RECD1-7-22

IECC: TABLE R406.5

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2024 International Energy Conservation Code [RE Project]

Revise as follows:

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX NOT INCLUDING OPP	ENERGY RATING INDEX WITH OPP
0-1	51	~~40~~ 35
2	51	~~40~~ 34
3	50	~~40~~ 33
4	53	40
5	54	~~40~~ 43
6	53	~~40~~ 43
7	52	~~40~~ 46
8	52	~~40~~ 40

Reason:

Climate Zone	Developed Using PNNL SF Prototypes	Building Type	R406 Target ERI without OPP *	1 kW PV Target ERI with OPP	2 kW PV Target ERI with OPP	3 kW PV Target ERI with OPP	4 kW PV Target ERI with OPP
CZ 1	R406 ERI Home - 51	Single Family	51	43	35	27	19
CZ 2	R406 ERI Home - 51	Single Family	51	42	34	26	18
CZ 3	R406 ERI Home - 50	Single Family	50	42	33	24	15
CZ 4	R406 ERI Home - 53	Single Family	53	47	40	32	25
CZ 5	R406 ERI Home - 54	Single Family	54	49	43	37	32
CZ 6	R406 ERI Home - 53	Single Family	53	48	43	39	35
CZ 7 & 8	R406 ERI Home - 52	Single Family	52	49	46	43	40

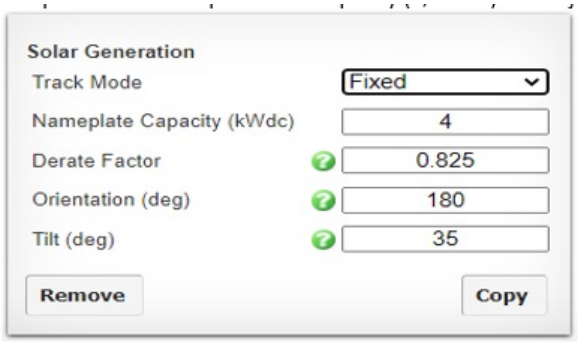
* R406 ERI "not including OPP" targets in IECC 2024 Public Comment Draft #1

The ERI with OPP targets in Public Comment Draft #1 (40 in every climate zone) were placeholders and not based on any form of analysis. The purpose of this proposal is to update the ERI with OPP targets based on simulation analysis via Residential Energy Services Network (RESNET) Accredited Rating Software (Ekotrope). PNNL analyzed the single-family prototypes (2376 sq ft) in the Ekotrope Rating software across all system types, foundation types and 19 representative cities based on a national scale analysis. According to NAHB, 2021 fourth quarter Census Quarterly Starts show a median single-family home is 2,338 square feet. Using prototype models that meet the ERI without OPP targets in Public Comment Draft #1 as the baseline, PNNL modeled onsite PV systems (1 kW, 2 kW and 4 kW) to calculate ERI with OPP potential targets based on system size. The modeled PV systems were oriented due south and tilted equal to the site latitude. The results are summarized in the table above.

The decision to propose 2 kW ERI with OPP scores for Table R406.5 was based in part on the fact that a 2 kW size system fits almost any rooftop. However, based on LBNL and PNNL research, the median size residential PV system in the U.S. in 2021 was 7 kW, with most systems – those within the 20th to 80th percentile – between 4 and 10 kW.

The proposed ERI with OPP targets represent an easy score for a home to meet utilizing onsite PV.

PV specs from Ekotrope - varied capacity (1, 2 or 4) and adjusted tilt to match latitude:



Real Examples for context: CZ5 house with 1500 ft^2 footprint, and around 2,700 ft^2 of CFA. 30 panels, 7.14 kW, produces ~9,400 kWh/yr (Net-zero for electric, still uses gas for heat/DHW)

Another CZ5 home, with 1384 ft^2 CFA...24 panels, ~5 kW.

Bibliography: PV System Sizes - Lawrence Berkeley National Laboratory
https://emp.lbl.gov/sites/default/files/2_tracking_the_sun_2022_report.pdf

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction.
Because the ERI with OPP targets in Public Comment Draft #1 are only placeholders, there is no basis for comparing cost between this proposal and Public Comment Draft #1. Compared to the placeholder targets, the proposed targets are less stringent in four climate zones, more stringent in three climate zones, and the same in one climate zone.