

Residential New Construction Programs Offered by Utility Companies in the Southwest

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Executive Summary

Introduction

The Southwest region of the United States has seen dramatic growth in residential building programs sponsored by utility companies. During the boom time of the early to mid 2000's the projected pace of new home construction was on track to deliver nearly two million new homes between 2008 and 2020. Now that the new construction bubble has burst and housing starts in the Southwest are among the lowest in the country, it is interesting to note that the market share of above code programs is increasing, not decreasing as could be anticipated in an economic slowdown.

The utility industry has in many cases been the driving force behind the exponential growth in construction of ENERGY STAR® new homes and highly efficient new homes that exceed this performance level. This trend has continued in spite of the fact that new home construction has dramatically declined. In mid-summer 2010, it was still not clear whether the housing industry had hit bottom in the southwestern U.S., as some markets had seen greater than 50 percent reductions in housing prices in three short years. New construction in Nevada in 2009 was down by 79% since 2000, for example.¹ But utility programs are ensuring that a large fraction of those new homes still being built are energy efficient.

Many builders have found that emphasizing energy efficiency can help to sell homes in a very difficult market environment. Growth rates of homes constructed to a utility's home building program standard have in many cases quadrupled in parts of the southwest. In Colorado, ENERGY STAR New Homes had reached 44.5% of the market share in the second quarter of 2010, demonstrating a growing demand for homes built above code.

Purpose and Scope of the Report

SWEEP reviewed current building programs for each major electric and gas utility operating in the southwestern states of Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. The purpose of the report is to document the utility programs that offer residential building programs to builders of new single family homes, highlight key program findings and challenges, and to highlight the utilities that are on the path to programs that encourage net-zero energy homes. NREL, utilities, states, local governments, and home builders can use the details to enhance the programs, policies and technologies and lead the way to net zero energy.

The impact of adopting newer building energy codes, such as the 2012 International Energy Conservation Code (IECC), is not addressed in this report. Many utilities are reviewing the potential impact to their building programs as more efficient energy codes become the baseline for new construction in the state. The question of how a utility building program can maintain

¹ U.S. Census Bureau. <http://www.census.gov/const/www/C40/annualhistorybystate.xls>. Accessed November 2010.

its cost effectiveness with a more stringent baseline should be reviewed throughout the next two years as localities and states start adopting the new code.

Findings

Residential utility building programs have changed dramatically in recent years. All utilities offer some type of incentivized residential building program whether it is tied to the ENERGY STAR New Homes program or a utility-developed program. Most offer tiers of efficiency levels with increased incentives associated with each tier. The ENERGY STAR New Homes program is the most common program model offered by the utilities because of its high profile market brand for both builders and homebuyers. Utilities receive strong support from the U.S. Environmental Protection Agency staff for training and builder education needs.

In 2009 and 2010, many Southwest utilities had to raise the standards for the program tiers as market penetration for ENERGY STAR homes increased. In the second quarter of 2010 the market penetration rate for new homes in Colorado was 44.5%, according to the Governor's Energy Office. NV Energy created their own Energy Plus New Homes program to drive builders to achieve a rating of 70 points or less on the HERS index scale or Energy Smart Home Scale. The utility saw market penetrations of 24% of all new single family housing in 2009 and 50% in 2010. They are going even further with their Advanced Building Techniques Program. This next tier explores new technologies, materials, and processes to drive homes to near net zero while doing so in a small and focused setting with custom builders.

Tucson Electric Power (TEP) has taken it a step further with their Guarantee Solar Program (GSP) which requires HERS 45 or lower and includes Best Practice and Low Energy tiers. However, TEP has been slow in rolling out the Best Practices Tier because many builders are already building to the Tier 2 standard with or without the financial incentive. As newer building energy codes are adopted across the Southwest, utilities will need to increase their tier level requirements to exceed base energy code requirements and achieve cost effective energy savings for the utility. Builders continue to look to these utility programs for not only financial incentives but also technical support for themselves and the building trades. The most pressing challenge seems to be creating tier levels beyond base energy code to meet goals set by the respective utility commissions.

In summary, key findings in this report include the following:

- Multi-tier incentive packages support highly efficient homes by providing a whole-home rebate with bonus incentives for additional energy savings measures
- Several utilities have implemented pilot programs to encourage construction of net-zero energy homes
- Evaluation and measurement of homes in the utility program can provide documentation for building code compliance; however, the discussion of how utilities can support building codes is just beginning

- Collaboration and partnership between programs within the same territory provide more value and seamlessness than programs that do not work together
- Technical assistance is effective in helping builders achieve their desired results
- Marketing assistance and product differentiation is very important to the industry.

Recommendations

Looking forward, utilities must maintain cost-effective new home programs in the context of more stringent building energy codes and reduced natural gas prices. The latter affect electric utility avoided costs as well as gas utility avoided costs, and both tend to make energy efficiency programs less cost-effective. As a result, some utilities, such as Public Service Company of New Mexico, are struggling to justify continuing their new homes programs. To help utilities show that a new homes program is worth continuing, as well as to assist utilities in program design, DOE and the national labs could provide the following:

- Technical support in the development of the next generation of residential new construction programs (beyond their current programs) and net zero energy home programs
- Locally-specific cost and performance data on the most cost effective strategies for achieving above code energy performance including near net zero performance
- Analysis of how development of net zero energy homes might impact the utility's distribution systems
- Assistance in energy savings calculations
- Information on state-of-the-art efficiency measures and home design approaches that can result in more cost-effective solutions for high energy performance.

As utilities consider new program designs that will position their programs above the 2009 IECC, it is important that the programs promote a whole house, systems approach in order to maximize energy savings. Programs should base incentives on HERS ratings for the home as a whole. However, combining incentives based on whole house performance with additional incentives for individual add-on measures, such as is being offered by Rocky Mountain Power and Questar Gas Company, is a reasonable approach. In addition, we recommend that new homes programs:

1. Integrate design phase technical assistance to address window and home orientation, roof design, shading and other energy efficient design concepts
2. Require energy efficiency as a prerequisite to eligibility for renewable energy incentives
3. Consider integrating energy efficiency and renewable energy programs to encourage pre-wiring and piping for solar ready homes

Education and outreach is a vital component to any successful program. Builder training and technical support are key features of the programs implemented by Rocky Mountain Power, Questar Gas Company, and NV Energy, for example. Educating consumers is also valuable to increase demand for highly efficient new homes. Since education and outreach often does not count toward energy savings in DSM portfolios, it is important to embed education and outreach within an overall new homes program, and make sure the program is having an

adequate impact on the market as a whole to justify the combination of financial incentive, education and outreach costs. Top priorities for builder educational efforts should include:

- ENERGY STAR Versions 2.5 and 3.0;
- Sizing heating and cooling systems, duct design and location, heat gain calculations; and
- Techniques for achieving high energy performance (i.e., 30-50% savings relative to new codes).

In addition, it is helpful for utilities to develop strategies to educate real estate and lending professionals on the value of energy efficiency. For example, including real estate professionals and appraisers in utility sponsored training events will increase understanding of the value of energy efficiency in disciplines where major gaps still remain.

Finally, it could be beneficial for utility programs to reference and possibly utilize the energy efficiency chapter of the National Green Building Standard/ICC 700 (NGBS), since many jurisdictions throughout the nation will be considering adoption of this standard in the near future. With respect to energy efficiency, the NGBS starts with a bronze entry level at 15% above the 2006 IECC. The silver, gold and emerald levels are 30, 50 and 60% above the 2006 IECC, respectively. Meeting these performance tiers should qualify a home for incentives under a utility's New Homes program.

