EECC Recommends Approval of RE186 – "Builder Flex Beyond the 2012," As Modified

No other proposal before the Governmental Members will produce an additional 5% savings from all residential buildings subject to the code, with the level of flexibility allowed by RE186.

Reason:

We recommend approval of RE186 as modified by this public comment. The original reason statement for RE186 offers a comprehensive set of reasons why a points-based set of options provides maximum flexibility, while also improving the efficiency of the IECC by about 5%. As a result, we need not reiterate the reasons in this public comment.

However, based on the residential energy committee's reason statement, as well as misinformation raised in testimony by various stakeholders, we submit the following clarifications and further explanation:

- The residential energy committee's reason for recommending disapproval appears to reflect a mistaken understanding of this proposal. The EECC is not proposing to adopt ICC-700 or anything like it. In fact, we opposed incorporation of ICC-700 into the IECC in another code proposal (CE34).
- The "Flex Points" proposal is not an "above-code" program. Rather it is an additional efficiency requirement with the choice among a number of compliance options. The IECC commercial provisions already have a similar approach (see section C406).
- RE186 improves the 2012 IECC by 5% in two ways:
    - Homes can be built to the performance path and show an annual energy usage of no more than 95% of the standard reference design.
    - Homes can be built to the prescriptive or Total UA paths and show that they have installed sufficient additional energy efficiency measures to equal at least 5 Flex Points from the table column appropriate to the jurisdiction.
- For many builders, there will be no cost increase whatsoever, since many of the Flex Points options are commonly installed -- such as improved HVAC equipment or ducts located indoors – and can satisfy all 5 flex points (or more).
- The flex points measures in most cases are not appropriate to require in the base code, either because of federal preemption issues or a lack of market penetration for new efficient products.
- As indicated in our original reason statement, the analysis is based on the Department of Energy Methodology for Evaluated Cost-Effectiveness of Residential Energy Code Changes and the present value calculation methodology, which will allow for easy updates to the table in the future. The analysis first uses a present value analysis over a 30-year useful life of the building to determine the present value of energy cost savings for each measure – specifically, the

analysis calculates the energy savings on a present value basis for the estimated life of each measure up to 30 years. Then the estimate of energy savings is converted into points for each measure. Each point is equal to the present value of 1% energy savings over 20 years; by using a 20 year benchmark, the points allow more flexibility among measures and provide some greater recognition to those measures with longer useful lives. While some measures have a longer life than 30 years, using a 30-year useful life ensures that savings are capped at a commonly used 30-year metric for homes, such as a typical 30 year mortgage, which is conservatively low for measures that last for the entire lifetime of the home.

In this public comment, we propose limited modifications to the original proposal to further simplify it. Most importantly we have deleted two of the tables as no longer necessary and modified the companion language accordingly. These changes will make application of the table simpler. The original three tables with options were necessary due to uncertainty regarding federal minimum equipment efficiencies when the proposal was in the process of preparation. At this point, minimum equipment requirements in 2015 are clear, requiring only one table that will apply nationwide.

We urge approval of RE186 as modified.

Revise as follows:

SECTION R401 (N1101)
GENERAL

R401.2 (IRC N1101.15) Compliance. Projects shall comply with Sections identified as "mandatory" and with either sections identified as "prescriptive" or the simulated performance alternative in Section R405. In addition, all projects shall comply with Section R406.

SECTION R406 (N1106)
ADDITIONAL ENERGY EFFICIENCY (MANDATORY)

R406.1 (N1106.1) Scope. This section establishes additional mandatory requirements applicable to all compliance approaches to achieve additional energy efficiency.

R406.2 (N1106.2) Points-based compliance. One or more energy efficiency measure(s) shall be installed in accordance with Section R406.3 that cumulatively equal or exceed 5 (five) Flex Points for the appropriate Climate Zone. Projects complying under the simulated performance alternative outlined in Section R405 shall demonstrate compliance with Section R405 without including in the proposed design any features that will be utilized to comply with Section R406.

Exceptions: The requirements of this section shall not apply to:

1. Projects complying under the performance approach outlined in Section R405, where the *proposed design* under section R405.3 is shown to have an annual energy cost that is less than or equal to 95% of the annual energy cost of the *standard reference design.*

2. Projects with an on-site or building integrated renewable energy system installed that provides not less than 0.50 watts per square foot (5.4 W/m2) of *conditioned floor area*.
3. Additions with a *conditioned floor area* equal to or less than 1,000 square feet.
4. *Alterations*, renovations and *repairs* to an existing building.

R406.3 (N1106.3) Flex Points for additional energy efficiency. Measures shall be selected from Table R406.3. Each measure chosen shall receive credit for the Flex Points as indicated in the Table for the specific Climate Zone. Interpolation of points between measures shall not be permitted.

TABLE R406.3.1 (N1106.3.~~2~~1)
FLEX POINTS FOR ADDITIONAL ENERGY EFFICIENCY

Measure Number	Measure Description	Flex Point Value								
		CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C [a]	CZ 5	CZ 6	CZ 7	CZ 8
1a	≥ 2.5% reduction in total UA [b]	1	1	2	2	2	2	3	4	4
1b	≥ 5% reduction in total UA [b]	3	3	3	3	3	4	5	5	5
1c	≥ 7.5% reduction in total UA [b]	5	5	5	5	5	6	7	8	8
1d	≥ 10% reduction in total UA [b]	6	7	7	7	8	8	9	10	10
2a	≥ 10% reduction in glazed fenestration area-weighted average SHGC	2	1	-	-	-	-	-	-	-
2b	≥ 20% reduction in glazed fenestration area-weighted average SHGC	4	1	-	-	-	-	-	-	-
3a	≤ 4 ACH50 air leakage rate with ERV or HRV installed [c]	1	2	-	-	-	-	-	-	-
3b	≤ 3 ACH50 air leakage rate with ERV or HRV installed [c]	2	4	5	7	7	7	7	8	8
3c	≤ 2 ACH50 air leakage rate with ERV or HRV installed [c]	2	5	7	9	9	9	10	11	11
4a	≤ 2 CFM of total duct leakage per 100 square feet of conditioned floor area when tested in accordance with Section R403.2.2	1	1	1	1	-	1	1	1	1

