

ORIGINAL NEW APPLICATION



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BEFORE THE ARIZONA CORPORATION

COMMISSIONERS

KRISTIN K. MAYES, Chairman  
GARY PIERCE  
PAUL NEWMAN  
SANDRA D. KENNEDY  
BOB STUMP

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Arizona Corporation Commission

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ARIZONA CORPORATION  
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IN THE MATTER OF THE APPLICATION  
OF ARIZONA PUBLIC SERVICE  
COMPANY FOR PROPOSED  
RESIDENTIAL NEW CONSTRUCTION  
PROGRAM ENERGY EFFICIENCY  
MEASURE – ENERGY STAR PLUS.

DOCKET NO. E-01345A-09-\_\_\_\_\_

APPLICATION

E-01345A-09-0332

Arizona Public Service Company (“APS” or “Company”) submits this application, outlining a proposed new residential energy efficiency measure (“New Measure” or “ENERGY STAR Plus”), which would be added to the current APS Residential New Construction Program (“Residential Program”). The New Measure is designed to provide an enhanced incentive to encourage builders to go beyond APS’s current ENERGY STAR® Homes efficiency level (“ENERGY STAR” or “Current Measure”) moving toward the goal of net zero energy homes.

**I. BACKGROUND**

**A. Procedural**

In Decision No. 70666, dated December 24, 2008, the Arizona Corporation Commission (the “Commission”) ordered APS to build on its current residential energy efficiency program and to prepare a report, and to propose a new measure addressing and outlining the requirements for a net zero residential energy efficiency program. In addition, APS was ordered to outline the existing and developing net zero technologies and incentives, and to define how these technologies and incentives can be incorporated into the Company’s existing DSM, Renewables and AMI programs. APS proposes the addition of ENERGY STAR Plus as the net zero residential energy efficiency Residential Program measure. APS is

1 positioned to propose this New Measure because APS has been studying the ENERGY STAR  
2 Plus concept since mid-2008. APS presented a proposed ENERGY STAR Plus program  
3 design to the APS DSM Collaborative in November 2008.

#### 4 **B. Net Zero Energy Homes**

5 The U.S. Department of Energy's ("DOE") net zero energy homes research initiative,  
6 the Building America Program,<sup>1</sup> is bringing a new concept to homebuilders across the United  
7 States. A net zero energy home combines state-of-the-art, energy-efficient construction and  
8 appliances with commercially available renewable energy systems, such as solar water  
9 heating and solar electricity. This combination can result in net zero energy consumption  
10 from the utility provider. Net zero energy homes are connected to the utility grid, but can be  
11 designed and constructed to produce as much energy as they consume annually. For example,  
12 consider that a typical new home in the Phoenix metro area will use an average of  
13 approximately 18,000 kWh per year. The implementation of energy efficiency measures (like  
14 ENERGY STAR Plus) can potentially save 60% or more of this annual consumption (savings  
15 of 10,800 kWh), and produce a home where the remaining energy use (7,200 kWh) can be  
16 supplied with a significantly smaller sized renewable energy system than one that would be  
17 needed for a standard built home. And, since the energy efficiency improvements can  
18 typically be made for less than the cost of renewable energy per kWh, the total cost to the  
19 consumer is lower to achieve a net zero energy home.

#### 20 **C. Building America Program and Builders Challenge**

21 The DOE recognizes that net zero energy homes are not currently cost-effective for  
22 builders or widely marketable given current building practices and market dynamics. To  
23 establish a framework for continuous improvement that will help propel the market toward  
24 zero energy performance, the DOE established the Building America Program and the  
25

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26  
27 <sup>1</sup> Building America forms research partnerships with all facets of the residential building industry to improve  
28 the quality and energy efficiency of homes. The goal is to develop cost effective solutions that reduce the  
average energy use of housing by 40% to 100%. Ultimately, Building America research will lead to net zero  
energy homes, which produce as much energy as they use.

1 Builders Challenge.<sup>2</sup> Through these initiatives, the DOE set a goal to cost-effectively  
2 construct net zero energy homes anywhere in the United States by 2030 or earlier, as new  
3 technologies become available and the cost of existing technologies comes down. In order to  
4 reach the goal of marketable net zero energy homes, the DOE is setting progressively higher  
5 Builders Challenge energy efficiency milestones to be achieved by certain target dates to  
6 continue moving the market closer to net zero energy. Currently, the Builders Challenge  
7 milestone is equal to a 30% efficiency improvement over current construction practices to be  
8 met by 2012.

9 APS believes that the DOE's Builders Challenge charts a reasonable path for builders  
10 in Arizona to move towards constructing net zero energy homes. In fact, it is the only current  
11 national program effort that helps builders work toward the goal of net zero energy.  
12 Considering the current economic downturn and realities of the housing market in Arizona,  
13 the DOE Builders Challenge threshold of a 30% efficiency improvement over standard  
14 construction is an aggressive, but achievable, stretch goal as a higher tier measure that  
15 encourages builders to push the envelope on current construction practices. Adopting the  
16 same 30% energy efficiency improvement in the proposed ENERGY STAR Plus efficiency  
17 level is equivalent to approximately double the efficiency level of the current ENERGY  
18 STAR homes measure, so it represents a significant increase over the Current Measure. It  
19 also ties the program's efficiency level to a national standard that builders are familiar with,  
20 which will help program marketing efforts to builders. Compared to a typical new home in  
21 the Phoenix metro area, the 30% efficiency improvement represents an average annual energy  
22 savings of more than 5,000 kWh per year.

