The Massachusetts New Homes with ENERGY STAR® Program

2008 PROGRESS REPORT

FINAL REPORT
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Submitted to:
The Massachusetts New Homes with ENERGY STAR Program
Joint Management Committee

Submitted by:
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1 Introduction
The annual Massachusetts New Homes with ENERGY STAR® Program 2008 Progress Report is a summary of 2008 Program activity. Program performance information includes historical as well as current information to show the growth of the Program over time.

1.1 Metrics
There were two residential new construction metrics for 2008. The Program achieved the exemplary level for both metrics

1.1.1 Zero Energy Home Demonstration Project
**Threshold:** Develop and provide a pilot design for Zero Net Energy Homes. Include renewable energy, innovative technologies and products, and ‘best practice’ HVAC installations. Provide incentives, comprehensive technical assistance, and other appropriate support to encourage builders to participate. The maximum modeled energy performance rating of homes will be HERS index 35 or better.

**Design:** Recruit at least three builders to participate in the pilot with at least one of their homes. Builders will sign an MOU indicating their intention to participate and agreeing that all participating homes are scheduled to be substantially completed by December 31, 2009.

**Exemplary–Achieved:** One of the participating pilot homes is considered “affordable”, using the HUD income guidelines (80% of area median income). Provide a pilot status update memo documenting 2008 pilot accomplishments.

1.1.2 Support Residential New Construction Code development
**Threshold:** Develop a strategy to examine and pursue options for adopting a residential energy code at least as stringent as the national ENERGY STAR Homes standard in Massachusetts municipalities, and facilitate one introductory meeting among communities.

**Design:** Encourage at least three municipalities to pursue the adoption of an ENERGY STAR equivalent code and support the process toward adoption in each municipality.

**Exemplary–Achieved:** For at least one municipality, provide the technical specifications and support necessary so the town could develop an ordinance and/or law that will put in place a building code at least as stringent as the national ENERGY STAR Homes standard.
2 Over the Years

The figures on the following pages show historical data on housing permits issued, housing units recruited, housing units Energy star qualified, and the Program’s achievements since 1999. They show the number of housing units recruited each year, the average HERS ratings of homes completed in each year, the average cost per signed housing unit and per completed housing unit each year, and completed housing units each year as a percentage of estimated total annual housing units completed in Massachusetts. As these figures will show, while the number of housing permits issued and the number of housing units completed in 2008 are both lower than in 2007, the number of new housing units signed in 2008 is more than twice as high. Also, despite the drop in the number of homes completed through the Program in 2008, completed ENERGY STAR-qualified homes increased their share of estimated homes completed statewide. As of the end of 2008, the Program has completed over 14,300 ENERGY STAR-qualified housing units.

2.1 Massachusetts Housing Permits

The numbers of both single family and multi-family permits issued in Massachusetts fell for the third year in a row. Single family permits issued in 2008, at 5,368 permits, are at their lowest level during the 1980 to 2008 period. (Figure 2-1) Annual multi-family permits issued, which grew consistently from 2002 through 2005, also dropped in each of the last three years, but remain above 1990 through 2002 levels. Compared to 2005, the number of total permits issued in 2008 is down by 59%, the number of single family permits issued is down by 62% and the number of multi-family permits issued is down by 55%.

Figure 2-1: Massachusetts Housing Permits Issued 1980 – 2008
Figure 2-2, Figure 2-3, and Figure 2-4 show year-to-date total, single family and multi-family permits issued from 2002 through May 2009. Total permits issued in 2008 are 36% lower, single family permits 40% lower and multi-family permits 30% lower than in 2007. Total permits issued January through May 2009 are 31% lower, single family permits 34% lower and multi-family permits 27% lower than in the first five months of 2008.

Figure 2-2: Year-to-Date Total Permits Issued 2002 – 2009

Figure 2-3: Year-to-Date Single Family Permits Issued 2002 – 2009

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1 Total permits for each year are the final revised annual totals which may be higher or lower than the published December year-to-date totals.
2.2 Annual Signed Housing Units

2.2.1 Recruited Housing Units Compared to Statewide Permits Issued

Figure 2-5 shows new housing units recruited to participate in the Program as a percentage of all housing permits issued in the state climbed sharply in 2008—from 13% in 2007 to 49% in 2008. The number of housing units signed in 2008 is almost two and a half times the number signed in 2007. Prior to 2006, signings include only housing units signed and committed to being built to ENERGY STAR standards; 2006 signings include both ENERGY STAR and Energy Measure Upgrade (EMU) housing units; 2007 and 2008 signings include both ENERGY STAR and Code Plus housing units. From 2003 through 2006 signings were tracked by housing type—single family or multi-family; for 2007 and 2008 no breakdown of signings by housing type is available.
2.3 Participating Housing Units as Percentage of Statewide Completed Housing Units

