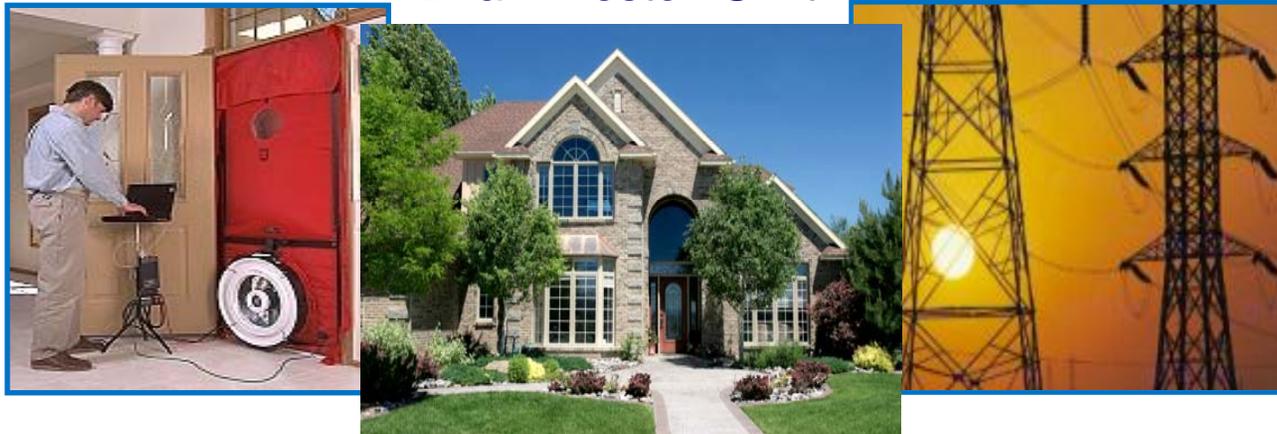




Evaluating HERS Ratings in the Lone Star State

Oncor's Quality Assurance and Quality Control Process

Presented by:
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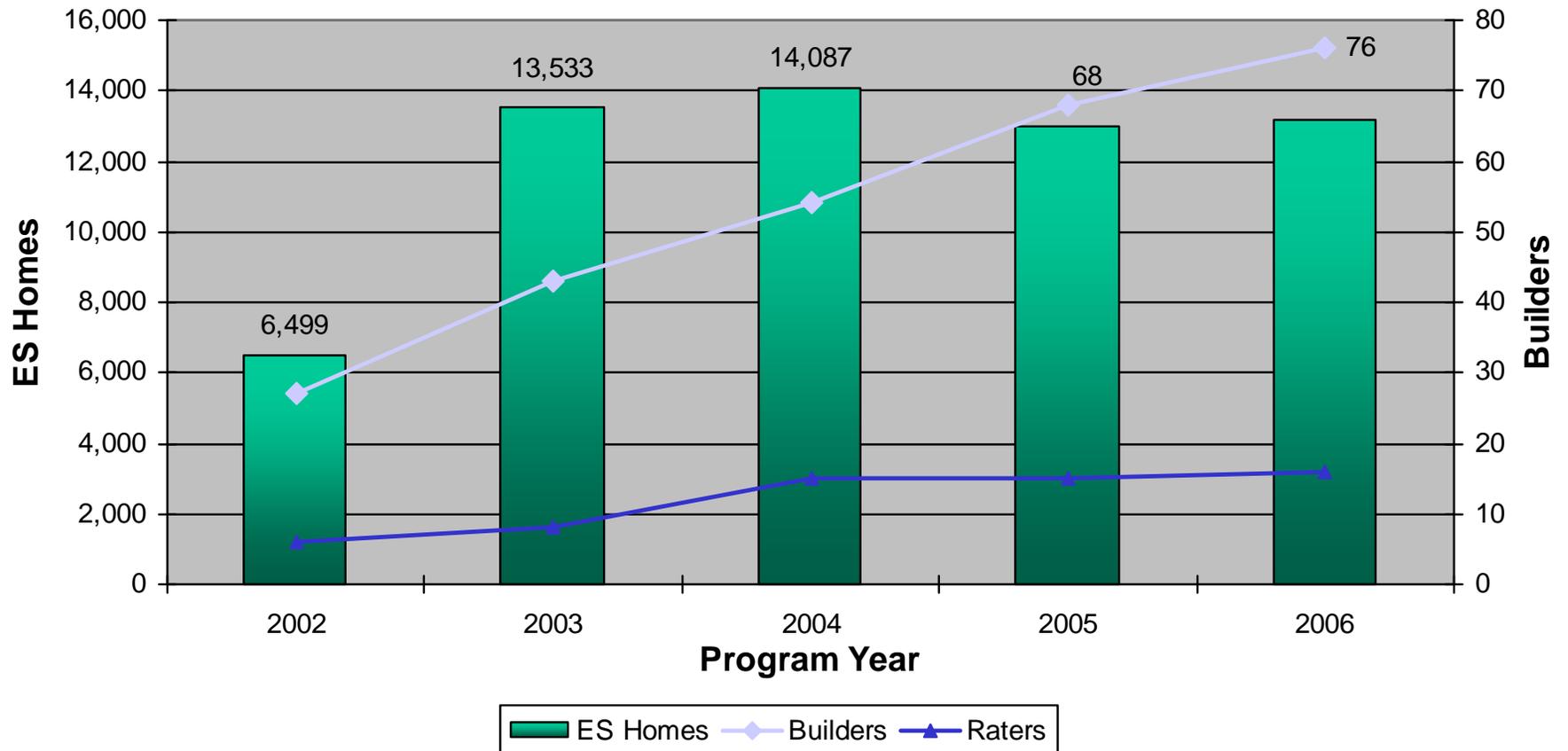
Background

