



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



SAMPLE

NOT AN ACTUAL HOME

EPS is a tool to assess a home's energy consumption, cost and carbon footprint.

EPS™ is an energy performance score that measures and rates the energy consumption and carbon footprint of a newly constructed 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

\$103*

Estimated average energy costs per month: Electric \$78, Natural gas \$25

Estimated average annual energy costs: **\$1,233***

Location

12345 SE Example Street
Portland, OR 97215

YEAR BUILT: 2012

SQ. FOOTAGE: 1,799

EPS ISSUE DATE: 4-17-12

Utilities:

Gas: NW Natural

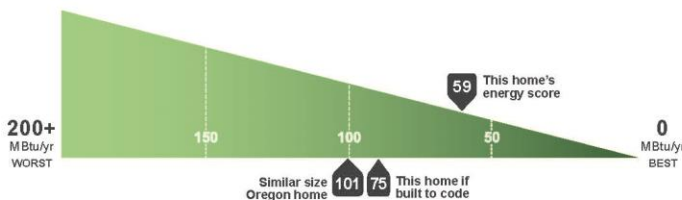
Electric: Portland General Electric

Energy Score

59

ENERGY CONSUMPTION:

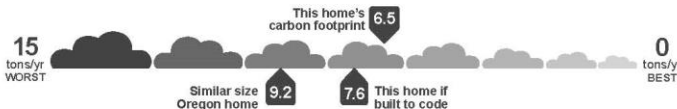
Measured in millions of Btu per year (MBtu/yr).
One million Btu = 293 kWh or 10 therms.



Estimated average energy usage: Electric (kWh): 9,234*, Natural gas (therms): 274

CARBON FOOTPRINT:

Measured in tons of carbon dioxide per year (tons/yr). One ton = 2,000 miles driven by one car (typical 21 mpg car).



Estimated average carbon footprint: Electric (tons/yr): 4.9, Natural gas (tons/yr): 1.6

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



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 CONSUMPTION - Measured in millions of Btu per year (MBtu/yr). One million Btu = 293 kWh or 10 therms.

+ Energy-efficient features that contribute to this home's score:

Insulated Ceiling: R-49

Efficient Windows: U-0.31

Space Heating: 92% AFUE Furnace

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 is 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.

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



Energy Trust of Oregon 421 SW Oak St, Suite 300, Portland, Oregon 97204 1.866.368.7878 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 tapping renewable resources. 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 inks on paper that contains 100% post-consumer waste. 10/12

New Homes program market share

Program year	EPS homes	Market share
2009	673	12 %
2010	602	12.5%
2011	812	20%
2012	1320	25.3%
2013	1,750	27%
2014	2,186	34%
2015	2,500+	TBD



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Estimated Monthly Energy Costs

\$103*

Estimated average annual energy costs: \$1,233*

Estimated average energy costs per month: Electric \$78, Natural gas \$25

Location
12345 SE Example Street
Portland, OR 97215

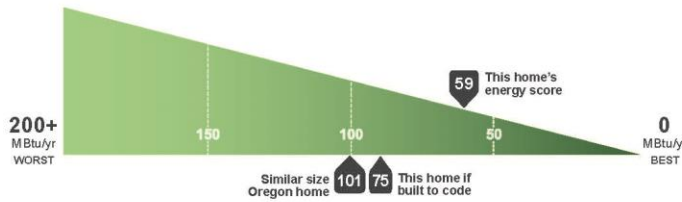
YEAR BUILT: 2012
SQ. FOOTAGE: 1,799
EPS ISSUE DATE: 4-17-12

Utilities:
Gas: NW Natural
Electric: Portland General Electric

Energy Score

59

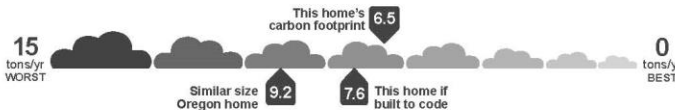
ENERGY CONSUMPTION: Measured in millions of Btu per year (MBtu/yr). One million Btu = 293 kWh or 10 therms.



Estimated average energy usage: Electric (kWh): 9,234*, Natural gas (therms): 274

CARBON FOOTPRINT:

Measured in tons of carbon dioxide per year (tons/yr). One ton = 2,000 miles driven by one car (typical 21 mpg car).



