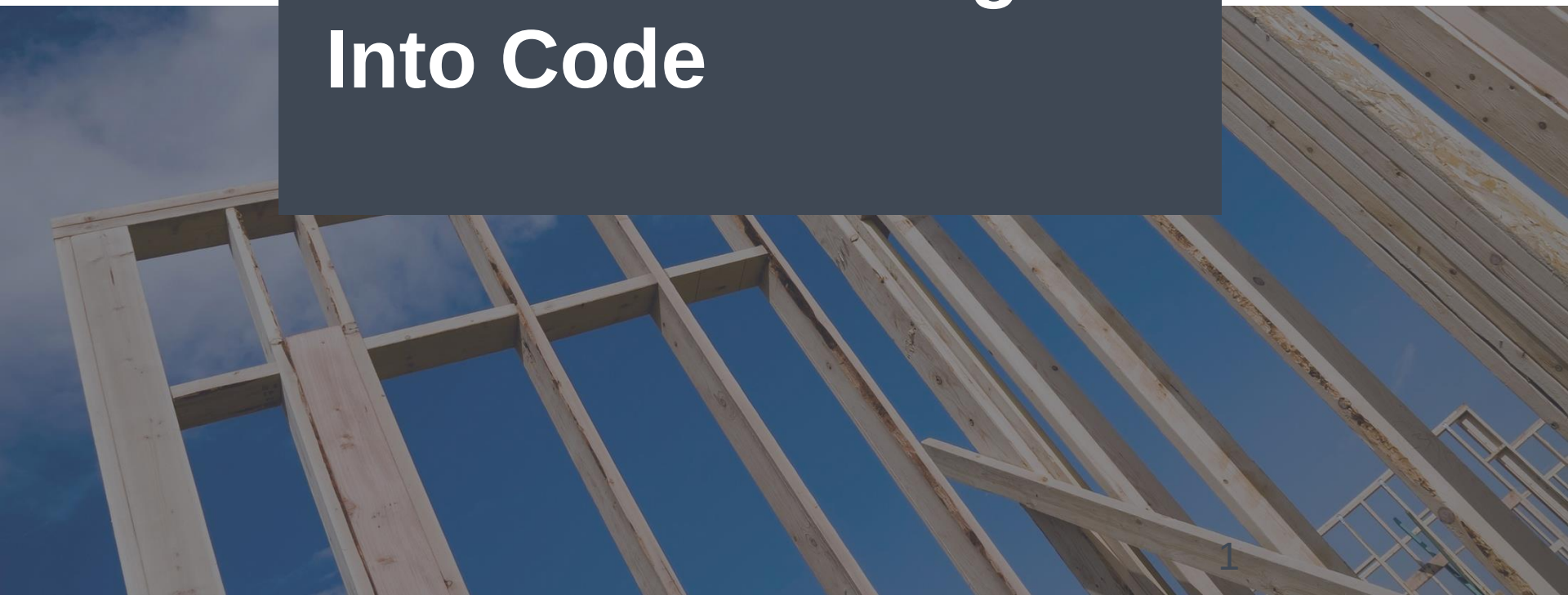
BetterBuiltNW

Top 5 Efficiency Measures Moving Into Code



Top 5 Efficiency Measures Moving Into Code

The List

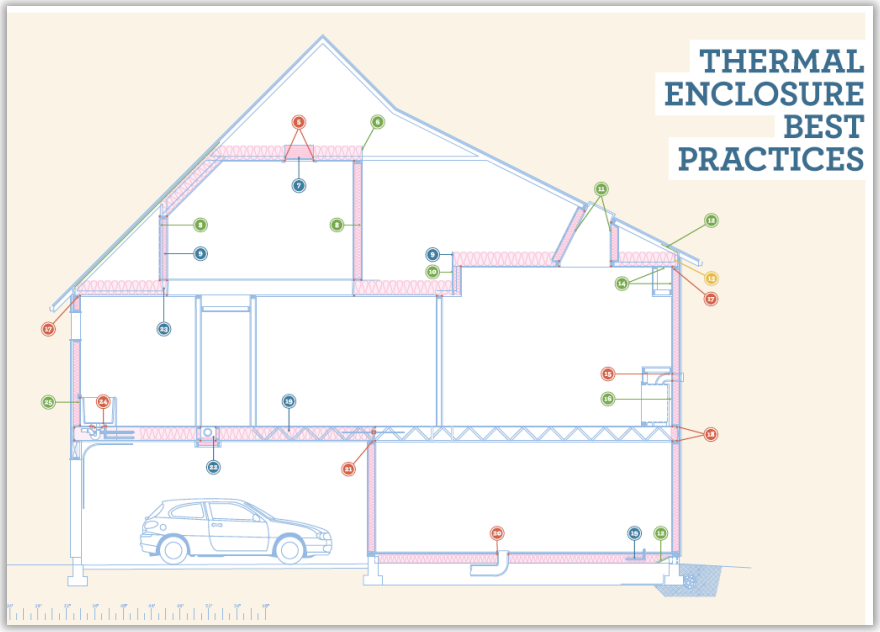
1. Infiltration
2. Ventilation
3. Heat Pump Water Heaters
4. Better Walls and Windows
5. Energy Ratings