23 Builders in APS's service territory that participate in ENERGY STAR Plus would be  
24 encouraged to take advantage of existing APS solar and renewable energy rebates. By  
25 combining ENERGY STAR Plus with the existing APS solar and renewable energy rebates,

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26  
27 <sup>2</sup> Spearheaded by the U.S. Department of Energy, the Builders Challenge helps builders meet and  
28 communicate high levels of energy performance that will meet or exceed any existing performance home  
program. When builders agree to join the Builders Challenge, they commit to constructing homes that rate 70  
or lower on the Energy Smart Home Scale and meet the Builders Challenge Quality Criteria.

1 builders would be able to take advantage of significant APS incentives to move closer to the  
2 goal of building net zero energy homes. In fact, APS has already produced a Builder's Guide  
3 for APS ENERGY STAR and Solar Homes (Attachment A) that cross-promotes to potential  
4 builder program participants the value of participating in both energy efficiency and  
5 renewable energy rebate programs.

6 The following section provides details and background information for APS's  
7 proposed New Measure, ENERGY STAR Plus.

## 8 **II. PROPOSED NEW MEASURE UNDER APS'S RESIDENTIAL NEW** 9 **CONSTRUCTION PROGRAM: ENERGY STAR PLUS**

### 10 **A. Concept and Description**

11 APS proposes that additional cost-effective energy savings could be achieved through  
12 the implementation of the proposed higher energy efficiency level of ENERGY STAR Plus  
13 under the current Residential New Construction Program. The current residential new  
14 construction program measure is linked to the energy efficiency standards of the national  
15 EPA/DOE ENERGY STAR homes program. The ENERGY STAR energy efficiency  
16 standard represents an improvement in energy efficiency of 15% as compared to the 2006  
17 International Energy Conservation Code ("IECC") and typical current baseline construction  
18 practices in Arizona. Homebuilders that participate in the Current Measure receive an  
19 incentive of \$400 per home from APS to help offset their incremental construction costs.

20 APS proposes to add the higher efficiency ENERGY STAR Plus to the Current  
21 Measure, which would be equivalent to a 30% efficiency improvement over current baseline  
22 practices, or double the 15% savings that are associated with the Current Measure. In  
23 exchange for meeting this New Measure, APS proposes that a DSM incentive of \$1,000 per  
24 home be provided to participating builders that meet or exceed the New Measure. Builders  
25 that choose to incorporate renewable energy technologies in these homes could also take  
26 advantage of APS renewable energy incentives, in addition to the DSM incentive.

1 The table below illustrates how the different efficiency levels compare to current  
2 construction practices and the 2006 International Energy Conservation Code, which is  
3 currently adopted in several Arizona municipalities.

4

5 **Comparison of New Home Energy Efficiency Levels**

6 <b>Level</b>	7 <b>% Improvement Compared to 2006 International Energy Conservation Code</b>
8 Current Typical New Home Construction	9 0%
10 ENERGY STAR Homes (Current Measure)	11 15%
12 2009 International Energy Conservation Code (not yet adopted in Arizona)	13 15%
14 ENERGY STAR Plus/DOE Builder's Challenge (New Measure)	15 30%

16 It is expected that this New Measure would provide the following benefits for APS  
17 customers:

- 18 ■ Generate additional cost-effective DSM savings;
- 19 ■ Improve the quality of construction and produce energy cost savings for  
20 participating homebuyers;
- 21 ■ Help to transform the market to drive additional efficiency improvements in the  
22 residential new construction market in Arizona, and move the market toward the  
23 goal of marketable zero energy homes; and
- 24 ■ Ensure that the program stays relevant and ahead of code improvements.

25 The 2009 IECC is set at a level that is roughly equivalent to the Current Measure's  
26 level, which will require the EPA/DOE to increase the ENERGY STAR efficiency standards  
27 when the 2009 IECC becomes widely adopted. In fact, ENERGY STAR is currently  
28 planning to increase the program standard in 2011. If APS implements this New Measure  
now, it would align builders to move in the same direction that the ENERGY STAR program  
will head in two years.

To move builders closer to the goal of net zero energy, APS plans to market this New  
Measure to builders in conjunction with APS renewable energy incentive programs. While

1 the energy efficiency and renewable energy programs would be separate for administrative  
2 purposes, they would be bundled together and marketed to builders as a combined program  
3 whenever possible, similar to the current APS ENERGY STAR and Solar Homes marketing  
4 campaign (*see* Attachment A). In addition, keeping the New Measure separate from other  
5 measures would encourage builders that are not interested in incorporating renewables to still  
6 consider increasing their energy efficiency to the standard of the New Measure.

### 7 **B. Target Market**

8 The target market for this New Measure is the same as the Current Measure: newly-  
9 constructed single-family homes and low-rise townhouses/condos that receive electric service  
10 from APS. Marketing of the New Measure would focus on builders that are building homes  
11 that meet the Current Measure and provide an additional incentive for builders to continue  
12 improving efficiency to meet the higher energy efficiency level of the New Measure, which  
13 would further differentiate the superior energy efficiency of their homes. In addition, these  
14 builders would be encouraged to consider incorporating renewable energy technologies into  
15 their homes to move towards the goal of net zero energy.