Estimated average carbon footprint: Electric (tons/yr): 4.9, Natural gas (tons/yr): 1.6

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



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 newly constructed 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

\$103*

Estimated average annual energy costs: \$1,233*

Location
1234 SE Example Street
Wilsonville, OR 97070

YEAR BUILT: 2012
SQ. FOOTAGE: 1,799
EPS ISSUE DATE: 4-17-2012

Utilities:
Gas: NW Natural
Electric: Portland General Electric

Estimated average energy costs per month: Electric \$78, Natural gas \$25

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

\$120*

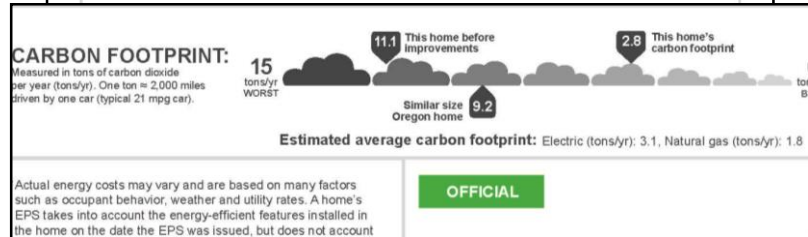
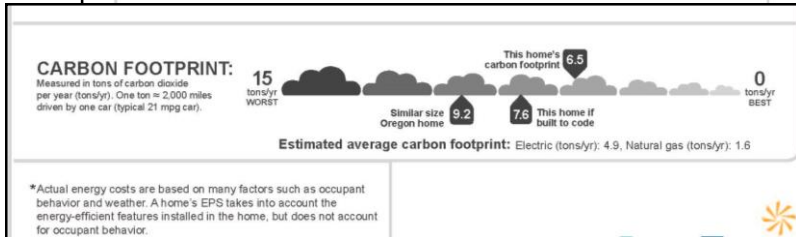
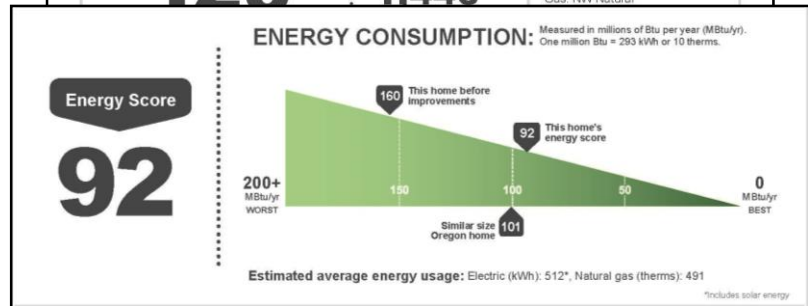
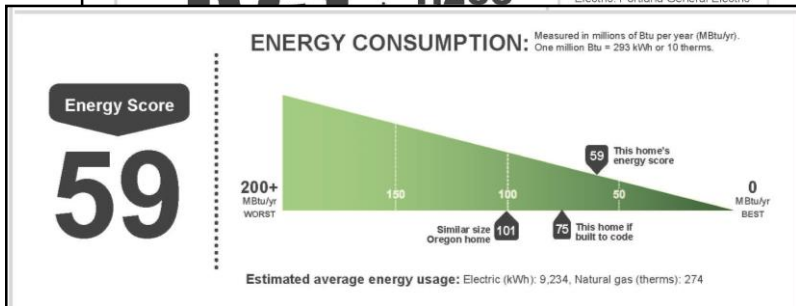
Estimated average annual energy costs: \$1,440*

Location
12345 Southeast Very Long
Example Street
Portland, OR 97215

YEAR BUILT: 1984
SQ. FOOTAGE: 2,112
EPS ISSUE DATE: 9-17-11

Utilities:
Gas: NW Natural
Electric: Portland General Electric

Estimated average energy costs per month: Electric \$90, Natural gas \$30



New Homes incentives

Incentive Framework

Sliding scale incentives

- Pathways
 - Stepping stones
- Performance
 - Modeled performance

Verifier incentive

- 20 percent of builder incentive
- \$300 minimum

EPS INCENTIVE OVERVIEW

2015 CASH INCENTIVES FOR ENERGY-EFFICIENT NEW HOMES



EPS[®], brought to you by Energy Trust of Oregon, is an energy performance scoring tool that measures a newly built home's energy consumption, carbon footprint and utility costs. Homes that have an EPS qualify for cash incentives from Energy Trust depending on the energy-efficiency improvements installed during construction. Review the chart below for guidance on specifications that improve a home's energy performance and related incentives.

