



## A CASE STUDY IN BUILDING ENERGY STAR® QUALIFIED AFFORDABLE HOUSING IN NORTH CAROLINA

*This case study describes how the North Carolina Housing Finance Agency is promoting the development of more energy efficient properties that meet ENERGY STAR guidelines through its Housing Tax Credit Program. It describes the costs and benefits of incorporating ENERGY STAR, the key steps that the Agency has taken, and the lessons learned from this experience. The case study highlights the Carousel Place development including its ENERGY STAR features, its local ENERGY STAR partners, costs and benefits, and lessons learned.*

### Overview

The North Carolina Housing Finance Agency (NCHFA or the Agency) is a self-supporting public agency. The Agency's mission is to create affordable housing opportunities for North Carolinians whose needs are not met by the market. To this end, the Agency responds to the housing needs of individuals in ways that strengthen communities, invests in quality housing that improves the lives of residents, and promotes long-term solutions. Affordable housing that uses energy efficiently and reduces utility costs is a key priority within the Agency's larger mission.

The Agency provides financing through the sale of tax-exempt bonds and management of federal and state housing tax credit programs, the federal HOME Program, the state Housing Trust Fund, and other programs. The Agency offers low-cost mortgages and down-payment assistance for first-time home buyers, finances affordable homes and apartments developed by local governments, nonprofit organizations, and private owners, and finances the development of housing for people with special needs and the rehabilitation of substandard owner-occupied homes. The Agency has begun to incorporate ENERGY STAR into its affordable housing programs, which fits into its overall organizational goal of providing high quality housing.

#### NCHFA Highlights for 2006

- Real Estate Financing Delivered: \$730 million
- Number of Families Assisted with Rent Subsidy: 24,020
- Number of Affordable Housing Units Financed: 6,900
- Number of First-time Homebuyer Homes Financed: 2,870
- Number of Rental Units Developed: 2,350
- Number of Affordable Housing Units Preserved: 1,380
- Number of Supportive Housing Units Developed: 290
- Percentage of Rental Units Affordable  $\leq$ 60% AMI: 100%
- Percentage of Rental Units Affordable  $\leq$ 50% AMI: 88%
- Percentage of Rental Units Affordable  $\leq$ 30% AMI: 34%
- Number of Construction Jobs Generated: 7,000
- Amount of State and Local Tax Revenues Produced: \$68 million

#### *Feature Program: Housing Credit Program*

One of the major programs offered by NCHFA is the Housing Credit Program, which encourages the construction and rehabilitation of quality rental housing that is affordable for low-income families and elderly persons by providing a 10-year federal tax credit. Owners of Housing Credit properties agree to maintain the units as affordable housing for 15 to 30 years, in return for federal tax credits that offset part of the cost of developing the housing. Through their architectural and site requirements, NCHFA's goal is to produce Housing Credit developments that are compatible in appearance to market-rate properties.

## ENERGY STAR Qualified Homes

### What are the features of ENERGY STAR qualified homes?

- Any home three stories or less can earn the ENERGY STAR if it has been verified to meet EPA's guidelines.
- Must be at least 15% more energy efficient than homes built to the 2004 International Residential Code.
- Includes energy-saving features that typically make them 20–30% more efficient than standard homes:
  - Effective Insulation
  - High-Performance Windows
  - Tight Construction and Ducts
  - Efficient Heating and Cooling Equipment
  - Efficient Products and Appliances

### How are ENERGY STAR qualified homes verified?

- Independent home energy raters conduct on-site testing and inspections to verify the energy efficiency measures, as well as insulation, air tightness, and duct sealing details.

### What are the benefits of ENERGY STAR qualified homes?

- Savings on energy bills
- Improved comfort and durability
- Higher construction quality
- Increased value of the home

For more information about ENERGY STAR for homes, see ENERGY STAR's Web site:

[www.energystar.gov/homes](http://www.energystar.gov/homes).

In North Carolina, federal Housing Credits have financed 58,007 privately owned, affordable apartments statewide. The 2006 Housing Credits helped to rebuild public housing, convert schools into apartments, and renovate two historic hotels that were converted in the 1980s into apartments for the elderly. The project highlighted later in this case study, Carousel Place, is a 55-unit senior housing center that used Housing Credits.