### 16 **C. Current Baseline Conditions**

17 At the current time, the residential new construction market (national and local) is  
18 suffering from a combination of circumstances: decreased demand caused by the economic  
19 downturn, a rash of home foreclosures, and stricter lending guidelines. The housing forecast  
20 for 2009 currently predicts less than 10,000 home permits will be issued in the Phoenix metro  
21 area, down from a high of over 65,000 permits in 2005. While the overall new home market  
22 is extremely poor, it has provided an opportunity for builders to assess their current product  
23 offerings and search for ways to differentiate themselves. A number of builders, including  
24 large production builders, are looking at improvements in energy efficiency, incorporating  
25 renewable energy, and other green building practices as potential ways to differentiate  
26 themselves from other builders. This New Measure would help to support and encourage  
27 builders to build higher efficiency homes in today's volatile market.

28

1           There are only a handful of builders (typically smaller custom/semi-custom builders)  
2 in Arizona that are currently building near this level of energy efficiency. This would initially  
3 be a niche market, but it should help drive a higher percentage of builders to consider the  
4 New Measure. In addition, first year savings would be relatively small due to the natural lag  
5 time associated with new construction programs.

#### 6           **D. Eligibility**

7           Eligibility to participate in ENERGY STAR Plus would be the same as the Current  
8 Measure. The New Measure would be available to builders that build newly-constructed  
9 residential single-family homes and low-rise condos/townhomes in the APS service territory.

#### 10          **E. Rationale**

11          The New Measure would augment the Current Measure and encourage builders to  
12 achieve higher levels of energy efficiency, which would produce lasting, cost-effective  
13 energy savings for APS customers.

#### 14          **F. Objectives**

- 15           ▪ Retain builders that are participating in the current APS ENERGY STAR Homes  
16 program while encouraging builders to achieve higher efficiency levels.
- 17           ▪ Provide additional cost-effective savings and benefits for APS customers.
- 18           ▪ Continue market transformation to promote increasing energy efficiency standards.
- 19           ▪ Keep the Residential New Construction Program relevant by continuing to raise the  
20 standards as building codes become more stringent (2009 IECC likely to be adopted  
21 by many Arizona municipalities in the next few years).
- 22           ▪ Provide opportunities for cutting edge builders to differentiate their homes as  
23 meeting a higher energy efficiency standard.
- 24           ▪ Promote the next step in DOE Builders Challenge goal of achieving marketable net  
25 zero energy homes by 2030.

#### 26          **G. Products and Services Provided**

- 27           ▪ The New Measure would be added to the current Residential New Construction  
28 Program, and could be easily folded into the current marketing materials and

1 program implementation infrastructure.

- 2 ■ The New Measure would be performance based and would be achieved by meeting  
3 a Home Energy Rating System (“HERS”) score of 70. This is the same score  
4 system that is used nationally to certify ENERGY STAR homes. ENERGY STAR  
5 homes require a HERS score of 85 to qualify, while the proposed ENERGY STAR  
6 Plus measure would require a HERS score of 70 to qualify. This represents a  
7 savings of 30% over current code homes, and 15% savings compared to the Current  
8 Measure’s levels.
- 9 ■ Builders would be able to use a number of different construction upgrades and  
10 approaches to meet the performance standard. It is anticipated that common  
11 upgrades that builders would make to achieve the standard would include the  
12 following:
- 13 ■ All upgrades currently required to meet the APS ENERGY STAR Homes  
14 program.
  - 15 ■ Install HVAC ductwork inside the conditioned space of the home. This  
16 produces significant energy efficiency benefits as compared to the current  
17 practice of installing ducts in unconditioned attics.
  - 18 ■ Install vinyl frame low E windows with a low Solar Heat Gain Coefficient.
  - 19 ■ Install high SEER/EER equipment – typically 15 SEER or higher.
  - 20 ■ Install higher efficiency water heating.
  - 21 ■ Install high efficiency lighting and appliances.
- 22 ■ In exchange for meeting the New Measure, builders would receive an incentive of  
23 \$1,000 per home, paid at the time the home connects to the APS system (same  
24 process as the Current Measure). Based on research of current local market  
25 conditions, APS estimates that the average incremental cost for a typical builder to  
26 achieve this level of efficiency is \$3,500. Because this efficiency level represents a  
27 stretch goal relative to current building practices (especially in light of current  
28 market conditions), it is essential to provide a significantly higher rebate than the

1 Current Measure's incentive of \$400 per home. The incentive levels for the New  
2 Measure and the Current Measure are shown in the table below:

Residential New Construction Program Measures	Incentives
Meets 2006 ENERGY STAR Homes program standard (at least 15% more efficient than 2006 IECC).	\$400/home
Meets ENERGY STAR Plus program standard (at least 30% more efficient than 2006 IECC).	\$1,000/home

### 3 4 5 6 7 8 **H. Delivery Strategy and Administration**

9 The New Measure would be implemented in-house by APS and would rely on the  
10 same delivery strategy and administration as the Current Measure.

### 11 **I. Marketing and Communications**

12 ENERGY STAR Plus could take advantage of existing advertising and marketing  
13 support used for the Current Measure. Special collateral materials would be developed as  
14 needed to focus on the additional features and benefits that customers would receive from the  
15 added energy efficiency elements that would be incorporated in homes that meet the higher  
16 efficiency level of the New Measure. New marketing materials would also be developed for  
17 builders to market the benefits of participation in the New Measure. The Residential Program  
18 would combine marketing efforts with the renewable energy programs to encourage builders  
19 to adopt both energy efficiency and renewable energy features that move toward the goal of a  
20 net zero energy home.

### 21 **J. Implementation Schedule**

22 The New Measure would be integrated into the Residential Program, and marketing to  
23 builders would begin immediately upon approval by the Commission.

