

Lessons from a Successful QAQC Process:

Implementing a QAQC Process to Improve a Residential
Energy Efficiency Program

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Outline

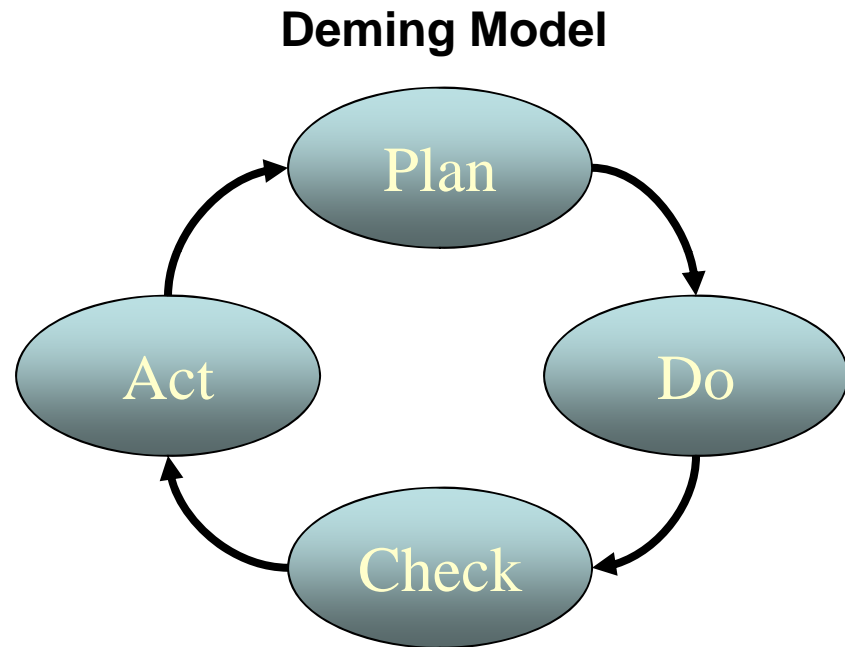
- Overview of Oncor Electric Delivery's ENERGY STAR Homes Program
- Overview of the Quality Assurance and Control (QAQC) Process for the ENERGY STAR Homes Program
- Establishing a System-Based QAQC Process
- Lessons Learned

Oncor's ENERGY STAR Homes Program

- Average annual budget of \$8 million covers:
 - Implementation
 - Marketing and outreach
 - QAQC Process
- Implemented by ICF International since 2002
- Competitive, Market-Based HERS Rating Infrastructure
 - More than 160 completed the RESNET accredited training
 - 15 RESNET accredited HERS Rating Providers
 - Established Texas Home Energy Rating Organization in 2003
- More than 60,000 ENERGY STAR qualified homes since 2002

Overview of the QAQC Process

- Established to verify RESNET standards are being followed by HERS Rating Providers
- Systems approach to measure and verify energy peak demand savings while improving efficiency and control
- Modeled after the Deming model of plan, do, check, and act
- Provides continuous improvements in overall program and home energy ratings



Benefits of Systems-Based QAQC Process

- Demonstrate commitment to measurable goals;
- Reduce liabilities;
- Increase efficiencies through continuous improvements;
- Improve communication;
- Develop shared solutions;
- Improve public / community relations; and
- Positive external relations and public image.

Establishing a QAQC Process

Four Steps:

- Plan – Develop the QAQC Process
- Do – Implement QAQC Process
- Check – Evaluate QAQC Process and Take Corrective Action
- Act – Perform Management Review and Make Necessary Changes

Plan – Develop the QAQC Process

- Establish Goals:
 - Validate accuracy of information reported by HERS Raters
 - Strengthen integrity of ENERGY STAR label and HERS rating process
 - Confirm kW and kWh savings
- Establish Objectives:
 - Sampling protocol – proportionate sample, randomly selected
 - Performance factors - HERS index, % above IECC, SEER
 - Acceptable variances
- Design Program:
 - Data Collection Process by Third-Parties
 - Data Analysis Process by Third-Parties
 - Corrective Action Process

