

## Issue Brief: ENERGY STAR<sup>®</sup> for New Homes<sup>1</sup>

Green building is becoming much more common throughout the United States, which is a positive response to the need to reduce our energy consumption and carbon footprint. One successful green building program is ENERGY STAR New Homes, a residential energy efficiency program. ENERGY STAR-qualified homes save homeowners at least 15 percent in energy use as compared to a non-qualified home. At the end of 2010, more than 1.2 million of these homes had been built since 1996, increasing from 17 percent of new construction in 2008 to 28 percent in 2010. The growth of ENERGY STAR homes is significant – it is far easier to build a home to high energy efficiency standards than to retrofit an existing home. By state, the percentage of new homes that meet the ENERGY STAR standard vary considerably with 11 states over 35 percent in 2010 but 23 states less than 15 percent. The states with high percentages generally provide greater subsidies to builders and have tighter building codes.

The savings in energy use and resulting greenhouse gases is significant. EPA has estimated that each ENERGY STAR home keeps 4,500 pounds of greenhouse gases out of the air each year. Assuming new housing starts return to normal levels, from 2011- 2020, more than 8 million new single family homes could be built. Based on those projections, at least twenty percent of those homes could be ENERGY STAR qualified or 1.6 million homes. Using projections based on 2008-2010 market share, ENERGY STAR homes could be as much as 60 percent of the single family market by 2020.<sup>2</sup> The energy savings and environmental benefits would be hugely significant for this country.

This issue brief provides an understanding of the ENERGY STAR New Homes program and its success, its regional variation and factors contributing to this variation, which illustrate the need for more state government involvement as well as more legislation and regulation to begin mandating a uniform level of residential energy efficiency across the country. Without these changes, residential energy efficient construction will continue to vary widely across the country. Some areas of the country will continue to miss out on the benefits of green building. The energy savings and environmental benefits that could be achieved nationally would be limited because of the lack of participation in ENERGY STAR New Homes in some regions.

### **Background**

In the mid-1990s, the Environmental Protection Agency (EPA) began focusing on energy efficiency in residential construction. They created the ENERGY STAR<sup>®</sup> New Homes program to recognize homes that were at least 30 percent more energy efficient for heating, cooling, and water heating than homes built to the Model Energy Code. In 2006, EPA introduced its second generation of efficiency

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<sup>1</sup> This issue brief was prepared by Energy Programs Consortium (EPC), a 501(c)(3) nonprofit organization that conducts policy research and demonstration programs sponsored by the four main organization representing state energy and regulatory agencies. For additional information, contact Rebekah King , Research Associate, 202-333-5915, [rking@energyprograms.org](mailto:rking@energyprograms.org)

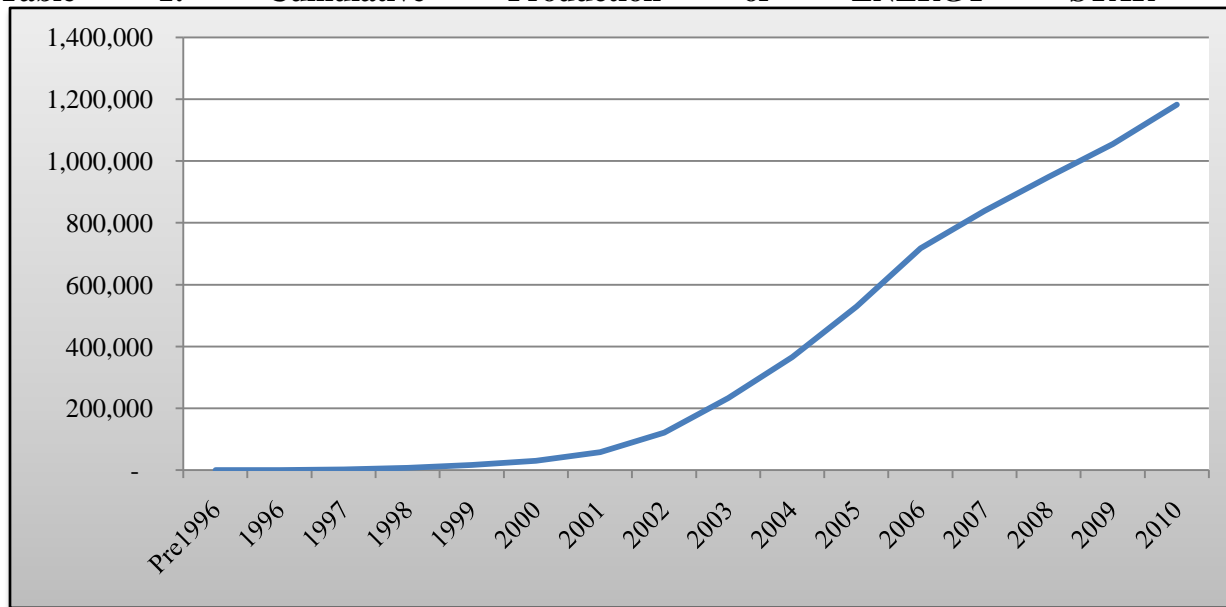
<sup>2</sup> In 2008, the ENERGY STAR single family homes' market share was 16.9 percent, increasing to 22.4 percent in 2009, and up to 27.5 percent in 2010. Projections were based on EPC calculations.

requirements for new homes, requiring homes earning the ENERGY STAR label to be at least 15 percent more energy efficient than the 2004 International Residential Code through the use of efficiency measures including effective insulation, high performance windows, tight construction, efficient heating and cooling equipment, and ENERGY STAR lighting and appliances. EPA estimates these measures can deliver \$200-\$400 in annual energy savings for homeowners, and each ENERGY STAR qualified home can keep 4,500 lbs of greenhouse gases out of our air each year.<sup>3</sup> Starting in 2012, EPA will fully implement its third generation of efficiency requirements for residential construction, referred to as Version 3. Homes built to Version 3 requirements are at least 15 percent more efficient than homes built to the 2009 International Energy Conservation Code (IECC) and include additional systems-based efficiency measures that make them 20-30 percent more efficient than typical new construction. Energy savings measures that are required in Version 3 include a complete heating and cooling system, a complete thermal enclosure system, a comprehensive water management system, and energy-efficient lighting and appliances. To participate in the program, builders must partner with ENERGY STAR, complete ENERGY STAR's online builder training module, and have their homes' energy efficiency third-party verified for the ENERGY STAR label.