Figure 2-6 on the following page shows the number of housing units completed through the Program each year. Figure 2-7 shows annual ENERGY STAR housing units qualified each year through the Program as a percentage of estimated total annual completed housing units in Massachusetts. From 1999 through 2006 both the number of housing units qualified through the Program and their percentage of estimated statewide completed housing units increased each year, peaking in 2006 at 2,610 housing units and 16% of the market. In 2007, both the number of total housing units qualified and their share of total estimated housing units completed in Massachusetts dropped sharply. In 2008, the number of total housing units ENERGY STAR qualified fell farther, by 300 housing units or 23%. However, completed ENERGY STAR housing units as a percentage of estimated total housing units completed in Massachusetts climbed from 9% in 2007 to 10% in 2008, reflecting a sharper drop in estimated statewide home completions (33%) than in ENERGY STAR-qualified home completions (23%). Using Census Bureau definitions of single family and multi-family housing, the number of single family homes ENERGY STAR qualified fell by 75 homes or 10% in 2008, while their share of estimated statewide single family homes completed in Massachusetts climbed from 7% in 2007 to a new high of 10% in 2008; the number of multi-family housing units ENERGY STAR qualified fell by 225 units or 41% in 2008, while their share of estimated statewide multi-family units completed in Massachusetts fell from 14% in 2007 to 11% in 2008.

Figure 2-8 is the same as Figure 2-7 except that the 2006 through 2008 data include housing units completed through the Program under the EMU and Code Plus participation paths. Including housing units participating though non-ENERGY STAR paths increases the number of housing units completed through the Program from 2,610 to 3,318 in 2006, from 1,286 to 1,616 in 2007, and from 986 to 1,396 in 2008. Completed ENERGY STAR, EMU and Code Plus housing units as a percentage of estimated total housing units completed in Massachusetts climbed from 11% in 2007 to 15% in 2008; single family homes completed through the Program climbed from 8% to 12% of estimated statewide single family home completions; multi-family units completed through the Program remained constant at 20% of estimated statewide multi-family unit completions.

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2 In 2003, the Program began tracking recruited and completed homes under the Census Bureau single family and multi-family housing category definitions, which is how housing permit data are reported. Under the Census Bureau definitions, single family includes fully detached housing units, semi detached (semi attached, side-by-side) housing units, row houses, and townhouses. In the case of attached units, each must be separated from the adjacent unit by a ground-to-roof wall and must not share heating/air-conditioning systems or inter-structural public utilities such as water supply, power supply, or sewage disposal lines. Because housing units qualified as ENERGY STAR since 2003 are tracked using the Census Bureau definitions, it is possible to separately calculate the estimated percentages of multi-family and single family housing units completed in the state that participated in the Program.
Figure 2-6: ENERGY STAR, EMU and Code Plus Housing Units Completed

Figure 2-7: ENERGY STAR Completions as Percent of Statewide Completions

Figure 2-8: ENERGY STAR, EMU and Code Plus Completions as Percent of Statewide Completions
2.4 HERS Ratings

Through 2005, all ENERGY STAR-qualified housing units were rated using the classic HERS score.\(^3\) In 2006, the HERS index\(^4\) approach to rating homes was introduced; most homes qualified in 2006 (92%) were rated using the classic HERS score. Homes completed in 2007 and 2008 were rated using the HERS index approach.

Figure 2-9 shows the average classic HERS score for housing units ENERGY STAR qualified in 1999 through 2006 and the average HERS index for housing units ENERGY STAR qualified in 2007 and 2008. As shown, the average HERS rating has improved each year. The average classic HERS score of housing units qualified in 1999 was 86.7 and by 2006 climbed to 89.3; this 2.6 point increase in the average classic HERS score equates to an increase of 13% in energy efficiency. The average HERS index improved from 68.1 in 2007 to 64.8 in 2008 representing a 3.3% increase in energy efficiency. The average 64.8 HERS index corresponds to a home 34.2% more energy efficient than the 2006 International Energy Conservation Code reference home.

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\(^3\) For homes rated before July 1, 2006, the rating score is known as a “HERS Score.” The HERS Score is a system in which a home built to the specifications of the HERS Reference Home (based on the 1993 Model Energy Code) has a HERS Score of 80. Unlike the HERS Index, each 1-point increase in a HERS Score is equivalent to a 5% increase in energy efficiency. Source: http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_HERS

\(^4\) The HERS Index is a scoring system established by the Residential Energy Services Network (RESNET) in which a home built to the specifications of the HERS Reference Home (based on the 2006 International Energy Conservation Code) scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0. The lower a home’s HERS Index, the more energy efficient it is in comparison to the HERS Reference Home. Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS Reference Home. Source: http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_HERS
Figure 2-10 compares the percentage of ENERGY STAR-qualified housing units falling into five HERS index ranges in 2007 and 2008. As shown, the biggest differences between the two years are that the percentage of qualified housing units with HERS indices of 66 to 74 fell sharply from 42% in 2007 to 28% in 2008; the percentage of qualified housing units with HERS indices of 51 to 57 grew from 5% to 14%; and the percentage of qualified housing units with HERS indices of 50 or lower grew from 3% to 8%. (A HERS index of 50 is considered an indication that a home could qualify for the $2,000 federal tax credit.). A likely factor in the increased percentage of homes achieving HERS indices of 65 or lower in 2008 is the 2008 Program’s strategy to encourage builders to build to higher efficiency levels by paying a higher incentive for homes achieving HERS indices of 65 or lower.

