January 2016 Trade Ally Forums

New Homes: EPS™

January 19, 2016 (Portland)
January 21, 2016 (Medford)
January 22, 2016 (Bend)

Mike Lillesand
EPS
Learning objectives

1. Why was EPS developed?
2. Value of EPS?
3. How do you get an EPS?
Why was EPS developed?

To create an easy way for homebuyers and homeowners to compare:

- Estimated utility costs
- Energy efficiency
- Environmental impact

Motivate consumers to make energy-efficiency improvements
EPS is not

- A certification
- A program
- A guarantee
- A cash incentive
- An alternative to ENERGY STAR®, Earth Advantage®, LEED® for Homes or any other certification program
EPS for New Homes

- Launched in 2009
- Over 10,000 homes to date
- 2,500 in 2015
- 200 builders
- 30 verifiers
What does the EPS sheet tell you?

**Energy-efficient features that contribute to this home’s score:**

<table>
<thead>
<tr>
<th>Insulated Ceiling: R-49</th>
<th>Efficient Windows: U-0.31</th>
<th>Space Heating: 92% AFUE Furnace</th>
</tr>
</thead>
</table>

**USEFUL TERMINOLOGY**

**Energy-efficient features**

- **R-Value**: Rates the efficiency of insulation; a higher R-Value signals improved performance of floor, ceiling and wall insulation.

- **U-Value**: Indicates the rate of heat loss in windows; a lower U-Value demonstrates the effectiveness of a window, resulting in a more comfortable home.

- **ACH @ 50Pa**: Total air changes per hour at 50 pascals; a low number signifies a properly-sealed home with fewer air leaks.

- **EF**: Energy Factor for water heaters or appliances; the higher the EF, the more energy efficient the model.

**Energy score**

- **EPS**: Displayed in millions of Btu per year.

  - A Btu or British Thermal Unit is a measurement of the heat content of fuel.
  - One Btu = the energy produced by a single wooden match.

- **Carbon footprint**

  - A home’s energy consumption affects carbon emissions and impacts the environment. The carbon calculation for EPS is based on emissions from the utility-specific electricity generation method and natural gas consumption of the home.

**Similar size Oregon home**

- **Energy**: The energy consumption of an average Oregon home of similar square footage, heating type and geographical region.

- **Carbon**: The carbon footprint of an average Oregon home of similar square footage, heating type, geographical region and utility mix.

**This home if built to code**

- The estimated annual energy and carbon use for this home if it was just built to the minimum standards allowed under Oregon code at the time of construction without energy-efficient features installed.
<table>
<thead>
<tr>
<th>Program year</th>
<th>EPS homes</th>
<th>Market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>673</td>
<td>12 %</td>
</tr>
<tr>
<td>2010</td>
<td>602</td>
<td>12.5%</td>
</tr>
<tr>
<td>2011</td>
<td>812</td>
<td>20%</td>
</tr>
<tr>
<td>2012</td>
<td>1320</td>
<td>25.3%</td>
</tr>
<tr>
<td>2013</td>
<td>1,750</td>
<td>27%</td>
</tr>
<tr>
<td>2014</td>
<td>2,186</td>
<td>34%</td>
</tr>
<tr>
<td>2015</td>
<td>2,500+</td>
<td>TBD</td>
</tr>
</tbody>
</table>
EPS for Existing Homes

- Launched in 2012
- 1200 official scores
- 460 in 2015
- 14 contractors
Score sheet – New vs. Existing Homes

Energy Performance Score is a tool to assess the energy consumption and carbon footprint of a home. The lower the score, the better—a low EPS identifies a home as energy efficient with a smaller carbon footprint and lower energy costs.

**Estimated Monthly Energy Costs**

**New Home**

- Monthly energy costs: **$103**
- Annual energy costs: **$1,233**

**Existing Home**

- Monthly energy costs: **$120**
- Annual energy costs: **$1,440**

**Energy Consumption**

- Measured in millions of Btu per year (MBtu/yr).
- Estimated average energy usage: Electric (kWh): 9,234, Natural gas (therms): 274

**Carbohydrate Footprint**

- Measured in tons of carbon dioxide per year (tons CO2/yr).
- Estimated average carbon footprint: Electric (tCO2/yr): 4.9, Natural gas (tCO2/yr): 1.6

*Actual energy costs are based on many factors such as occupant behavior, weather, and utility rates. A home's EPS takes into account the energy-efficient features installed in the home, but does not account for occupant behavior.*
New Homes incentives
Incentive Framework

