

**Agenda
Item
IV.B.**

State of Oregon

Board memo

Building Codes Division

March 3, 2010

To: Mechanical Board

From: Chris Huntington, Manger, Policy and Technical Services

Subject: 2010 Oregon Energy Efficiency Specialty Code update

Action requested:

Information only

Background:

With the passage of Senate Bill 79, the Oregon Building Codes Division was directed to adopt codes that increase energy efficiency in commercial buildings by 15 to 25-percent. To that end, the division worked with stakeholders in the development of what ultimately was presented and approved by the Building Codes Structures Board on February 3, 2010.

In previous editions of the *Oregon Structural Specialty Code* (OSSC), energy related code provisions comprised all of Chapter 13 and constituted an Oregon amendment. Consistent with the division's goal to align with model codes, the division is recommending adoption of the 2009 *International Energy Conservation Code* (IECC) with certain Oregon amendments necessary to achieve the energy savings required by SB 79. This new code will be known as the "Oregon Energy Efficiency Specialty Code," (OEESC). Significantly, the energy provisions will now be a stand-alone code.

The OEESC, as proposed, incorporates amendments to all three elements that impact a building's energy consumption: Building envelope, lighting, and mechanical systems. Notable changes to the envelope requirements include increased insulation levels for walls, higher performance windows and the incorporation of vestibules on entrance doors opening into spaces of more than 3,000 square feet. Energy savings found in the lighting provisions included a reduction in allowable Lighting Power Densities (LPD's) and expanded lighting control requirements. The majority of the energy savings achieved through mechanical system provisions were gained by adjusting the thresholds that trigger efficient designs and components such as *including variable speed drives on motors*.

Significant Changes - The following highlights some of the significant changes in the 2010 OEESC:

Chapter 3 – Climate Zones

- “Zone 1” and “Zone 2” replaced with “Marine (c) 4” and “5 Dry (B)”
- Defining line unchanged: Counties previously in Zone 1 are in Zone 4C, those previously in Zone 2 are in 5B
- Very few differences in the requirements for Zones 4C and 5B

Chapter 4 – Residential

- Has been replaced in its entirety to mirror that in Chapter 11 of the ORSC
- Definition follows model codes – R1 Occupancies (Hotels and Motels) follow the commercial building provisions of Chapter 5

Section 502 – Building Envelope

- Increased insulation requirements for envelope components
- Single prescriptive path for both climate zones
- Window/wall ratio 30% maximum
- Increased minimum performance requirements for windows
- Vestibule required on entrance doors opening into spaces 3,000 sq. ft. and more

Component	2007 Value		2010 Value
Roofs	<i>R-19 / U.050</i>		<i>R-20 c.i./ U-.048 (Entirely above deck) R-13+R-13/.055 (Metal buildings) R-38 / U.027 (Attic and other)</i>
	<i>R-19 / U.050</i>		
Walls (wood framed, above grade)	<i>R-13 / U.130</i>		<i>R-13 + R-3.8 c.i. / U.064</i>
Floors	<i>R-11 / U.070</i>		<i>R-30 / U.033</i>
Windows	Zone 1 Up to 30% = <i>U.540</i> SHGC= .57	Zone 2 Up to 25% = <i>U.500</i> SHGC= .57	Zone 4 and 5 Up to 30%= <i>U.46</i> SHGC= .40
	Up to 40% = <i>U.370</i> SHGC= .352	Up to 33% <i>.370</i> SHGC= .43	

Section 503 - Building Mechanical Systems

The majority of the energy savings achieved through mechanical systems came from reducing the 2007 OSSC thresholds for requiring various equipment and design efficiencies. Existing Oregon specific mechanical requirements were maintained by adding them to the model code.