Figure 2-10: 2007 and 2008 HERS Indices*

<table>
<thead>
<tr>
<th>HERS Index</th>
<th>Percent of Qualified Housing Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 or Higher</td>
<td>22%</td>
</tr>
<tr>
<td>66 to 74</td>
<td>42%</td>
</tr>
<tr>
<td>58 to 65</td>
<td>28%</td>
</tr>
<tr>
<td>51 to 57</td>
<td>27%</td>
</tr>
<tr>
<td>50 or Lower</td>
<td>14%</td>
</tr>
</tbody>
</table>

Figure 2-11, Figure 2-12 and Figure 2-13 on the next page show the individual HERS indices achieved by homes qualified in 2008 for all qualified homes, qualified single family homes and qualified multi-family units, respectively. As shown, the average HERS index for all housing units is the same as the average for multi-family units, at 65; the average HERS index for single family homes is slightly higher at 66. The median HERS index for all housing units is 66, for single family homes is 67 and for multi-family units is 65. The range of HERS indices achieved by single family homes is much larger than for multi-family units: HERS indices achieved by multi-family units range from 85 to 44, while HERS indices achieved by single family homes range from 85 to 20.
Figure 2-11: 2008 HERS Indices—All Housing Units

2008 HERS Indices

973 ENERGY STAR-Qualified Housing Units

Figure 2-12: 2008 HERS Indices—Single Family Homes

645 ENERGY STAR-Qualified Single Family Homes

Figure 2-13: 2008 HERS Indices—Multi-family Units

328 ENERGY STAR-Qualified Multi-family Units
2.5 Spending per Participating Housing Unit

Table 2-1 shows that the number of housing units signed in one year peaked in 2005 at 4,761. Beginning in 2006, homes were signed under non-ENERGY STAR as well as ENERGY STAR participation paths—ENERGY STAR and EMU paths in 2006 and ENERGY STAR and Code Plus paths in 2007 and 2008. The total number of housing units signed dropped sharply in 2006 and again in 2007, reflecting the impacts of not recruiting multi-family units in buildings over three stories and the slow down in the new construction market. The sharp increase in housing units signed in 2008 likely reflects the combined impact of increased Program marketing and aggressive recruiting by participating HERS raters.

The annual number of housing units completed through the Program rose steadily through 2006, then plunged in 2007. The drop in 2007 completions again reflects the impacts of the depressed market for new housing and the Program not qualifying multi-family units in buildings over three stories. The number of housing unit completed in 2008 is 220 or 14% lower than in 2007. However, as described earlier, the estimated number of housing units completed statewide in 2008 fell by more than the percentage of housing units completed through the Program (33% vs. 14%) resulting in the penetration of housing units completed through the Program growing from 11% in 2007 to 15% in 2008.

<table>
<thead>
<tr>
<th>Year</th>
<th>Spending $Thousands</th>
<th>Housing Units Signed</th>
<th>Housing Units Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$3,160</td>
<td>2,085</td>
<td>565</td>
</tr>
<tr>
<td>2001</td>
<td>$3,434</td>
<td>2,715</td>
<td>965</td>
</tr>
<tr>
<td>2002</td>
<td>$4,078</td>
<td>2,423</td>
<td>1,435</td>
</tr>
<tr>
<td>2003</td>
<td>$4,160</td>
<td>2,063</td>
<td>1,630</td>
</tr>
<tr>
<td>2004</td>
<td>$5,193</td>
<td>3,320</td>
<td>1,854</td>
</tr>
<tr>
<td>2005</td>
<td>$5,284</td>
<td>4,761</td>
<td>2,358</td>
</tr>
<tr>
<td>2006*</td>
<td>$5,390</td>
<td>2,580</td>
<td>3,318</td>
</tr>
<tr>
<td>2007*</td>
<td>$3,610</td>
<td>1,994</td>
<td>1,616</td>
</tr>
<tr>
<td>2008*</td>
<td>$3,848**</td>
<td>4,854</td>
<td>1,396</td>
</tr>
</tbody>
</table>

* 2006–2008 include ENERGY STAR, EMU and Code Plus housing units.
**Preliminary Estimate
Figure 2-14 shows annual spending by electric Program Sponsors increased each year from 2000 to 2006, then declined sharply in 2007, predominantly due to a decrease in low income spending.\textsuperscript{5} Spending for both low income and market rate components of the Program increased in 2008.