NEW HOME INCENTIVE OPTIONS

These examples are for illustration only and are a small fraction of the options available to trade ally builders for improving a home's EPS and maximizing energy savings. Incentives are available for building homes based on one of five prescriptive pathways, or based on a sliding scale of performance above code, starting at 10 percent improvement. Incentives will vary depending on energy-efficiency improvements.

	Path 1 or 10% Improvement	Path 2 or 20% Improvement*	Path 3 or 25% Improvement	Path 4 or 35% Improvement	Path 5 or 40% Improvement	Your Efficient Home Path
Potential Incentive[†]	\$600	\$1,200	\$2,000	\$4,000	\$5,000	
Ceiling	R-49	R-49	R-49	R-60	R-60	
Wall	R-23	R-23	R-23	R-25	R-40	
Floor	R-30	R-30	R-30	R-38	R-38	
Window	U-0.30	U-0.30	U-0.30	U-0.25	U-0.20	
Gas Furnace	92 AFUE	94 AFUE	94 AFUE	94 AFUE	85 AFUE Non Ducted	
Heat Pump	8.5 HSPF [‡]	8.5 HSPF [‡]	8.5 HSPF [‡]	8.5 HSPF [‡]	9.0 HSPF Ductless Heat Pump	
Ducts	Mastic Sealed and Tested	Mastic Sealed and Tested	Ducts Inside and Sealed [§]	Ducts Inside and Sealed [§]	No Ducts	
High-Efficiency Lighting %	80%	80%	80%	100%	100%	
Gas Water Heater	0.61 EF	0.82 EF	0.82 EF	0.82 EF	0.82 EF	
Electric Water Heater	0.93 EF	2.0 EF	2.0 EF	0.93 EF	0.93 EF	
Air Sealing ACH50	4.0	4.0	4.0	2.5	2.5	
Ventilation	ENERGY STAR [®]	ENERGY STAR	ENERGY STAR	Qualified HRV/ERV	Qualified HRV/ERV	

Incentives above are calculated by computer modeling of a 2,200 sq. ft. house plan in full Energy Trust service territory. Incentives are based on improvements in the home's annual energy use over minimum code requirements, as demonstrated by energy modeling. Incentives are subject to funding availability and may change. Incentive examples are based on the 2011 Oregon Residential Specialty Code.

*Achieving Northwest ENERGY STAR certification will qualify homes for Path 2 and will help guide you towards higher performance paths.

[†]Homes can qualify for an additional incentive of up to \$200, if built to be solar ready. For more information, contact a program-approved verifier.

[‡]9.0 HSPF for Climate Zone 5.

[§]All HVAC equipment and ducting must be located inside a conditioned space to qualify for this path.

EPS: prescriptive or performance

	Path 1 or 10% Improvement	Path 2 or 20% Improvement*	Path 3 or 25% Improvement	Path 4 or 35% Improvement	Path 5 or 40% Improvement
Potential Incentive[†]	\$600	\$1,200	\$2,000	\$4,000	\$5,000
Ceiling	R-49	R-49	R-49	R-60	R-60
Wall	R-23	R-23	R-23	R-25	R-40
Floor	R-30	R-30	R-30	R-38	R-38
Window	U-0.30	U-0.30	U-0.30	U-0.25	U-0.20
Gas Furnace	92 AFUE	94 AFUE	94 AFUE	94 AFUE	85 AFUE Non Ducted
Heat Pump	8.5 HSPF [‡]	8.5 HSPF [‡]	8.5 HSPF [‡]	8.5 HSPF [‡]	9.0 HSPF Ductless Heat Pump
Ducts	Mastic Sealed and Tested	Mastic Sealed and Tested	Ducts Inside and Sealed [§]	Ducts Inside and Sealed [§]	No Ducts
CFL Lighting %	80%	80%	80%	100%	100%
Gas Water Heater	0.61 EF	0.82 EF	0.82 EF	0.82 EF	0.82 EF
Electric Water Heater	0.93 EF	2.0 EF	2.0 EF	0.93 EF	0.93 EF
Air Sealing ACH50	4.0	4.0	4.0	2.5	2.5
Ventilation	ENERGY STAR®	ENERGY STAR	ENERGY STAR	Qualified HRV/ERV	Qualified HRV/ERV