### 24 **K. Monitoring and Evaluation Plan**

25 The New Measure would be evaluated as part of the currently approved Measurement,  
26 Evaluation and Research ("MER") plan. Homes that participate in the New Measure would  
27 undergo a separate analysis to verify the impacts and savings achieved under the higher  
28

1 efficiency standard. The research would follow the same basic protocol and timeline as  
2 detailed in the Residential New Construction MER Evaluation Plan.

### 3 **L. Program Costs**

4 APS anticipates that this New Measure will be a stretch goal for builders, and that it  
5 will represent a niche market in the first years of implementation. Because the new  
6 construction market has a natural lag time associated with it, relatively few builders would  
7 earn incentive payments for the New Measure in the first one to two years of implementation.  
8 In addition, the promotion of the New Measure could piggyback on existing program  
9 marketing and advertising for the current energy efficiency and renewable energy programs;  
10 therefore, minimizing the incremental costs for program marketing.

11 The attached spreadsheet, Attachment B (Residential New Construction ENERGY  
12 STAR Plus Budget), provides a breakdown of the anticipated 2010 program budget, including  
13 both the Current Measure and the New Measure.

### 14 **M. Estimated Energy Savings**

- 15 ■ Compared to current construction practices, the New Measure would yield a  
16 weighted average savings of more than 5,100 kWh/year. The following table shows  
17 estimated peak demand and lifetime energy savings from the Current Measure and  
18 ENERGY STAR Plus.
- 19 ■ The attached spreadsheet, Attachment C (DSM Estimated Energy Savings 2010),  
20 provides more information about estimated energy savings.

21 <b>Year</b>	<b>Measure</b>	<b>No.</b>	<b>Peak Demand</b>	<b>Lifetime kWh</b>
		<b>Homes</b>	<b>kW Savings</b>	<b>Savings</b>
22 2010	ENERGY STAR	3,500	5,000	203,616,000
23	ENERGY STAR Plus	250	497	23,256,000
24				
25				
	TOTAL 2010	3,750	5,497	226,872,000

1 *Cost Effectiveness*

- 2 ■ The following table provides a summary of the anticipated program costs and  
3 benefits, as well as the program's expected benefit/cost ratio. For more  
4 information, see Attachment D (Net Benefits 2010 – Residential New Construction  
5 Measures).

6

7 <b>Measure</b>	<b>Total APS Program Cost 2010</b>	<b>\$/Lifetime kWh</b>	<b>Societal Cost Test Total Benefits</b>	<b>Societal Cost Test Total Costs</b>	<b>Societal Cost Test Benefit/ Cost Ratio</b>
8 ENERGY STAR	\$2,018,258	\$0.010	\$12,922,000	\$2,982,000	4.33
9 ENERGY STAR 10 Plus	\$ 400,000	\$0.017	\$ 1,619,000	\$ 938,000	1.76

11

12 **N. Environmental Benefits**

13 Based on an estimate of 226,872,000 lifetime kWh savings in 2010 from the Current  
14 Measure and the New Measure, APS anticipates the following environmental benefits would  
15 accrue over the 20-year planning horizon for homes built to meet program energy efficiency  
16 standards in 2010:

- 17 ■  $SO_x = .0043 \text{ lbs/MWh} \times 226,872 \text{ MWh} = 976 \text{ lbs saved}$   
18 ■  $NO_x = .172 \text{ lbs/MWh} \times 226,872 \text{ MWh} = 39,022 \text{ lbs saved}$   
19 ■  $CO_2 = 917 \text{ lbs/MWh} \times 226,872 \text{ MWh} = 208,041,624 \text{ lbs saved}$   
20 ■  $PM_{10} = .0237 \text{ lbs/MWh} \times 226,872 \text{ MWh} = 5,377 \text{ lbs saved}$   
21 ■  $\text{Water} = 233 \text{ gallons/MWh} \times 226,872 \text{ MWh} = 52,861,176 \text{ gallons saved}$

22 **III. CONCLUSION**

23 The Company's proposed ENERGY STAR Plus, a New Measure to be added to the  
24 Residential New Construction Program sets a new, higher energy efficiency goal for  
25 residential building construction that provides benefits to customers through incentives,  
26 rebates, and other resources as described in this application. The New Measure adopts the  
27 DOE Builders Challenge threshold efficiency goal of a 30% energy efficiency improvement  
28 over current construction standards, and will assist in moving the industry toward a zero net

1 energy building standard. Therefore, in accordance with Decision No. 70666, APS  
2 respectfully requests that the Commission approve ENERGY STAR Plus as the Company's  
3 net zero residential energy efficiency program measure.

4 RESPECTFULLY SUBMITTED this 29<sup>th</sup> day of June, 2009.

5 PINNACLE WEST CAPITAL CORPORATION  
6 LAW DEPARTMENT

7  
8 By: Thomas L. Mumaw  
9 Thomas L. Mumaw  
10 Linda J. Benally  
11 Attorneys for Arizona Public Service Company

12 ORIGINAL and thirteen (13) copies  
13 of the foregoing filed this 29<sup>th</sup> day of  
14 June, 2009, with:

15 Docket Control  
16 ARIZONA CORPORATION COMMISSION  
17 1200 West Washington Street  
18 Phoenix, Arizona 85007

19 Dana Turner

# ATTACHMENT A

# APS ENERGY STAR® and Solar Homes: A Builder's Guide



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OVERVIEW	STEPS TO PARTICIPATE	APS ENERGY STAR® HOMES	SOLAR HOMES	INCENTIVES	THE BOTTOM LINE	RESOURCES

