

EEC Energy Efficiency Recommendations

The Building Codes Construction Commission (BCCC) has reviewed the 2015 International Building Codes and made some recommended changes to the code before adoption. The Energy and Environment Commission (EEC) does not recommend adopting changes to the code that have the effect of decreasing energy efficiency, or weaken previously adopted code designed to increase energy efficiency. In this document, the EEC has only addressed those BCCC recommendations which directly impact energy efficiency.

Foundation Insulation

BCCC recommends changing the termite infestation probability from “Moderate to Heavy” to “Very Heavy”. EEC disagrees with this recommendation for the following reasons:

- The 2015 International Residential Code has a map which shows Boone County is in the “Moderate to Heavy” termite region and a large distance from the “Very Heavy” region which is along the Gulf coast, *IRC Figure R301.2(6) TERMITE INFESTATION PROBABILITY MAP*, (attached).
- Changing the infestation probability for our region from “Moderate to Heavy” to “Very Heavy” gives credibility to the idea that foundations should be uninsulated to allow for easy viewing by termite inspectors.
- The City has received complaints from customers about winter electric bills of over \$400 per month.
 - Columbia Water and Light found these higher energy costs to be primarily a result of uninsulated foundations in slab floored rentals.
 - Slab insulation increases energy efficiency by 15%.
 - Structures built with uninsulated foundations do represent an initial reduced cost for the building but significantly increases costs for consumers because of reduced energy efficiency.

The 2012 International Building Code, which was previously adopted by the City, contains section R318.3 which describes a solution to the problem of termite infestation being hidden by insulation. This section requires foundation insulation with termite shields. The EEC recommends that no changes be made to existing codes that remove the requirement for slab floor foundation insulation with termite shields.

Air Tightness Testing

Demonstrating compliance by testing for air infiltration (blower door test) and duct leakage test is required by IBC. In several places BCCC has recommended changing “shall” to “should,” or similar intent, regarding testing and documentation. The EEC disagrees with these recommendations for the following reasons:

- Very few builders will demonstrate their compliance with the provisions of the 2015 code. The rationale that BCCC uses is that “when constructed per the prescriptive code requirements the ... test is unnecessary.” But the inspections process for air infiltration and ducts is a process in which it is difficult to identify all of the possible problems during the normal inspection process.
- The EEC is willing to assume that the 2015 International Building Code had reason for recommending the tests and that the provisions of the Code should be adopted and followed in Columbia.
- The blower door and duct tests were adopted when the 2012 International Building Code was passed. Changes suggested by BCCC represent a reduction in efficiency standards from current requirements.

Some individuals believe that if the blower door test passes requirements there is no need for a duct test. EEC feels that this is in error for the following reasons:

- There can be large leakage in ducts outside of conditioned space which though they influence the blower door test will not cause it to fail since the size of duct connections are such a small portion of the possible air leakage into the house.
- Significant duct leakage, which occurs within the conditioned space, prevents conditioned air from reaching the more distant rooms and results in occupants adjusting the thermostat setting in order to be comfortable in those more distant rooms. Air in ducts is air on which money has just been spent so that the residence can be comfortable. It is clearly the most expensive air.

Residential Energy Efficiency

The BCCC has supplied a figure titled 2015 RESIDENTIAL ENERGY CODE REQUIREMENTS DIAGRAM to simplify understanding of their proposed reductions in energy efficiency requirements. The figure is helpful but makes several reductions in the energy efficiency standards adopted with the 2012 International Building Code. The EEC recommends changes to the diagram for those items which delete the energy efficiency provisions to maintain the code standards the City adopted with the 2012 International Building Code. An amended diagram is attached.

Specific changes to the diagram:

Item 1

“Ducts shall be sealed. Contractor may have envelope and ducts tested to demonstrate compliance.”

To be replaced with:

“Ducts shall be sealed. Envelope (blower door test) and duct testing are required to demonstrate compliance.”

The specific references in the International Code are:

- R402.4 Air leakage (Mandatory)
- R402.4.1.2 Testing The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding ... three air changes per hour in Climate Zones 3 through 8. (Columbia is in Climate Zone 4.)
- N1102.4.1.2 (R402.4.1.2) Testing; The building or dwelling unit shall be blower door and verified as having an air leakage...
- R403.3.3 Duct leakage.(Mandatory) Ducts shall be pressure tested to determine air leakage...

Item 2

Under the diagram labeled “Termite barrier installed per R318.3, rigid insulation, extend down 2’-0” the word “OPTIONAL” occurs.

OPTIONAL should be replaced with **REQUIRED**.