SW Washington: February 1 Launch

Incentive	Potential Incentive
10% improvement	\$300
20% improvement	\$400
30% improvement	\$500
40% improvement	\$700
45% improvement	\$900
Verifier Incentive	\$100 per home

Value of
EPS

Benefits of EPS

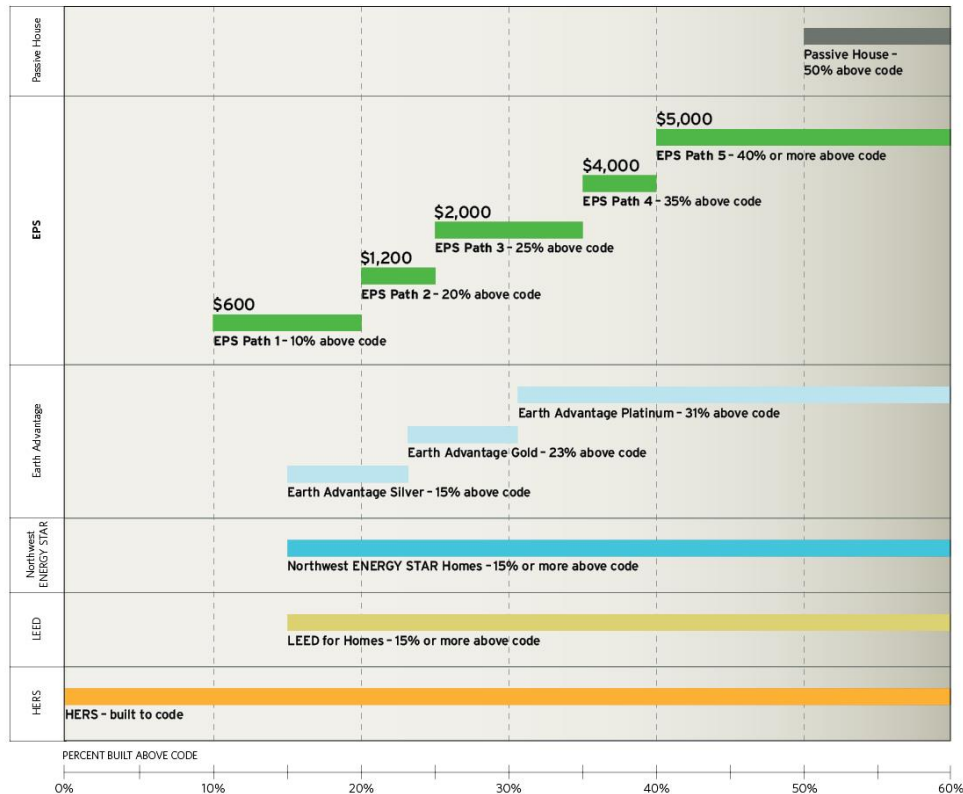
- **Comfort**
 - Increased customer satisfaction
- **Health**
 - Fewer customer complaints
- **Safety**
 - Avoided risk or liability
- **Durability**
 - Fewer repair call backs
- **Quantify savings**
 - Energy and financial
- **Influence decisions**
 - Educate customers
- **Show upgrades**
 - Highlight 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 Efficiency Family Tree

- Explains EPS and shows how it works with common scores and certifications
- ENERGY STAR®
- LEED® for Homes
- Earth Advantage®
- Passive House

EPS in the RMLS

- PDF of score sheet
- Other green certifications obtained
- Energy-efficient features of the home
- Score