**Program Success**

Overall, the ENERGY STAR New Homes program has been very successful. To date, 8,500 home builders have partnered with ENERGY STAR to build more than 1 million single family homes, manufactured homes, and multifamily units. ENERGY STAR home's total market share was approximately 8 percent in 2006, and it has increased to 21 percent in 2010.<sup>4</sup> From 2001–2010, more than 14 million total building permits were issued, and of these, 1.15 million ENERGY STAR units were completed. Single family ENERGY STAR construction has enjoyed particular success, increasing its market share from 17 percent in 2008 to 28 percent in 2010.

**Table 1: Cumulative Production of ENERGY STAR Homes<sup>5</sup>**



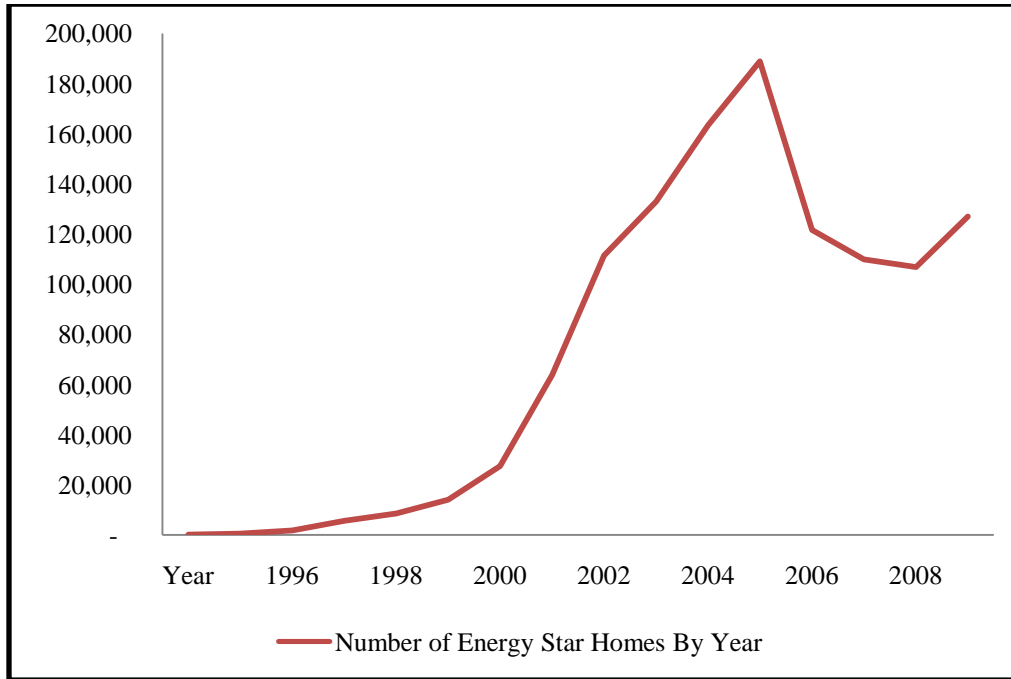
<sup>3</sup> See [http://www.energystar.gov/index.cfm?c=new\\_homes.nh\\_greenbuilding](http://www.energystar.gov/index.cfm?c=new_homes.nh_greenbuilding)

<sup>4</sup> All ENERGY STAR production data is courtesy of the EPA iStar database, 5/10/11; Building permit data courtesy of U.S. Census Bureau: New Privately-Owned Housing Units Authorized by Building Permits in Permit-Issuing Places

<sup>5</sup> Includes multifamily, manufactured housing, and single family site built homes built to ENERGY STAR standards.

Total production over recent years has been less consistent, but in 2010, production increased. The decline from 2006–2009 may be attributed to the overall state of the housing market when total building permits issued declined from 1,838,900 to 583,000 from 2006 –2009.<sup>6</sup>

