The Price Premium of ENERGY STAR Certified® Homes:

A Maryland Analysis

2016 ENERGY STAR Certified Homes Stakeholder Meeting
New Orleans, Louisiana
10/25-10/27/2016
EmPOWER Maryland

EmPOWER Maryland Act of 2008:
Original goal to reduce energy consumption 15% by the end of 2015
Renewed in 2015

Maryland utilities help implement cost effective energy efficiency programs and created portfolio of programs.

<table>
<thead>
<tr>
<th>EmPOWER Maryland (2008-2014)</th>
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<tbody>
<tr>
<td>Reduced consumption by (2,000,000) MWh. This is equivalent to:</td>
</tr>
<tr>
<td>80,000 homes</td>
</tr>
<tr>
<td>2 medium sized power plants</td>
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</table>
Maryland ENERGY STAR New Homes Program

• 2008:
  – ENERGY STAR New Homes comprised ≈ 6% of the Maryland new homes market
  – Market penetration was 42nd in the nation
• Today:
  – ENERGY STAR New Homes now make up ≈ 40% of new homes built in Maryland in past 3 yrs
  – Now 2nd in nation for market penetration
Maryland ENERGY STAR New Homes Program Results

• 2015:
  – Incentivized 4,373 homes
  – Paid close to $6 million in incentives
  – Saved ≈ 7,516 MWh

• Program Lifetime:
  – ≈ 21,000 ENERGY STAR New Homes
  – $27 million in incentives
  – 30,000+ MWh saved
Evolution of Program

- **Program Launch:**
  - Tiered incentive structure based on HERS Scores
  - Introduced 90% CFL minimum in 2014
  - Simplified tiered structure in 2015
  - Shift away from HERS Scores to Home Type in 2015

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>HERS 85-81</td>
<td>HERS 75-71</td>
<td>HERS 70-66</td>
</tr>
<tr>
<td>$400</td>
<td>$1000</td>
<td>$1000</td>
</tr>
<tr>
<td>HERS 80-76</td>
<td>HERS 70-66</td>
<td>HERS 65-61</td>
</tr>
<tr>
<td>$800</td>
<td>$1300</td>
<td>$1300</td>
</tr>
<tr>
<td>HERS 75- Below</td>
<td>HERS 65-61</td>
<td>HERS 60 - Below</td>
</tr>
<tr>
<td>Below $1000</td>
<td>$1600</td>
<td>$1600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>After April 1, 2015 ES v 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multifamily</td>
</tr>
<tr>
<td>2-on-2 Condo</td>
</tr>
<tr>
<td>Townhome</td>
</tr>
<tr>
<td>Single Family</td>
</tr>
</tbody>
</table>
Program Benefits

- Marketing support
- Website listing
- Sales training
- Technical training
- QA/QC
- Research: Baseline and price premium studies
Price Premium Study

• Collaboration between the Maryland utilities to quantify the impact of ENERGY STAR Certification on home prices
  • Evaluated Maryland home prices between 2010-2016
  • Included sample of 2,723 ENERGY STAR homes and 13,065 non-certified homes
  • Regression model used to isolate impact of ENERGY STAR Certification on home value (hedonic regression model)
Main Objectives of Study

• Utility Perspective
  – First steps to capture non-energy benefits
• Builder Perspective
  – Concrete answer of what is ENERGY STAR Certified New Home worth
• Homeowner Perspective
  – Non-energy benefits are at times more important in driving energy efficiency program for end consumers
Methodology

Characteristics Based On:
• Impact on Home Value
• Availability of Information
• Feasibility of Analysis

Some of the Home Characteristics Include:
• Location
• Home Type
• Date of Sale
• Sale Price
• Number of Levels
• Year Built
• New Construction
• Number Bedrooms, Bathrooms, Fireplaces
• Lot Size Square Footage
• Living Area Square Footage
• Basement, Attic, Swimming Pool
• Parking
• Water Oriented, View, or Access
Methodology

MD Homes Data from MLS/RBI
- 366,542 homes
- Homes sold between 1/1/2010-3/1/2016

Processing
- New construction
- Built after 2008 and sold after 2010
- 18,566 homes

“ES Report” and MLS Data Standardized and Matched to Identify ES Homes in MLS Data
- Exact & App. String Match
- Remove duplicates
- Remove homes with missing Information

Sample
- 2,723 ES homes
- 13,065 non-ES homes

MD “ES Report” Data
- 17,860 homes
- 1/1/2010-3/1/2016

5 Maryland Utilities
Exploring the Data

54% single family homes
43% townhomes

Most homes (99.5%) were sold in standard sales
Exploratory Data Analysis and Missing Data

Top 10 counties with highest number of new homes accounted for 92.2% of the sample
What’s in the data and what does that mean?