		RESIDENTIAL ML#: 13620027 Addr: 2714 NE 60th AVE City: Portland Map Coord: 597/D/3 County: Multnomah Elem: Roseway Heights High: Madison Nhood/Bldg: Rose City Legal: To Follow Internet/Address/No Blog/No AVM: Y/Y/N/N PDF Doc(s): 2 # Supplements: 1		Status: SLD Area: 142 List Price: \$559,900 Unit#: Condo Loc: Zoning: 97213 Tax ID: Not Found Middle: PropType: DETACHD CC&Rs: N List Type: ER LR: N Offer/Nego: CALL-LA 3:57:36 PM	
GENERAL INFORMATION					
Lot Size: 3K-4,999SF	View:	# Acres:	Lot Desc:	Lot Dimensions: 40x100	
Wtrmt:		Seller Disc: EXEMPT	Other Disc:		
Body Water:					
RESIDENCE INFORMATION					
Upper SQFT: 1051	SFSrc: floorplan	#Bdrms: 3	#Bth: 2/1	#Lvl: 3	Year Bt: 2013 / NEW
Main SQFT: 1060	TotUp/Mn: 2111	Style: OLD-PDX, BUNGALO	Green / Yr / Obtained: LEED-HS / 2013 / YES		
Lower SQFT: 348	Parking: STREET, DRIVEWAY	#Garage: 1/ATTACHD	Home Wrnty: Y	#Fireplaces: 1/ INSERT, GAS	
Ttl SQFT: 2459	Adtl. SQFT:	Roof: COMP	Exterior: FIBRCEM	Bsmt/Fnd: PARTBAS, SLAB, PARTFIN	
REMARKS					
XSt/Dir:	I-84E; Take exit 2: 39th Ave; L on NE Cesar Chavez; 2nd R- NE Sandy; R onto NE 60th				
Private:	Move-In Ready!! \$40k price reduction! Air Conditioning! Great street! Irrigation in yard. Close to shops, parks, restaurants. Utility estimate for gas/electric - \$93/month.				
Public:	Move-In Ready! Just completed! New LEED certified Vintage-inspired home by PDX's #1 Builder in Rose City! Air Conditioning! Bungalow style w/ HWs on main, box beams, fireplace w/ built-ins, spacious kitchen w/pantry, granite, master ste w/ WI closet&soak tub. Fenced yard. Rm in bsmt finished w/ extra unf rm as storage. Close to shops, parks, restaurants. Utilities \$93/month.				
APPROXIMATE ROOM SIZES AND DESCRIPTIONS					
Living: / /		Mstr Bd: U/ 15 X 13 / SOAKTUB, WI-CLOS, SUITE		Bths - Full/Part	
Kitchen: M/ 10 X 13 / GASAPPL, PANTRY, GOURMET		2nd Bd: U/ 12 X 10 / WI-CLOS, WW-CARP		Upper Lvl: 2/0	
Dining: M/ 12 X 11 / HARDWOD		3rd Bed: U/ 12 X 10 / WW-CARP, WI-CLOS		Main Lvl: 0/1	
Family: M/ 14 X 17 / FIREPL, BEAMS, HARDWOD		DEN/OFF: M/ 10 X 11 / FNCH-DR, WW-CARP		Lower Lvl: 0/0	
BONUS: L/ 15 X 13 / WW-CARP		UTILITY: U/ / AIRCLEN, SINK, LINS-FL		Total Bth: 2/1	
FEATURES AND UTILITIES					
Kitchen:	PANTRY, GASAPPL, GRANITE, DISHWAS, DISPOSL, BI-MICO, D-DRAFT, PLB-ICE, ESTARAP, FS-RANG				
Interior:	BI-RDLY, LINS-FL, SOAKTUB, TILE-FL, HARDWOD, GAR-OPN, OWSECUR, GRANITE, AIRCLEN				
Exterior:	COVDECK, VYW-DBL, YARD, GASHKUP, PORCH, SPRNKL, SEC-LIT, DECK, FENCED				
Accessibility:	BINLITE				
Energy Eff:	FOR-90, TNKLESS, VYW-DBL, INSU+CL				
Water: PUBLIC	Sewer: PUBLIC	Hot Water: RECIRC, TNKLESS	Cool: CENTAIR	Heat: FOR-90	Fuel: GAS, ELECT
FINANCIAL					
Property Tax/Yr: \$0.00	Spcl Asmt Balance:	Tax Deferral:	BAC: % 2.7		
Terms: CASH, CONV, VA	Short Sale/Pre-Approv\$: N/	3rd Party: N	Total Comm Differs: Y		
Escrow Pref: Laurie Wood-Lawyers		Bank Owned/REO: N			
HOA: N	Dues:	Other Dues:	Rent, If Rented:		
HOA Incl:					
BROKER / AGENT DATA					
BRCD: RENA01	Office: Renaissance Development Corp.	Phone: 503-636-5800	Fax: 503-635-8400		
LPID: ANDRUSSA	Agent: Amanda Andruss	Phone: 503-969-4939	Cell/Pgr: 503-969-4939		
Email(s) AG: aandruss@renaissance-homes.com			Agent Ext:		
CoLPID: WELLSLEE	CoBRCD: RENA01	CoAgent: Lee Wells	CoPh: 503-899-7754		
Show Hrs: 24 hr	Tran: 9/10/2013	List: 6/25/2013	Exp:	Occ: VACANT	Pos: CLOSING
LB/Loc/Cmb: front door	Owner: Renaissance Homes	FIRPTA: N	Phone:		
Show: RMLS LBX, VACANT	Tenant/Other:	Phone:			
COMPARABLE INFORMATION					
Pend: 8/4/2013	DOM/CDOM: 40 /	O/Price: \$574,900			
Sold: 9/6/2013	Terms: CONV	Sold Price: \$555,000			
SPID: CHASECYN	S/Agt: Cynthia Chase	S/Off: RGIC02	S/Off Phone: 503-284-7755		