In addition to federal tax credits, NCHFA also offers state tax credits for projects that receive an allocation of federal tax credits and meet certain income targeting requirements. The State Housing Credit enables owners to offer rents that are affordable to households with lower incomes than would be feasible with the federal Housing Credit alone. Through the State Housing Credit, NCHFA helped finance 245 properties with 11,566 units in more than 70 counties and leveraged \$6.48 of affordable rental housing for every \$1 of the refundable credit.

### *Utilizing the Housing Credit Program To Promote Energy Efficiency*

Since 1995, NCHFA has implemented design standards that help ensure high quality affordable housing. Each year since, the Agency has continued to raise the standards of quality. As energy efficiency has become an important priority in the state, this effort has included promoting the construction of ENERGY STAR qualified affordable homes.

Starting with single-family affordable housing units, the Agency encouraged the use of ENERGY STAR's energy efficiency guidelines for new residential construction. Since 1995, NCHFA has funded over 1,000 single family units that have earned the ENERGY STAR. In 2007 NCHFA also integrated ENERGY STAR into their supportive housing by making ENERGY STAR a requirement.

From the start, the Agency wanted to have a federal energy efficiency standard that was not proprietary for their tax credit program, and selected ENERGY STAR as the standard for its programs. NCHFA's construction staff was aware there may be an additional cost per unit to meet ENERGY STAR guidelines from their basic knowledge of construction as well as from working with developers and local energy consultants. They understood that ENERGY STAR would impact their tax credit program, and determined that a financial incentive would be necessary, at least initially, for developers to build affordable housing to meet ENERGY STAR guidelines.

## Promoting Energy Efficiency in the Qualified Allocation Plan (QAP)

### 2007 QAP

Starting in 2007, NCHFA developed an incentive in their draft Qualified Allocation Plan (QAP) for tax credit projects meeting ENERGY STAR guidelines. Based on public comments, they made revisions and released the 2007 Final QAP, which included a financial incentive for residential buildings meeting all ENERGY STAR

standards. In the “Limitation of Awards to Principals and Projects” section, North Carolina’s 2007 QAP states that “the maximum award to any one project will be \$1,000,000, other than the preservation set-aside, which will be \$250,000 the lesser of (a) \$800,000 or (b) \$8,000 per qualified low-income unit. The per-unit limit will be \$8,500 for adaptive reuse projects or where the residential buildings meet all ENERGY STAR guidelines (as defined in Appendix B (Design Standards)).” As a result of the incentives for ENERGY STAR, 19 out of 44 projects awarded indicated on their applications that they would meet all ENERGY STAR guidelines.

**NCHFA ENERGY STAR  
Highlights From 2007:**  
19 out of 44 of the projects awarded indicated on their application that they would meet all ENERGY STAR standards.

NCHFA monitors all projects awarded with tax credits according to the compliance monitoring procedures established in Appendix F of the 2007 QAP. All projects are monitored through multiple on-site inspections and are notified of non-compliance with tax credit regulations and commitments agreed upon in their application, including ENERGY STAR guidelines. If the project is non-compliant, the project owner has 90 days from the notice of non-compliance to bring the project into compliance, unless NCHFA extends the correction period. All projects that committed to meeting ENERGY STAR guidelines in their tax credit application will be required to show proof of ENERGY STAR qualification. NCHFA will require ENERGY STAR qualification from a licensed third party. The consequences of not having that documentation will depend on the circumstances. For projects that do not meet ENERGY STAR guidelines, the owners will be required to correct the project to meet these guidelines.

## 2008 QAP

NCHFA regularly evaluates and refines their QAP to ensure their Agency’s goals are reflected in the requirements and incentives. As a result of their evaluation process, the Agency has decided to award bonus points instead of financial incentives for projects that will be ENERGY STAR qualified. In the Special Criteria and Tiebreakers section, the 2008 QAP states that “five (5) points will be awarded to applications that agree to have residential buildings comply with all ENERGY STAR standards as defined in Appendix B.” Additionally, NCHFA has made an exception to ENERGY STAR qualified projects whose total development costs increase due to the ENERGY STAR features they add. In the Project Development Costs and Rental Production Program (RPP) Limitations section of the 2008 QAP, “the Agency will assess negative points to applications listing more than the following construction costs per unit, as outlined in Chart A below. The point structure in Chart B will apply to the following...”