**Table 2: ENERGY STAR Production by Year**

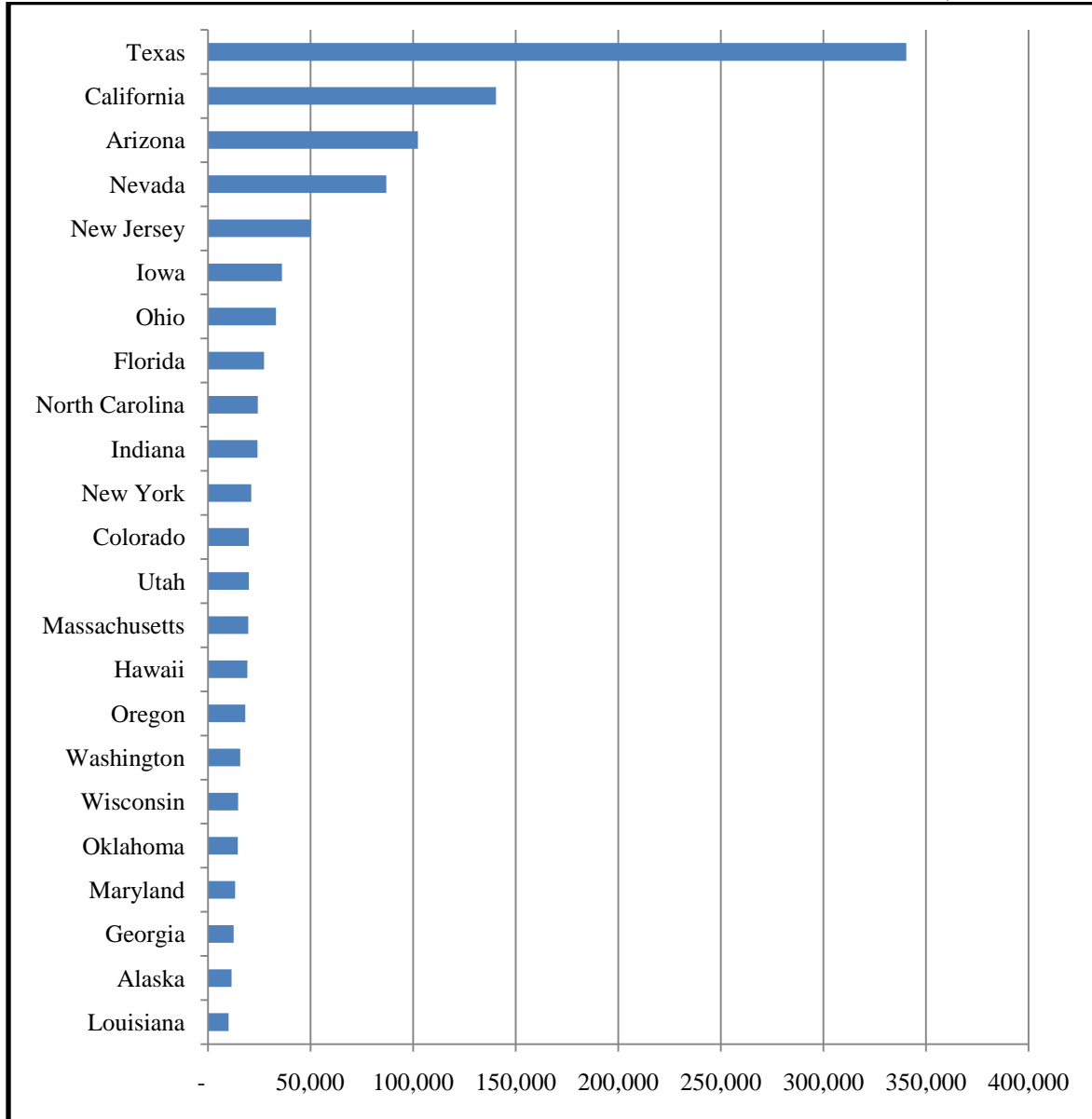


Production among states is highly variable but in many states, ENERGY STAR New Homes' production is a significant share of the overall housing stock. Twenty-three states have more than 10,000 ENERGY STAR units to date. Texas has the most ENERGY STAR homes, with more than 340,000. Arizona and California have completed over 100,000 ENERGY STAR homes each; New Jersey and Nevada have more than 50,000. In 2009, ENERGY STAR single family market share was more than 40 percent in 6 states, and in 2010 this increased to 9 states. However, the dispersal of ENERGY STAR homes is highly uneven. Seven states have fewer than 1,000 ENERGY STAR homes completed, 10 states have fewer than 5,000, and 17 states had ENERGY STAR single family market share of less than 11 percent in 2010. The overall picture of the program is that some states are achieving disproportionate success and increased production, while other states are falling behind in energy efficient residential construction.<sup>7</sup>

<sup>6</sup> New Privately Owned Housing Units Authorized by Building Permits in Permit-Issuing Places. US Census.

<sup>7</sup> Please note that all references to ENERGY STAR production or market share within this paper are courtesy of the EPA and the iStar database.

**Table 3: ENERGY STAR Homes Total Production for States with over 10,000 Units<sup>8</sup>**



**Need for Uniformity**

This divergence among states is a problem; all states should be benefitting from ENERGY STAR Homes. First, an ENERGY STAR Home saves homeowners \$200-\$400 in utility bills each year, which is \$12,000 over a 30 year mortgage.<sup>9</sup> These savings make homeownership more stable as well as improving the quality and comfort of the home. In this slowly recovering economy, these energy savings

<sup>8</sup> Includes multifamily, manufactured, and single family site built homes

<sup>9</sup> See [http://www.energystar.gov/index.cfm?c=new\\_homes.nh\\_features](http://www.energystar.gov/index.cfm?c=new_homes.nh_features); the \$200-\$400 in savings is based on Version 2 requirements.

could be significant for households and/or even allow them to spend those funds in their local community, providing a benefit to the economy. ENERGY STAR Homes help stimulate job creation; according to the National Association of Home Builders, for each standard new home constructed, 3 jobs are created.<sup>10</sup> While this job creation is not directly tied to ENERGY STAR, ENERGY STAR is proving to be a driving force in the market. In addition, they create green jobs requiring construction workers to understand green building. Lastly, ENERGY STAR Homes provide notable environmental benefits, and these benefits are important in a time of worsening air quality and pollution. ENERGY STAR homes built in 2010 are the equivalent of eliminating emissions from 62,519 vehicles and saving the environment 741.7 million pounds of carbon dioxide.<sup>11</sup> Texas has over 340,000 ENERGY STAR homes, eliminating the emissions of 170,000 vehicles. These significant environmental, financial, and economic benefits are only accruing to some states.

In order to achieve overall energy savings for the US, incentives and regulations must be made more uniform. A combination of regulation, legislation, and state government involvement can ensure that all states reap the benefits of energy efficient residential construction through the ENERGY STAR homes program.

### *General*

Most regions in the United States have mixed rates of participation in the ENERGY STAR New Homes program; our research and conversations with stakeholders indicate that a primary reason for this variation is that some state energy codes for residential new construction are more rigorous than others. States use one of many versions of the International Energy Conservation Code (IECC), including the 2009, 2006, as well as other codes.

Of note is the effect of these differing codes on the behavior of homebuilders. In states with stringent energy codes, it is more likely that the homebuilder will pursue the ENERGY STAR Homes standard because the gap between ENERGY STAR and the state energy code would be very small, and the added cost would not be a strong deterrent. There are exceptions however; in New Mexico, production of ENERGY STAR homes is projected to decrease in 2011 because of more aggressive building codes. When the building codes change to require all new construction to be more energy efficient, the measures left to be installed to bring the home up to ENERGY STAR standards are likely to be those that are less cost effective from a utility perspective, so they are less likely to offer an incentive or program for residential construction.<sup>12</sup>

In states where the gap between the energy efficiency standards of ENERGY STAR homes and regular homes is much larger, homebuilders may have less incentive to do the extra work to make the home ENERGY STAR compliant. As with the example above, this is not entirely pre-determined. In some markets, homebuilders may think that the ENERGY STAR certification is more valuable and thus more attractive to consumers because the standard home is significantly less efficient.