Overview of HERS Rating Infrastructure:

- ◆ Established by Oncor ENERGY STAR Homes Program in 2003
- ◆ Rapid growth during five year period (1 to 16 companies)
- ◆ Many companies new to the home energy rating business
- ◆ These companies certified more than 60,000 ENERGY STAR qualified homes during a five year period

Background

Annual Delivery of ENERGY STAR Certificates and Partner Participation





Background

Rapid expansion of program and growth of rating infrastructure lead to certain questions:

- ◆ How are raters performing?
- ◆ Are they following RESNET standards?
- ◆ Are the homes truly meeting ENERGY STAR performance specifications?

Background

Program responses:

- ◆ Established Texas Home Energy Rating Organization in 2003 (Texas HERO):
 - Non-profit, industry association
 - Facilitates discussion on standards and best practices
 - Provides continuing education/training
 - Represents interests of HERS rating companies in TX and the U.S.
- ◆ Implemented QAQC Process in 2004



Goals of the QAQC Process

1. Validate the accuracy of the information reported to the Program by participating HERS Raters;
2. Confirm the data used by Oncor to calculate predicted kW and kWh savings reported to the PUCT; and
3. Help strengthen the ENERGY STAR for homes brand and the integrity of the HERS rating industry in the region.

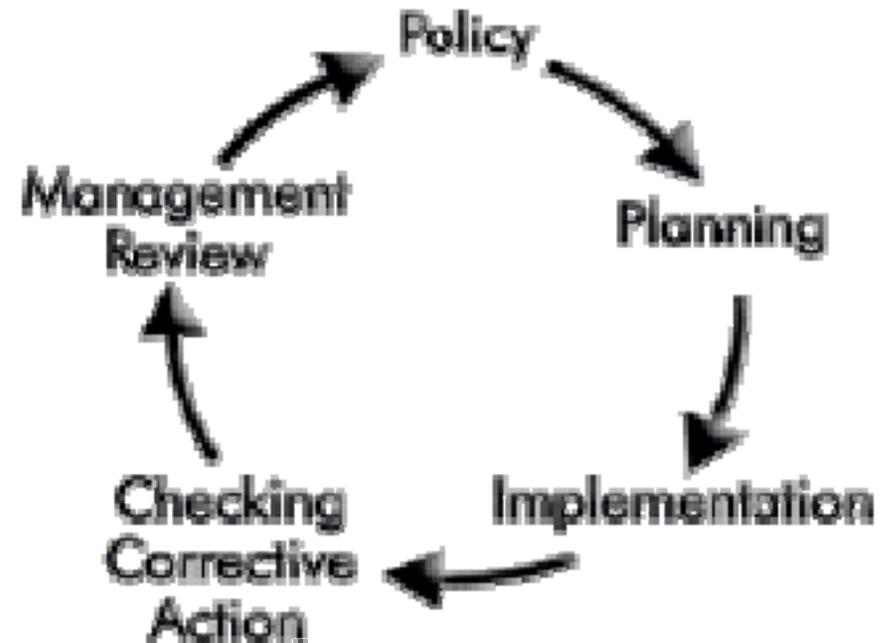


Objectives to Achieve Goals

- A. Verify RESNET standards for home ratings are being followed by accredited HERS Raters and Providers;
- B. Identify inconsistencies and misinterpretations of national standards;
- C. Establish continuous feedback loop and facilitate corrective actions; and
- D. Encourage Texas HERO and RESNET to adopt best practices and clarify industry standards.

Design of QAQC Process

- ◆ Based on:
 1. Deming model of Plan, Do, Check, Act
 2. ISO 14000: Environmental Management Systems
- ◆ A systems approach to verify quality and achieve continuous improvements



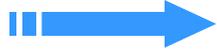


Methodology

1. Determine acceptable variances;
2. Generate sampling protocol;
3. Collect necessary data from actual building plans and on-site inspections of tested and batched homes;
4. Generate *worst-case* QAQC results and compare to data generated and reported by HERS Raters;
5. Identify discrepancies and conduct further analysis to determine cause(s);
6. Share results with Texas HERO, rating providers and the EPA and RESNET when necessary; and
7. Develop corrective action plans to achieve continuous improvements in HERS rating process and industry.

