

EC100-09/10 Part I & Part II

EECC Requested Final Action: Approved as Modified by the Public Comment

EECC Reason Statement:

EC100 Parts I & II should be approved as modified by this public comment.

Significant energy is wasted in buildings that have single zone conditioning. The Department of Energy states that “**zone heating can produce energy savings of more than 20%.**” See http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12520. This public comment modification is intended to establish a straightforward requirement to apply energy-saving multi-zone requirements while addressing the Code Development Committee’s concerns about the cost of installation. The proposal has been modified to apply only to dwellings with more than 2000 square feet or more of conditioned area. Although we believe the original EC100 would have saved even more energy, EC100 as modified above would still result in more comfortable, more efficient homes.

Because hot air rises and cool air settles to the lowest floor, conditioning multiple stories as one zoned space creates a large temperature difference between the hottest and coldest space in the home. To correct for the temperature imbalances, occupants often set the thermostat unnecessarily low or high just to make one story of the home more comfortable. This common situation causes increased energy use for space conditioning – which is responsible for 56% of the energy use in a typical home. See www.energysavers.gov. Zoning reduces the excess energy consumption that can result from single zoning by supplying heating or cooling to each zone on a separately-controlled basis. EC100, which applies only to dwelling units of 2000 square feet or more of conditioned space, provides two methods to achieve multiple conditioned zones – either through individual systems for each floor or through “smart” zoning controls with automatic duct dampers or zone valves for each zone. While more precise zonal controls for all homes may be appropriate in the future, we believe that this proposal moves the IRC and IECC in the right direction.

EECC Proposed Modification to Original Proposal:

Part I - IECC

403.1 Controls (Mandatory). At least one thermostat shall be provided for each separate heating and cooling zone as defined by section 403.1.3.

403.1.3 Heating and cooling Zone. Each dwelling unit ~~with 2,000 square feet or more of conditioned floor area shall have at least one heating and cooling zone per story or per 1000 square feet of floor space, whichever requires fewer zones. Each zone shall have a separate return and supply.~~ Each system shall be designed to operate within the equipment manufacturer's specifications. Each heating and cooling zone shall be served by:

1. An individual system or
2. An automatic air duct damper or automatic zone valve separately controlled by a thermostat for that zone for systems serving multiple zones. Each system serving multiple zones shall be capable of reducing or increasing the delivered air or water flow with a variable-speed fan or pump, and modulating the heating or cooling equipment output, based on a signal from the thermostat that the air duct damper or zone valve is being open or closed.

Part II - IRC

N1103.1 Controls. At least one thermostat shall be installed for each separate heating and cooling zone as defined by section N1103.1.3.

N1103.1.3 Heating and cooling Zone. Each dwelling unit with 2,000 square feet or more of conditioned floor area shall have at least one heating and cooling zone per story ~~or per 1000 square feet of floor space, whichever requires fewer zones.~~ Each zone shall have a separate return and supply. Each system shall be designed to operate within the equipment manufacturer's specifications. Each heating and cooling zone shall be served by:

1. An individual system or
2. An automatic air duct damper or automatic zone valve separately controlled by a thermostat for that zone for systems serving multiple zones. Each system serving multiple zones shall be capable of reducing or increasing the delivered air or water flow with a variable-speed fan or pump, and modulating the heating or cooling equipment output, based on a signal from the thermostat that the air duct damper or zone valve is being open of closed.

Proposal History:

Committee Recommended Action on Original Proposal at Public Hearing:

Part I IECC – Disapproved

Part II IRC – Disapproved

Committee Reason(s) for Recommended Action:

Part I IECC – There is no evidence provided that heating and cooling zones save energy. This provision would be too far reaching in regulating building heating and cooling system design.

Part II IRC – There is no evidence provided that heating and cooling zones save energy. This provision would be too far reaching in regulating building heating and cooling system design.

Initial Recommendation of EECC: Approve

Initial Proposal for Reference:

EC100–09/10

403.1, 403.1.3 (New); IRC N1103.1, N1103.1.3 (New)

Proponent: Bill Prindle, ICF International, representing the Energy Efficient Codes Coalition; Jeff Harris, Alliance to Save Energy; Harry Misuriello, American Council for an Energy-Efficient Economy (ACEEE); Garrett Stone, Brickfield, Burchette, Ritts & Stone; Steve Rosenstock, Edison Electric Institute; Brian Dean, ICF International

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IECC

1. Revise as follows:

403.1 Controls (Mandatory). At least one thermostat shall be provided for each separate heating and cooling zone as defined by Section 403.1.3 ~~system~~.