Chart A		Chart B	
Max. Costs Per Unit	Negative Points	Max. Costs Per Unit	Negative Points
\$78,000	-10	\$90,000	-10
\$90,000	-20	\$110,000	-20

“The cost amounts above will be increased by \$4,000 per unit for applications that agree to have residential buildings comply with all ENERGY STAR standards as defined in Appendix B.”

These changes were implemented to help to address the concerns of developers while continuing to promote and provide incentives for developers who build to ENERGY STAR guidelines.

## Forming Partnerships to Integrate ENERGY STAR

NCHFA works with several partners, including developers, lenders, and advocacy groups that support the incorporation of ENERGY STAR into the Agency’s programs. The support of these partners has played an important role in the successful development of ENERGY STAR qualified homes. They provide training and technical support in building energy-efficient, affordable homes that includes plan review, standards and specification writing, contractor and subcontractor training, onsite quality assurance, performance testing, and

building monitoring and diagnostics. These partners ensure that contractors and subcontractors are properly trained in how to install components so they will meet ENERGY STAR guidelines when tested.

## Costs and Benefits of ENERGY STAR

- **Units are Affordable to Tenants.** The most significant benefit of incorporating ENERGY STAR is that the units are affordable to the tenants whether or not the tenant is paying the utilities or the property owner is paying the utilities. NCHFA anticipates that these properties will have greater financial stability over the next 20-30 years because they have lower operating expenses and will be less vulnerable to rising energy costs.
- **Greater Financial Stability of Projects.** Energy efficient units will be less vulnerable to changes in utility cost if the developers are able to adjust rents based on actual or estimated energy costs for their specific property. It is hoped that the anticipated changes to the Internal Revenue Service (IRS) regulations will allow ENERGY STAR qualified homes developed in the future to be even more financially stable over the life of the project. Additionally, future changes to the IRS code may allow ENERGY STAR qualified homes to be underwritten based the lower utility costs, resulting in an offset to the additional costs of construction.
- **More Subsidies for Higher Quality Properties.** Property owners benefit from spending funds upfront to improve the energy efficiency of their properties when the funds are subsidized rather than at the backend when they are receiving little or no subsidy.
- **ENERGY STAR Enhances Marketability of Units.** Affordable properties remain similar to market-rate properties which are increasingly built to ENERGY STAR guidelines. The ENERGY STAR qualification enhances the marketability of the property since to earn the ENERGY STAR the property must have its energy performance verified by a third-party certified independent Home Energy Rater. This verification step helps ensure that the property's energy efficiency level will be as designed.
- **Healthy Homes for Residents.** Residents have benefited from the tighter construction of ENERGY STAR qualified homes through increased comfort, and because the Agency requires a number of the guidelines included in the ENERGY STAR Indoor Air Package (IAP), residents in single-family and supportive housing also can experience healthier homes.

### Utility Allowances – Possible Policy Change That Rewards Energy Efficiency

In one promising initiative, the IRS is in the process of reviewing the utility allowance regulation for federal low-income housing tax credit (LIHTC) properties and considering allowing alternative methods for calculating the allowance. The existing utility allowances are calculated from older, less efficient public housing units. In contrast, many of the LIHTC properties constructed are more energy efficient, including those that are qualified as ENERGY STAR. The alternative methods under consideration by the IRS would allow owners to use more precise methods for calculating the utility allowance to reflect the actual lower utility expenses of newer LIHTC units and create cost savings over the project's life. If the utility allowances used by LIHTC properties are based on a method that fails to recognize the greater energy efficiency of ENERGY STAR qualified homes, the property cannot realize the full financial benefits of the improved energy performance.

The incremental costs associated with constructing ENERGY STAR qualified homes depends on many factors including how early ENERGY STAR is brought into the planning and design process, the availability of qualified home energy raters and contractors, and the use of bulk purchasing and procurement methods for ENERGY STAR qualified products and appliances. Also, as architects, developers, and contractors become familiar with ENERGY STAR construction guidelines, costs typically will fall. For NCHFA there were incremental upfront costs for incorporating ENERGY STAR into residential projects. This has proven to be the most considerable barrier for NCHFA and its developers. However, NCHFA has mitigated this hurdle by increasing its subsidy available through tax credits. This could impact the number of projects the Agency is able to fund but at this point, the Agency predicts the impact to be the difference of no more than two projects.