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





Northwest ENERGY STAR® Homes, Version 3 (Rev. 02) Thermal Enclosure System Verifier Checklist

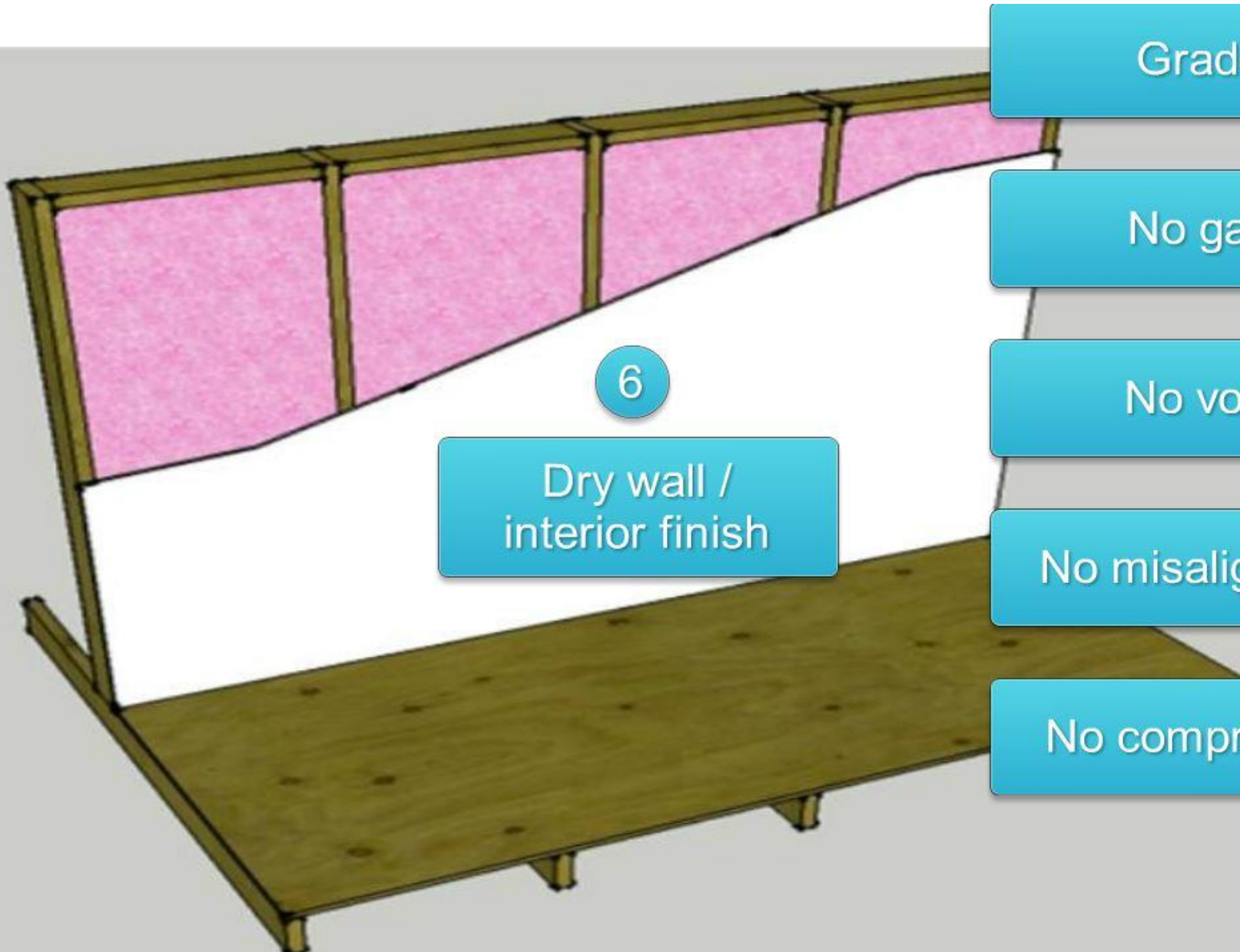
Home Address: _____ City: _____ State: _____