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I. Introduction

The utility industry has in many cases been the driving force behind the rapid growth in construction of ENERGY STAR new homes and highly efficient new homes that exceed this performance level. This trend has continued in spite of the fact that new home construction has dramatically declined. In mid-summer 2010, it was still not clear whether the housing industry had hit bottom in the southwestern U.S., as some markets had seen more than 50 percent reductions in housing prices in three short years. New construction in Nevada was down by 79% from 2000 to 2009 (U.S. Census), for example. But utility programs are ensuring that a large fraction of those new homes still being built are energy efficient.

Many builders have found that emphasizing energy efficiency can help to sell homes in a very difficult market environment. Utility incentives have provided significant motivation to builders in adopting new building methods who could likely not otherwise afford the upgrade.

The goals of the utilities differ from those of home builders. For example, utilities are focused on promoting more efficient electricity and gas use where doing so is less costly than increasing energy supply over the long term. Yet both industries have successfully found a way to help each achieve their respective goals, improving both actual energy savings improved market value in a house.

Most programs in the southwest region use either multiple tiers or sliding scale incentives to encourage construction at very high energy efficiency levels, rather than focusing just on one target such as ENERGY STAR performance. Builders are able to receive financial and in some cases technical assistance for just reaching ENERGY STAR, but incentives increase for going beyond the ENERGY STAR baseline. Each utility has implemented dramatically different program structures, incentive levels, benchmarks and reporting requirements, so comparative data analysis can be difficult.

The utility program standards require improved construction practices, decreased air infiltration, improved duct work and location, and best building practices as described by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA). Some utilities are now incorporating renewable technologies or, more often, encouraging builders to incorporate solar-ready features² into their new residential construction programs so that new homes can approach net zero energy.³ Utilities in the Southwest are experimenting with net zero energy program models by offering multiple programs or tiers within a program that taken together incent near net zero energy homes.

² Solar-ready features include plumbing for solar hot water systems or wiring for a solar photovoltaic array.

³ Net zero energy means that the home produces as much energy as it uses or more. *Near* net zero is a term used to describe homes that use significantly less energy than code in the range of 50% or less.

This report reviews utility new homes programs operating in the southwestern states. The report highlights utility programs that are driving the residential housing industry to produce net zero energy homes. Although the utility programs in the southwest might be struggling with this “best practice” design, they are having a significant impact on new home construction practices throughout the region. While there is no universal utility program, or regional program that drives utilities and builders into a single path toward net zero energy homes, utilities are working to develop cost effective programs with the right program features to achieve that result.

II. Overview of Residential New Construction Programs

The structure and function of residential new construction programs vary considerably throughout the southwestern states. Most programs offer financial incentives, technical assistance, training opportunities and marketing resources to the homebuilders. The homebuyer benefits from purchasing a home that is energy efficient as proven by the energy rating. In a high efficiency home a homebuyer can expect properly installed insulation, high-performance windows, air infiltration control, duct efficiency improvement and proper location, efficient heating and cooling equipment, efficient appliances and lighting, and third party verification.

The Programs are typically designed to benchmark energy savings with reference to the state or local code, such as International Energy Conservation Code (IECC) 2003, 2006, or 2009. As of 2010, the EPA's ENERGY STAR® New Homes Program requires homes to be at least 15% more energy efficient than the 2004 International Residential Code (IRC). A 2007 SWEEP report entitled *High Performance Homes in the Southwest*⁴, recommended that utility companies offer a suite of programs with incremental energy savings tiers. The report presented the entry level, above code program the equivalent to 15-30% above the baseline energy code; The ENERGY STAR New Homes Program falls into the Tier 1 category. The second tier termed "Best Practice" in the SWEEP report is positioned at 30-50% savings relative to the baseline energy code. Third, the Low Energy tier must meet or exceed 50% energy savings above the baseline energy code. Net-zero energy homes are the end goal. Energy savings are commonly calculated using RESNET modeling tools and are displayed as a Home Energy Rating System (HERS) index.

Table 1 presents the energy savings tiers of residential new construction programs currently offered by the major utility companies in the southwestern states. The programs use different benchmarks to require energy efficiency criteria above jurisdictional code, so the actual energy savings within each tier vary from program to program. For the purpose of this chart, the benchmark is normalized at the IECC 2006.

⁴ Dunn, Steve, "High Performance Homes in the Southwest: Savings Potential, Cost Effectiveness and Policy Options." SWEEP Report. June 2007.

Table 1. Overview of Residential New Construction Programs offered by Utilities in the Southwest

State	Utility Company	ENERGY STAR Homes (15-30% savings)	Best Practice (30-50% savings)	Low Energy (50%+ savings)
AZ	Arizona Public Service (APS)	✓	✓	
	Tucson Electric Power (TEP)	✓	✓	✓
	Salt River Project (SRP)	✓		
CO	Xcel Energy (Xcel)	✓	✓	✓
NM	Public Service Company of New Mexico (PNM)	✓	✓	✓
	New Mexico Gas Company (NMG)	✓		
NV	NV Energy North (NVEN)	✓		
	NV Energy South (NVES)		✓	✓
UT	Questar Gas (Questar)	✓	✓	
	Rocky Mountain Power (RMP)	✓	✓	✓
WY	Questar Gas (Questar)	✓		

Table 2. Baseline and Incentive Levels for the Programs

St.	Code	Utility/ Agency	Level 1		Level 2		Level 3		Level 4	
ENERGY STAR		EPA	HERS 85		HERS 70		Solar ready			
AZ	Home Rule	APS	HERS 85	\$400	HERS 70	\$1000	Variable*			
		TEP	HERS 85	\$400	HERS 70	\$1500	HERS 45	\$3000		
		SRP	HERS 84	\$480	HERS 80	\$680	Variable	\$1160		
CO		Xcel	HERS 75	\$360	HERS 70	\$700	HERS 65	\$1400	HERS 60	\$2200
NM		PNM	HERS 85	\$500	HERS 70	\$750	HERS 50	\$1000		
		NMG	HERS 85							
NV	2006 IECC***	NVES	HERS 70		HERS 40	\$.32/ kWh saved				
		NVEN	HERS 85							
UT		RMP	HERS 85	\$500	HERS 50	\$800				
		Questar	HERS 85	\$500**						
WY	Outdated ****	Questar	HERS 85	\$500						

* Builders are required to build solar-ready homes and install solar on 50% of the homes.

** Incentives are offered per measure in addition to the whole home incentive.

*** Energy codes in New Mexico and Nevada have been updated to the 2009 IECC (or a more stringent code in the case of New Mexico), with the new codes slated to take effect in 2011.

****Pre-dates 1998 IECC, not mandatory

Utilities across the region employ a variety of program structures according local demographics, market conditions, jurisdictional building codes, and available resources. Table 2 illustrates the diversity of baseline levels and financial incentives of the new construction programs in the southwest.

However, inconsistent program structures can be problematic for builders working in multiple regions, as they need to keep up-to-date on many different programs and be able to communicate the programs to their customers. In an environment where the goal is to advance energy efficiency without causing market confusion, it could be beneficial to foster the development of more consistent programs. Among other benefits, more consistent programs could save in program development costs and provide information sharing platforms to advance a common program model, such as best practice program features and technical specifications of products that meet cost effectiveness criteria.

Due to the patchwork of building energy codes and adoption cycles in states and local jurisdictions, utilities must adjust their program criteria, sometimes in the middle of a program year, to ensure that the program requirements are more stringent than the building code for the area. Some utilities have built in flexible options for cities or counties that have more stringent codes than the program for the territory; for example, Xcel Energy requires a lower HERS rating for homes in the City of Boulder.

Adoption of the 2009 and eventually the 2012 IECC by states and jurisdictions in the coming years will significantly raise the threshold for energy efficiency programs throughout the nation. Simultaneously, utilities are tasked with creating a set of Demand-side Management (DSM) programs that achieve the energy savings goals established by their state utilities commissions. Finding measures that are both cost-effective *and* achieve a very high level of savings will be the focus in the upcoming years.