## Lessons Learned

### *Lesson 1. It's Not as Difficult as You Think*

The most important lesson that NCHFA has learned is that incorporating ENERGY STAR into their affordable housing programs has not been as difficult as initially perceived. As a growing number of market-rate units have begun to be built to ENERGY STAR guidelines and marketed to homeowners and renters, ENERGY STAR is increasingly becoming the industry standard. NCHFA saw that ENERGY STAR was the next reasonable step to reach their goal of investing in high quality affordable housing that improves the lives of the residents.

### *Lesson 2. Get Developer Buy-In*

NCHFA has been successful in incorporating ENERGY STAR guidelines because of interest from the developers. With the additional subsidy to cover additional upfront costs, many developers are less hesitant to propose affordable housing projects that will meet ENERGY STAR standards. Developers need to know there is a reasonable payback for the upfront costs in their long-term investments. Developers, many of whom will own their properties for 30 years, need to understand the financial benefits that continue past the installation of ENERGY STAR products. By obtaining enough training on the front end and a quality control process that does not impede production schedules, developers will be able to have a finished product without having failed testing or completing retrofits. By supplying them enough training and a quality control process, NCHFA reduces the risks and fears associated with incorporating ENERGY STAR.

### *Lesson 3. Build Partnerships to Reduce Administrative Burden*

NCHFA has been successful because of the ability for architects and engineers to access and incorporate technical help early in the design and planning phases, thus helping to minimize implementation costs by reducing the need to make design changes to accommodate ENERGY STAR features during construction. Technical support and training is also available for project manager, contractors, and subcontractors throughout the construction phase to reduce need for construction changes to meet ENERGY STAR guidelines. The adoption of ENERGY STAR has not created an administrative burden on the State. North Carolina has an adequate supply of technical assistance providers who specialize in ENERGY STAR, including Advanced Energy and Southern Energy Management. By making its developers aware of these technical support providers, NCHFA is not burdened with the responsibility or the cost of offering support and training on the technical aspects of ENERGY STAR and does not require additional staffing.

## Key Actions for HFAs Considering ENERGY STAR

1. Ensure an Adequate Infrastructure Exists. HFAs need to have an adequate supply of qualified contractors and Home Energy Raters to ensure that the developments they fund can be designed, built, and tested to earn the ENERGY STAR. Without qualified contractors and ENERGY STAR raters, HFAs will have a very difficult time requesting or encouraging their developers to build homes that are tested and qualified as ENERGY STAR. Consider: *Do you have ENERGY STAR raters in your market? Are there qualified contractors available? If not, what can you do to encourage the development of this infrastructure (i.e., provide funds for an ENERGY STAR pilot program)*

2. Anticipate Concerns From Developers. HFAs need to understand the concerns of their developers in order to gain their support in incorporating ENERGY STAR into their tax credit program. If developers' concerns are not addressed in the design of the tax credit program, they may not decide to incorporate ENERGY STAR into their developments.

Consider: *What changes should you make to your tax credit program to gain developers' interest in ENERGY STAR and minimize their concerns?*

3. Partner with Those Who Can Provide Technical Support and Training. HFAs need to build partnerships with training and technical support providers so that developers and their contractors have the knowledge and skills necessary to build ENERGY STAR qualified homes. The developers and subcontractors who are technically competent in ENERGY STAR are more likely to have fewer mistakes in the design and construction of their projects.

Consider: *Are there Home Energy Raters and training providers available for developers? Are they knowledgeable?*

## For More Information

### NCHFA

For more information about the NCHFA, visit their website at [www.nchfa.com](http://www.nchfa.com), or contact:

*For Policy and Finance questions:*

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### ENERGY STAR

For more information about EPA or ENERGY STAR for New Homes, contact:

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# Project Profile: Carousel Place

## Project Description

Carousel Place is an ENERGY STAR qualified, two-story, 55-unit apartment building. There are 40 one-bedroom units and 15 two-bedroom units ranging from 617 sq. ft. to 941 sq. ft. Construction on the building was completed at the end of August 2007. The Housing Authority of the City of Raleigh achieved 100% qualified occupancy of the building as of the end of November 2007. Occupancy at the senior building is limited to low-income persons age 55 and older. All units will be targeted to persons earning 60% of area median income or less with 20% of the units more deeply targeted to persons making 40% of area median income or less, and an additional 25% of the units more deeply targeted to persons earning 30% of area median income or less.