Methodology

Acceptable variances for the 2004 – 2006 QAQC process (as agreed to by Oncor, Texas HERO, and ICF):

- ◆ HERS score  +/- 0.5 point
- ◆ IECC score  +/- 3%

Note: Dual metric for ENERGY STAR for homes in Texas during 2004 – 2006 due to adoption of IECC in 2003.

Sample Generation

- ◆ Includes all raters participating in the Program
- ◆ Sample Priorities:
 - 1st: proportionate to rater participation
 - 50% of homes in program = 50% of homes in QAQC sample
 - 2nd: proportionate to builder participation
- ◆ Sample goal: 300 homes (~2% of total homes delivered to Program each year.)
 - 50% batched
 - 50% tested

Data Collection

Data collected from HERS rating providers:

- ◆ Final *REM/Rate* files with “confirmed” HERS score;
- ◆ Data submitted by raters through Program online reporting system (HERS score, floor area, equipment specifications, etc); and
- ◆ Building plans.

Data Collection

Data collected by third party during on-site verification of *tested* and *batched* homes:

- Home location
- Number of stories
- Foundation type
- Home orientation
- Predominant exterior wall color
- Total duct leakage
- Duct leakage to the outside
- Whole house infiltration value from blower door test
- Blower door metric used
- Presence of radiant barrier
- Presence of p-stat
- Predominant window frame type and number of panes in windows
- HVAC coil and condenser brand, model, and serial number
- Qualitative assessment of attic insulation installation and HVAC installation quality
- Photograph of front orientation

Note: On-site verification was performed at least 72 hours after raters' final test



Analyses and Evaluation

ENERGY STAR Performance Verification:

- A. HERS Score Analysis
- B. Percent Savings Above IECC Analysis

Additional Analyses Conducted:

- A. SEER Analysis
- B. Attic Insulation Analysis
- C. Number of Stories Comparison
- D. Square Footage Comparison

Corrective Action Plan

1. Present initial findings and observations to Texas HERO and stimulate dialogue to clarify assumptions used by raters;
2. Meet with raters with greatest inconsistencies to review results, discuss causes of inconsistencies, and develop a corrective action plan;
3. Monitor raters' progress concerning specific inconsistencies;

Corrective Action Plan

4. Present final results and recommendations to TX HERO and encourage the adoption of industry standard or best practices; and
5. Discontinue accepting certificates for ENERGY STAR qualified homes from rating providers who continuously deliver inconsistent results, even after intervention.