Most utility programs are based on the ENERGY STAR New Homes Program. ENERGY STAR has been very successful as a high-profile market brand that has allowed homebuyers to easily identify energy-efficient homes. Utilities leverage the nationally recognized program by becoming program ENERGY STAR partners, and many utilities set program performance thresholds above the ENERGY STAR benchmark. In 2009, ENERGY STAR achieved an average national market presence in the new homes sector of nearly 21%.⁵ The program has achieved much higher market penetration in some parts of the Southwest, including 46% in Nevada in 2009 and 44.5% in Colorado in the first half of 2010.⁶ Table 3 presents the market penetration of ENERGY STAR new homes in the southwestern states in 2009.

⁵ Environmental Protection Agency. "2009 ENERGY STAR Qualified New Homes Market Indices for States." Retrieved October 10, 2010. <http://www.energystar.gov/index.cfm?fuseaction=qhmi.showHomesMarketIndex>.

⁶ Colorado Governor's Energy Office. "Annual Report Fiscal Year 2009-2010." <http://rechargecolorado.com/images/uploads/pdfs/GEOAR09-10.pdf>

Table 3. Market Penetration of ENERGY STAR Homes in the Southwest⁷

State	2009 ENERGY STAR Qualified New Homes	2009 One-Unit Housing Permits	2009 ENERGY STAR Market Penetration
Arizona	3,931	12,687	31%
Colorado	2,337	7,182	33%
New Mexico ⁸	675	4,095	17%
Utah	2,353	6,245	38%
Nevada	2090	4496	46%
Wyoming	n/a	n/a	<3%
Regional Average	n/a	n/a	28%
National Average	n/a	n/a	21%

ENERGY STAR for New Homes is currently in a transition period, a shift that is necessary to maintain its above-code status. The ENERGY STAR Version 3.0 program is expected to take effect on January 1, 2012 (see Figure 1). Version 3.0 is expected to achieve 15% energy savings above the 2009 IECC. The program will be strengthened by integrating whole-home and building science concepts, requiring more checklists, integrating the Indoor Air Plus and WaterSense programs, and requiring more extensive HVAC testing by the mechanical contractors.

Figure 1. ENERGY STAR New Homes Implementation Schedule



According to EPA’s cost analysis for the ENERGY STAR Qualified Homes 2011 Guidelines, an incremental cost of \$4,000 to \$5,000 can be expected.⁹ The projected average incremental monthly mortgage increase is lower than the expected monthly energy savings, and thus meets EPA cost effectiveness criteria. Still, program participation costs for both builders and HERS raters might increase, and there is a possibility that the program will lose partners and see a decline in program participation when Version 3.0 is implemented. Individual utilities will need to determine whether ENERGY STAR New Homes Version 3.0 will remain cost effective in their

⁷ See Reference 5.

⁸ The number of ENERGY STAR qualified homes in New Mexico in this table differs from that reported by the EPA, in order to reflect participation claims by the utilities.

⁹ Environmental Protection Agency. ENERGY STAR Qualified Homes 2011 Fact Sheet. Retrieved November 10, 2010. http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/2011_Fact_Sheet.pdf

jurisdictions based on local climatic conditions, local energy prices, construction costs, etc. Utilities will be evaluating the new program in the coming year to determine whether it will continue to be a part of their portfolio of DSM programs.

The EPA has designed a Version 4.0 Concept Home program to address the need for a national net-zero program model. With the rise of more stringent energy codes, utilities and the building industry need a program model that will continue to offer builders market differentiation, be attractive to homebuyers, and allow utilities to attain their energy efficiency goals that pass the cost-effectiveness test. Utilities can consider promoting the Version 4.0 performance level within their New Homes program.

III. Utility Programs

Arizona

Arizona Public Service (APS)

Arizona Public Service (APS) Company has a three-tier program model that was enhanced in 2010. The first tier allots \$400 for the builder to construct a home that is 15% more energy efficient than typical new construction in Arizona. The second tier allots \$1000 for the builder to construct a home that is at least 30% more energy efficient than code. This program enhancement represents a significant step on the road to net-zero energy homes, as ordered by the Arizona Corporation Commission (ACC) in December 2008, Decision No. 70666.

The ENERGY STAR New Homes program and a Solar and Renewable Rebate program are packaged as the Green Choice Programs, launched as a joint promotion in 2009 to encourage builders to offer both energy efficiency and solar features in their new residential communities. The program requires builders to meet the ENERGY STAR New Homes program requirements as a prerequisite for being able to access special homebuilder incentives for solar energy. This ensures that homes incorporate efficiency first to enable solar to be as cost-effective as possible. To participate, builders commit to all of the homes in a community to be ENERGY STAR certified and "solar ready" (pre-wired and plumbed to accommodate future solar PV panels and/or water heaters). In addition, builders are required to install PV and/or solar hot water systems in at least 50% of the homes in the subdivision. As of the end of 2009, three homebuilders (Joseph Carl Homes, Monarch Communities, and Shea Homes) were participating in the combined Green Choice Program.

From 2006-2010, APS paid incentives on 6504 homes in the ENERGY STAR New Homes program. By the end of 2010, there were 37 homebuilders planning 137 subdivisions with 17,444 future lots registered in the program.¹⁰ APS trains builders when they sign up for the program. While direct impacts of participation numbers and energy savings can be easily shown, officials at APS suggest that the new construction program has sparked significant "spillover" changes in the market that are not accounted for in these numbers. Table 4 shows the direct program results from the reporting period July-December 2009, not including spillover results.

¹⁰ Arizona Public Service. "Demand Side Management Semi-Annual Progress Report for the Period: July through December 2009." Found in Docket No. E-0\345A-03-0437 & E-0\345A-05-0526 before the Arizona Corporation Commission. March 2010.

Table 4. APS ENERGY STAR Program Results July-December 2009

Activity	Results
Number of Homes	730
Total Program Budget	\$731,443
Annual Savings per Home	2,505 kWh
Total Annual Savings	1,971 MWh
Total Lifetime Savings	39,426 MWh
Demand Savings per Home	1.5 kWh
Total Savings	1.4 MWh

In a 2008-2010 DSM Program Portfolio Plan Update, it was estimated that the one-tier ENERGY STAR program could reduce peak demand by about 9.7 MW and cut energy use by 457,632 MWh over the life of the measures that were expected to be installed from 2008 – 2010. The following table shows projections for the 2011 ENERGY STAR and ENERGY STAR Plus programs; the Solar and Renewable Rebate Program is accounted for separately.¹¹

Table 5. APS 2011 Electric Savings Benefits from the New Construction Program

Activity	Projections
Proposed Budget	\$2,800,000
Capacity Savings	3.7 MW
Total Annual Savings	7,000 MWh
Total Lifetime Savings	155,000 MWh
Societal Benefits	\$16,410,000
Societal Costs	\$4,428,000
Net Benefits	\$11,982,000

APS' three tier program can serve as a model for other utilities in the southwest that want to integrate renewable concepts into their ENERGY STAR programs. No changes to the new homes programs have been proposed for 2011. APS can leverage the EPA's Concept Home program when it launches, since many of the program components are already active within the existing APS program. The company's portfolio of energy efficiency programs is expected to remain strong in light of the Energy Efficiency Standard adopted by the ACC in 2009.

Salt River Project (SRP)

The Salt River Project PowerWise Homes program, active since 2005, recognizes energy efficient subdivisions in the metropolitan Phoenix area with homes that achieve a HERS rating of 84 or lower. PowerWise is a two tier program: Tier 1 requires a HERS 81-84 with financial incentive of \$480 per home, and Tier 2 requires a HERS 80 or lower with an incentive of \$680

¹¹ Arizona Public Service. "2011 Demand Side Management Implementation Plan." Found in Docket No. E-0 1345A-10-02 19 before the Arizona Corporation Commission. June 1, 2010.

per home. SRP allows the builder to earn more rebates for achieving greater efficiency than the base level: Tier 1 participants can receive an extra \$100 for a SEER 14 air conditioner; Tier 2 participants can receive additional rebates for SEER 15 (\$200), SEER 16 (\$300), Air Changes per Hour (ACH) .20 (\$80), and Window U-Value .35 (\$100).