4b	100% of duct thermal distribution system located in *passively conditioned space* and/or *actively conditioned space*	1	1	1	1	1	1	2	2	2
4c	100% of duct thermal distribution system located in *actively conditioned space* [d]	8	8	9	11	8	12	15	17	17
4d	100% of ductless thermal distribution system located in *building thermal envelope*	8	8	9	11	8	12	15	17	17
4e	100% of hydronic thermal distribution system located in *building thermal envelope*	8	8	9	11	8	12	15	17	17
5a	≥ 15 SEER and ≥ 12.5 EER cooling system efficiency [e]	2	2	1	-	-	-	-	-	-
5b	≥ 16 SEER and ≥ 13 EER cooling system efficiency [e]	5	4	1	1	-	-	-	-	-
5c	≥ 18 SEER and ≥ 14 EER cooling system efficiency [e]	9	7	3	2	-	-	-	-	-
5d	≥ 16 EER cooling system efficiency [e]	10	7	3	2	-	-	-	-	-
5e	≥ 18 EER cooling system efficiency [e]	13	10	4	2	-	1	-	-	-
5f	≥ 20 EER cooling system efficiency [e]	16	12	5	3	-	1	-	-	-
6a	≥ 90 AFUE heating system efficiency [f]	-	2	4	6	6	7	8	8	9
6b	≥ 92 AFUE heating system efficiency [f]	-	2	5	7	7	8	9	10	11
6c	≥ 95 AFUE heating system efficiency [f]	-	2	6	8	9	10	11	12	13
6d	≥ 96 AFUE heating system efficiency [f]	-	2	6	9	10	10	11	12	14
6e	≥ 98 AFUE heating system efficiency [f]	-	3	7	10	11	12	13	14	15
7a	≥ 8.8 HSPF heating system efficiency [f]	-	-	-	-	-	-	-	-	-
7b	≥ 9.5 HSPF heating system efficiency [f]	-	-	1	2	2	2	2	2	1
7c	≥ 10.5 HSPF heating system efficiency [f]	-	1	2	4	4	5	4	3	3

7d	≥ 3 COP heating system efficiency [f]	-	1	2	3	3	4	3	3	2
7e	≥ 3.5 COP heating system efficiency [f]	-	2	4	6	6	8	7	6	5
7f	≥ 4 COP heating system efficiency [f]	-	2	5	8	9	10	10	9	7
8a	≥ 0.7 EF for fossil fuel service water heating system	2	2	-	-	-	-	-	-	-
8b	≥ 0.8 EF for fossil fuel service water heating system	7	5	4	3	2	2	2	1	1
8c	≥ 0.95 EF for electric service water heating system	-	-	-	-	-	-	-	-	-
8d	≥ 1.15 EF for electric service water heating system	7	7	7	4	5	3	3	2	2
8e	≥ 0.4 Solar Fraction for service water heating system	8	9	9	7	9	6	5	4	3

a. Climate Zone 4C is Climate Zone Marine 4.
b. The Total UA shall be calculated in accordance with Section R402.1.4 Total UA alternative.
c. Minimum Heat Recovery Ventilator (HRV) and Energy Recovery Ventilator (ERV) requirements, measured at the lowest tested net supply airflow, shall be ≥ 75% Sensible Recovery Efficiency (SRE), ≤ 1.1 W/CFM Fan Energy and shall not use recirculation as a defrost strategy. In addition, the Energy Recovery Ventilator (ERV) shall be ≥ 50% Latent Recovery/Moisture Transfer (LRMT).
d. To achieve 100% of the thermal distribution located in the actively conditioned space, no ducts ~~or pipes~~ used for the heating and cooling systems shall be located within walls or ceilings where losses are not directly regained into the conditioned space.
e. For multiple cooling systems, all systems shall meet or exceed the minimum efficiency requirements in Table R406.3.~~2~~1 and shall be sized to serve 100% of the cooling design load. As an alternative, each system installed shall receive credit for the percentage of the Flex Points for the measure equal to the percentage of the cooling design load served by the system.
f. For multiple heating systems, all systems shall meet or exceed the minimum efficiency requirements in Table R406.3.~~2~~1 and shall be sized to serve 100% of the heating design load. As an alternative, each system installed shall receive credit for the percentage of the Flex Points for the measure equal to the percentage of the heating design load served by the system.

SECTION R202 (IRC N1101.9)
GENERAL DEFINITIONS

CONDITIONED SPACE. An area within a building that is either *actively conditioned space* or *passively conditioned space.*

ACTIVELY CONDITIONED SPACE. An area within a *building thermal envelope* that is directly heated or cooled, including any habitable room.

PASSIVELY CONDITIONED SPACE. An area within a *building thermal envelope* that is not directly heated or cooled, including wall cavities, floor cavities, ceiling cavities, storage rooms, closets, non-habitable attic, non-habitable basement, crawlspace, spaces or cavities that contain uninsulated ducts or thermal distribution systems or have an opening directly into an adjacent conditioned space.

Reason: