over 140 builders were recruited into the program in 2001, over 2,000 consumer inquiries were received from the program ads, and the number of active certified HERS raters in New York has risen from one to over a dozen. The stage is set for rapid program growth in 2002 and following years.

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[5] NYSERDA decided to encourage development of a private sector HERS Rating industry for program verification, rather than using NYSERDA, program implementers, or utility staff. NYSERDA's residential programs (ENERGY STAR Labeled Homes and Home Performance with ENERGY STAR) support the development of private sector certified home performance contractors, with a shared goal of providing the NY market with the building science expertise needed to deliver high performance to new and existing home owners.

Program Comparison

In comparing these two programs, it is clear that they differ fundamentally in several significant ways. A side-by-side comparison of these differentiating factors is shown in **Table 1**. Key among them are the demographics of the local building industries, the approach to offering incentives (both programs offer builder incentives), and the rigor of the technical standards required for participation.

Table 1. Program Comparison

Program Attribute	Reliant Energy	NYSERDA
Program Administration	Investor Owned Utility (private), by PUC mandated system benefits charge program.	State Agency (public) through system benefits charge program.
Annual Funding Level	Approximately $1 Million	Approximately $2 Million
Program Territory (housing starts per year)	Reliant Energy service territory - Houston metropolitan area (~28,000)	Service territories of six IOU's in upstate New York (~18,000)
Builder Demographics	Large production builders; average builder enrolled builds over 300 homes per year.	Small custom builders; average builder enrolled builds 16 homes per year.
Rigor of Technical Standard	- ENERGY STAR (HERS 86) - Plus verification of AC equipment coil matching	- ENERGY STAR (HERS 86) - Plus mechanical ventilation - Plus combustion safety requirements - Plus lighting & appliance efficiency requirements (300 kWh per year additional savings)
Verification Method & Cost	HERS w/EPA production builder sampling protocol (1 in 7 home tested); <$100 per house rated.	HERS (every home tested); $300-$500 per house rated.
Incentive Levels	Low ($150-$300 per house)	High ($1,000-$5,000 per house)
Marketing & Advertising Strategy	Co-op ad group established. Builders collectively decide ad strategy.	NYSERDA contracted ad campaign for ENERGY STAR Labeled Homes & Home Performance with ENERGY STAR programs.

Clearly, the focus of these programs is different. The Reliant program focuses on a single market (Houston). The New York program is focused on six distinct markets throughout up-state New York, but with fewer housing starts. Thus, the Reliant program has only had to focus its efforts on a handful of large builders (6 in 2001, and 14 in 2002), that deliver large quantities of ENERGY STAR Labeled Homes to the Houston market. In New York, over 150 builders have been recruited into the program, most of them small custom

builders, who had already pre-sold most of their homes for the 2001 season prior to launch of the program, leading to very low numbers in the first program year. In addition, the Reliant program had existing relationships with several large builders in its market, and an established HERS infrastructure at the outset of the program, whereas New York started from scratch on both points.

Because Reliant had a head start, it was able to keep builder incentive levels low, and institute an innovative bid process to secure builder commitments early on in the year that would reach the established program goals for peak demand (kWH) savings. New York wanted quick results as well, but determined early on that it would have to use high incentive levels to get the attention of the many small custom builders that dominate its new construction markets.

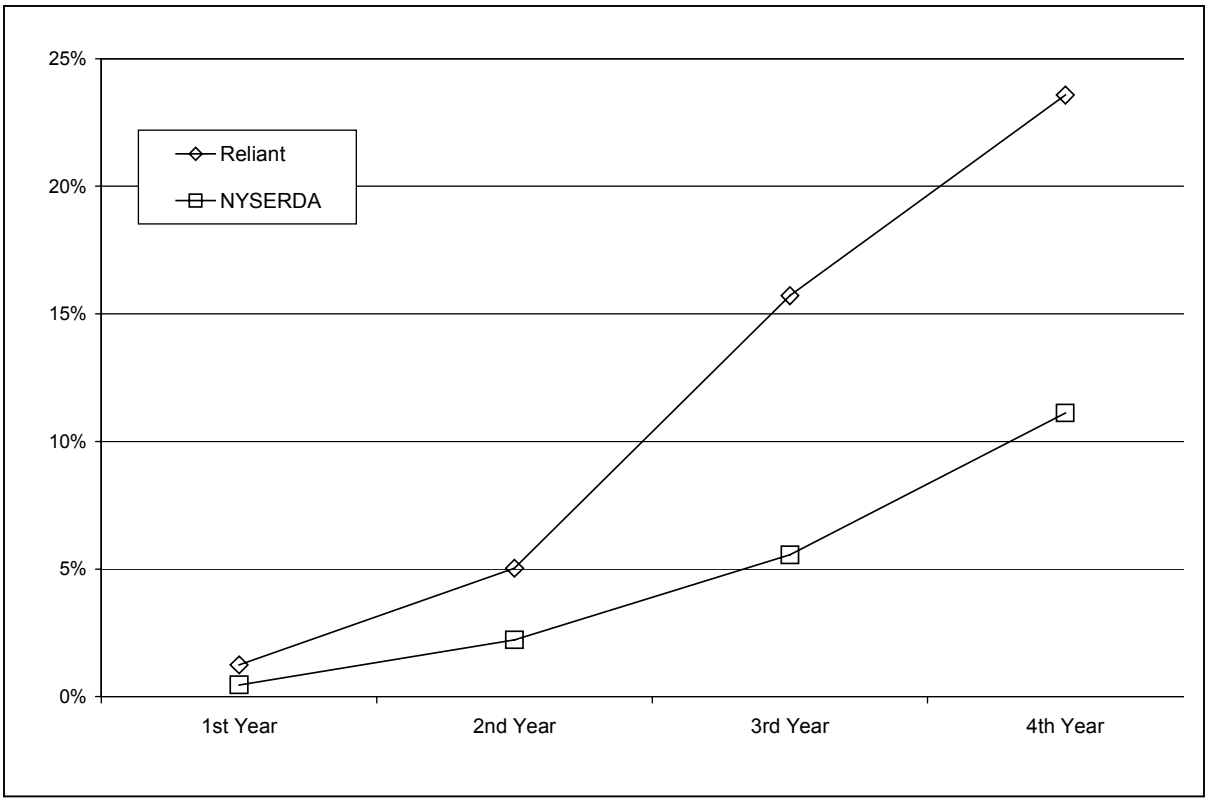
Finally, these programs differ significantly in the rigor of the technical standard built into their respective program designs. In Houston, the ENERGY STAR performance standard of HERS 86 was deemed sufficient for meeting its program goals, provided it could ensure that design air-conditioning peak demand savings were achieved. Thus, Reliant added a requirement to inspect the air-conditioning system coils for proper match and installation. In New York, several additional requirements were included that raised the bar significantly higher. The New York requirements include addition of a mechanical ventilation system designed to meet ASHRAE Standard 62 requirements for indoor air quality, a requirement for direct vented combustion appliances (for space and water heating) or a worst-case depressurization test to protect occupants against back-drafting induced by tight construction, and the addition of savings requirements for energy efficient lighting or appliances. This rigorous new construction standard was desired by NYSERDA to ensure that New York ratepayer funds were used by the program to assure participants received the benefits of an energy efficient, safe, and healthy indoor environment.

Both programs are using an aggressive advertising campaign to deliver the ENERGY STAR messages to their respective marketplaces. The cost of New York's ENERGY STAR advertising campaign was significantly higher to NYSERDA than Reliant's advertising campaign was in Houston, primarily because of the much larger service territory included (i.e. six markets vs. one), but also because of the quality of the ads purchased.

Figure 2 shows the projected market penetration for the two programs for the first four years of each program[6]. If these projected growth rates are achieved, it is clear that a large production builder focus can result in faster program growth. However, it is not clear whether the program design decisions made for a large builder focused program (i.e. small incentives) could be applied to a small builder focused program. It is also too early in the New York program to determine whether its more rigorous technical standard will deliver higher savings per home.

[6] For the Reliant program, projections include 1st and 2nd year actuals, 3rd year commitments, and estimated commitments for the 4th year. For New York, the projections show 1st year actuals, and estimates for the following years based on number of builders enrolled, their respective sales volumes, and the rate of program growth to date.

Figure 2. Projected Market Penetration for Reliant and NYSERDA Programs



Conclusion

The design features of Reliant and NYSERDA ENERGY STAR Labeled Homes programs differ in several profound ways, as outlined in Table 1. In the author's opinion, these differences occurred because of the following factors:

1. Funding organizations' stake in the outcomes, and the metrics used to evaluate success,
2. Program funding available,
3. Influence of previous programs on program design,
4. Average size of targeted builders,
5. Desired technical rigor of program requirements, including whether non-energy requirements are included,
6. Presence of existing HERS infrastructure prior to program launch.

Clearly, the program design features reflect the differences in these factors. Because Reliant's previous program was very successful, Reliant started with sufficient large production builders to more than meet program goals. The Reliant program was able to set up it's bid system to select participating builders, and concentrate program efforts on a handful of builders. Reliant also was able to work with HERS raters with significant experience in the market, and established relationships with some of the key builders in the program.

NYSERDA not only started from scratch with the rating system, but also had many times more builders to work with, and a perception among builders from the previous program that home buyers will not pay for energy efficiency, and that programs won't help. The barriers to success were much larger for NYSERDA. Fortunately, the expected outcomes are greater, and the funding levels are higher.

It is tempting to evaluate the relative effectiveness of these programs on the numbers alone (i.e. program funding per certified home & and number of certified homes per housing start). However, these quantitative evaluation criteria have two flaws: 1) they assume the objectives of all programs are the same, when they are not; and 2) short term results do not accurately measure the long term benefits (i.e. builder training, market changes in non-energy practices, etc.). The author recommends that ENERGY STAR Labeled Homes program evaluation measures be developed that clearly identify non-standard program objectives in a more consistent manner, so that program implementers can benefit more from the evaluation efforts of similar programs.

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