\textsuperscript{5} The cost data are from annual reports filed with the Division of Energy Resources (DOER) by the electric utilities and Cape Light Compact. The cost data include customer incentives plus in-house and contracted out expenses for planning and administration, marketing, and implementation. The cost data do not include evaluation expenses, market research expenses, performance incentives, other costs or participant costs.
Figure 2-15 shows the annual spending per signed housing unit and per completed housing unit. The dramatic decrease in spending per completed housing unit from the early years of the Program is largely a reflection of the lag between the time housing units are signed up and the time they are qualified. 2006 through 2007 include housing units signed and completed under both ENERGY STAR and non-ENERGY STAR paths. The sharp decline in 2008 spending per signed housing unit is the result of the number of units signed increasing by a higher percentage than spending—the number of housing units signed more than doubled from 2007 to 2008 while spending increased by only 7%. Conversely, the increase in 2008 spending per completed housing unit is the result of the number of completed housing units decreasing while spending increased— the number of completed housing units dropped 14% while spending increased by 7%.

Figure 2-15: Annual Spending per Housing Unit
3 2008 Housing Units Completed

Figure 3-1 shows the allocation of 2008 completions between single family and multi-family for combined ENERGY STAR and Code Plus completions; only ENERGY STAR completions; and only Code Plus completions.

**Figure 3-1: All 2008 Completions by Housing Type**

- **2008 Total Completions**
  - ENERGY STAR & Code Plus
    - Multi-family: 41%
    - Single Family: 59%
  - (n=1,396)

- **2008 Completions**
  - ENERGY STAR
    - Single Family: 67%
    - Multi-family: 33%
  - (n=986)

- **2008 Completions**
  - Code Plus
    - Single Family: 41%
    - Multi-family: 59%
  - (n=410)
Figure 3-2 shows the allocation of 2008 market rate completions between single family and multi-family for combined ENERGY STAR and Code Plus completions; only ENERGY STAR completions; and only Code Plus completions.

**Figure 3-2: 2008 Market Rate Completions by Housing Type**

2008 Market Rate Completions
ENERGY STAR & Code Plus
(n=943)

- Single Family: 73%
- Multi-family: 27%

2008 Market Rate Completions
ENERGY STAR
(n=670)

- Single Family: 79%
- Multi-family: 21%

2008 Market Rate Completions
Code Plus
(n=273)

- Single Family: 59%
- Multi-family: 41%
Figure 3-3 shows the allocation of 2008 low income completions between single family and multi-family for combined ENERGY STAR and Code Plus completions; only ENERGY STAR completions; and only Code Plus completions.

**Figure 3-3: 2008 Low Income Completions by Housing Type**
4 Distribution of Completions across Sponsor Territories

This section shows the distribution of housing units completed through the Program in 2008 by electric and gas Sponsors. Table 4-1 and Table 4-2 show the data used to generate the figures on the following pages.

### Table 4-1: Electric Sponsor 2008 Completed Housing Units

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Total Units</td>
<td>Market Rate Units</td>
<td>Low Income Units</td>
</tr>
<tr>
<td>National Grid</td>
<td>81</td>
<td>75</td>
<td>6</td>
</tr>
<tr>
<td>NSTAR</td>
<td>323</td>
<td>197</td>
<td>126</td>
</tr>
<tr>
<td>Western Mass Electric (WMECo)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cape Light Compact (CLC)</td>
<td>6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Unitil</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Municipals (Muni)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>410</td>
<td>273</td>
<td>137</td>
</tr>
</tbody>
</table>

### Table 4-2: Gas Sponsor 2008 Completed Housing Units

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Units</td>
<td>Market Rate Units</td>
<td>Low Income Units</td>
</tr>
<tr>
<td>Bay State Gas</td>
<td>21</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>National Grid</td>
<td>360</td>
<td>227</td>
<td>133</td>
</tr>
<tr>
<td>Berkshire Gas (BRKSH)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>NSTAR</td>
<td>25</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>New England (NE)</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>No Gas Sponsor</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>410</td>
<td>273</td>
<td>137</td>
</tr>
</tbody>
</table>
4.1 Electric Sponsor Territories

Figure 4-1 shows the percentage of total ENERGY STAR and Code Plus housing units completed in 2008 in each of the electric Sponsors’ service areas and in municipal electric service areas; the percentage of total ENERGY STAR-qualified housing units completed in 2008 in each of the electric Sponsors’ service areas and in municipal electric service areas; and the percentage of total Code Plus housing units completed in 2008 in each of the electric Sponsors’ service areas and in municipal electric service areas.