Large percentage of data missing for total living area (55%) and lot size (11%)

ENERGY STAR Homes and non-ENERGY STAR Homes included in the data were comparable

However, ENERGY STAR Homes sold faster than non-ENERGY STAR Homes!
Data Analysis and Model Selection

10 Models with Different Dependent Variables

Final Model: 2G2

- Dependent Variable: Log of sale price
- Primary Independent Variable: ENERGY STAR Certification
- Model fitted separately to each year
- Include 2,811 parameters
  - Parameters only created for terms that are statistically significant at the 5% significance level for 2+ out of 5 years
## Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimate</th>
<th>StdErr</th>
<th>tValue (T-statistic)</th>
<th>Probt (P-Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>0.0575</td>
<td>0.0647</td>
<td>0.8892</td>
<td>0.3740</td>
</tr>
<tr>
<td>2012</td>
<td>0.0521</td>
<td>0.0166</td>
<td>3.1322</td>
<td>0.0018</td>
</tr>
<tr>
<td>2013</td>
<td>0.0327</td>
<td>0.0092</td>
<td>3.5451</td>
<td>0.0004</td>
</tr>
<tr>
<td>2014</td>
<td>0.0271</td>
<td>0.0079</td>
<td>3.4375</td>
<td>0.0006</td>
</tr>
<tr>
<td>2015</td>
<td>0.0210</td>
<td>0.0078</td>
<td>2.6945</td>
<td>0.0071</td>
</tr>
<tr>
<td>2016</td>
<td>0.0351</td>
<td>0.0364</td>
<td>0.9649</td>
<td>0.3359</td>
</tr>
</tbody>
</table>

- Model is a good fit and there is statistically significant price premium for ENERGY STAR New Homes for years 2012-2015 at 1% level
- Not significant for 2011 and 2016 due to insufficient data
- Price premium of 2.1-5.2% for 2012-2015
What this means:

<table>
<thead>
<tr>
<th>Year</th>
<th>Price Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$24,953</td>
</tr>
<tr>
<td>2013</td>
<td>$15,645</td>
</tr>
<tr>
<td>2014</td>
<td>$12,978</td>
</tr>
<tr>
<td>2015</td>
<td>$10,077</td>
</tr>
</tbody>
</table>

- $10,077-$24,953 price premium is attributed to ENERGY STAR New Homes certification per home
- The Maryland ENERGY STAR New Homes Program has delivered 21,000 homes since 2010: $211,617,000 - $524,013,000 additional value generated for builders
- Study is first step, imagine quantifying other economic/market impact related to $211-524 million dollars (job growth, regional impact, etc)
An ENERGY STAR® New Home helps reduce energy use up to 30% on utility bills and increases your property value by 2-5%.

The ENERGY STAR Difference

- **Reducing Costs and Drifts:**
  - An ENERGY STAR® Certified new home is built to be energy efficient, which reduces energy costs and drifts in the home.

Savings and Home Value

Beyond providing increased savings on your utility bills, ENERGY STAR® Certified homes offer a price premium. A recent study by the Environmental Protection Agency (EPA) showed that ENERGY STAR® Certified homes sold for 5-7% more than similar non-certified homes.

- **Insulating in All Areas:**
  - A comprehensive energy management system, including high-performance insulation, windows, and doors, keeps your home comfortable no matter the weather.

www.CraftmarkHomes.com

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The ENERGY STAR® Difference

- **Reduction in Energy Usage:**
  - ENERGY STAR® Certified homes are designed to consume 20-30% less energy than a typical new home.

Savings and Home Value

Beyond providing increased savings on your utility bills, ENERGY STAR® Certified homes offer a price premium. In a recent study, ENERGY STAR® Certified homes sold for 5-7% more than similar non-certified homes.

www.Officetopia.com

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An ENERGY STAR® Certified home helps reduce energy use up to 30% on utility bills and increases your property value by 2-5%.

The ENERGY STAR® Difference

- **Enhancing Comfort:**
  - ENERGY STAR® Certified homes are built to be energy efficient, providing a comfortable living environment year-round.

Savings and Home Value

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