In addition to financial incentives, SRP also offers brand recognition, utility cost estimate sheets, and encouragement for best practices such as complimentary inspections during various stages of construction including blower door, duct testing, and insulation review. Account managers are available to review the REM/Rate files (the output of simulation software used by HERS raters) with the builder to help them achieve the target HERS rating and the desired level of efficiency.

A noteworthy builder that SRP has assisted through the PowerWise program is Meritage, the only publicly traded homebuilder based in Arizona. Meritage builds homes with HERS ratings of just 20 to 30, currently offered in the \$200,000 price range in the Phoenix market, and soon to be rolled out nationwide. Meritage offers an enticing education display of their model home, which allows customers to see the construction detail and learn about high performance building science and technology.

PowerWise has evolved significantly from the first program year, when it required a HERS rating of 90 or lower and offered no incentives for participation other than free testing for compliance. In 2009, the program's requirements became more stringent, requiring a thermal bypass inspection for level 1 insulation installation and pressure balancing for each room to ensure that heating and cooling is distributed appropriately throughout the house.

In the area of technology and research, SRP is conducting research on air conditioning loads by installing meters in their customers' homes. The intent is to better understand the impact of higher SEER units on total energy usage and summer demand, especially during the 3:00-6:00 pm peak. The company wants to better examine the energy and peak effects of two-stage compressors and variable speed motors. Since HVAC performance standards are based on outside air temperatures below 100 degrees, the company is studying the degradation of AC efficiencies at higher temperatures that are commonly reached in Phoenix.

SRP claimed an annual aggregate energy savings of 87,591 MWh from an estimate of 3,248 homes in 2009. The company has seen a significant increase in participation in the new construction program, which has been attributed to the builder's desire for market differentiation. SRP plans to continue the program and enhance promotional efforts about the program's value and benefits.

Tucson Electric Power (TEP)

The Tucson Electric Power (TEP) Guarantee Home Program (GHP) has been active since 1997. The program focuses on indoor air quality, requiring mechanical ventilation and pressure management techniques in each home to prevent appliance backdrafting and molds, pollutants

and allergens. Another benefit to the homebuyer is that TEP guarantees heating and cooling operating costs for five years. If the electric bill is over the predetermined amount, TEP will credit the customer the difference. Water heaters and heat pumps are required to be electric, but TEP allows gas dryers and other appliances.

The program was recently expanded to include two more tiers. The company has been slow in rolling out the second tier because but many homebuilders have been building to the higher tier without the program’s financial incentives. The third tier, the Guarantee Solar Program (GSP), requires HERS 45 or lower. This is the most stringent program tier in the southwest, after NV Energy South’s Advanced Building Techniques Program that requires a rating of HERS 40 or below. The Guarantee Solar Program can serve as a reference for utilities in the southwest that want to examine very low energy program tiers.

Tables 6 and 7 illustrate energy savings, budget and participation projections for the three-tier program during 2010-2012.

Table 6. Tucson Electric Power Energy Savings Projections for Three Tiers

	Baseline Model HERS 90	Tier 1: HERS ≤ 85	Tier 2: HERS ≤ 70	Tier 3: HERS ≤ 45
Modeled Annual Consumption (kWh)	14,228	13,142	11,355	4,770
Peak Demand-Coincident (kW)	5.72	4.40	3.75	2.54
Annual kWh Savings	n/a	1,086	2,873	9,458
Annual Peak kW Savings	n/a	1.32	1.97	3.18
Incentive to the Builder	n/a	\$400	\$1500	\$3000

Table 7. Tucson Electric Power Tier 2 and 3 Program Targets, 2010-2012

	Budget	Tier 2 # Participants	Tier 3 # Participants	Tiers 2 and 3 Total
2010	\$230,519	300	150	450
2011	\$252,050	300	150	450
2012	\$275,286	300	150	450
2010-2012 Total	\$757,855	900	450	1350

The Pima County housing market has continued to be depressed during the first half of 2010, and forecasts predict less than 2,000 new homes will be permitted in Pima County during 2010. Many national homebuilders building in the Tucson market are beginning to embrace energy efficiency in their homes as a marketing advantage against the large number of foreclosed homes on the market. The GHP has four communities enrolled with the first model being built in July 2010.

Colorado

Xcel Energy

In Colorado, Xcel Energy provides electricity to over 1.15 million residential customers and natural gas to 1.20 million residential customers. Xcel launched an ENERGY STAR New Homes program in 2009, offered to builders of residential single-family, multi-family (duplex, triplex, fourplex) and town homes that receive electric and/or gas service from Xcel.

The national ENERGY STAR qualification threshold in the Denver climate zone is a HERS rating of 85 or lower and a HERS rating of 80 or lower in higher elevations; however homes must reach a HERS index of 75 to receive a rebate from Xcel. This more stringent requirement was implemented in 2010 after analysis indicated new homes constructed within the HERS 85-75 range were not generating the forecasted energy savings and as such, were not cost-effective. In the Xcel program, the builder can choose one of three paths to qualify a home for the rebate: HERS Performance Method, Builder Option Package (BOP), or Sampling.

The BOP is an alternate path to ENERGY STAR certification in which builders construct the home using a prescribed set of construction specifications that meet program requirements. The EPA has approved BOP specifications at the county and regional levels. Among the prescriptive measures, builders must install a 92% efficient furnace and achieve at least a 4.5 air changes per hour at 50 Pascals (ACH50) in order to receive the BOP rebate. A final HERS rating is not required for homes using the BOP method.

Builders can also obtain the ENERGY STAR qualification by the “sampling” method performed by a HERS rater. Sampling allows an accredited rater to qualify a group of new homes to meet ENERGY STAR guidelines based on pre-analysis of building plans and subsequent random testing and inspections of a sample set of built homes. For those builders who have demonstrated an ability to consistently meet the ENERGY STAR guidelines, sampling helps to minimize production interruptions and verification costs, while ensuring that homes meet or exceed ENERGY STAR requirements. Sampling can be applied when either the performance verification method or prescriptive verification method (BOP) is used.

Table 8. Xcel Energy ENERGY STAR Program Structure

HERS Index for Rebate Eligibility	Performance Rating Rebate	BOP Rating Rebate	Sampling Rating Rebate
75-71	\$ 360	\$ 360	\$ 120
70-66	\$ 700	\$ 360	\$ 233
65-61	\$ 1,400	\$ 360	\$ 467
60 or below	\$ 2,200	\$ 360	\$ 733

As shown in Table 8, the builder’s rebate depends on the qualification. For example, a new home in the Denver Metro area with a HERS index of 70 would receive a total rebate of \$700 under the Performance method, whereas the same home would receive the minimum rebate of \$360 using the Builder Option Package (BOP) Rating method. The reduced rebates for the Sampling option reflect both the construction efficiencies obtained by the builder, and the builders reduced cost from foregoing the HERS rating.

Xcel encourages builders to model and test each new home using the HERS Performance method because it provides the most accurate data of any of the paths.

Under the Xcel program, the rater also receives a payment. Raters are eligible to receive two payments per home: the first for successfully enrolling a qualified home in the program, and the second when the home is completed. Total payment to the rater for enrolling and completing the scope of work for the path chosen cannot exceed the maximum amounts listed in Table 9.

Table 9. Xcel Energy HERS Energy Rater Payment Structure

	Performance Path	BOP Path	Sampling Path
Enrollment	\$ 150	\$ 75	\$ 50
Completion	\$ 250	\$ 125	\$ 85
Maximum	\$ 400	\$ 200	\$ 135

Due to the wide range of building codes throughout the state, Xcel offers alternative options for cities or counties that have adopted more stringent codes. For example, codes in the City of Boulder and most of Boulder County require new homes up to 3,000 square feet to achieve at least 30% energy savings relative to the 2006 IECC. Builders can participate in the Xcel program if they build meet the performance levels shown in Table 10. Under this incentive structure, a 3,000 square foot home that achieves a HERS index of 65 would receive a total rebate of \$800 for meeting the minimum Rebate Eligibility threshold. The BOP and Sampling Rating options are not offered in the Boulder area at this time. Rebates are not offered for homes greater than 3,000 SF in the City of Boulder and greater than 1,000 SF in unincorporated Boulder County due to the more stringent energy codes established for these homes and the higher incremental costs needed to achieve savings below these standards.

Table 10. Xcel Energy City of Boulder Financial Incentive Levels

HERS Index for Rebate Eligibility	Up to 3,000 sq ft	3,001-5,000 sq ft	5,001 sq ft and over
65-61	\$ 800	N/A	N/A
60 or below	\$ 1,100	N/A	N/A

In Xcel’s program, the builder may mix and match efficient technologies or building techniques to obtain a HERS index that qualifies for the Xcel Energy rebate. For example, a builder could install a high efficiency 96% AFUE furnace combined with less efficient windows, but still meet the threshold requirements. For the ENERGY STAR electric option, the builder can receive a \$110 rebate for installing all four required bundled measures: ENERGY STAR clothes washer, dishwasher, refrigerator and 20 ENERGY STAR fixtures or bulbs. This rebate is available to all electric residential new home construction or large remodeling projects. Rebates are only paid for the HERS rating for homes and the electric option package. Prescriptive rebates for other equipment such as air conditioners, furnaces, insulation, and hot water heaters are not paid since the impacts from these appliances are already included in the HERS analysis and final HERS index.

In 2009, only 100 qualifying homes were completed under the Xcel program due to the late start of the program as well as the depressed construction market. Nonetheless the program was cost effective with an estimated benefit-cost ratio of 1.74 under the modified Total Resource Cost (TRC) test used in Colorado. The goal for 2010 is to complete about 200 qualifying homes, and the program is expected to ramp up significantly in 2011. Table 11 presents the 2011 program budget and goals as stated in the 2011 DSM plan. Xcel may amend the ENERGY STAR program in 2011 after a review and evaluation of the ENERGY STAR Version 3.0 program.

Table 11. Xcel Energy 2011 Program Budget and Goals¹²

Activity		Projection
Electric	Participants	1,400
	Budget	\$245,845
	Net Generator	45 kW
	Net Generator	401,622 kWh
	Benefit-cost Ratio (modified TRC Test)	1.07
Gas	Participants	1,400
	Budget	\$2,207,711
	Net Annual Dth Savings	39,618
	Annual Dth/\$M	17,945
	Net Benefits (modified TRC Test)	\$104,641
	Benefit-cost Ratio (modified TRC Test)	1.02

¹² Xcel Energy. “2011 Demand Side Management Plan: Electric and Natural Gas.” July, 2010. Page 11-12.

New Mexico

The Public Service Company of New Mexico (PNM) sold its natural gas utility to the New Mexico Gas Company (NMG) in 2009. NMG provides natural gas services to more than 500,000 customers throughout New Mexico. PNM also has approximately 500,000 customers and is the largest electricity provider in New Mexico. As a result, both PNM and NMG implement coordinated ENERGY STAR New Homes programs. NMG and PNM received recognition from the EPA for their partnership to sponsor and launch an ENERGY STAR New Homes program in 2009. Key accomplishments of the ENERGY STAR program in 2009 include:

- Recruiting 40 builders and 22 HERS raters to join the ENERGY STAR New Homes program despite the downturn in single-family housing permits;
- Sponsoring the construction of about 500 ENERGY STAR qualified homes, exceeding program goals by 25%;
- Achieving 30 percent market penetration of ENERGY STAR qualified homes within the NMG and PNM service areas;
- Offering educational presentations on building science and marketing and selling ENERGY STAR for over 600 individuals including city council members, real estate professionals, builders and their sales agents, and representatives of local home builder associations.¹³

New Mexico Gas Company (NMG)

The New Mexico Gas Company (NMG) provides builders a \$500 incentive to build an ENERGY STAR home in the NMG territory. Of the homes rebated in 2009 and the first quarter of 2010, over 650 were part of larger developments. The remaining were custom homes, with a limited number of homes built by individual builders. Of note, NMG expanded outreach and marketing mid-year in order maintain strong program participation in spite of the downturn in the new construction market. This effort was very successful. Table 12 shows the gross savings and participation results from the 2009 program.¹⁴

¹³ Environmental Protection Agency. Award Details. Retrieved October 15, 2010.

http://www.energystar.gov/index.cfm?fuseaction=pt_awards.showAwardDetails&esa_id=3824.

¹⁴ ADM Associates report prepared for New Mexico Gas Company. DSM Portfolio Evaluation New Mexico Gas Company Program Year 2009, Measure and Verification Report, Draft #1. June, 2010. p.2-2.

Table 12. New Mexico Gas Company 2009 Program Results in Gross Savings

Activity	Results
Participation	675 (includes 500+ homes under PNM)
Annual Energy Savings (projected)	121,500 Therms
Annual Energy Savings (actual)	109,091 Therms
Lifetime Energy Savings (projected)	3,365,000 Therms
Lifetime Energy Savings (actual)	3,272,730 Therms
Gross Realization Rate	90%

The consulting firm ADM Associates, under contract to NMG, conducted on-site measurement and verification on a sample of homes that had been rebated in order to verify that the measures were installed and confirm energy savings deemed on the HERS report. ADM verified that the inputs to the HERS rating were accurate, conducted visual inspections of equipment and tested for duct leakage and air infiltration.¹⁵

NMG is proposing to continue the ENERGY STAR new homes program with a \$500 builder incentive in 2011. The utility projects 325 participating new homes in spite of the very slow new construction market.

Public Service Company of New Mexico (PNM)

PNM's ENERGY STAR Homes program began in the Fall of 2007. In 2009, the ENERGY STAR Home program worked with 33 homebuilders and 20 HERS raters. In July 2009, the introduction of a tiered incentive structure was incorporated into the program, as follows:

- Tier I — HERS 85 to 71; \$500 maximum
- Tier II — HERS 70 to 51; \$750 maximum
- Tier III — HERS 50 or lower; \$1,000 maximum

The ENERGY STAR Homes program achieved savings of 838,812 kWh in 2009, 1,111,500 kWh in 2010 and 392,611 kWh in 2011. The following table shows the total number of customer participants, the annual energy and demand savings, the lifetime energy savings and the total costs for the 2009 program year.

¹⁵ Ibid.

Table 13. Public Service Company of New Mexico 2009 Program Results

Activity	Results
Number of Homes	566
Annual Savings	838,812 kWh
Total Lifetime Savings	25,164,360 kWh
Total Program Costs	\$395,855
Net Present Value of Economic Benefits	\$5,911,623
Net Present Value of Total Program Costs	\$1,367,067
Benefit-Cost Ratio (Total Resource Cost)	4.32

The program has continued to grow in 2010 despite the downturn in the economy because custom homes were still being built. PNM expects 750 homes to participate in 2010. Because the State of New Mexico passed aggressive building codes that will go into effect in mid-2011, the ENERGY STAR New Homes program will not be as cost effective so participation will most likely decrease in 2011.

The current program structure accounts for building code advancements at the local level. For example, Santa Fe's current building code is equivalent to ENERGY STAR; therefore, Tier 3 is offered for Santa Fe residents, but Tiers 1 and 2 are not. In both Santa Fe and Albuquerque, a maximum incentive of \$500 is offered for new homes that have a HERS rating of 50 or lower. Other details for each city are listed below:

- City of Albuquerque
 - Permit issued on or after December 1, 2009, and subject to 2009 Albuquerque Energy Conservation Code.
- City of Santa Fe
 - Permit issued on or after July 1, 2009, and subject to Santa Fe Residential Green Building Code.
 - Home must be 3000 square feet or less.