**Figure 4-1: Electric Sponsor 2008 Completed ENERGY STAR and Code Plus Housing Units**

- NSTAR 58%
- National Grid 28%
- WMECO 6%
- CLC 6%
- Muni 1%

**2008 Total Units Completed**
- ENERGY STAR & Code Plus (n=1,396)
- NSTAR 50%
- National Grid 31%
- WMECO 9%
- CLC 8%
- Muni 1%

**2008 ENERGY STAR Units Completed** (n=986)
- NSTAR 79%
- National Grid 20%
- CLC 1%

**2008 Code Plus Units Completed** (n=410)
4.2 Gas Sponsor Territories

Figure 4-2 shows the percentage of total ENERGY STAR and Code Plus housing units completed in 2008 in each of the gas Sponsors’ service areas and in areas not served by the gas Sponsors; the percentage of total ENERGY STAR-qualified housing units completed in 2008 in each of the gas Sponsors’ service areas and no gas Sponsor areas; and the percentage of total completed Code Plus housing units in 2008 in each of the gas Sponsors’ service areas and no gas sponsor areas.

Figure 4-2: Gas Sponsor 2008 Completed ENERGY STAR and Code Plus Housing Units
5 2008 Projects and Housing Units Recruited

Figure 5-1 and Figure 5-2 show, respectively, the annual percentages of market rate and low income projects and housing units recruited from 2003 through 2008. Low income projects are defined as any project that includes at least one low income unit. As shown, in 2008 the percentages of both projects and housing units recruited that are low income are higher than in previous years.

**Figure 5-1: Percent of 2003–2008 Market Rate versus Low Income Projects Signed**

![Chart showing percentages of market rate and low income projects signed from 2003 to 2008.](chart1)

**Figure 5-2: Percent of 2003–2008 Market Rate versus Low Income Housing Units Signed**

![Chart showing percentages of market rate and low income housing units signed from 2003 to 2008.](chart2)
5.1 2008 Recruited Projects by Size—Number of Units

Figure 5-3 and Figure 5-4 show the annual percentages of projects and housing units signed from 2003 through 2008 falling into various size categories based on the number of housing units in the project. Figure 5-3 shows single homes account for over half of all signed projects in each year but 2007 (48% in 2007). Projects with more than 25 units account for 15% or less of signed projects in each year. However, as Figure 5-4 shows, in every year a majority (65% to 80%) of signed housing units are in the large, over 25 unit projects and 10% or fewer in one- to five-unit projects.

**Figure 5-3: 2003—2008 Signed Projects by Number of Housing Units per Project**

**Figure 5-4: 2003—2008 Signed Housing Units by Project Size**
Figure 5-5 is another way of showing the very high percentage of projects signed in 2008 that have very few housing units and includes the number of units in the individual very large projects. Going forward it will be interesting to see if the percentage of one- and two-unit projects decreases as the Program moves further toward a market driven model using independent HERS raters to recruit projects. HERS raters will likely target multiple unit projects because those projects are more profitable, requiring less time per housing unit to service than single-home projects. On the other hand, if the number of one- and two-unit projects is predominantly driven by small builders who want to participate in the Program and homeowners who want their custom home built to ENERGY STAR standards the percentage of one and two unit projects may continue to be high.

**Figure 5-5: 2008 Signed Projects by Number of Housing Units**

- 61% of Projects Signed in 2008 Have Only One or Two Housing Units
- 16% of Projects Have 3 to 10 Units
- 11% of Projects Have 11 to 25 Units
- 11% of Projects Have 26 to 100 Units
- 1% of Projects (6 projects) Have Over 100 Units
6 Distribution of Signings across Sponsor Territories

This section shows the distribution of housing units signed in 2008 by electric Sponsor and gas Sponsor. Table 6-1 and Table 6-2 show the data used to generate the figures on the following pages.

**Table 6-1: Electric Sponsor Signed Projects and Housing Units**

<table>
<thead>
<tr>
<th>Electric Sponsors And Municipals</th>
<th>Total Projects</th>
<th>Market Rate Projects</th>
<th>Low Income Projects</th>
<th>Total Units</th>
<th>Market Rate Units</th>
<th>Low Income Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Grid</td>
<td>167</td>
<td>126</td>
<td>41</td>
<td>1,747</td>
<td>1,343</td>
<td>404</td>
</tr>
<tr>
<td>NSTAR Electric</td>
<td>145</td>
<td>108</td>
<td>37</td>
<td>2,585</td>
<td>1,812</td>
<td>773</td>
</tr>
<tr>
<td>Western Mass Electric (WMECo)</td>
<td>48</td>
<td>39</td>
<td>9</td>
<td>280</td>
<td>211</td>
<td>69</td>
</tr>
<tr>
<td>Cape Light Compact (CLC)</td>
<td>58</td>
<td>47</td>
<td>11</td>
<td>179</td>
<td>86</td>
<td>93</td>
</tr>
<tr>
<td>Unitil</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Municipals (Muni)</td>
<td>14</td>
<td>12</td>
<td>2</td>
<td>63</td>
<td>58</td>
<td>5</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>432</strong></td>
<td><strong>332</strong></td>
<td><strong>100</strong></td>
<td><strong>4,854</strong></td>
<td><strong>3,510</strong></td>
<td><strong>1,344</strong></td>
</tr>
</tbody>
</table>