2. Add new text as follows:

403.1.3 Heating and cooling zone. Each dwelling unit shall have at least one heating and cooling zone per story or per 1000 square feet of floor space, whichever requires fewer zones. Each zone shall have a separate return and supply. Each system shall be designed to operate within the equipment manufacturer's specifications. Each heating and cooling zone shall be served by:

1. An individual system or
2. An automatic air duct damper or automatic zone valve separately controlled by a thermostat for that zone for systems serving multiple zones. Each system serving multiple zones shall be capable of reducing or increasing the delivered air or water flow with a variable-speed fan or pump, and modulating the heating or cooling equipment output, based on a signal from the thermostat that the air duct damper or zone valve is being open or closed.

PART II – IRC BUILDING/ENERGY

1. Revise as follows:

N1103.1 Controls. At least one thermostat shall be installed for each separate heating and cooling zone as defined by section N1103.1.3 ~~system~~.

2. Add new text as follows:

N1103.1.3 Heating and cooling zone. Each dwelling unit shall have at least one heating and cooling zone per story or per 1000 square feet of floor space, whichever requires fewer zones. Each zone shall have a separate return and supply. Each system shall be designed to operate within the equipment manufacturer’s specifications. Each heating and cooling zone shall be served by:

1. An individual system or
2. An automatic air duct damper or automatic zone valve separately controlled by a thermostat for that zone for systems serving multiple zones. Each system serving multiple zones shall be capable of reducing or increasing the delivered air or water flow with a variable-speed fan or pump, and modulating the heating or cooling equipment output, based on a signal from the thermostat that the air duct damper or zone valve is being open or closed.

Reason: Significant energy can be wasted in buildings that have single zone conditioning. The www.energysavers.gov website from the DOE states that “zone heating can produce energy savings of more than 20% compared to heating both occupied and unoccupied areas of your house.” This proposal sets a requirement to have separate HVAC zone control for homes that have combinations of floor area and building height that makes them susceptible to inefficient space conditioning.

Number of Stories:

Due to the fact that hot air rises and cool air settles to the lowest floor, conditioning multiple stories as one zoned space creates a large temperature difference between the hottest and coldest space in the home. This leads to overcooling some areas in summer and overheating some areas in winter. Zoning reduces the excess energy consumption that can result from single zoning by supplying heating or cooling to each zone on a separately-controlled basis.

Floor Area:

As homes get larger in floor area, controlling space temperatures across extensive area even on the same level becomes increasingly harder. Walls facing different directions experience solar loads that vary throughout the day and year, while other spaces experience differing internal heat gains throughout the day or year. Under such conditions, one space conditioning zone control simply cannot keep all spaces in the house comfortable without wasting energy. This proposal reduces such energy waste by requiring one zone per 1000 square feet of floor area of a given story.

Direct from www.toolbase.org:

An HVAC "smart" zoning control system divides the home into two or three zones, with a thermostat in each zone. It works with single-stage gas, oil, heat pump or electric HVAC equipment or internally staged, multi-stage equipment. The control system includes automatic dampers that fit into the ducts and a control panel that allows for the feedback of information between the programmable thermostat, indoor climate and damper position. The drive damper actuator assembly does not use wear- and friction-producing gears for damper control. Instead, a synthetic cord transfers the motor rotation to the lever arm. Flexible-link or air-driven dampers are considered more reliable than typical gear-driven dampers for controlling HVAC system zone output. Mechanical, electric, digital, or programmable thermostats by other manufacturers or by RP can be used. It is cost-effective to install when the HVAC system is being replaced, or in new construction. Manufacturers claim that proper installation can result in 10 to 20% energy savings from thermostat setbacks that prevent over-conditioning zones. Comfort is more readily achieved in each zone, and additional, targeted thermostats are more convenient to control than those at a single location.

DOE Reference: www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12520

Cost Impact: The code change proposal will increase the cost of construction.

PART I – IECC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IRC BUILDING/ENERGY

Public Hearing: Committee:	AS	AM	D
Assembly:	ASF	AMF	DF

ICCFILENAME: PRINDLE-EC-22-403.1-N1103.1