- Some of the changes are compared in the table below:

Component	2007	2010
Optimum start controls 503.2.4.3	10,000cfm	All systems
Kitchen hood makeup air / demand ventilation required on at least 75% of the exhaust and makeup air 503.2.5.2	-	5,000cfm
Enclosed parking ventilation controls 503.2.5.3	30,000cfm	30,000cfm
Energy / heat recovery systems required 503.2.6	10,000 cfm / 70% outside air supply and at least one exhaust fan rated at 75% min. outside air supply	5,000 cfm and min. outside air supply of 70% or greater. Based on aggregate supply
Large volume fan system serving single zones– reduce airflow requirement 503.2.10.3	15,000cfm	8,000cfm
Heat rejection fan speed control (variable speed control) 503.4.4	10hp	7.5hp

Section 504 – Service Water Heating

- Scoping language has been modified to retain spas and hot tub requirements
- Automatic on/off control required on heaters and pumps

Section 505 – Electrical Power and Lighting

- Egress lighting required to be off when the building is unoccupied
- Automatic lighting shutoff controls are required for buildings 2,000 ft² and larger (was 5,000ft²)
- Occupancy sensor control requirement expanded
- Daylighting controls required for spaces with 350 feet of day lit area
- Space-by-space method retained
- Light power allowances reduced (for both approaches: building area and space-by-space)
- Exterior lighting supplied by the building power now covered by the code

Section 506 – Whole Building Approach (WBA)

- WBA brought in to replace total building performance criteria. The division has committed to working with stakeholders including the Department of Energy to update and simplify the criteria used. Once completed the instructions and criteria will be available on our Website.

Section 507 – Other Equipment

- This section provides requirements for distribution transformers and was carried forward un-amended from the 2007 OSSC

Cross-reference: The following provides a trail from the 2007 OSSC Chapter 13 Energy provisions to where the same topic is found in the 2010 OEESC.

TOPIC	2010 OEESC	2007 OSSC
Scope, applicability, additions, alterations	101	1301
Definitions	202	1302
Climate Zone(s)	301	1302
Insulation – general requirements for installation	303.1	1312.1.2
Fenestration product rating	303.1.3	1312.1.3.1
Residential energy provisions (<i>this was imported from the 2008 ORSC</i>)	Chapter 4	1304 thru 1309
Scope and application of the “commercial building” provisions (formerly known as “other buildings”)	501	1301, 1311
ENVELOPE		
Building envelope - general	502	1312
Building envelope requirements: Minimum <i>U</i> -factors	Table 502.1.2	Table 13-C
Building envelope requirements: Opaque assembly (<i>R</i> -values)	Table 502.2(1)	Tables 13-E&F
Building envelope sealing	502.4.3	1312.1.1
Vestibules	502.4.6	N/A
Recessed lighting	502.4.7	1312.1.2.2
Building envelope: Fenestration requirements	Table 502.3	Tables 13-E&F
MECHANICAL		
Mechanic systems - general	503.1	1317.1
Provisions applicable to all	503.2 thru 503.2.11	1317.2 thru 1317.8
Equipment performance requirements	503.2.3	1317.5
HVAC system controls	503.2.4	1317.4
Optimum start controls	503.2.4.3	1317.4.3.2
Shutoff dampers	503.2.4.5	1317.4.3.3
Ventilation	503.2.5	1317.2
Kitchen hoods	503.2.5.2	1317.11
Enclosed parking ventilation	503.2.5.3	1317.2.3
Insulation of ducts	503.2.7	1317.7
Simple HVAC systems	503.3 thru 503.3.2	1317.9
Complex systems	503.4 thru 503.4.5.3	1317.10 thru 1318.4.2.4
Service water heating	504	1315

LIGHTING		
General lighting provisions	505.1	1313.1
Lighting controls	505.2	1313.3
Daylight Zones	505.2.2.3	1313.3.1.3
Interior lighting power method	505.5.2	1313.4.1
Interior allowable lighting power density	Table 505.5.2(a)	Table 13-G
Space-by-space method	505.5.2.1	1313.4.2
Space-by-space lighting power density	Table 505.5.2(b)	Table 13-H
Exterior lighting	505.6	1313.5
Exterior lighting power allowances	Table 505.6.2(2)	N/A
COMPLIANCE ALTERNATIVES		
Simplifies trade-off approach	502.1.3	1312.2.2
Whole building approach	506.1	1311.1