In September 2010, PNM applied to the Public Regulation Commission (PRC) for approval of its Electric Energy Efficiency and Load Management Program Plan, including discontinuance of the ENERGY STAR New Homes program effective January 1, 2012. The utility found it could no longer operate a cost-effective DSM program for new homes due to the increased energy efficiency of the state energy code. The PRC has not yet acted on the proposal.

Nevada

Nevada Power Company merged with Sierra Pacific Power Company and its holding company, Sierra Pacific Resources, in 1999. In 2008, the company announced that the two utilities, Nevada Power Company and Sierra Pacific Power Company, would do business under the name NV Energy.

NV Energy North

NV Energy North (NVEN), formerly known as the Sierra Pacific Power Company, has approximately 270,000 residential customers who consumed 2,235,305 MWh in 2009. NVEN has an Energy Education and Consultation Program that includes Residential Builder Support and an ENERGY STAR for New Home Construction program. These programs provide education, energy calculations, home inspections and certifications to label the home ENERGY STAR. Unlike most other new homes programs in the region, NVEN does not offer financial incentives for ENERGY STAR single or multi-family construction. The utility does implement a financial incentive program for ENERGY STAR manufactured homes.

In 2009, NVEN certified 209 ENERGY STAR homes, falling short of the target for 300 homes. This was due primarily to the downturn in new construction, not to a lack of program impact. Based on 2009 results, 23% of all housing units in the Reno/Sparks/Carson City metropolitan area were ENERGY STAR certified compared to 12% for 2007 and 19% for 2008. Table 14 shows the 2009 results of the Energy Education and Consultation Program.

Table 14. NV Energy North 2009 ENERGY STAR Program Activity¹⁶

2009 Activity	Totals
Budget (actual)	\$316,056
Homes Certified ENERGY STAR	209
In-home Energy Audits	1,583
Telephone Consultations	1,520
Project Plans Analyzed for Energy Savings	23
Builder Training Sessions Delivered	4
Builder Representatives Impacted by Training	76
HVAC Contractor Training Sessions Delivered	4
HVAC Contractors Impacted by Training	8
Subcontractor Training Sessions Delivered	2
Subcontractors Impacted by Training	7

¹⁶ NV Energy. "2009 Energy Plus New Homes NV Energy-Southern Nevada Program Year 2009 Measurement & Verification Final Report." June 1, 2010.

The program savings are not accounted for in the DSM portfolio because the program does not assume a direct impact on reducing energy consumption. Energy Rated Homes of Nevada estimated that the 209 ENERGY STAR certified homes in 2009 achieved 104.7 MWh in electrical savings. This equates to an annual average energy savings of 501 kWh per home. In addition, Energy Rated Homes of Nevada calculated the annual natural gas savings for homes certified during 2009 in northern Nevada to be 1,798.3 therms or an average of 8.6 therms per home.¹⁷

NVEN works collaboratively with other organizations to assist with adoption of local building energy codes. NVEN is anticipating code changes from the 2006 to 2009 IECC to significantly increase the requirements to qualify as an ENERGY STAR New Home which will present a significant challenge for keeping builders in the program or recruiting new builders. The Company is planning builder outreach and training to assist with the understanding and acceptance of the proposed changes. This program has proven effective in providing education and consultation to the builders and customers; therefore the Utility recommends that the program be continued in the 2011-2013 Action Plan Period with a yearly program budget of \$340,000. As more utilities, such as in Arizona, begin accounting for energy savings for building energy code work, NVEN might offer lessons learned to other utilities.

NV Energy South

NV Energy South (NVES), formerly known as Nevada Power Company, offers a portfolio of programs to reduce household energy use and promote renewable energy generation. For residential new construction programs, NVES offers the Energy Plus New Homes Program (EPNH) and the Advanced Building Techniques Program (ABTP). The programs are designed to work in tandem. EPNH requires 30% less energy than a code-built home and the ABTP requires homes to use 60% less energy than code.

Energy Plus New Homes Program (EPNH)

The Energy Plus New Homes Program requires a rating of 70 or less on the Department of Energy's Energy Smart Home Scale. The program achieved a market penetration rate of 24% in 2009 despite the Las Vegas real estate market being flooded with foreclosed and bank owned properties which in turn caused a decline in demand for home building. By third quarter, 50% of the homes sold in 2010 qualified for ENERGY STAR.¹⁸ Table 15 shows results for 2008-2009 and projections for 2011. The free-ridership rate in 2009 was estimated to be 24.7%.¹⁹

¹⁷ Sierra Pacific. "2010 Annual Demand Side Management Update Report." Found in Docket No. 10-08006 before the Public Utilities Commission of Nevada.

<http://nvenergy.com/company/rates/filings/images/Vol6DSMxhbDSM1-3.pdf>

¹⁸ Larry Holmes, NV Energy. From presentation at SWEEP conference in Las Vegas, Nevada. November 8, 2010.

¹⁹ Free-ridership is the fraction of program participants that would have adopted the energy-efficient measure or practice without the utility incentive program.

Table 15. 2008-2009 NV Energy South Energy Plus Results and 2011 Targets²⁰

	2008 Results	2009 Target	2009 Actual	% of 2009 Target	2011 Recommended Budget and Targets
Budget	\$690,102	\$2,379,000	\$1,592,826	67.0%	\$1,700,000
Unit	419	1,750	1,023	58.5%	1,494
Demand Savings (kW)	721	1,800	919	51.1%	1,181
Energy Savings (kWh)	1,533,258	4,037,600	2,041,047	50.6%	2,623,464
Benefit-cost ratio (TRC test)		1.22	1.63	133.6%	1.31

Twenty of the 1,023 homes were sampled in a measurement and verification analysis by ADM Associates.²¹ ADM found issues with the calculation methodology of the energy savings reports. Rather than using REM/Rate files and HERS, an Energy Star Home Report was used which did not differentiate between energy use and loads. Thus, home energy savings on the individualized Energy Star Home Reports were inaccurate.

ADM offered recommendations pertaining to the energy analysis software and quality control mechanisms for the program, including the following:

- Use a standardized baseline model from which to calculate energy savings per home
 - Energy savings should be derived exclusively from the REM/Rate Fuel Summary Report.
 - Energy savings should be calculated using REM/Rate HERS 85 baseline reference
- More stringent quality control mechanisms should be put in place to review the program implementer’s energy savings calculations
- The multiplier by which demand (kW) savings are calculated from energy (kWh) savings should be revised based on calibrated eQuest building simulation or other method²²

The EPNH has an Action Plan budget of \$4.97 million and a lifetime energy savings target of 104.6 million kWh during 2010-2012. The EPNH is expected to maintain energy savings criteria above ENERGY STAR, even after the Version 3.0 program is launched by the EPA.²³

Advanced Building Techniques Program (ABTP)

The Advanced Building Techniques Program (formerly the Zero Energy Home Program) requires the lowest HERS rating of any program in the southwest. The program is intended to investigate and demonstrate the viability of advanced building techniques and materials that can increase the energy efficiency of new homes in the production home market. The program

²⁰ Nevada Power Company. Filed with the PUCN in Docket 10-08006 on August 12, 2010. Page 137-143.

²¹ ADM Associates Report prepared for NV Energy. “2009 Energy Plus New Homes NV Energy-Southern Nevada Program Year 2009 Measurement & Verification Final Report.” June 1, 2010.

²² Ibid., p.20.