## Are you looking for a competitive edge in today's new home market?

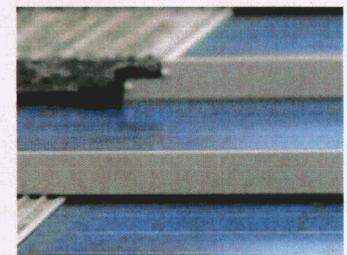
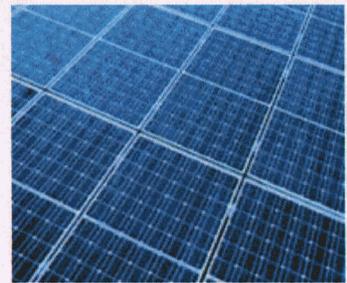


From energy-efficient light bulbs to smaller cars, consumers are making purchases that reflect their desire to live a "green" lifestyle. APS is proud to offer two programs to help Arizona builders tap into this growing market.

Through the APS ENERGY STAR® Homes program, you can incorporate energy-saving features and building technologies that increase home values, improve home comfort and help your customers reduce their utility bills.

The APS Solar Homes program provides another smart, easy-to-implement option that helps make solar profitable for builders and affordable for homeowners.

When you combine the APS ENERGY STAR and Solar Homes programs, you can realize the greatest benefits for your business — standing out in a crowded market and making a positive difference for the environment.



## What's in it for me?

As a builder, it's essential to differentiate yourself from the competition. The APS ENERGY STAR and Solar Homes programs help you do just that, providing tangible benefits to your business and lasting benefits to your customers.

Partner with APS and buyers will know your homes are equipped to save them money and protect the environment. You'll also receive free training, marketing support and sales assistance — and we'll even pay incentives for the homes you sell.

### Builder benefits

- Add more value to your homes
- Increase buyer traffic
- Improve your bottom line
- Gain a competitive advantage
- Reduce environmental impact
- Build image as an environmental steward
- Add credibility
- Reduce callbacks

### Homebuyer benefits

- Lower cost of ownership
- Increase resale values
- Enjoy greater year-round comfort
- Improve indoor air quality
- Reduce air pollution and greenhouse gases
- Live a greener lifestyle
- Stabilize energy costs

## Steps to participate

To build an APS ENERGY STAR home, first consult with a HERS (Home Energy Rating System) Rater to ensure you have the right efficiency measures in place to qualify. When installing solar, begin by partnering with a licensed installer.

You can find HERS Raters and links to licensed solar installers at [www.aps.com/constructioncorner](http://www.aps.com/constructioncorner) or at the back of this Guide.



## Why make the next home you build an APS ENERGY STAR home?

Given volatile energy costs and greater environmental awareness, most homebuyers now expect and even demand energy-efficient homes. For those customers, APS ENERGY STAR homes are an indication of quality and value — a designation that can set your business apart from the competition.

Of course, building ENERGY STAR homes only makes sense if it can be done cost-effectively. That's where APS comes in. We work closely with builders through every step of the process, providing:

- **Free** APS ENERGY STAR construction training by national experts
- **Free** sales training for your sales team, including interactive sales training sessions and onsite sales books
- **Free** advertising to drive buyer traffic to your communities
- **Free** customized model home signage as well as brochures that include the estimated energy costs for each of your floor plans
- **Plus, APS will pay you a financial incentive of \$400 for each APS ENERGY STAR home you sell.**



## fact



### What is ENERGY STAR?

ENERGY STAR is a symbol of energy efficiency, backed by the U.S. Environmental Protection Agency and the U.S. Department of Energy. Products or practices that earn the ENERGY STAR label save money and energy while protecting the environment. For more information, go to [www.energystar.gov](http://www.energystar.gov).

### Did you know?

To help drive customer traffic to participating communities, APS is spending more than \$1 million in marketing and advertising over the next three years to promote APS ENERGY STAR builders and their communities.



## fact



### Get started

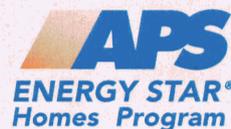
It's easy to start building APS ENERGY STAR homes. Simply work with a HERS Rater to qualify your plans, and sign an agreement. Go to [www.aps.com/constructioncorner](http://www.aps.com/constructioncorner) for more information.



## What does it take to build an APS ENERGY STAR home?

APS ENERGY STAR homes are built using standard construction practices, with special attention in these areas:

- A tighter building envelope and sealed ducts
- Properly installed insulation
- Energy-efficient, low-E windows
- High-efficiency heating and cooling
- Fresh air ventilation and room pressure balancing
- Independent testing and inspection



APS ENERGY STAR homes appeal to consumers who seek lower energy costs and higher resale values — as well as better year-round comfort and improved indoor air quality.

For builders who want to provide real energy savings for their customers, the APS ENERGY STAR Homes program is the right choice.

## The right state. The right time for solar.

Particularly in sunny Arizona, solar simply makes sense. Our homes soak up the sun more than 300 days a year, and new incentives and technological improvements now make solar easier to implement and more profitable than ever.

The improved aesthetics of solar significantly increase initial and resale home values. And APS incentives plus federal/state tax credits make solar an even more attractive option.

Together with APS ENERGY STAR homes, today's solar makes sense for the environment, for builders, and for buyers.