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<sup>10</sup> “Economic Benefits of New Construction.” NAHB April 2011.

[http://www.nahb.org/fileUpload\\_details.aspx?contentID=155811](http://www.nahb.org/fileUpload_details.aspx?contentID=155811)

<sup>11</sup> See [http://www.energystar.gov/index.cfm?fuseaction=new\\_homes\\_partners.locator](http://www.energystar.gov/index.cfm?fuseaction=new_homes_partners.locator)

<sup>12</sup> Southwest Energy Efficiency Project. “Residential New Construction Programs Offered by Utility Companies in the Southwest.” February 2011

Based on our research for this issue brief, it appears that building codes can significantly contribute to ENERGY STAR Homes' production and even reduce the need for subsidies.<sup>13</sup> However, the use of subsidies is also very important for ENERGY STAR participation. It can provide the funding to address the extra cost between meeting code and meeting the ENERGY STAR standards; this cost would be less in states with more stringent building codes.

Another important factor driving ENERGY STAR new home construction is the network of supporting partners in the program, specifically including utilities and energy raters, such as HERS Raters. These networks are important for spreading marketing messages and raising awareness about the benefits of ENERGY STAR homes. In some states, the utility companies have been a major driving force behind ENERGY STAR participation. Where regulation or legislation requires energy reductions over time, usually through energy efficiency resource standards (EERS), utility companies are more likely to offer subsidies for meeting the ENERGY STAR standard in residential new construction. It is also notably less costly to offer incentives to increase efficiency than it is to increase energy supply.

A well established and well-organized HERS Raters network, like in Nevada and California, has dramatically increased the technical capacity of the raters in those states. A large and skilled HERS Rater network may also encourage homebuilders to build to ENERGY STAR standards in an area. When home builders, utility companies, and HERS Raters are involved in partnerships, a state is more likely to have strong ENERGY STAR participation.<sup>14</sup>

Another factor related to ENERGY STAR homes production is the additional cost to build ENERGY STAR homes. In the absence of subsidies, this premium can either be borne by the homebuilder or passed on to the consumer. In some cases, borrowers may be unwilling or unable to pay the difference. Providing incentives or subsidies to the homebuilders and/or homebuyers is one approach to bridging the additional cost and driving sales. There are more than 150 local and state subsidy programs across the country, offering rebates and incentives to homes meeting certain energy efficiency criteria. Some subsidy programs waive the cost of the HERS rating or give the homeowner a discount on their utility bill. Ten states have a state rebate available for site built ENERGY STAR homes and some states have tax credits available, like Montana and Kentucky. In 2009, Arizona Public Service spent more than \$700,000 on incentives for 730 homes.<sup>15</sup>

Interestingly, states with more abundant subsidies are not always the states with the most ENERGY STAR home production. This implies that subsidies need to be paired with other factors to generate significant participation. Tennessee ranks 4th for the most subsidies available but ranks 39th for ENERGY STAR New Homes' production. Tennessee's subsidies vary from \$200 to \$1500 per home. However, Tennessee does not have an energy efficiency resource standard nor are large production builders very active in the state. Nine states have no subsidy available at all, not from the individual utility companies or their state governments. Of those nine states, only two have over 10,000 ENERGY STAR Homes units.

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<sup>13</sup> More research in this area is needed to determine the extent of building codes' effect on ENERGY STAR Homes' production.

<sup>14</sup> Northwest ENERGY STAR Homes Evaluation. NW Energy Efficiency Alliance.

<sup>15</sup> This information is from the Database of State Incentives for Renewable Energy and ENERGY STAR's website. Subsidy programs mentioned are specifically for ENERGY STAR Homes only, not ENERGY STAR appliances.

### *State Examples*

In the Great Lakes/Upper Midwest region, Kentucky, Michigan and Illinois have moderate levels of participation, due to the lack of large production builders participating in ENERGY STAR Homes and limited number of HERS raters. However, Indiana, Ohio and Iowa have been much more active in the program. Indiana's marketing program has ENERGY STAR home partners pool marketing funding, which has contributed to greater market success in the state. Iowa has strong partners including HERS raters and homebuilders. In this region, states with energy efficiency resource standards (EERS) are typically more active than states without EERS in place.

In the South, Alabama, Mississippi, Tennessee, and South Carolina have low rates of participation, while Florida, North Carolina, Georgia and Virginia have higher rates of participation. Alabama's low participation is due to a voluntary and less stringent statewide residential energy code and a lack of involvement from its Homebuilders' Association and utility companies.<sup>16</sup> Florida and Virginia are using code standards more efficient than the 2006 IECC, and North Carolina is using the 2006 IECC. South Carolina, Georgia, and Tennessee have made their energy codes more stringent so their participation may increase in the future.

In the Northeast, New York, New Jersey, and Massachusetts are in the top 15 states for ENERGY STAR New Homes' production, while Connecticut, New Hampshire, Vermont, Rhode Island, and Maine have much lower rates. Both New York and New Jersey have statewide incentives available for homebuilders; they also have a comprehensive approach to ENERGY STAR for New Homes providing marketing, training, and technical assistance.<sup>17</sup> Some municipalities within states are taking a regulatory approach: Long Island, NY requires townships to mandate ENERGY STAR as building code for every new home. As an example of partnerships, NYSERDA works closely with the New York State Builders Association and helps connect builders with BPI contractors and HERS raters. Vermont is increasing its production under the program, partially because of the efforts of Efficiency Vermont, a nonprofit funded by an energy efficiency charge on ratepayers' bills. Efficiency Vermont offers technical assistance to builders and financial incentives for building to ENERGY STAR standards. Because of these efforts, Vermont's participation may begin to increase. Most states in the Northeast are using the 2009 IECC.