²³ Nevada Power Company. Filed with the PUC in Docket 09-07003 in January 2010. Page 367.

explores the use of proven energy efficient techniques that are being used on smaller scale settings such as in custom and demonstration homes. The program is designed to research, introduce, and encourage the use of advanced building techniques to provide builders a clear path to the development of near zero and zero energy homes. The structure of this program is also designed to expose the value of investing in energy efficiency and renewable energy to home buyers, home appraisers, real estate agents, and financial companies. The longer term goal of this program is to develop and drive new technologies and energy-efficient materials into all relevant programs offered by NVES.²⁴

The following table shows 2008-2009 program results with 2011 recommended targets.

Table 16. 2008-2009 NV Energy South Zero Energy Homes Results and 2011 Targets

Activity	2008 -Actual	2009 Target	2009 Actual	2011 Recommended Budget and Targets
Budget	\$120,561	\$270,000	\$112,361	\$500,000
# Units	4	20-50	15	50-75
Demand Savings (kW)	5	50-100	79	135-203
Energy Savings (kWh)	11,076	77,550-155,100	173,967	300,000-451,000

In 2008, Pulte Homes was the builder to partner with Nevada Energy and the Center for Energy Research at University of Nevada, Las Vegas (UNLV) through the ABTP to build four homes in the Villa Trieste community. The 2008 goal was to construct 25-50 homes through the program, but the decline in homebuilding left the goal unmet.

NV Energy analyzed two model homes in the Villa Trieste community called Venezia and Milano. NV Energy’s contractor compared measureable data to code simulations to analyze building performance and offered suggestions on data projections. UNLV also conducted analysis and determined a need for research on damper settings in air ducts and thermostat setbacks. See the 2010 Annual Demand Side Management Update Report²⁵ for the technical details of the research.

²⁴ Nevada Power Company Integrated Resource Plan for 2010-2012. Docket No. 09-07003 before the Public Utilities Commission of Nevada. January 2010. Page 320.

²⁵ Nevada Power Company, filed with the PUCN in Docket 10-08006 on August 12, 2010.

Utah

Utah's primary electric and gas utilities, Rocky Mountain Power (RMP) and Questar Gas, both offer ENERGY STAR New Homes programs for builders. RMP's program was recognized in 2007 as one of three exemplary programs for residential new construction by the American Council for an Energy Efficient Economy.²⁶ RMP received an ENERGY STAR Leadership in Housing Award in 2008 and 2009. In 2010, RMP received an ENERGY STAR Award for Sustained Excellence. Questar won the ENERGY STAR Partner of the Year Award in 2009 for its New Homes program.

Questar Gas Company

Questar Gas offers two-tiers in its comprehensive ThermWise energy efficiency program. The first tier offers a \$500 rebate for building an ENERGY STAR certified home. The second tier has an \$800 rebate available if the home exceeds 50% energy savings above the 2004 IRC. Table 17 shows the financial incentives offered through the program, including the per measure incentives that are available to the builder.

Table 17. Utah Questar Gas Financial Incentives

Measure	Rebate
ENERGY STAR Certification	\$500
High Performance Home	\$800
ENERGY STAR Gas Storage Water Heater EF 0.62 to 0.66	\$50
ENERGY STAR Gas Storage Water Heater EF 0.67 or higher	\$100
ENERGY STAR Tankless Gas Water Heater EF 0.82 or higher	\$300
High-Efficiency Gas Furnace AFUE 90% or higher	\$300
High-Efficiency Gas Boilers AFUE 85% or higher	\$400
Solar Assisted Gas Water Heating	\$750

Based on an impact evaluation in 2009, the program had realization rates under 30% because the company was not requiring high efficiency furnaces or water heaters. Builders were receiving the ENERGY STAR brand based on electric measures, not gas. In 2011, Questar is making high efficiency furnaces and water heaters mandatory.

²⁶ ACEEE, "Compendium Compendium of Champions: Chronicling Exemplary Energy Efficiency Programs from Across the U.S." February, 2008. Retrieved from <http://www.aceee.org/research-report/u081>.

By the third quarter of 2010, Questar had reached 85% of the participation goal, achieved 84% of the natural gas savings goal, and spent 79% of the budget. Questar projects that about 1,700 qualifying single-family homes and about 500 qualifying multifamily housing units will be constructed in 2011, and estimates a 2011 program budget of about \$2.6 million.

For 2011, Questar is proposing a three tier program which will include one tier at the ENERGY STAR 2.0 performance level, a second tier at ENERGY STAR 2.5 performance, and a third tier for meeting ENERGY STAR 3.0 and also exceeding the 2006 IECC by 30% or more (i.e., high performance homes). In 2011, they will be taking the opportunity to educate the market about ENERGY STAR's program changes. As part of its 2011 program application, Questar modified the previous deemed savings values used in the program's cost effectiveness tests to reflect lower realization rates and free-ridership based on the aforementioned Impact Evaluation.

In 2009, an Order was issued by the Utah Public Service Commission stating that small-scale renewable resources – critical for net zero energy construction – are subject to the same evaluation criteria as utility DSM programs:

We concur with the recommendation to evaluate small-scale renewable resources, such as solar photovoltaic projects, on a similar basis as energy efficiency and load management until other economic tests are available.²⁷

Utility Cost Test is the primary test used to evaluate the cost effectiveness of DSM programs in Utah. Using this test could help solar energy measures pass the cost effectiveness threshold and thus be incorporated into the new homes programs in the future. This order is a critical step in the direction of net zero energy construction.

Rocky Mountain Power (RMP)

The Rocky Mountain Power ENERGY STAR New Homes program includes 3 tiers with “Plus Measures” to incent additional efficient equipment, such as ground source heat pumps (GSHP), standard and ducted whole-house evaporative cooling systems, whole house fans, and ceiling fans with Gossamer blade design. Table 18 presents the financial incentives and construction requirements for builders who participate in the program.

²⁷ Utah Public Service Commission Order, Docket: 09-035-27, In the Matter of the Proposed Revisions to the Utah Demand Side Resource Program Performance Standards.
<http://www.psc.utah.gov/utilities/electric/elecindx/0903527indx.html>. Accessed on October 7, 2009.

Table 18. Rocky Mountain Power Incentive Structure in Utah

Package	Equipment	2009 Incentive (\$)
Tier 1	2009 ENERGY STAR with performance-based duct sealing, SEER 13 A/C, A/C commissioning, performance testing, correct sizing, best practices installation, thermal bypass checklist; CFLs in 50% of available light sockets	250
Tier 2	2009 ENERGY STAR with performance-based duct sealing, SEER 13 A/C, A/C commissioning, performance testing, correct sizing, best practices installation, thermal bypass checklist; CFLs in 75% of available light sockets	300
Tier 3	Meet Federal Tax Credit Home requirements and ENERGY STAR envelope, performance-based duct sealing, A/C commissioning, performance testing, correct sizing, A/C best practices installation, SEER 15 A/C; thermal bypass checklist; CFLs in 90% of available light sockets and .30 U-value windows	800
Plus Measure*	Lighting upgrade to 90% CFLs (Tier 1 only - from base of 50% CFLs)	75
	14 SEER HVAC equipment commissioned with correct sizing and best practices installation (Tier 1 and 2 only)	100
	Duct placement inside conditioned space	100
	Installation of a single vent evaporative cooling system	400
	Installation of a ducted premium evaporative cooling system	750
	Installation of whole house fan system	200
	ENERGY STAR ceiling fan with "Gossamer" blade design	75
	Installation of an ENERGY STAR dishwasher	10
	Lighting upgrade to ENERGY STAR Fixture (per unit)	50
Heat Pump Option	Meet ENERGY STAR specification with well-based ground source heat pump	2,000

* Plus measures must be installed in conjunction with Tier package 1 or 2 or Heat Pump Option to be eligible for incentives.²⁸

²⁸ Rocky Mountain Power Builder Incentives. Retrieved from http://portal.ecosconsulting.com/rmp_energystar/builders/builderincentives.html. Accessed October 15, 2010.