Commercial Residential Energy Efficiency

Some types of residential buildings fall under the International Commercial Building Code due to their use and density. Thus, a single-family residential home could have different energy efficiency requirements than another type of residential building. EEC recommends that all R1, R2, R3 and R4 zoned residential buildings be required to meet IBC 2015 Residential Energy Efficiency Code.

The IBC classification system should not be confused with Columbia's zoning classification despite use of the same codes lettering:

1. **R-4**
5 to 16 persons plus custodial care staff in a supervised residential environment.
2. **R-3 non R-1, R-2, R-3, R-4**
Typically transient or non-transient housing with 16 or fewer residents.
3. **R2**
Apartments houses, non-transient hotels and motels, fraternities, sororities, dormitories and a few other residential types
4. **R-1**
Primarily transient small, 10 or fewer transient occupant, housing.

EEC recommends that all R1, R2, R3 and R4 classified residential buildings be required to meet IBC 2015 **Residential** Energy Efficiency Code for the following reasons:

- Students and permanent Columbia residents who are low income and/or elderly are major consumers of housing that does not meet IBC residential efficiency standards..
- The modest savings on construction costs results in a burden of higher energy costs for consumers of these buildings. Keeping utility costs down is an important social equity component, and is part of Columbia's Strategic Plan. Increasing energy efficiency also reduces the rate at which we need to expand City utilities.
- In the International Building Code the residential energy efficiency code is for "one- and two-family dwellings, and multifamily dwellings (townhouses)."

The BCCC has proposed changes that redefine the insulation values for "commercial residential" units that changes energy efficiency for those housing units. (see table below)

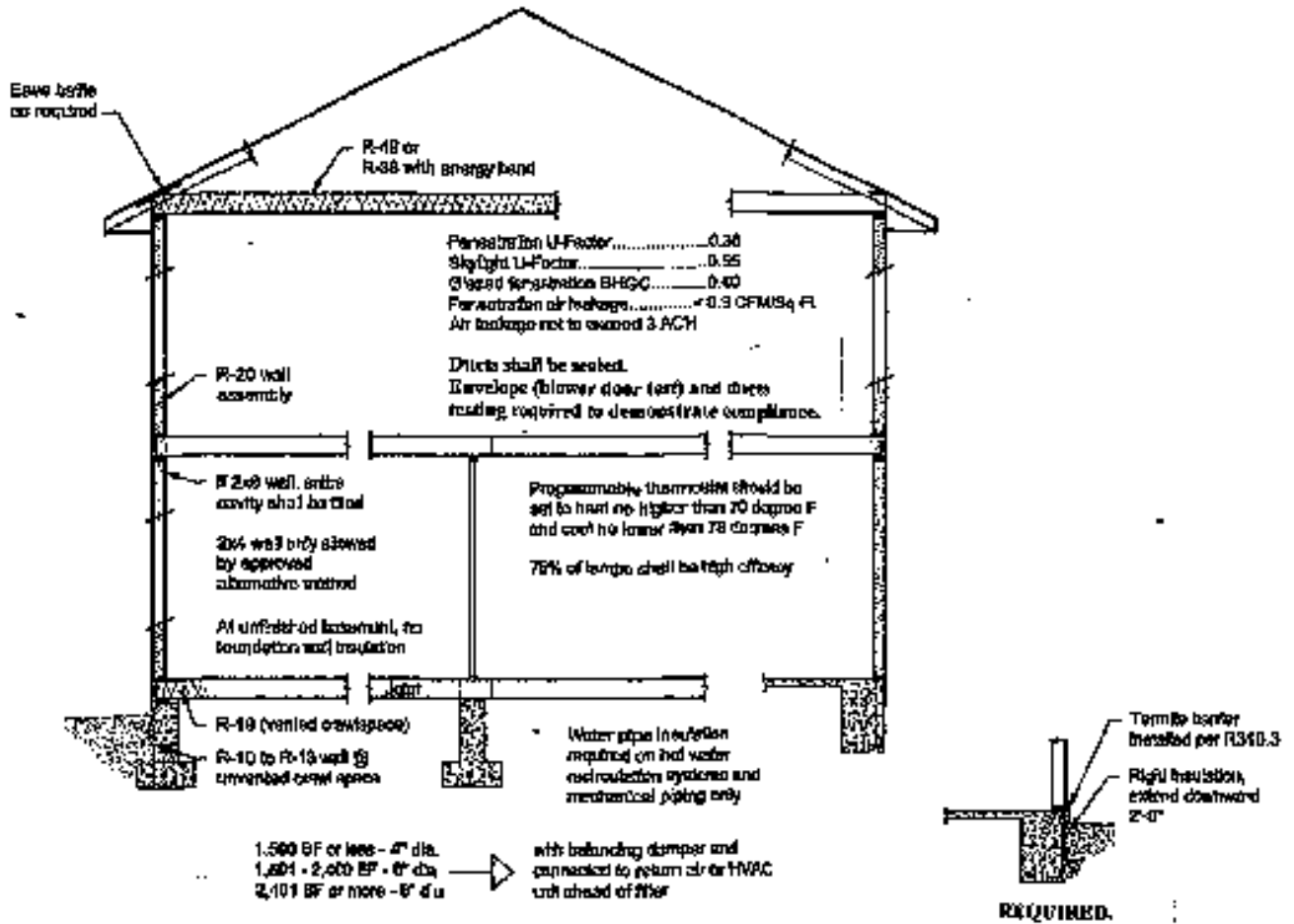
Building Area	2015 IECC Table R402.1.2 Residential Code	BCCC Recommended	IRC 2015 IECC Table C402.1.3 Commercial Code
Required Insulation Values			
Ceiling or roof	R49	R38	R38
Exterior wall	R20 or 13+5	R15.5	R13+R3.8 or R20
Floor above crawlspace and ducts in ventilated attic and crawl space	R19	R19	R30
Walls separating garages and other internal but unheated space	R13		R13
Ducts in unheated areas not exposed to outside ventilation	R4	R4	R6 (C403.2.9)
Slab insulation	R10, 2 ft.	Omitted	R10, 2 ft.