Infiltration and Ventilation

Largest areas of opportunity for improving shell efficiency beyond current codes:

- Infiltration
- Wall U-value

Both are relatively inexpensive to implement



Infiltration and Ventilation

2012 IECC:

- Mandates $\leq$ 3.0 ACH_{50} in Climate zones 3-8

Current Washington Code:

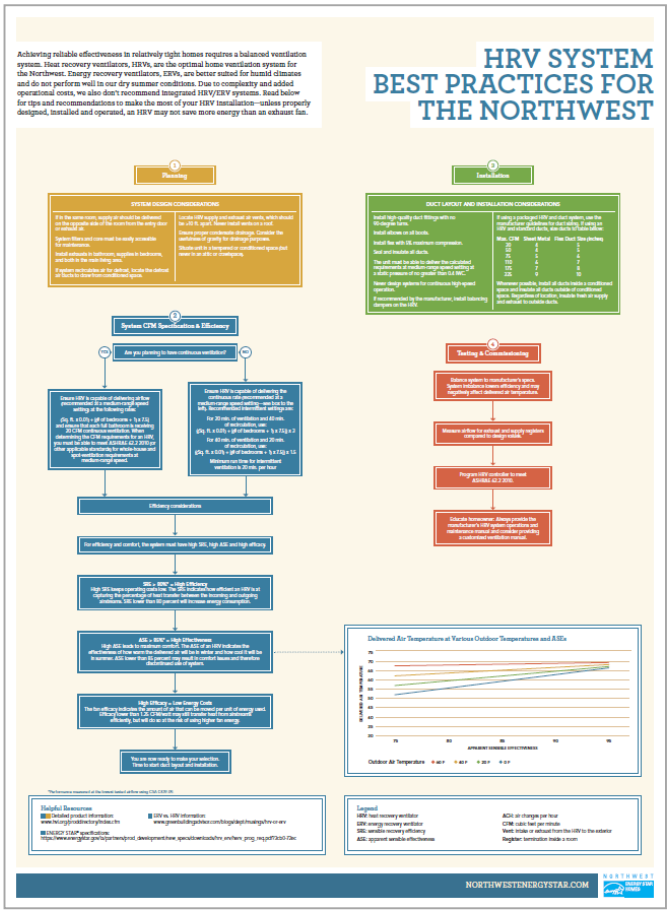
- .5 energy credits for 4.0 ACH_{50} with high-efficacy exhaust fan
- 1.0 energy credits for 2.0 ACH_{50} with a 70% HRV
- 1.5 energy credits for 1.5 ACH_{50} with a 85% HRV

Current Oregon Code:

- Envelope enhancement measure for meeting 6.0 ACH_{50} with basic ventilation system

Infiltration and Ventilation

- Most recent ventilation research points to need for balanced, distributed ventilation in order to affect IAQ
- HRVs and other balanced, distributed ventilation methods likely a requirement of future codes and standards



Heat Pump Water Heaters

Latest Federal standard requires all electric water heaters >55 gal to meet a HPWH-based EF

Residential water heaters must comply with the amended standards found in the Code of Federal Regulations, 10 CFR 430.32(d), by April 16, 2015. This information is also in the Electronic Code of Federal Regulations.

Table 2. Amended Energy Conservation Standards for Residential Water Heaters

Product Class	Rated Storage Volume	Energy Factor
Gas-fired Water Heater	≥ 20 gal and ≤ 55 gal	$0.675 – (0.0015*V_s)$
	> 55 gal and ≤ 100 gal	$0.8012 – (0.00078* V_s)$
Oil-fired Water Heater	≤ 50 gal	$0.68 – (0.0019*V_s)$
Electric Water Heater	≥ 20 gal and ≤ 55 gal	$0.960 – (0.0003*V_s)$
	> 55 gal and ≤ 120 gal	$2.057 – (0.00113*V_s)$
Tabletop Water Heater	≥ 20 gal and ≤ 100 gal	$0.93 – (0.00132*V_s)$
Instantaneous Gas-fired Water Heater	< 2 gal	$0.82 – (0.0019*V_s)$
Instantaneous Electric Water Heater	< 2 gal	$0.93 – (0.00132*V_s)$

V_s: Rated Storage Volume – the water storage capacity of a water heater (in gallons).