Inspection Guidelines	Must Correct	Builder Verified ¹	Verifier Verified	N/A
1. High-Performance Fenestration				
1.1 Fenestration shall meet or exceed Northwest ENERGY STAR Homes BOP or TCO ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 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 ^{3,4,5}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2 All ceiling, wall, floor, and slab insulation shall achieve RESNET-defined Grade I installation or, alternatively, Grade II for surfaces that contain a layer of continuous, air impermeable insulation \geq R-3 in Climate Zone 4, \geq R-5 in Climate Zones 5 & 6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fully-Aligned Air Barriers⁶				
At each location noted below, a complete air barrier shall be provided that is fully aligned with the insulation as follows:				
<ul style="list-style-type: none"> • At interior surface of ceilings. 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 soffit vent that will also prevent wind washing of insulation in adjacent bays. • At exterior surface and interior surface of walls⁷ • At interior surface of floors, including supports to ensure permanent contact and blocking at exposed edges^{8,9} 				
3.1 Walls¹⁰				
3.1.1 Walls behind showers and tubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.2 Walls behind fireplaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.3 Attic knee walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.4 Skylight shaft walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.5 Wall adjoining porch roof	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.6 Staircase walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.7 Double walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.8 Garage rim / band joist adjoining conditioned space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.9 All other exterior walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2 Floors				
3.2.1 Floor above garage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.2 Cantilevered floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.3 Floor above unconditioned basement or vented crawlspace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3 Ceilings¹⁰				
3.3.1 Dropped ceiling / soffit below unconditioned attic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.2 All other ceilings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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, \geq R-21. ^{3,11}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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, \geq R-5 at slab edge. Slab insulation shall be aligned with thermal boundary of the walls. ^{3,4,5,11}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) \geq R-49, or when using alternative in Footnote 11, \geq R-38. ^{3,11}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4 Reduced thermal bridging at above-grade walls separating conditioned from unconditioned space (rim / band joists exempted) using one of the following options: ^{12,13}				
4.4.1 Continuous rigid insulation sheathing, insulated siding, or combination of the two; \geq R-3 in Climate Zone 4, \geq R-5 in Climate Zones 5 & 6. ^{14,15} OR;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.2 Structural Insulated Panels (SIPs), OR;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.3 Insulated Concrete Forms (ICFs), OR;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4.4 Double-wall / staggered stud framing ¹⁶ OR (see next page);	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Framing