Sliding scale incentives

• Pathways
  • Stepping stones
• Performance
  • Modeled performance

Verifier incentive

• 20 percent of builder incentive
• $300 minimum
**EPS: prescriptive or performance**

<table>
<thead>
<tr>
<th></th>
<th>Path 1 or 10% Improvement</th>
<th>Path 2 or 20% Improvement*</th>
<th>Path 3 or 25% Improvement</th>
<th>Path 4 or 35% Improvement</th>
<th>Path 5 or 40% Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Potential Incentive</strong></td>
<td>$600</td>
<td>$1,200</td>
<td>$2,000</td>
<td>$4,000</td>
<td>$5,000</td>
</tr>
<tr>
<td><strong>Ceiling</strong></td>
<td>R-49</td>
<td>R-49</td>
<td>R-49</td>
<td>R-60</td>
<td>R-60</td>
</tr>
<tr>
<td><strong>Wall</strong></td>
<td>R-23</td>
<td>R-23</td>
<td>R-23</td>
<td>R-25</td>
<td>R-40</td>
</tr>
<tr>
<td><strong>Floor</strong></td>
<td>R-30</td>
<td>R-30</td>
<td>R-30</td>
<td>R-38</td>
<td>R-38</td>
</tr>
<tr>
<td><strong>Window</strong></td>
<td>U-0.30</td>
<td>U-0.30</td>
<td>U-0.30</td>
<td>U-0.25</td>
<td>U-0.20</td>
</tr>
<tr>
<td><strong>Gas Furnace</strong></td>
<td>92 AFUE</td>
<td>94 AFUE</td>
<td>94 AFUE</td>
<td>94 AFUE</td>
<td>85 AFUE Non Ducted</td>
</tr>
<tr>
<td><strong>Heat Pump</strong></td>
<td>8.5 HSPF</td>
<td>8.5 HSPF</td>
<td>8.5 HSPF</td>
<td>8.5 HSPF</td>
<td>9.0 HSPF Ductless Heat Pump</td>
</tr>
<tr>
<td><strong>Ducts</strong></td>
<td>Mastic Sealed and Tested</td>
<td>Mastic Sealed and Tested</td>
<td>Ducts Inside and Sealed$</td>
<td>Ducts Inside and Sealed$</td>
<td>No Ducts</td>
</tr>
<tr>
<td><strong>CFL Lighting %</strong></td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Gas Water Heater</strong></td>
<td>0.61 EF</td>
<td>0.82 EF</td>
<td>0.82 EF</td>
<td>0.82 EF</td>
<td>0.82 EF</td>
</tr>
<tr>
<td><strong>Electric Water Heater</strong></td>
<td>0.93 EF</td>
<td>2.0 EF</td>
<td>2.0 EF</td>
<td>0.93 EF</td>
<td>0.93 EF</td>
</tr>
<tr>
<td><strong>Air Sealing ACH50</strong></td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Ventilation</strong></td>
<td>ENERGY STAR*</td>
<td>ENERGY STAR</td>
<td>ENERGY STAR</td>
<td>Qualified HRV/ERV</td>
<td>Qualified HRV/ERV</td>
</tr>
</tbody>
</table>
### SW Washington: February 1 Launch

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Potential Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% improvement</td>
<td>$300</td>
</tr>
<tr>
<td>20% improvement</td>
<td>$400</td>
</tr>
<tr>
<td>30% improvement</td>
<td>$500</td>
</tr>
<tr>
<td>40% improvement</td>
<td>$700</td>
</tr>
<tr>
<td>45% improvement</td>
<td>$900</td>
</tr>
<tr>
<td>Verifier Incentive</td>
<td>$100 per home</td>
</tr>
</tbody>
</table>
Value ofEPS
Benefits of EPS

• Comfort
  – Increased customer satisfaction
• Health
  – Fewer customer complaints
• Safety
  – Avoided risk or liability
• Durability
  – Fewer repair call backs

• Quantify savings
  – Energy and financial
• Influence decisions
  – Educate customers
• Show upgrades
  – Highlight your work
IMPROVE YOUR EPS AND EARN YOUR REWARDS

EPS works with other energy ratings and certifications, and is the only option that provides a cash incentive for qualified projects in Oregon. The more efficient the home, the better the EPS and the higher the incentive.