**Table 6-2: Gas Sponsor Signed Projects and Housing Units**

<table>
<thead>
<tr>
<th>Gas Sponsors</th>
<th>Total Projects</th>
<th>Market Rate Projects</th>
<th>Low Income Projects</th>
<th>Total Units</th>
<th>Market Rate Units</th>
<th>Low Income Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay State Gas</td>
<td>73</td>
<td>49</td>
<td>24</td>
<td>858</td>
<td>613</td>
<td>245</td>
</tr>
<tr>
<td>National Grid</td>
<td>190</td>
<td>139</td>
<td>51</td>
<td>2,685</td>
<td>1,827</td>
<td>858</td>
</tr>
<tr>
<td>Berkshire Gas (BRKSH)</td>
<td>18</td>
<td>14</td>
<td>4</td>
<td>199</td>
<td>146</td>
<td>53</td>
</tr>
<tr>
<td>NSTAR</td>
<td>74</td>
<td>64</td>
<td>10</td>
<td>838</td>
<td>720</td>
<td>118</td>
</tr>
<tr>
<td>New England Gas (NE)</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>12</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>No Gas Sponsor</td>
<td>70</td>
<td>61</td>
<td>9</td>
<td>262</td>
<td>195</td>
<td>67</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>432</strong></td>
<td><strong>332</strong></td>
<td><strong>100</strong></td>
<td><strong>4,854</strong></td>
<td><strong>3,510</strong></td>
<td><strong>1,344</strong></td>
</tr>
</tbody>
</table>
6.1 Electric Sponsor Territories

Figure 6-1 shows the percentage of total projects, market rate projects and low income projects signed in 2008 in each of the electric Sponsors’ service areas and in municipal electric service areas. Figure 6-2 shows the percentage of total housing units, market rate housing units and low income housing units signed in 2008 in each of the electric Sponsors’ service areas and in municipal electric service areas.

Figure 6-1: Electric Sponsor Signed Total, Market Rate and Low Income Projects

![Pie chart showing percentages of 2008 total signed projects by service area.]

- NSTAR: 34%
- National Grid: 39%
- WMECo: 11%
- CLC: 13%
- Muni: 3%

2008 Total Signed Projects (n=432)

![Pie chart showing percentages of 2008 signed market rate projects by service area.]

- NSTAR: 33%
- National Grid: 38%
- WMECo: 12%
- CLC: 14%
- Muni: 4%

2008 Signed Market Rate Projects (n=332)

![Pie chart showing percentages of 2008 signed low income projects by service area.]

- NSTAR: 37%
- National Grid: 41%
- WMECo: 9%
- CLC: 11%
- Muni: 2%

2008 Signed Low Income Projects (n=100)
Figure 6-2: Electric Sponsor Signed Total, Market Rate and Low Income Housing Units

2008 Total Signed Units
(n=4,854)

- NSTAR: 53%
- National Grid: 36%
- WMECo: 6%
- CLC: 4%
- Mun: 1%

2008 Signed Market Rate Units
(n=3,510)

- NSTAR: 52%
- National Grid: 38%
- WMECo: 6%
- CLC: 2%
- Mun: 2%

2008 Signed Low Income Units
(n=1,344)

- NSTAR: 58%
- National Grid: 30%
- WMECo: 5%
- CLC: 7%
6.2 Gas Sponsor Territories.

Figure 6-3 shows the percentage of total projects, market rate projects and low income projects signed in 2008 in each of the gas Sponsors’ service areas and in areas where natural gas is not available or gas providers do not sponsor the Program. Figure 6-4 shows the percentage of total housing units, market rate housing units and low income housing units signed in 2008 in each of the gas Sponsors’ service areas and in areas where natural gas is not available or gas providers do not sponsor the Program.

Figure 6-3: Gas Sponsor Signed Total, Market Rate and Low Income Projects
Figure 6-4: Gas Sponsor Signed Total, Market Rate and Low Income Housing Units

2008 Total Signed Units
(n=4,584)

2008 Signed Market Rate Units
(n=3,510)

2008 Signed Low Income Units
(n=1,344)
7 Lighting
Prior to 2008 builders could have their HERS raters install free compact fluorescent lamps (CFLs) in all appropriate sockets when the final inspection was conducted; builders did not pay anything for the CFLs and there was no limit to the number of CFLs that could be installed. In 2008, builders became responsible for selecting, ordering and installing the free CFLs and received an incentive of $2 for each CFL they installed. Figure 7-1 shows the percentage of ENERGY STAR-qualified housing units in each year from 2002 through 2006 and 2008 that installed CFLs through the Program. (ICF was not able to provide the number of homes installing lighting measures in 2007.) The drop in the percentage of ENERGY STAR-qualified homes installing CFLs in 2008 likely reflects many builders deciding not to install CFLs if they had to select, order and install the CFLs themselves rather than have their HERS rater install them at the final inspection.