Table 19. Rocky Mountain Power 2009 Results in Utah

Program	# of Homes	kWH/Yr Savings (at Site)
Tier 1	914	1,392,122
Tier 2	415	833,731
Tier 3	8	19,968
Tier 4*	48	144,144
Total Program Results	1,385	2,389,965
Plus Measures		
14 SEER HVAC	20	3,570
Lighting Fixtures and CFLs	510	161,274
Duct Placement	784	438,718
ENERGY STAR Dishwasher	1,313	39,390
ENERGY STAR Ceiling Fan	0	0
Whole House Fan System	5	1,800
Evaporative Coolers	0	0
Ground Source Heat Pumps	1	15,568
Total Plus Measures	2,633	660,320

*Four tiers have been consolidated to three in the current program.²⁹

In 2009, RMP proposed modifications to the ENERGY STAR New Homes program. The changes were proposed to maintain and increase program participation in the challenging economic climate by providing a multi-year incentive offer (2009 – 2010) that would be available while adoption of the 2009 IECC was under consideration. The primary changes included consolidating the program from four to three tiers, offering incentive packages for 50 and 75 percent CFL installations in homes, and modifying five Plus Measures and incentives. The changes were approved with an effective date of July 24, 2009. The annual results presented in Table 19 reflects a combination of the measures from the previous program and the revised program.³⁰

By the third quarter of 2010, RMP had reached 83% of the participation goal, achieved 100% of the kWh savings goal, and spent 100% of the budget. RMP is currently accepting bids for the program administration for the 2011-2013 program years, and is planning to transition to version 3.0 by 2012.

²⁹ Rocky Mountain Power. "2009 Annual DSM Annual Report for 2009 - Utah." Page 29.

³⁰ Rocky Mountain Power. "Electric Service Schedule No. 110, State of Utah. P.S.C.U. No. 47." Filed June 24, 2010.

Wyoming

Questar Gas

Questar Gas offers the ThermWise program in Wyoming as well as Utah. A \$500 rebate is available for building an ENERGY STAR new home. Additional measures installed can accrue extra rebates, as shown in Table 20.

Table 20. Wyoming Questar Gas Financial Incentives

Measure	Rebate
ENERGY STAR Certification	\$500
ENERGY STAR Gas Storage Water Heater > EF 0.62	\$50
ENERGY STAR Tankless Gas Water Heater EF 0.82 or higher	\$300
High-Efficiency Gas Furnace AFUE 90% or higher	\$300
High-Efficiency Gas Boilers AFUE 85% or higher	\$400
Solar Assisted Gas Water Heating	\$750

Rocky Mountain Power (RMP)³¹

Rocky Mountain Power (RMP) is responsible for about 57% of electricity sales in Wyoming. The utility received approval from the Wyoming Public Service Commission (PSC) to implement DSM programs over four years beginning January 1, 2009. RMP offers attic, wall and floor insulation incentives to the builder and evaporative cooler incentives to the customer through the Home Energy Savings (HES) Program. To qualify for the insulation incentive the home must be built with a central air conditioner, heat pump or electric heating system serving 80% of the floor area with minimum R-values of R-48 in the attic, R-24 in the wall, and R-29 in the floor. Changes to the program were proposed on November 1, 2010 to offer higher incentives for insulation and incentives for additional measures.³²

³¹ This paragraph has been updated since the initial publication of the report. The original version erroneously stated that RMP does not offer incentives for energy efficient new construction.

³² Rocky Mountain Power. "Demand Side Management Improvement Plan."
http://www.homeenergysavings.net/Downloads/WY_RMPfiling_document_110110.pdf. Filed November 1, 2010.

IV. Conclusion and Recommendations

Southwestern utilities implement a variety of above-code new homes programs, with most programs promoting both ENERGY STAR and beyond ENERGY STAR (30-50% energy savings relative to code) performance. Five utilities (Arizona Public Service, Tucson Electric Power, Public Service Company of New Mexico, NV Energy South and Rocky Mountain Power) are also promoting and providing higher incentives for highly energy-efficient new construction that achieves 50% or greater energy savings relative to codes. In some cases utilities are also providing incentives for solar-ready homes with pre-wiring for photovoltaics and plumbing for solar thermal, incentives for fully installed photovoltaic and/or solar thermal systems, and providing technical assistance in the design phase to encourage passive solar features.

Some utilities in the region have had great success with their new homes programs. NV Energy South, for example, estimates that 24% of new homes built in 2009 and 50% of new homes built by the third quarter of 2010 qualified as ENERGY STAR Plus new homes, meaning that they were at least 30% more efficient than the 2006 IECC. Nearly all new homes being built in the Salt River Project service area in 2010 are qualifying for the utility's new homes program, although the minimum performance for qualification in this case is only a HERS rating of 84 (i.e., close to the ENERGY STAR performance level). Even though the new construction market is severely depressed, some builders recognize that superior energy efficiency can be a valuable selling point, and are responding well to rebates and/or technical and marketing assistance offered by their utilities.

Looking forward, utilities must maintain cost-effective new homes programs in the context of more stringent building energy codes and reduced natural gas prices. The latter affect electric utility avoided costs as well as gas utility avoided costs, and both tend to make energy efficiency programs less cost-effective. As a result, some utilities, such as Public Service Company of New Mexico, are struggling to justify continuing their new homes programs. To help utilities show that a new homes program is worth continuing, as well as to assist utilities in program design, DOE and the national labs could provide the following:

- Technical support in the development of the next generation of residential new construction programs (beyond their current programs) and net zero energy home programs
- Locally-specific cost and performance data on the most cost effective strategies for achieving above code energy performance including near net zero performance
- Analysis of how development of net zero energy homes might impact the utility's distribution systems
- Assistance in energy savings calculations
- Information on state-of-the-art efficiency measures and home design approaches that can result in more cost-effective solutions for high energy performance

As utilities consider new program designs that will position their programs above the 2009 IECC, it is important that the programs promote a whole house, systems approach in order to

maximize energy savings. Programs should base incentives on HERS ratings for the home as a whole. However, combining incentives based on whole house performance with additional incentives for individual add-on measures, such as is being offered by Rocky Mountain Power and Questar Gas Company, is a reasonable approach. In addition, we recommend that new homes programs:

1. Integrate design phase technical assistance to address window and home orientation, roof design, shading and other energy efficient design concepts
2. Require energy efficiency as a prerequisite to eligibility for renewable energy incentives
3. Consider integrating energy efficiency and renewable energy programs to encourage pre-wiring and piping for solar ready homes

Education and outreach is a vital component to any successful program. Builder training and technical support are key features of the programs implemented by Rocky Mountain Power, Questar Gas Company, and NV Energy, for example. Educating consumers is also valuable to increase demand for highly efficient new homes. Since education and outreach often does not count toward energy savings in DSM portfolios, it is important to embed education and outreach within an overall new homes program, and make sure the program is having an adequate impact on the market as a whole to justify the combination of financial incentive, education and outreach costs. Top priorities for builder educational efforts should include:

- ENERGY STAR Versions 2.5 and 3.0
- Sizing heating and cooling systems, duct design and location, heat gain calculations
- Techniques for achieving high energy performance (i.e., 30-50% savings relative to new codes)

In addition, it is helpful for utilities to develop strategies to educate real estate and lending professionals on the value of energy efficiency. For example, including real estate professionals and appraisers in utility sponsored training events will increase understanding of the value of energy efficiency in disciplines where major gaps still remain.

Finally, it could be beneficial for utility programs to reference and possibly utilize the energy efficiency chapter of the National Green Building Standard/ICC 700 (NGBS), since many jurisdictions throughout the nation will be considering adoption of this standard in the near future. With respect to energy efficiency, the NGBS starts with a bronze entry level at 15% above the 2006 IECC. The silver, gold and emerald levels are 30, 50 and 60% above the 2006 IECC, respectively. Meeting these performance tiers should qualify a home for incentives under a utility's New Homes program.