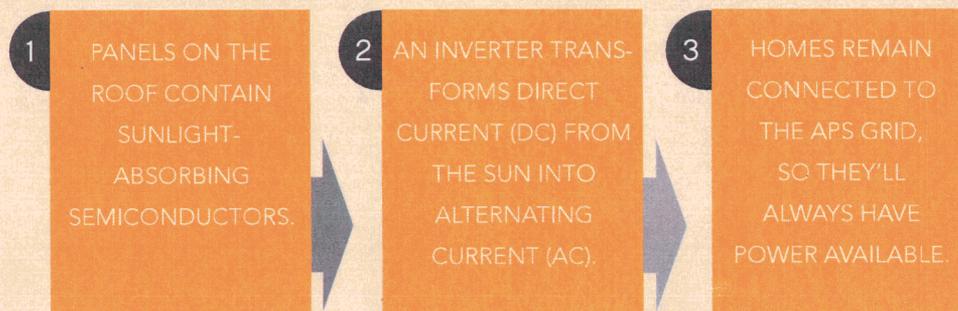
## Three APS solar solutions

The APS Solar Homes program supports three solar solutions: solar panel systems, solar water heaters and solar-ready home preparation.



**Solar panels** — also called photovoltaic or PV — contain modules made up of photovoltaic (PV) cells that generate electricity when exposed to sunlight. They have no moving parts, require almost no maintenance and last for decades. The PV cells generate direct current (DC) electricity, which is converted to alternating current (AC) electricity by an inverter.

### How solar PV systems work:



Today's PV systems come in a range of efficiencies and configurations that complement the home's design. PV systems with modules mounted over existing roofing are still the most common, but integrated photovoltaic panels — which generate electricity AND function as a finish building material — are rapidly gaining in popularity.

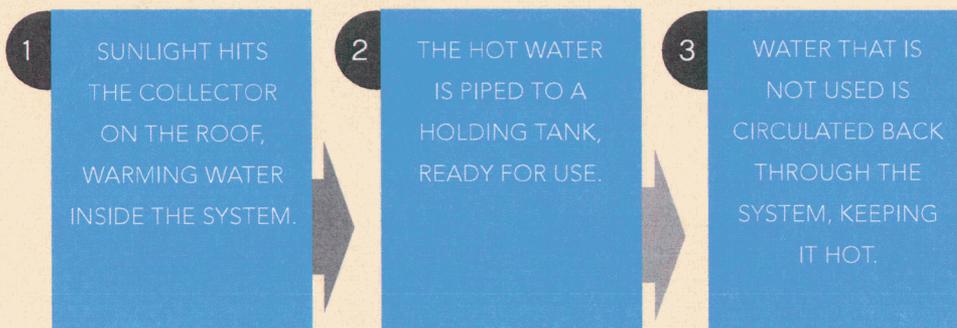
PV systems are eligible for federal, state and utility incentives that can reduce the cost by half or more. When PV systems are included as standard features in new, energy-efficient homes, and the cost is included in the mortgage, homebuyers often realize positive cash flow from their first payment.

Advantages of PV systems:

- Identify builder as an industry leader
- Enhance community prestige
- Aesthetics work well with new-home designs
- Reduce energy bills
- Offer credits for customers that produce more energy than they use
- Require little maintenance
- Provide a reliable source of electric power
- Decrease total dependence on outside energy sources



How a typical solar water heater works:



## fact



Up to 15% of a customer's energy costs can come from heating water — a solar water heater can eliminate most of this cost. When you combine APS incentives with federal and state tax credits, the cost of a system can be reduced by up to 80%.



**2 Solar water heaters** are reliable and economical systems for heating domestic water. They typically consist of collectors, a controller and a storage tank.

Like PV systems, when solar water heaters are installed on new houses and the cost is included in the mortgage, the increase in the monthly payment is small. And when you factor in the decrease in monthly energy costs, the solar investment often results in positive cash flow immediately.

Builders are able to take advantage of economies of scale, adding solar water heaters at a reduced expense. In addition, solar water heaters are now much easier to incorporate into production building schedules, thanks to packaged systems and streamlined installation processes.

### Advantages of solar water heaters:

- Lower monthly utility bills
- Hot water, day or night
- Stable energy costs — sunshine is free

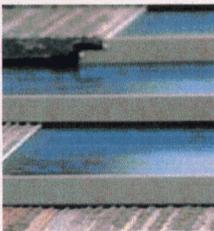


**3 Solar-ready homes** are prepared for adding solar PV and solar water heaters by incorporating necessary changes during design and construction. Even if you choose not to install solar panels or solar water heaters now, your customers will appreciate your forethought in making their homes solar-ready, because it will save them time and money when they install solar equipment in the future.

A solar-ready house will also be easier to sell as consumers become more aware of the environmental and economical benefits of solar technologies. By making a home solar-ready, you are providing your customers an opportunity to increase the value of their investment.

### Advantages of solar-ready homes:

- Can be done at little cost to builders
- Differentiates your community and homes
- Offers an added incentive for homebuyers
- Increases home values
- Saves homeowners money and time on future solar installations



### Tips for building solar or solar-ready homes

- Design a portion of the roof to be south-facing and unshaded.
- On the design specs, call out the structural capabilities of the roof – especially that it is able to accommodate the weight of the solar equipment.
- When building an integrated system, use flat concrete tile work.
- Work with your solar professional to incorporate structural and design changes specific to your development.

#### Solar water heaters

- Design in solar stubs with 3/4-inch copper plumbing between solar storage tank and solar collector locations.
- Plumb in soft copper.
- Add roof truss support for collectors where necessary.