See below for example incentive ranges and how EPS lines up with common ratings and certifications.

The above image represents the approximate minimum energy requirements for each certification or score. In many cases the actual energy performance is better than the value that is listed. For additional information on these scores and certifications, speak to your verifier or contact the New Homes trade ally coordinator at 1.877.283.0698, option 1.

To learn more about EPS, visit www.energytrust.org/eps.

*EPS incentive offers are subject to funding availability and may change.

Energy Trust of Oregon
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503.546.6862 fax
energytrust.org

Energy Trust of Oregon is an independent nonprofit organization dedicated to helping utility customers benefit from saving energy and generating renewable power. Our services, cash incentives and energy solutions have helped participating customers of Portland General Electric, Pacific Power, NW Natural and Cascade Natural Gas save on energy costs. Our work helps keep energy costs as low as possible, creates jobs and builds a sustainable energy future. (Printed with vegetable-based ink on paper that contains 100% post-consumer waste, 5/14)
**EPS in the RMLS**

- PDF of score sheet
- Other green certifications obtained
- Energy-efficient features of the home
- Score
Consumption defines energy rating

Both homes have an energy rating (HERS) of 70

EPS of 189

EPS of 38
Compares energy usage to code

Large home (4,218 sq. ft.)

Built energy efficient
EPS of 189

Built to code
EPS of 238
Compares energy usage to code

Small home (1,677 sq. ft.)

Built energy efficient
EPS of 38

Built to code
EPS of 55
How to get an EPS
Obtain an EPS

1. Engage with a trade ally
2. Submit plan set to a verifier for modeling
3. Receive unofficial EPS
4. Schedule inspections
5. Receive final EPS and incentives
EPS requirements

• Compliance with NW ENERGY STAR® Thermal Enclosure Checklist, TEC
• Blower Door test
• Insulation and framing inspections
• Duct sealing and testing
• Installation of zonal pressure relief
• Heat pump commissioning*
• Combustion Appliance Zone testing
Program verification requirements

- Hire a third-party verifier
- Two site inspections
  - First inspection pre-drywall
  - Second inspection post-construction
### Thermal Enclosure System Verifier Checklist

#### High-Performance Fenestration

1.1 Fenestration shall meet or exceed Northwest ENERGY STAR Homes BOP or TCO.  

#### Quality-Installed Insulation

2.1 Ceiling, wall, floor, and slab insulation levels shall meet or exceed Northwest ENERGY STAR Homes BOP Prescriptive Path or TCO requirements.  

3. Fully-Aligned Air Barriers

At each location noted below, a complete air barrier shall be provided that is fully aligned with the insulation as follows:  
- At interior surface of walls. Also, include barrier at interior edge of attic eave using a wind baffle that extends to the full height of the insulation. Include a baffle in every bay or a tabbed baffle in each bay with a soft vent that will also prevent wind washing of insulation in adjacent bays.  
- At exterior surface and interior surface of walls.  
- At interior surface of floors, including supports to ensure permanent contact and blocking at exposed edges.

#### Insulation

4. Reduced Thermal Bridging

4.1 For insulated ceilings with attic space above (i.e., non-cathedralized ceilings), Grade I insulation extends to the inside face of the exterior wall below meets or exceeds Northwest ENERGY STAR Homes BOP or TCO, or, when using alternative in Footnote 11, ≥ R-21.  

4.2 For slabs on grade, insulation under slab and at 100% of slab edge meets or exceeds Northwest ENERGY STAR Homes BOP or TCO, or, when using alternative in Footnote 11, ≥ R-5 at slab edge. Slab insulation shall be aligned with thermal boundary of the walls.

4.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-48, or when using alternative in Footnote 11, ≥ R-38.  

4.4 Reduced thermal ongoing at above-grade walls separating conditioned from unconditioned space (rim or band posts exempted) using one of the following options:  

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Must</th>
<th>Builder Verified</th>
<th>Verifier Verified</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.4.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.4.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dry wall / interior finish

Grade I
No gaps
No voids
No misalignment
No compression
Nickel-thick mastic application
Zonal pressure relief is required in all homes with ducted heating systems.
Ventilation rates

Simplified ASHRAE 62.2

Minimum cfm =
(bedrooms + 1) 7.5 + (.01 * conditioned area)

Example:
(3 bedrooms + 1) 7.5 + (.01 * 2200 sq ft) = 52 cfm
Thank You
Mike Lillesand
503-310-4981