Figure 7-1: Percent of Qualified Housing Units Installing CFLs 2002 – 2008
7.1 Changes in Types of CFLs Installed—2007 to 2008

ICF provided data on the number of CFLs, by bulb type, they installed and verified in participating homes in the 2007 and 2008 Program years. Almost all (91%) of the bulbs installed in 2008 were ordered and installed by builders. Figure 7-2 shows that spirals remain the most frequently installed type of CFL, but that they accounted for a much smaller percentage of CFLs in 2008 (38% vs. 49% in 2007). Globes also accounted for a smaller percentage of 2008 CFLs (3% vs. 7% in 2007). Capsules accounted for 22% of all CFLs in both 2007 and 2008. Reflectors and floods, candelabra-based bulbs, 3-way bulbs, and dimmable floods and spirals all accounted for larger percentages of bulbs in 2008 than in 2007, though some of the percentages are very low. The drop in the percentage of spirals installed likely reflects builders becoming more familiar with and comfortable with the variety of CFL choices now available to them. ICF installed an average of 25 CFLs per housing unit installing CFLs in 2007. In 2008, the average number of CFLs installed per housing unit installing CFLs was 44.

Figure 7-2: Type of CFLs Installed—2007 and 2008
8 ENERGY STAR Windows and HVAC Equipment

Figure 8-1 shows the percentages of ENERGY STAR-qualified housing units that installed ENERGY STAR windows, heating systems and central air conditioning. As shown, the percentage of homes installing ENERGY STAR windows has varied over the years. In 2005, almost three-fourths (73%) of all qualified homes installed ENERGY STAR windows; in 2006 the percentage of homes installing ENERGY STAR windows fell sharply to 56%, then rebounded in 2007 to 83% of qualified homes and rose to 86% in 2008. Window U-values in 2008 ENERGY STAR-qualified housing units range from 0.22 to 0.82; the average is 0.33.

The percentage of ENERGY STAR housing units with ENERGY STAR heating systems increased steadily from 2003 through 2006 to 87%, fell to 72% in 2007 and climbed to 77% in 2008. In 2008, boiler Average Fuel Utilization Efficiencies (AFUEs) range from 80.0 to 98.5; the average is 85.4. Natural gas and propane furnace AFUEs range from 91.9 to 98.0; the average is 91.9.

The percentage of housing units installing ENERGY STAR central air conditioning remains low. The percentages of ENERGY STAR homes installing ENERGY STAR central air conditioning in 2007 and 2008 are percentages of homes with central air conditioning. (Comparable percentages are not available prior to 2007 because data on the number of ENERGY STAR central air conditioning units installed were available, but not on the number of homes with central air conditioning.) The percentage of ENERGY STAR-qualified homes with central air conditioning was 55% in 2007 and 58% in 2008. The average SEER of central air conditioning systems installed in ENERGY STAR-qualified housing units in 2008 (567 homes) is 12.8; the minimum SEER is 9.4 and the maximum SEER is 21.4.

Figure 8-1: Percent of ENERGY STAR-Qualified Housing Units Installing ENERGY STAR Windows, Heating Systems, and Central Air Conditioning 2002 – 2008
9 ENERGY STAR-qualified versus Code Plus Homes

Figure 9-1 shows that virtually the same percentages of ENERGY STAR-qualified and Code Plus housing units installed ENERGY STAR heating systems in 2008, and Code Plus housing units with central air conditioning were more likely than ENERGY STAR-qualified housing units with central air conditioning to have ENERGY STAR air conditioning systems. At the same time, Code Plus housing units were much less likely than ENERGY STAR-qualified housing units to have installed free CFLs through the Program or have ENERGY STAR windows.

Figure 9-1: Comparison of 2008 ENERGY STAR versus Code Plus Housing Units Installing Free CFLs and ENERGY STAR Heating Systems, Windows and Air Conditioning
10 Duct Leakage

Standards for ENERGY STAR qualification require that ducts be sealed and tested to have leakage at or below 6 cfm25 to outdoors per 100 square feet of conditioned floor area. However, duct leakage testing is not required if all ducts and air handling equipment are in conditioned space and envelope leakage is 3 ACH50 or less. The majority of homes participating in the Program have ducts—98% of ENERGY STAR and 100% of Code Plus homes completed through the Program in 2008.

The Program encourages builders to install ducts in conditioned space and, based on findings from the 2005 Baseline study, it has been successful. In the 2005 Baseline Study, only 11% of the single family homes with ducts had all ducts installed in conditioned space. In 2007, 42% of all ENERGY STAR-qualified housing units had all ducts installed in conditioned space. In 2008, 77% of ENERGY STAR-qualified housing units and 64% of Code Plus housing units had all ducts installed in conditioned space. In addition, in 2008, 72% of the ENERGY STAR-qualified housing units and 45% of the Code Plus housing units with all ducts in conditioned space had envelope leakage of 3 ACH50 or less, which means duct leakage testing could be waived.