Carousel Place was constructed on a 2.16-acre tract of land located on the site of the Chavis Heights Housing Communities. The Senior Housing Center is part of a larger revitalization effort by the Raleigh Housing Authority (RHA) and Capitol Area Developments to replace an outdated, dilapidated public housing complex, Chavis Heights, with a new mixed income community. Located in southeast Raleigh, North Carolina, the site features, in addition to Carousel Place, 40 one-bedroom villa style apartments, 46 two-bedroom town homes, 27 two- and three-bedroom triplex units, a community building, on-site management and maintenance facilities, and a park.

Community amenities include a large multi-purpose room, a community kitchen, a library/sitting social room, a TV room, an exercise room, a computer center, resident laundry and storage areas, covered porch areas for gathering and socials, rocking chairs, a garden area, an enclosed courtyard with fountain, and sidewalks around the building and community. The other housing on site includes a mixture of public housing and market-rate units.



The rents are structured as follows:

Rents for Carousel Place					
<u># of Bedrooms</u>	<u>% of Project</u>	<u># of Units</u>	<u>Monthly Rent*</u>	<u>Utility Allowance</u>	<u>Adjusted Rent</u>
<b>30% Units</b>					
1 BR	22%	12	\$402.00	\$70.00	\$332.00
2 BR	4%	2	\$483.00	\$84.00	\$399.00
Total	25%	14			
<b>40% Units</b>					
1 BR	16%	9	\$537.00	\$70.00	\$467.00
2 BR	4%	2	\$644.00	\$84.00	\$560.00
Total	20%	11			
<b>60% Units</b>					
1 BR	35%	19	\$664.00	\$70.00	\$594.00
2 BR	20%	11	\$808.00	\$84.00	\$724.00
Total	55%	30			

## ENERGY STAR FEATURES

Energy efficient building methods were incorporated into the building. On-demand, tankless, electric water heaters were put in each of the apartments and the common-area bathrooms. A 13-SEER ENERGY STAR qualified heat pump was set up in each unit for heating and cooling. Low-E double-insulated glass windows and R-13 insulation in the walls and R-38 insulation in the attic were installed throughout the building. On-site quality control on framing details critical for air-tightness and on insulation installation was conducted during construction. They installed compact fluorescent bulbs in units and energy-saving fluorescent lighting in the building. ENERGY STAR qualified refrigerators and dishwashers were also installed. The units are tight and have met blower door testing requirements.

## PROJECT SOURCES AND USES

The total cost of development of the building was approximately \$7.85 million. The developer of the building and managing member of the LLC ownership entity is Capitol Area Developments, Inc. (CAD), a non-profit affiliate of the RHA. CAD bought the vacant property from RHA with some infrastructure and landscaping improvements for a purchase price of \$564,500 and constructed the building. The equity provider/investor member is Community Affordable Housing Equity Corporation. Equity from the sale of federal low income housing tax credits provided the majority of the funding at approximately \$5.8 million. NCHFA provided a state tax credit loan for approximately \$700,000. The remaining development costs were funded by CAD.

Funding Sources	
RHA Loan	\$700,000
Capitol Area Developments Loan	\$204,628
Capitol Area Developments, Inc Equity	\$29,368
State Tax Credit Loan	\$691,943
Federal LIHTC Equity	\$5,763,303
<b>Total Funding</b>	<b>\$7,389,242</b>

Total Development Costs	
Cost Element	Total Costs
Hard Costs	\$5,393,311
Soft Cost	\$1,431,431
Land Costs	\$564,500
<b>Total Development Costs</b>	<b>\$7,389,242</b>

## ENERGY STAR COSTS AND BENEFITS

The additional cost to construct Carousel Place to ENERGY STAR standards was approximately \$82,500, or \$1,500 per unit. CAD covered all of the ENERGY STAR construction costs through the loans and equity it received for the project. Progress Energy, the local utility, provided funding toward the testing, testing fees, and oversight that Advanced Energy and Southern Energy Management provided. They covered the cost of Advanced Energy working on Carousel Place's design phase and then also covered the expense of the monitoring and the actual cost of the certificates. The RHA covered all of the ENERGY STAR construction costs through the loans and equity it received for the project. HUD also provided some of the funding for Advanced Energy's participation through an EDI (Economic Development Initiative) grant.