In the West, California, Oregon, Washington, and Colorado have high rates of participation. Colorado illustrates the effect of state government involvement. The Governor's Energy Office is very active in promoting the ENERGY STAR New Homes program; it began forming regional partnerships to promote the program in 2008 based on a strategic implementation plan. The GEO offered over 50 training events in 2008 and 2009 and also began offering a \$300 rebate to homebuilders in areas where the utility company did not offer one.<sup>18</sup> In addition, the GEO launched a massive marketing campaign, provided grant funding to its regional partners, and reached out to Xcel Energy, the largest investor owned utility company, who now participates in the program, which has contributed significantly to the success of the program with rebates for both homebuilders and raters.<sup>19</sup>

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<sup>16</sup> Northwest ENERGY STAR Homes Evaluation. NW Energy Efficiency Alliance.

<sup>17</sup> See <http://www.getenergysmart.org/SingleFamilyHomes/NewConstruction/Builder/SupportIncentives.aspx> and <http://www.njcleanenergy.com/residential/programs/nj-energy-star-homes/builder-information/benefits/builder-benefits>

<sup>18</sup> See [www.rechargecolorado.com](http://www.rechargecolorado.com)

<sup>19</sup> "States Stepping Forward: Best Practices for State Led Energy Efficiency Programs" Michael Sciortino. September 2010. ACEEE.

Homebuilders in the West have taken this support and embraced the program. For example, in the Northwest region, there are 20 homebuilder partners that have built more than 100 ENERGY STAR homes each, accounting for 50 percent of the total ENERGY STAR production in the region. It is also important to note that the culture of the region lends itself to green building programs because consumers will support higher prices for greener, more efficient building. Studies show that in cities such as Portland, Oregon, homes with green credentials can sell at prices 30 percent higher than their non-green counterparts.<sup>20</sup> Like other regions of the country however, ENERGY STAR home development has been highly uneven in the West. North and South Dakota and Wyoming are in the same region as Oregon and Colorado, but have very low rates of participation. These states have less rigorous energy codes and lack energy efficiency resource standards, making it less compelling for homebuilders and utility companies to get involved in ENERGY STAR Homes.

The Southwest region is very active in the ENERGY STAR for New Homes Program, Texas especially, as mentioned above. Texas has minimal rebates for builders, but has a number of other factors contributing to its high rate of participation, including utility sponsorship, marketing programs and a strong network of HERS raters. On the utility side, Texas was the first state to establish Energy Efficiency Portfolio Standards (EEPS) which are similar to the energy efficiency resource standards. ENERGY STAR New Homes is one of the allowed market transformation programs that investor-owned utilities employ to meet the EEPS.<sup>21</sup> In addition, Texas has a general building trade awareness surrounding ENERGY STAR.<sup>22</sup> The State Energy Conservation Office (SECO) is actively promoting compliance with the 2009 International Energy Conservation Code (IECC) with the goal to achieve 90 percent compliance by 2017.<sup>23</sup> In Arizona, a tax credit for the construction/sale of a new energy efficient residence was in place from December 31, 2001 to December 31, 2010 which was also during the state's housing construction boom. In 2006, Arizona Public Service (APS), the state's largest utility, in conjunction with the state energy office and other partners, implemented a program to train builders and offer incentives for construction companies whose residential units pass energy inspections.<sup>24</sup> Production builders are also very active in the program in the Southwest. Another reason for this region's success is more stringent building codes. New Mexico and Nevada are now using the 2009 IECC.<sup>25</sup> An additional benefit is that as ENERGY STAR New Homes market share increased in these states, some utilities increased their standards for their new homes rebates programs, further increasing residential energy efficiency.

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<sup>20</sup> Williams, Christina. "Earth Advantage: Green homes fetch higher prices." *Sustainable Business Oregon*. June 8, 2011.

<sup>21</sup> An EEPS sets multiyear electric or natural gas efficiency targets measured against a baseline of retail sales.

<sup>22</sup> Hudson, Patrick. "Government Intervention in the Energy Efficient Home Marketplace." A Project Paper. Western Michigan University. April 2007

<sup>23</sup> See <http://www.seco.cpa.state.tx.us/tbec/>

<sup>24</sup> See [http://www.naseo.org/taskforces/energystar/casestudies/2008-07-ENERGY\\_STAR\\_Case\\_Studies.pdf](http://www.naseo.org/taskforces/energystar/casestudies/2008-07-ENERGY_STAR_Case_Studies.pdf)

<sup>25</sup> Southwest Energy Efficiency Project. "Residential New Construction Programs Offered by Utility Companies in the Southwest." February 2011.

## **Builder Perspectives<sup>26</sup>**

The collapse of the housing market has significantly decreased housing starts, including new ENERGY STAR building, but ENERGY STAR Homes are still being built. Small builders are concerned about their profit margins and may decline to participate because of the additional verifier/certification fees they incur.<sup>27</sup> One way to overcome this may be to demonstrate how ENERGY STAR builders can use the brand to differentiate themselves in the marketplace. Larger builders appear to be less impacted by the cost differential for ENERGY STAR building. KB Homes has built more than 62,000 ENERGY STAR homes since joining the program in 2000, accounting for 5 percent of ENERGY STAR New Homes' total production. In 2010 alone, KB Homes built more than 6,000 ENERGY STAR homes.<sup>28</sup> Pulte Homes has built almost 70,000 ENERGY STAR homes, and more than 45,000 of those homes have been built since 2004.<sup>29</sup> Starting in February 2011, Beazer Homes pledged that 100 percent of its homes would be built to ENERGY STAR standards.<sup>30</sup> The participation of these large builders is very important to the overall success of the program. Large scale participation of builders such as KB, Pulte and Beazer can have a significant impact on a region or state's new ENERGY STAR construction. Providing more stringent building codes, for example, which are closer to ENERGY STAR standards, could be the catalyst to strengthen a state's green building infrastructure.