The average duct leakage in 2007 for ENERGY STAR-qualified housing units with ducts in unconditioned space was 4.3 cfm25 per 100 square feet of conditioned floor area. In 2008, duct leakage testing was required in 427 ENERGY STAR-qualified housing units and 219 Code Plus housing units that had ducts in unconditioned space or had ducts in conditioned space, but envelope leakage was greater than 3 ACH50. Figure 10-1 shows the average, minimum and maximum duct leakage measured in the 2008 housing units where duct leakage testing was required. As shown, duct leakage in ENERGY STAR homes requiring duct leakage testing ranged from 0.3 to 6.0 and averaged 4.0 cfm25 per 100 square feet of conditioned space, which is 0.3 lower than in 2007. Average duct leakage in 2008 Code Plus homes requiring testing is 6.4 and the average over all ENERGY STAR and Code Plus homes requiring testing is 5.0 cfm25 per 100 square feet of conditioned space.

**Figure 10-1: 2008 Duct Leakage**

![Graph showing duct leakage data for 2008 ENERGY STAR, Code Plus, and all homes.](image)
11 Envelope Leakage

For many years the Massachusetts Program required housing units to have envelope leakage of 5 ACH50 or lower to be ENERGY STAR qualified—this is not a requirement of the national ENERGY STAR Homes Program performance path. In 2007, the Massachusetts Program dropped the envelope leakage requirement. Figure 11-1 shows the average, minimum and maximum ACH50 measured in Code Plus and ENERGY STAR housing units completed in 2008. As shown, and not surprisingly, average envelope leakage is lower in the groups of housing with lower HERS indices. Figure 11-2 shows the percentages of Code Plus and ENERGY STAR housing units with ACH50 greater than 5. As shown, 56% of Code Plus housing units, 31% of ENERGY STAR I housing units and 3% of ENERGY STAR II housing units with HERS indices over 50 have ACH50 greater than 5. All ENERGY STAR housing units with HERS indices of 50 or lower have ACH50 below 5.

**Figure 11-1: Envelope Leakage (ACH50)**

![Graph showing envelope leakage (ACH50) for different categories of housing units.]

**Figure 11-2: Percent of 2008 Housing Units with ACH50 Greater than 5**

![Graph showing the percentage of housing units with ACH50 greater than 5 for different categories of housing units.]

12 HERS Raters

Eleven HERS rating companies participated in the Program in 2008. These HERS raters worked with builders that completed ENERGY STAR and/or Code Plus housing units and/or are working with new projects. Table 12-1 shows how many Code Plus and ENERGY STAR housing units each rater completed in 2008, the average HERS index of completed ENERGY STAR housing units and the number of housing units signed in 2008 that each rater is working with. The number of HERS raters working with participating builders is increasing and, as Table 12-1 shows, includes a mix of small and large rating companies, offering builders a wide choice of raters. By HERS rater, the average HERS index for rated ENERGY STAR housing units ranges from 49 to 73.

Table 12-1: 2008 Participating HERS Raters

<table>
<thead>
<tr>
<th>HERS Rater</th>
<th>Code Plus</th>
<th>ENERGY STAR*</th>
<th>Total Housing Units</th>
<th>Average ENERGY STAR HERS Index</th>
<th>2008 Signed Housing Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rater A</td>
<td>248</td>
<td>435</td>
<td>683</td>
<td>67</td>
<td>2,089</td>
</tr>
<tr>
<td>Rater B</td>
<td>145</td>
<td>281</td>
<td>426</td>
<td>64</td>
<td>1,603</td>
</tr>
<tr>
<td>Rater C</td>
<td>0</td>
<td>111</td>
<td>111</td>
<td>61</td>
<td>514</td>
</tr>
<tr>
<td>Rater D</td>
<td>7</td>
<td>80</td>
<td>87</td>
<td>73</td>
<td>266</td>
</tr>
<tr>
<td>Rater E</td>
<td>3</td>
<td>32</td>
<td>35</td>
<td>61</td>
<td>288</td>
</tr>
<tr>
<td>Rater F</td>
<td>0</td>
<td>22</td>
<td>22</td>
<td>63</td>
<td>0</td>
</tr>
<tr>
<td>Rater G</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>49</td>
<td>0</td>
</tr>
<tr>
<td>Rater H</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>NA</td>
<td>29</td>
</tr>
<tr>
<td>Rater I</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td>Rater J</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>62</td>
</tr>
<tr>
<td>Rater K</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>Totals:</td>
<td>410</td>
<td>972</td>
<td>1,382</td>
<td>65</td>
<td>4,854</td>
</tr>
</tbody>
</table>
Figure 12-1 shows the percentage of housing units completed by each rater in 2008 that were Code Plus, ENERGY STAR I and ENERGY STAR II. Figure 12-2 shows the percentage of projects and housing units signed in 2008 that each rater is working with.

**Figure 12-1: Rater Percentages of ENERGY STAR and Code Plus Housing Units**

*Others includes raters F, G, H and I.*

**Figure 12-2: Percentages of Signed Projects and Units Raters Working With**