The residents will reap the benefits of a low utility bill. Progress Energy provides up to a five-percent discount on the total electric bill for ENERGY STAR qualified units. This discount will be passed onto the residents of Carousel Place. The RHA believes the Progress Energy discount in combination with the reduced energy consumption achieved by making the units ENERGY STAR qualified will equate to a monthly savings of up to \$29 for a one-bedroom unit and \$45 for a two-bedroom unit. This will result in an annual savings of between \$350 and \$550 for the low-income residents of Carousel Place, and a simple payback of ENERGY STAR related construction costs of 3-4 years.



## PARTNERS IN ENERGY STAR

The RHA worked with JDavis Architects, Advanced Energy of North Carolina, Southern Energy Management, Progress Energy, Bill Warren Energy Services, and several other to develop Carousel Place so that it met ENERGY STAR guidelines.

“Advanced Energy told RHA what was needed for ENERGY STAR, and even if they didn’t *need* to do it to get the certification, they would have done it anyway because they believe it’s important.”

**Brian Coble, Advanced Energy**

### Advanced Energy

Advanced Energy is an independent nonprofit corporation set up to save energy. They assist government agencies and utilities with the design and implementation of energy efficiency programs. Advanced Energy works with affordable housing developers on the ENERGY STAR qualification by managing the process, providing training, oversight and guidance, and bringing parties together. Advanced Energy acted as an oversight agency for the incorporation of ENERGY STAR qualification of Carousel Place. RHA consulted with Advanced Energy on the ENERGY STAR features to use throughout the building. RHA needed little convincing to use ENERGY STAR guidelines in Carousel Place.

“We are hoping they are going to work with us on our next project also.

It was a fantastic experience learning from all of these entities.”

**Gail Keeter, RHA**

### Southern Energy Management

Southern Energy Management provides ENERGY STAR rating and green building consulting services in North Carolina. They work with developers on incorporating ENERGY STAR into their design specifications as well as with the ENERGY STAR qualification process. Southern Energy Management performed the ENERGY STAR field testing for Carousel Place.

## Lessons Learned

Carousel Place successfully earned the ENERGY STAR because of the knowledge and level of involvement each partner had in the process. It was the first multi-family, affordable housing development of its size to be qualified ENERGY STAR in the state. From their experience with Carousel Place as well as other developments, the developer and its partners have learned three key lessons:

### LESSON 1. HAVE A STRONG CHAMPION.

One person from the developer must champion ENERGY STAR from the beginning and throughout the process. The developer should be actively involved, and on-site for each milestone. They must set clear expectations for the building team and impress upon them to take the process, especially the training seriously. The process can break down if the champion does not stay with the project, the contractors and subcontractors are not trained, and the site supervisors are not detail oriented, and a strong quality control process is not put in place.

### LESSON 2. PLAN REVIEW STAGE IS CRITICAL.

Advanced Energy was involved early on in the specifications and plans for Carousel Place, and remained active throughout construction. Their coordination between the developer and various partners allowed for a thorough plan review that allowed an opportunity to give feedback on the plans and resulted in few change orders during construction. A meticulous plan review is necessary for ensuring that what the developer and architect are asking the builder to do is represented in the construction plans. Because multi-family construction can move much faster than single-family construction, mistakes must be caught as early as

possible. The cost for mistakes in multi-family construction often takes much more money and time to correct. Developers need to get the construction correct on the first unit and every unit thereafter.

### LESSON 3. TRAINING IS CONTINUOUS.

Carousel Place had a lag time of several months between when training of contractors and subcontractors first occurred and construction actually began. Without re-training contractors and subcontractors on how to build to ENERGY STAR guidelines, there could have been mistakes in the construction that would have led to Carousel Place failing its ENERGY STAR field test. Project managers, site supervisors, contractors, and subcontractors often change. When they do, it requires additional training of the new team member(s). Training and technical assistance providers need to be cognitive of the project schedule and have a plan for providing ongoing training and guidance to the entire project team. The project manager, contractors, and subcontractors should all know what ENERGY STAR guidelines will be incorporated into the project and how.

### FOR MORE INFORMATION

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