## **Challenges and Obstacles to Additional Building**

While the unevenness of ENERGY STAR Homes' production is a problem, there are also clear challenges to continuing to increase the overall success of the program. One challenge is how to finance the additional cost necessary to make a home ENERGY STAR certified. Most appraisers will not add the value of the energy efficiency improvements to the value of the home; accordingly, the energy improvements cannot be financed as part of the loan, presenting a financing challenge to homebuyers. The National Realtor's Association and Conservation Services Group is working to track green certified homes on Multiple Listing Services (MLS) but more needs to be done in this area. There have been efforts to document the additional market value of 3<sup>rd</sup> party certified homes including ENERGY STAR homes. A 2009 study by GreenWorks and the Earth Advantage Institute of such homes in the Pacific Northwest showed that certified homes sold faster and for a higher premium than non-certified homes.<sup>31</sup> One approach to mitigating the additional cost is providing subsidies or financial incentives to homebuilders and/or homebuyers. As described above, subsidies are very helpful in generating ENERGY STAR New Homes' participation but the subsidies available vary greatly in size and structure

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<sup>26</sup> In addition to market builders, nonprofit builders are active in the program, and both nonprofit and market builders are building affordable housing to the ENERGY STAR standard. Since 1996, Habitat for Humanity affiliates have built more than 8,100 ENERGY STAR homes. In 2010, Habitat for Humanity affiliates completed 1,690 ENERGY STAR homes.<sup>26</sup> Other nonprofit organizations are also active in the ENERGY STAR for New Homes program, and public agencies in many areas are incentivizing the use of such programs. For example, many states and local governments use their federal HOME funding to build to ENERGY STAR standards. For instance, North Carolina provides a \$4,000 subsidy in HOME funds to its nonprofit and Habitat partners for building homes to the System Vision standard, which goes further than meeting the ENERGY STAR standards.

<sup>27</sup> Northwest ENERGY STAR Homes Evaluation. NW Energy Efficiency Alliance.

<sup>28</sup> "KB Home Is Recognized with Twelve 2011 ENERGY STAR Leadership in Housing Awards" *Business Wire* June 10, 2011.

<sup>29</sup> See [http://www.pulte.com/value-of-pulte-homes/building/Green\\_team.aspx](http://www.pulte.com/value-of-pulte-homes/building/Green_team.aspx)

<sup>30</sup> See "Beazer to Achieve ENERGY STAR® Rating for Every New Home Built" *Market Wire* February 14, 2011

<sup>31</sup> See [http://www.earthadvantage.org/assets/uploads/Final\\_report\\_from\\_web\\_from\\_greenresourcecouncil.org\\_site.pdf](http://www.earthadvantage.org/assets/uploads/Final_report_from_web_from_greenresourcecouncil.org_site.pdf)

across the country. These varying program structures can be difficult for builders who work in more than one region. More consistent programs could be more cost effective for builders. Homebuilders could also benefit from incentives at the local government level, like faster permitting processes or increased density for ENERGY STAR neighborhoods, and such measures would not require financial commitments. In addition, the structure of the incentive is important. A multiyear incentive is better for homebuilders because it is easier to plan. A one year incentive is more attractive than incentives that only last as long as the funding does. In these situations, homebuilders may be less inclined to increase their building standards because they cannot plan on a subsidy being available. Also, the cost of certification may be a challenge. Many groups use green construction practices and materials but may not go the extra steps to get homes certified. The final step to get certified has costs that some groups do not value.

Another challenge is the perception in some areas that green building is too expensive. This perception usually exists in areas where the homebuilding community has not been very active in green building, so materials are harder to obtain and contractors are not trained on green building practices. In these places, building to ENERGY STAR can be more expensive but with more activity and participation, costs would decrease. Geographically, rural areas may be less active in the program than more urban areas, because of problems with access to energy rating professionals. It takes time to travel to the remote locations, and therefore the cost of the service is higher.

In areas with stringent building codes and reduced natural gas prices, utility companies may not be able to keep ENERGY STAR homes programs cost effective so they may be less able to provide subsidies in the future.<sup>32</sup>

Lastly, as mentioned above, the EPA has revised the energy efficiency guidelines for ENERGY STAR qualified homes to Version 3.0. These new guidelines remain an above-code voluntary energy efficiency program and incorporate additional cost-effective energy efficiency measures into a new home. All homes, regardless of permit dates, must be qualified under Version 3.0 starting January 1, 2012. Version 3.0 implementation may cause a slight decline in production as partners adjust to the revised guidelines. There is also the chance that some partners will stop building ENERGY STAR homes because of perceived additional costs of Version 3.0. Utilities could determine it is no longer cost effective and withdraw their support.<sup>33</sup>

### **Best Practices**

In a period of tight budget environments and a housing market that has yet to fully recover, homebuilders may be less inclined to take risks and governments may be less willing to provide funding for subsidies. Despite the challenges discussed, residential energy efficient construction is possible as states like Texas and California suggest. The primary way for states to “catch up” with these ENERGY STAR Homes leaders is to have legislation or regulation encouraging residential energy efficiency. This will have significant positive effects on ENERGY STAR production. Strong building codes and/or Energy Efficiency Resource Standards pave the way for increased ENERGY STAR activity. These approaches are revenue neutral and will help ensure more uniformity across the country in terms of energy efficiency residential construction. The American Recovery and Reinvestment Act contributed to

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<sup>32</sup> Southwest Energy Efficiency Project. “Residential New Construction Programs Offered by Utility Companies in the Southwest.” February 2011.

<sup>33</sup> Ibid.

this need for legislation by requiring that states using ARRA State Energy Program funds to adopt a residential building code that meets or exceeds the 2009 IECC and be 90 percent compliant by 2017.<sup>34</sup> ARRA did not include a deadline for full compliance and only 30 percent of states have building codes that meet or exceed the 2009 IECC; however this requirement could be a helpful standard for utilities, homebuilders, and state governments interested in improving their states' residential energy efficiency.<sup>35</sup>

Twenty-six states have implemented Energy Efficiency Resource Standards or Tailored Utility Targets (which achieve the same purpose) which is encouraging, but it also means almost half of the country could be doing more to reduce its energy consumption. For many of the 26 states, their EERS are recent, so they are still ramping up and their goals are increasing; this could contribute to more participation in ENERGY STAR New Homes in the future. As it takes time to fully implement EERS, states without them should consider enacting these standards to start moving towards less residential energy use.