Three Years of Results

	Number of homes that did not meet ENERGY STAR qualifications*	Passing Rate
2004	22	92.40%
2005	2	99.30%
2006	4**	98.70%

*HERS Score of 86 and 15% above IECC

**Failure is below a HERS 87 due to incentive structure



Corrective Action Plan at Work

2004	8% of homes failed to meet ENERGY STAR qualifications	
Issue	Action Taken	Result
14 homes lacked attic insulation at time of inspection	<ul style="list-style-type: none"> • Discussed findings with TX HERO • Improved home verification scheduling (72 hour window) 	<ul style="list-style-type: none"> • The issue has virtually disappeared
Roughly one third of the homes used inconsistent climate zone for analysis	<ul style="list-style-type: none"> • Discussed findings with RESNET, TX HERO • Increased the awareness of climate zone usage and the selection of correct weather files to use in plan analysis and software modeling • Track rating providers' climate zone usage 	<ul style="list-style-type: none"> • Standard practices were established by TX HERO and RESNET clarified language in specifications • No longer an issue
Result		<ul style="list-style-type: none"> • Passing rate increased from 92% in 2004 to 99% in 2006



Corrective Action Plan at Work

2005	1% of homes failed to meet ENERGY STAR qualifications	
Issue	Action Taken	Result
Many raters did not enter valid coil and condenser data for HVAC systems	<ul style="list-style-type: none"> • Discussed findings with TX HERO • Discussed with raters and providers with greatest failure rates 	<ul style="list-style-type: none"> ▪ Issue has somewhat improved ▪ However, still a minor issue
There was a discrepancy between HERS scores reported online and final REM/Rate files	<ul style="list-style-type: none"> • Discussed findings with TX HERO • Discussed with raters and providers with greatest failure rates 	<ul style="list-style-type: none"> ▪ Issue has somewhat improved ▪ However, still a minor issue



Corrective Action Plan at Work

2006	2% of homes failed to meet ENERGY STAR qualifications	
Issue	Action Taken	Result
Many homes did not have a valid ARI SEER match	<ul style="list-style-type: none"> Discussed findings with TX HERO Redesigned online system to require ARI reference number upon submission of home 	TBD
61.7% of homes had a different HERS scores in the <i>REM/Rate</i> files vs. the online system	<ul style="list-style-type: none"> Discussed findings with raters Suggesting improvements in data collection and reporting 	TBD
A large percentage of homes had a different floor area reported in the REM file, online system and the QAQC calculated floor area	<ul style="list-style-type: none"> Discussed findings with TX HERO Working with TX HERO to establish acceptable variance for floor area New RESNET standards should address 	<ul style="list-style-type: none"> Proposing acceptable range of 75 – 100 sqft for approval by all stakeholders

Trends & Challenges

For the Rating Industry:

- Raters are generally following RESNET standards.
 - Discrepancies typically result when there are ambiguities in standards that lead to misinterpretations.
- The efficiency of equipment is NOT being verified in the field.
 - However, efficiency levels used in ratings are almost always conservative.
- There seems to be a difference between the actual number of stories of a completed home and the stories used in energy modeling.
 - Need to evaluate more to determine cause.
- The EPA sampling protocol is working.
 - Batched homes are meeting ENERGY STAR specifications.

Trends & Challenges

For Sponsors of Regional Programs:

- Almost all raters participating in the utility sponsored program submit home data at the last minute.
 - This makes it very difficult to evaluate homes and implement timely corrective actions.

- Often times the REM/Rate files used to generate the final home energy rating does not match the data submitted the Program.
 - Important to streamline data collection process to reduce potential for data reporting errors.
 - Look for ways to encourage and reward frequent transfer of data and reporting by raters to the program.
 - Good news is raters use worst-case scenarios which results in conservative reporting.

Conclusions

The Systems-Based QAQC Process Has Been Effective In:

- Validating information reported by HERS Raters;
- Verifying peak energy demand and savings;
- Strengthening the HERS rating industry;
 - Improving the quality of home energy ratings;
 - Influencing positive changes in the national RESNET guidelines;
 - Establishing industry standards and best practices; and
- Improving the design and implementation of the Onkor ENERGY STAR Homes Program.

Thank You.

Questions?