Heat Pump Water Heaters

Current Washington Code:

- 1.5 energy credits for HPWH (≥2.0EF)

Current Oregon Code:

- Conservation measure for HPWH (≥1.8 NCEF) plus 75% high efficacy lighting

High Performance Walls

Largest areas of opportunity for improving shell efficiency:

- Infiltration
- Wall/window U-values

Successfully improving walls improves thermal performance and reduces infiltration

High Performance Walls

- Improving walls represents significant process changes from current practice
  - Change framing practices
  - Change sheathing practices
  - Cascading changes to structural, fenestration, air sealing, and cladding attachment practices/systems

High Performance Walls

Typical U-value Ranges
- Optimized 2x6 wall, 1” rigid: U- .040-.045
- Optimized 2x6 wall, no rigid: U- .050-.051
- 2012 IECC: U-.057

Current Oregon Code: U-.060
- R-19 Advanced framed
- R-21 Standard framed
- 2x4 wall with rigid foam

Note: Improving the U-value will generally require one of the following:
- *Framing changes*
- *Blown fiberglass cavity insulation*
- *Rigid insulation*

High Performance Walls

Thermal Bridging

- Address by incorporating insulation that “breaks” thermal bridges created by structural wall elements:
  - Rigid exterior insulation
  - SIPs or ICFs
  - Staggered stud/Double wall
  - Interior strapping

Windows and Walls

2012 IECC:

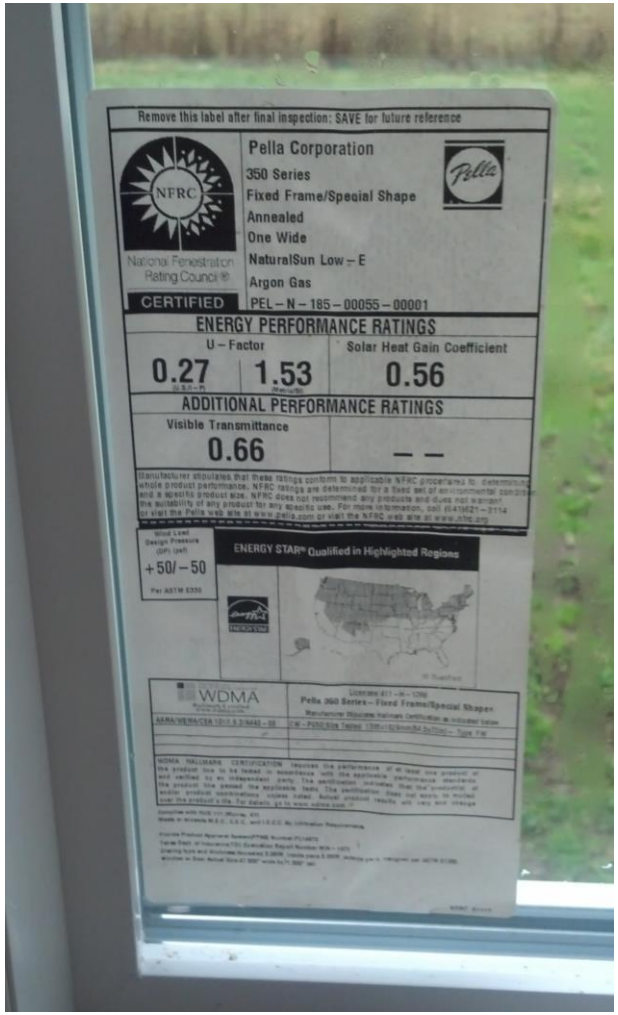
- U-.32

Current Washington Code:

- U-.30

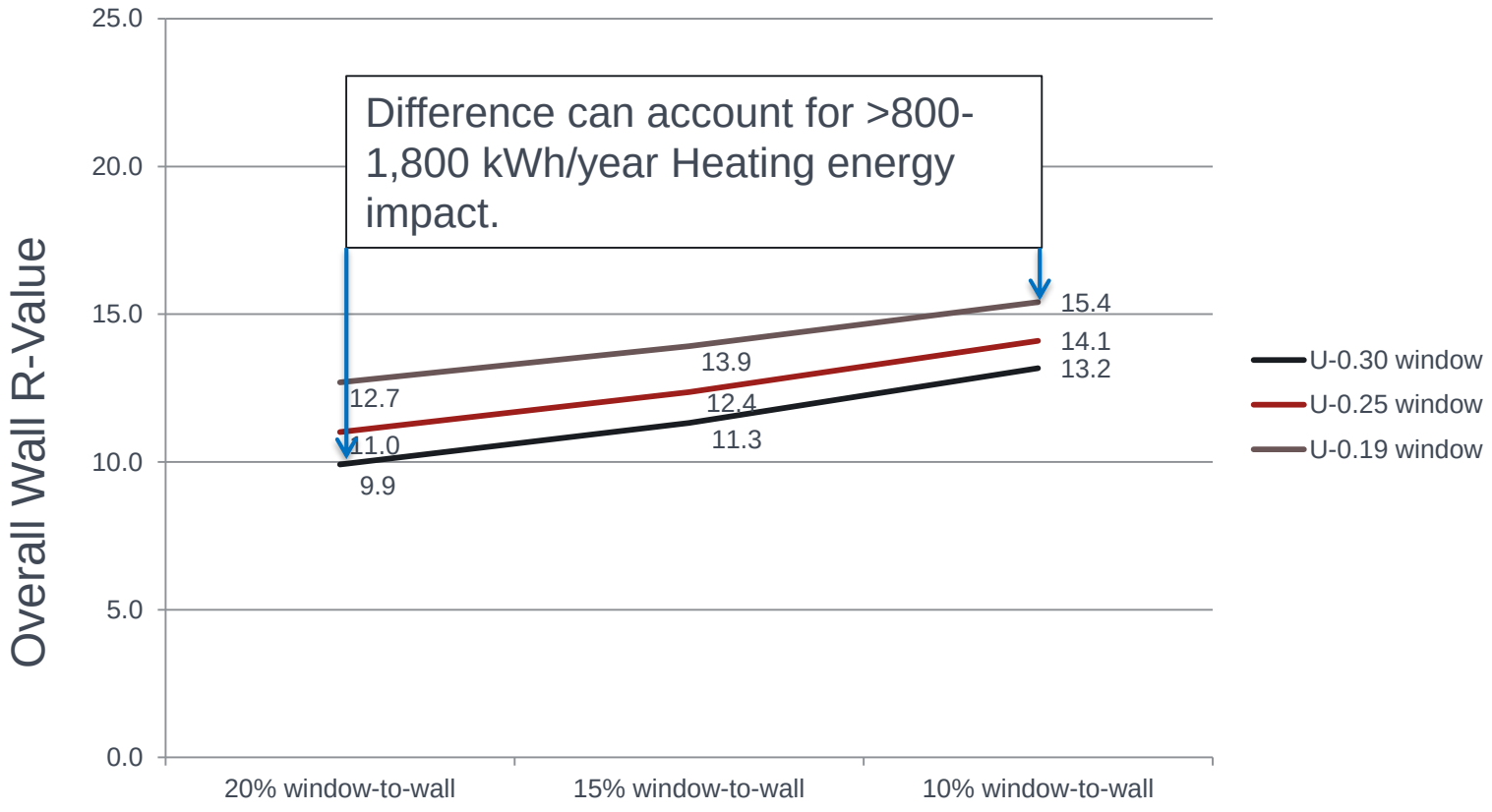
Current Oregon Code:

- U-.35



Windows and Walls

Impacts of window selection - Nominal R-23 wall (U-0.051)



Energy Ratings

From 2015 IECC:

SECTION R406 ENERGY RATING INDEX COMPLIANCE ALTERNATIVE

R406.1 Scope.
This section establishes criteria for compliance using an Energy Rating Index (ERI) analysis.

R406.2 Mandatory requirements.
Compliance with this section requires that the provisions identified in Sections R401 through R404 labeled as "mandatory" and Section R403.5.3 be met. The building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficient in Table 402.1.1 or 402.1.3 of the 2009 *International Energy Conservation Code*.

Exception: Supply and return ducts not completely inside the building thermal envelope shall be insulated to a minimum of R-6.

R406.3 Energy Rating Index.
The Energy Rating Index (ERI) shall be a numerical integer value that is based on a linear scale constructed such that the *ERI reference design* has an Index value of 100 and a *residential building* that uses no net purchased energy has an Index value of 0. Each integer value on the scale shall represent a 1-percent change in the total energy use of the rated design relative to the total energy use of the *ERI reference design*. The ERI shall consider all energy used in the *residential building*.

Energy Ratings

From 2015 IECC:

TABLE R406.4 MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX
1	52
2	52
3	51
4	54
5	55
6	54
7	53
8	53

Energy Ratings

Home Energy Score Proposal

The City of Portland proposes a new policy that would require sellers of single-family homes to incorporate the following practices:

1. Obtain a home energy performance report.[1]

2. Disclose the information from the home energy performance report to the City of Portland at or before the time that the home is listed for sale and to prospective home buyers who visit the home while it is on the market.

Single-family homes include existing detached single-family homes; existing attached single-family structures like townhomes[2]; and newly constructed homes that are either detached or attached side-by-side.

Initially, the requirement will apply only to owner-occupied units. Requirements for single-family rental homes will be phased in over time. Detached accessory dwelling units (ADUs) are not covered by the proposed requirement.

to catalyze change in the residential sector.

Thanks for attending

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