States with strong involvement from utility companies, homebuilders, and HERS raters network are key elements for ENERGY STAR New Homes' production. Having strong partnership networks is more likely to occur when the state government gets involved at encouraging, promoting, and strengthening those partnerships. Financial incentives are also important for encouraging homebuilders to get involved, which some states may be able to provide. Texas and Colorado are specific examples of these elements; having state government involvement can be pivotal for ENERGY STAR homes production.

In order for the rate of participation to be more uniform across the country as well as increase participation, more state involvement and regulation is necessary. Without this involvement at the state government level, if current trends continue, some regions of the country will have very green single family housing while others will lag far behind. By 2015, four states are projected to be building only ENERGY STAR single family homes and four more states could be building more than 90 percent of their single family homes to ENERGY STAR standards. Conversely, 3 states are projected to be doing zero ENERGY STAR single family construction and 8 states could be building fewer than 10 percent of their single family units to ENERGY STAR standards. These projections should be unacceptable and can easily be avoided through more state government involvement as well as additional regulation and legislation.<sup>36</sup>

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<sup>34</sup> Press Release on Clarification of ARRA Energy requirements. December 1, 2009

<http://www.usgbc.org/Docs/News/State%20Bldg%20Codes%20White%20Paper%2012-1-09%20REV2-usgbc.pdf>

<sup>35</sup> National Association of State Energy Officials. "State Compliance Requirements and Resources for ARRA" January 2011

[http://naseo.org/codes/documents/NASEO-ARRA\\_Codes\\_Compliance\\_Handout.pdf](http://naseo.org/codes/documents/NASEO-ARRA_Codes_Compliance_Handout.pdf)

<sup>36</sup> Projections are based on EPC calculations using EPA data for ENERGY STAR Homes' single family market share in 2008, 2009, and 2010.

Table 1: ENERGY STAR Single Family Production and Market Share	Production				Market Share			
	2008	2009	2010	2008-2010	2008	2009	2010	Average
Alabama	824	1,160	1,345	3,329	7%	14%	16%	12%
Alaska	-	-	8	8	0%	0%	1%	0%
Arizona	5,944	3,931	5,475	15,350	31%	31%	51%	38%
Arkansas	77	144	156	377	1%	3%	3%	3%
California	5,381	4,514	3,401	13,296	17%	19%	13%	16%
Colorado	2,150	2,333	3,937	8,420	19%	32%	45%	32%
Connecticut	973	134	316	1,423	31%	7%	12%	17%
Delaware	283	558	940	1,781	11%	21%	36%	22%
District of Columbia (D.C.)	1	85	42	128	0%	52%	24%	26%
Florida	2,329	3,677	4,107	10,113	6%	14%	14%	11%
Georgia	1,893	1,935	1,574	5,402	8%	14%	11%	11%
Hawaii	1,347	584	1,459	3,390	54%	29%	77%	54%
Idaho	363	556	730	1,649	6%	12%	21%	13%
Illinois	749	416	470	1,635	6%	5%	6%	6%
Indiana	2,163	1,664	2,127	5,954	19%	17%	22%	19%
Iowa	3,962	2,738	3,355	10,055	64%	51%	57%	57%
Kansas	178	1,287	350	1,815	3%	36%	9%	16%
Kentucky	1,712	1,637	1,977	5,326	25%	30%	33%	30%
Louisiana	15	240	74	329	0%	2%	1%	1%
Maine	21	50	62	133	1%	2%	2%	2%
Maryland	580	894	3,544	5,018	7%	11%	42%	20%
Massachusetts	797	1,938	950	3,685	15%	41%	16%	24%
Michigan	608	1,156	1,790	3,554	7%	18%	23%	16%
Minnesota	959	667	851	2,477	11%	10%	12%	11%
Mississippi	225	715	223	1,163	3%	15%	5%	8%
Missouri	160	695	594	1,449	2%	12%	9%	8%
Montana	79	150	140	369	4%	11%	11%	8%
Nebraska	697	965	654	2,316	15%	21%	18%	18%
Nevada	4,455	2,090	3,514	10,059	63%	46%	66%	59%
New Hampshire	523	667	401	1,591	23%	41%	21%	28%
New Jersey	2,492	2,091	2,851	7,434	27%	30%	39%	32%
New Mexico	653	558	1,152	2,363	13%	14%	29%	18%
New York	2,733	2,289	2,320	7,342	22%	25%	24%	23%
North Carolina	4,227	4,884	5,962	15,073	11%	20%	23%	18%
North Dakota	266	94	54	414	14%	5%	3%	7%
Ohio	2,697	3,490	5,275	11,462	21%	33%	50%	35%
Oklahoma	2,548	3,342	2,824	8,714	31%	45%	42%	39%
Oregon	899	726	522	2,147	12%	13%	10%	12%
Pennsylvania	557	1,172	1,921	3,650	3%	8%	12%	7%
Rhode Island	70	205	229	504	8%	30%	32%	23%
South Carolina	513	922	1,290	2,725	3%	7%	10%	7%
South Dakota	55	209	230	494	2%	9%	11%	7%
Tennessee	403	651	1,049	2,103	3%	6%	9%	6%
Texas	31,995	27,742	29,074	88,811	41%	42%	44%	42%
Utah	2,594	2,353	2,308	7,255	37%	35%	34%	35%
Vermont	344	317	279	940	33%	37%	29%	33%
Virginia	592	1,407	3,394	5,393	3%	9%	21%	11%
Washington	1,429	1,484	1,850	4,763	8%	12%	13%	11%
West Virginia	-	12	22	34	0%	1%	1%	1%
Wisconsin	1,748	1,471	1,792	5,011	17%	19%	24%	20%
Wyoming	19	1	10	30	1%	0%	1%	1%
U.S.	96,282	93,000	108,974	298,256	17%	22%	28%	22%