Do – Implement QAQC Process

- Implementing the QAQC process as designed during the planning stage

- Some activities can include:
 - Delivering required training
 - Effectively communicating plan to stakeholders and clarifying roles/responsibilities
 - Generating sample
 - Conducting data collection and on-site verification testing
 - Conducting independent analysis
 - Comparing independent results to data submitted by vendors (HERS Raters)

Check – Evaluate and Take Corrective Action

- Monitor and Measure
 - Identify discrepancies
 - Example from 2004 Oncor Electric Delivery Program:
 - 14 ENERGY STAR homes failed due to lack of insulation
 - 33 homes were rated in questionable climate zones
 - 1/3 of homes in sample did not have HVAC verified through ARI

- Evaluate and Determine Cause
 - Example from 2004 Oncor Electric Delivery Program continued:
 - Homes tested prior to completion
 - Climate zone guidelines not clear
 - HVAC performance verification guidelines not clear

Check – Evaluate and Take Corrective Action

- Take Corrective & Preventative Action
 - Focus on fixing current discrepancies and preventing future failures
 - Creates a continuous feedback loop to all stakeholders
 - Steps Taken by Oncor Electric Delivery Program:
 - Identified HERS Rating Providers with failures
 - Presented failure to respective HERS Rating Providers
 - Worked with HERS Rating Providers to identify cause and correct
 - Monitored progress of HERS Rating Providers towards improvements
 - Presented final results to TXU HERO and encouraged adoption of best practices

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 1/3 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

Corrective Action Plan at Work

2005	1% of homes failed to meet ENERGY STAR qualifications	
Issue	Action Taken	Result
<p>Many raters did not enter valid coil and condenser data for HVAC systems</p>	<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
<p>There was a discrepancy between HERS scores reported online and final REM/Rate files</p>	<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
25.2% of 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 	<ul style="list-style-type: none"> In 2007, 16.8% of homes did not have an ARI match. More improvements need to be made in 2008. Goal is 0%.
36.9% 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"> In 2007 (YTD), 34.6% of homes had an inconsistent square footage reported. Not much improvement has been made. Raters site clerical error and high staff turnaround as contributing factors.

Corrective Action Plan at Work

2007		
Issue	Action Taken	Result
<p>Many homes had a failing duct leakage value (of >6 cfm/100 sq ft) and did not meet ENERGY STAR guidelines.</p> <p>However, many of the same homes had a passing HERS Index.</p>	<ul style="list-style-type: none"> Discussed findings with TX HERO and participating raters. Provided quicker/more real time results to raters so that repairs could be made and retesting could be performed if necessary. 	<ul style="list-style-type: none"> TBD
<p>Many homes had a negative and/or failing Thermal Bypass Checklist.</p>	<ul style="list-style-type: none"> Noted most common infractions and mistakes. Discussed findings with TX HERO and participating raters. Provided quicker/more real time results to raters so that repairs could be made and retesting could be performed if necessary. 	<ul style="list-style-type: none"> TBD

Act – Perform Management Review

- Keep the Program Efficient and Effective
- Ensure the QAQC Process Will Meet Organizations Goals Over Time
- Some Questions to Ask:
 - Is the system working as intended?
 - Did we achieve our objectives and targets?
 - Are roles and responsibilities clear?
 - Are we applying resources appropriately?
 - Is there a better way? What else can we improve?

Conclusion

- The Systems-Based QAQC Process Has Been Effective In:
 - Validating information reported by HERS Raters (or, other vendors)
 - Verifying peak energy demand and savings
 - Strengthening the infrastructure that serves the program (HERS rating industry)
 - Improving the quality of home energy ratings or installations of measures
 - Identifying discrepancies in performance guidelines or practices
 - Establishing industry standards and best practices
 - Improving the design and implementation of the program

Lessons Learned

- Work closely with stakeholders during the design process
- Establish a continuous feedback loop and monitor progress closely
- Timing of on-site verification can be critical to accuracy of data collected
- Method of selecting sample should be independent of the entities being evaluated (HERS Raters)
- Corrective action is successful at achieving continuous improvements in program design and the quality of energy efficiency measure installations
- HERS Raters and program implementers are committed to improving the industry and take ownership in process

Questions

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