#### Solar panels

- Plan for the installer to mount inverters on the side of the garage.
- Make sure the electrical service panel can accommodate the solar electric system.
- Install a conduit “pre-plumb” to the attic or roof – a low-cost way to ensure the conduit line isn't seen from outside.

## The bottom line

You want to sell more homes. Your buyers want more choice, more value and more selection. You both get what you want when you combine APS ENERGY STAR and Solar Homes.

**Reduce the cost of solar.** Energy efficiency is the most cost-effective way to reduce utility bills and improve comfort. And the less energy a house requires — as is the case for APS ENERGY STAR homes — the smaller and less expensive the solar equipment needs to be.

**Amplify the impact of solar.** The greater efficiency of APS ENERGY STAR homes allows solar energy to have a greater impact.

**Attract more buyers.** When you add a PV system or solar water heater to an APS ENERGY STAR home, you attract more buyers. That includes energy-conscious consumers who recognize the lower monthly costs and enhanced resale value of energy-efficient homes.

With increasing interest in solar plus great utility incentives and tax credits, now is a great time to include PV and solar water heaters.

Current incentive amounts can be found at the back of this Guide or by visiting [www.aps.com/constructioncorner](http://www.aps.com/constructioncorner).



## fact



Energy-efficient mortgages are available to make solar homes more affordable for buyers by including reduced monthly energy costs in the qualification process. Both PV and solar water heating systems are allowable expenses under the federal guidelines for energy-efficient mortgages.

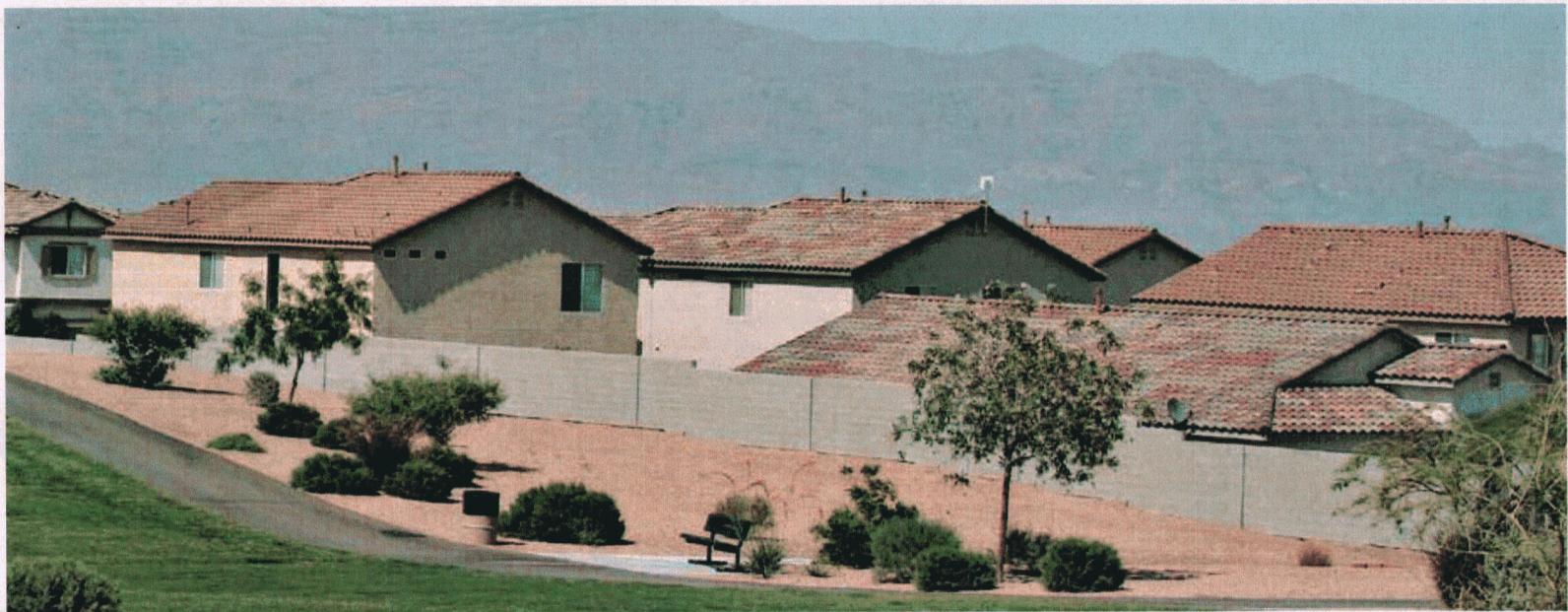
Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy

## Why add solar to APS ENERGY STAR homes?

### fact



Teaming up with a reliable, experienced solar installer is the single most important strategy for solar success. To find an installer, check out the back of this Guide or visit [www.aps.com/constructioncorner](http://www.aps.com/constructioncorner).



#### For the builder:

**Faster sales:** Solar homes can sell faster, and the ENERGY STAR label attracts buyers.

**Increased homebuyer satisfaction:** Customers prefer solar and ENERGY STAR as standard features to simplify their purchase.

**Streamlined sales:** Satisfied homeowners recommend their builder twice as often as neutral owners.

#### For the buyer:

**Faster appreciation:** APS ENERGY STAR and Solar Homes can appreciate faster than other homes.

**Energy price stability:** The cost of sunlight never fluctuates. APS ENERGY STAR and Solar Homes have lower energy bills, typically saving buyers 50% or more.

## Program resources for the builder

Many free resources are available to help you sell APS ENERGY STAR and Solar Homes.