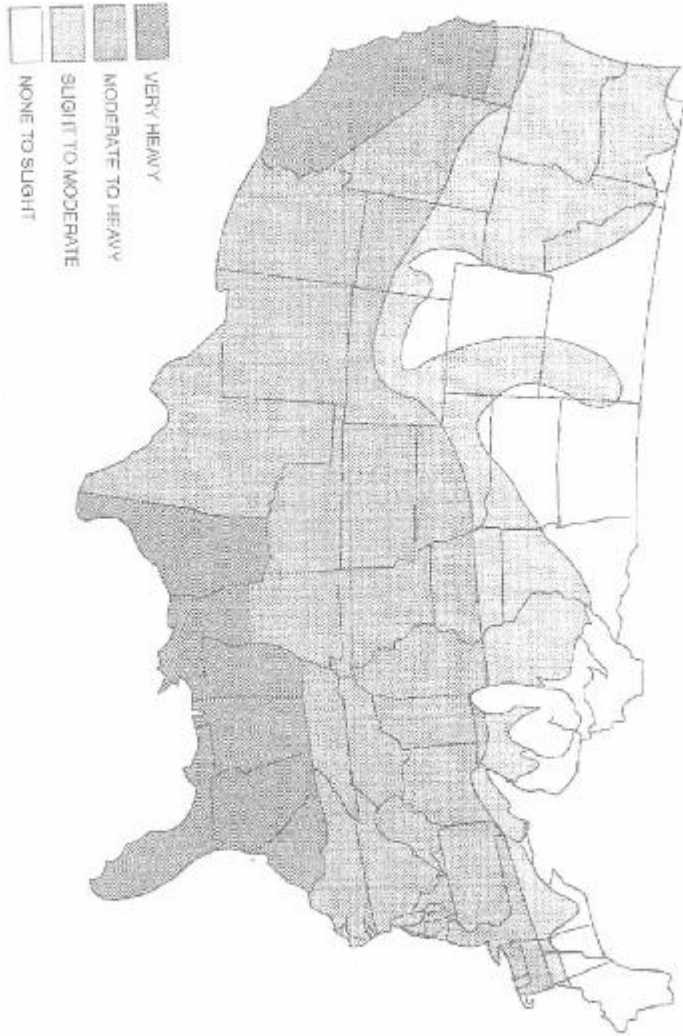
Solar Ready

BCCC does not recommend adopting the optional ordinance to require Solar Ready building design. The EEC disagrees for the following reason:

- Solar Ready sets standards for roof design which are minor changes from existing roofs and simply require a portion of the roof to be built without obstructions which would interfere with installing photovoltaic systems in the future.
- This should have very little impact on construction costs as it merely requires that the design takes solar into consideration.
- In the future, a larger portion of our electricity will need to come from solar power. The City of Columbia should encourage home owners to install it, and provide a building code that supports efforts to generate and use solar power.

2015 RESIDENTIAL ENERGY CODE REQUIREMENTS DIAGRAM





Note: Lines defining areas are approximate only. Local conditions may be more or less severe than indicated by the region shown herein.

FIGURE R301.210
TERMITE INFESTATION PROBABILITY MAP