Table 2: ENERGY STAR SF Production and Market Share -- Ranked by Average Market Share	Production				Market Share			
	2008	2009	2010	2008-2010	2008	2009	2010	Average
Nevada	4,455	2,090	3,514	10,059	63%	46%	66%	59%
Iowa	3,962	2,738	3,355	10,055	64%	51%	57%	57%
Hawaii	1,347	584	1,459	3,390	54%	29%	77%	54%
Texas	31,995	27,742	29,074	88,811	41%	42%	44%	42%
Oklahoma	2,548	3,342	2,824	8,714	31%	45%	42%	39%
Arizona	5,944	3,931	5,475	15,350	31%	31%	51%	38%
Utah	2,594	2,353	2,308	7,255	37%	35%	34%	35%
Ohio	2,697	3,490	5,275	11,462	21%	33%	50%	35%
Vermont	344	317	279	940	33%	37%	29%	33%
Colorado	2,150	2,333	3,937	8,420	19%	32%	45%	32%
New Jersey	2,492	2,091	2,851	7,434	27%	30%	39%	32%
Kentucky	1,712	1,637	1,977	5,326	25%	30%	33%	30%
New Hampshire	523	667	401	1,591	23%	41%	21%	28%
District of Columbia (D.C.)	1	85	42	128	0%	52%	24%	26%
Massachusetts	797	1,938	950	3,685	15%	41%	16%	24%
New York	2,733	2,289	2,320	7,342	22%	25%	24%	23%
Rhode Island	70	205	229	504	8%	30%	32%	23%
Delaware	283	558	940	1,781	11%	21%	36%	22%
Maryland	580	894	3,544	5,018	7%	11%	42%	20%
Wisconsin	1,748	1,471	1,792	5,011	17%	19%	24%	20%
Indiana	2,163	1,664	2,127	5,954	19%	17%	22%	19%
New Mexico	653	558	1,152	2,363	13%	14%	29%	18%
North Carolina	4,227	4,884	5,962	15,073	11%	20%	23%	18%
Nebraska	697	965	654	2,316	15%	21%	18%	18%
Connecticut	973	134	316	1,423	31%	7%	12%	17%
California	5,381	4,514	3,401	13,296	17%	19%	13%	16%
Michigan	608	1,156	1,790	3,554	7%	18%	23%	16%
Kansas	178	1,287	350	1,815	3%	36%	9%	16%
Idaho	363	556	730	1,649	6%	12%	21%	13%
Alabama	824	1,160	1,345	3,329	7%	14%	16%	12%
Oregon	899	726	522	2,147	12%	13%	10%	12%
Florida	2,329	3,677	4,107	10,113	6%	14%	14%	11%
Virginia	592	1,407	3,394	5,393	3%	9%	21%	11%
Minnesota	959	667	851	2,477	11%	10%	12%	11%
Washington	1,429	1,484	1,850	4,763	8%	12%	13%	11%
Georgia	1,893	1,935	1,574	5,402	8%	14%	11%	11%
Montana	79	150	140	369	4%	11%	11%	8%
Missouri	160	695	594	1,449	2%	12%	9%	8%
Mississippi	225	715	223	1,163	3%	15%	5%	8%
Pennsylvania	557	1,172	1,921	3,650	3%	8%	12%	7%
North Dakota	266	94	54	414	14%	5%	3%	7%
South Dakota	55	209	230	494	2%	9%	11%	7%
South Carolina	513	922	1,290	2,725	3%	7%	10%	7%
Illinois	749	416	470	1,635	6%	5%	6%	6%
Tennessee	403	651	1,049	2,103	3%	6%	9%	6%
Arkansas	77	144	156	377	1%	3%	3%	3%
Maine	21	50	62	133	1%	2%	2%	2%
Louisiana	15	240	74	329	0%	2%	1%	1%
West Virginia	-	12	22	34	0%	1%	1%	1%
Wyoming	19	1	10	30	1%	0%	1%	1%
Alaska	-	-	8	8	0%	0%	1%	0%
U.S.	96,282	93,000	108,974	298,256	17%	22%	28%	22%

## Appendix 1: Building Codes Explanation

The International Energy Conservation Code (IECC®) covers new construction, additions, remodeling, window replacement, and repairs of specified buildings. The Residential portion of the Code applies to single family detached, attached, duplexes, and multifamily dwellings of 3 or more units, of 3 or fewer stories. The Code provisions ensure the design of energy efficient building envelopes. They also address the energy efficiency of elements including mechanical, water heating, electrical, and lighting equipment.<sup>37</sup> The 2009 IECC had additional building envelope and energy efficient lighting requirements and mandatory duct pressure testing that are not part of the 2006 IECC. These changes, plus others, contributed to make the 2009 IECC 15 percent more efficient than the 2006 IECC.<sup>38</sup>

The International Residential Code (IRC) address all codes (structural, plumbing, etc) whereas the IECC only addresses energy. IECC is for all residential and commercial construction; the IRC is limited to single family detached and attached units, and duplexes. The 2009 IECC and 2009 IRC are very similar in regards to energy requirements, but the Department of Energy has decided that the 2009 IRC cannot be used to meet the ARRA energy code requirement.<sup>39</sup>

The Energy Programs Consortium (EPC) is a nonprofit energy research organization sponsored by the National Association of State Energy Officials, representing the state energy directors, National Energy Assistance Directors' Association, representing the state directors of the Low Income Home Energy Assistance Program, National Association of State Regulatory Commissioners, representing the state public service commissioners and the National Association for State Community Services Programs representing the state directors of the Weatherization Assistance Program.

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<sup>37</sup> See Responsible Energy Alliance: <http://reca-codes.org/pages/iecc2009.html>

<sup>38</sup> Southface Institute "Georgia Energy Code"

<http://www.southface.org/defaultinterior/Documents/residentialenergycodepresentation.pdf>

<sup>39</sup> Cao, Chunlin. RESNET presentation. February 2010 <http://www1.resnet.us/conference/2010/presentations/Cao.pdf>