Air sealing

Insulation



6

Dry wall /
interior finish

Grade I

No gaps

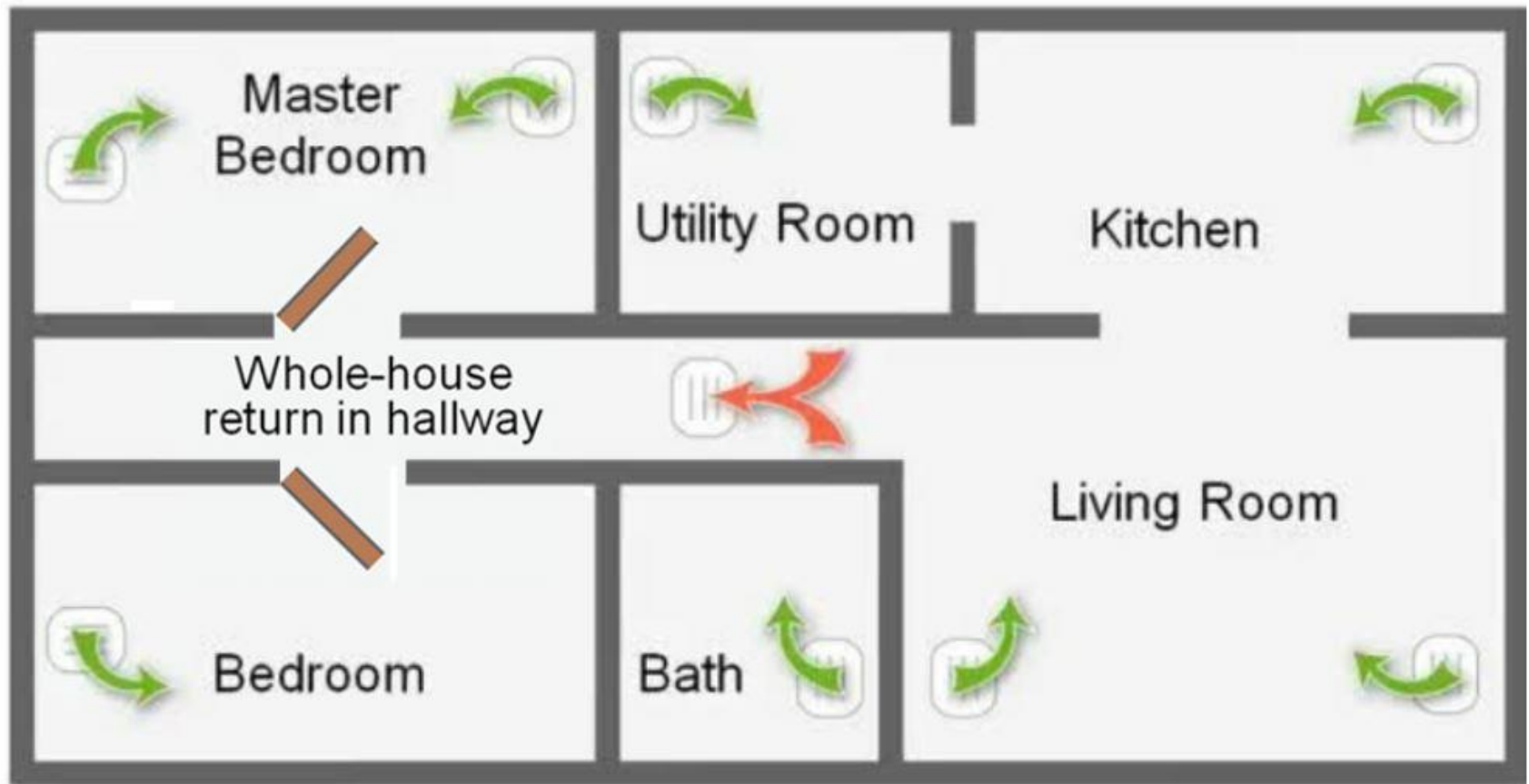
No voids

No misalignment

No compression

Nickel-thick mastic application





Zonal pressure relief is required in all homes with ducted heating systems.

Combustion Appliance Zone





Ventilation rates

Simplified ASHRAE 62.2

Minimum cfm =

$(\text{bedrooms} + 1) 7.5 + (.01$
 $* \text{conditioned area})$

Example:

$(3 \text{ bedrooms} + 1) 7.5 +$
 $(.01 * 2200 \text{ sq ft}) = 52 \text{ cfm}$



Thank You
Mike Lillesand
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