As an APS ENERGY STAR and Solar Homes builder, you'll benefit from being featured in APS marketing and advertising.

APS also offers the following resources to builders:

- Construction and sales training
- Radio, television and online advertising
- Inclusion on [aps.com](http://aps.com) with direct click-through capabilities to your Web site
- Cooperative advertising program
- Customized model home signage and other marketing collateral

## Now that you're ready, what's next?

1

Find a HERS Rater or solar installer in the back of this Guide or at "Construction Corner" on [aps.com](http://aps.com).

2

Work with your HERS Rater to meet the APS ENERGY STAR Homes standards.

3

Meet with your solar provider during your planning phase to ensure the best solar design and installation.





# ATTACHMENT B

**ATTACHMENT B**  
**Page 1 of 1**

<b>Residential New Construction Program - 2010 Budget including "E Star Plus" Measure</b>							
<b>Program Activity</b>	<b>Plan &amp; Admin</b>	<b>Program Marketing</b>	<b>Program Implement</b>	<b>Rebates &amp; Incentives</b>	<b>Training &amp; Tech Assist</b>	<b>Consumer Education</b>	<b>TOTAL</b>
Labor and Expenses - Planning and Oversight	79,310						\$79,310
Labor and Expenses - Program Implementation			169,254				\$169,254
Building Science Training					49,000		\$49,000
Builder Incentives				1,400,000			\$1,400,000
Consumer Advertising - Print		65,000					\$65,000
Consumer Advertising - Online		75,000					\$75,000
Consumer Advertising - TV/Radio/Other		75,000					\$75,000
Model Home POS Materials		26,694				9,000	\$35,694
Builder promotion and awareness		60,000					\$60,000
Realtor/Sales Agent Training					10,000		\$10,000
<b><i>Additional 2010 Costs for Energy Star Plus Measure</i></b>	<b><i>20,000</i></b>	<b><i>50,000</i></b>	<b><i>30,000</i></b>	<b><i>250,000</i></b>	<b><i>40,000</i></b>	<b><i>10,000</i></b>	<b><i>\$400,000</i></b>
<b>TOTAL</b>	<b>\$99,310</b>	<b>\$351,694</b>	<b>\$199,254</b>	<b>\$1,650,000</b>	<b>\$99,000</b>	<b>\$19,000</b>	<b>\$2,418,258</b>
<b>%</b>	<b>4.1%</b>	<b>14.5%</b>	<b>8.2%</b>	<b>68.2%</b>	<b>4.1%</b>	<b>0.8%</b>	

NOTES

This represents the total anticipated budget for the Residential New Construction Program in 2010, including the higher tier "ENERGY STAR Plus" measure shown in bold italics on the final row just above the "Total" line. The incentive budget is based on \$400/home x 3500 participating homes/year for the E Star Homes measure, and \$1000/home x 250 participating homes/year for the E Star Homes Plus measure.

# ATTACHMENT C

DSM Estimated Energy Savings 2010 - Current and Proposed Residential New Construction Measures										
Program	Measure	Demand kW savings per unit	Peak Coincidence Factor	Annual Energy kWh savings per unit	# unit 2010	NTG Adjust Factor	TOTAL kW Savings 2010	Meas. life	TOTAL Lifetime kWh Savings from 2010 Measures	Annual kWh Savings 2010
Res NC	E Star Homes (15% savings)	1.86	0.96	3636	3500	0.80	4999.7	20	203,616,000	10,180,800
Res NC	E Star Plus (30% savings)	2.3	0.96	5168	250	0.9	496.8	20	23,256,000	1,162,800
<b>Total Res NC</b>					<b>3750</b>		<b>5,496.5</b>	<b>20</b>	<b>226,872,000</b>	<b>11,343,600</b>

Where:  
 "Program" = Residential New Construction Program  
 "Measure" = DSM measure  
 "Demand kW Savings per Unit" = Non-Coincident Peak kW savings - from Summit Blue Consulting analysis  
 "Peak Coincidence Factor" = Coincidence of savings to APS peak load - APS/Summit Blue Consulting analysis  
 "Annual Energy" = kWh savings/home/year  
 "# Unit" = APS estimates of expected participation in each measure in 2010  
 "NTG Adjust Factor" = Net to Gross Ratio = factor to account for free riders  
 "Total kW Savings" = Total estimated demand savings from participating homes built in 2010  
 "Measure life" - Expected lifetime of the measure - based on DEER database and other national sources  
 "Total Lifetime kWh Savings" = Estimated total energy savings over the expected life of measures installed in 2010  
 "Annual kWh Savings" = Estimated annual energy savings from participating homes in 2010

# ATTACHMENT D

**Net Benefits 2010 - Residential New Construction Measures**

Measure	Avoided cost savings per unit	Customer Increment Cost per Unit	PA Costs per unit	TRC Costs per Unit	TRC # units 2010	Total PA Costs 2010	Total TRC Benefits 2010	Total TRC Costs 2010	TRC Net Benefits	TRC Benefit/Cost
Energy Star Homes (15% Savings)	\$3,692	\$675	\$177	\$852	3,500	\$619,500	\$12,922,000	\$2,982,000	\$9,940,000	4.33
Energy Star Plus (30% Savings)	\$6,604	\$3,152	\$600	\$3,752	250	\$150,000	\$1,651,000	\$938,000	\$713,000	1.76
<b>TOTAL</b>					<b>3,750</b>	<b>\$769,500</b>	<b>\$14,573,000</b>	<b>\$3,920,000</b>	<b>\$10,653,000</b>	