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Docket Number:	16-BSTD-03
Project Title:	Updates to the 2016 Residential Alternative Calculation Method Reference Manual and Software
TN #:	210963
Document Title:	Energy Design Ratings Presentation
Description:	N/A
Filer:	Hilary Fiese
Organization:	California Energy Commission/ Larry Froes
Submitter Role:	Commission Staff
Submission Date:	4/6/2016 2:25:48 PM
Docketed Date:	4/6/2016



C A L I F O R N I A E N E R G Y C O M M I S S I O N

Energy Design Ratings

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Energy Design Ratings

- Energy Design Rating (EDR)
- Alternative way to show building performance
- For use with Title 24, Part 11 (CALGreen A4.203.1)
- A scoring method where 100 represents a RESNET reference home characterization of the 2006 IECC
- An EDR score of Zero represents efficiency and renewable generation
- Includes nonregulated energy (such as lighting, appliances, and plug loads)



Energy Design Ratings

- CALGreen Prerequisites must be met (A4.203.1.1)
 - CBECC software and CF1R
 - Quality Insulation Installation (QII)
- Tier 1 must show ≥ 15 percent compliance margin
- Tier 2 must show ≥ 30 percent compliance margin
- ZNE Design Designation must meet the Tier and show $EDR \leq 0$
 - Tier 1 for Single Family (CZ 6, 7)
 - Tier 1 for Multi-Family (CZ 3, 5-7)
 - Tier 2 for Single Family (CZ 1-5, 8-16)
 - Tier 2 for Multi-Family (CZ 1, 2, 4, 8-16)



EDR Reference Design

EXCEPTIONS/CLARIFICATIONS to 2006 IECC

- Climate Zones:
 - CZ 1 uses 2006 IECC requirements for Zone 4 marine
 - CZ 2 - 15 uses 2006 IECC requirements for Zone 3
 - CZ 16 uses 2006 IECC requirements for Zone 5
- Air handler fan watt draw is 0.8 W/cfm
- Building air infiltration rate is 7.2 ACH50



EDR Reference Design

EXCEPTIONS/CLARIFICATIONS to 2006 IECC

- Duct R-value is R-8
- Duct System Efficiency 80 percent
- HVAC is set to 78% AFUE Gas-Fired Heating, 13 SEER DX Cooling
- Water heating is set to a 40 gallon gas-fired storage with an Energy Factor of 0.594



EDR Reference Design

EXCEPTIONS/CLARIFICATIONS to 2006 IECC

- Walls:
 - CZ 1, 16 = R-19
 - CZ 2-15 = R-13
- Roof/ceiling:
 - CZ 1, 16 = R-38 / no radiant barrier
 - CZ 2-15 = R-30 / no radiant barrier
- Floor:
 - CZ 1, 16 = R-30
 - CZ 2-15 = R-19
- Slab edge: CZ 1, 16 = R-10, 24-in deep



EDR Reference Design

EXCEPTIONS/CLARIFICATIONS to 2006 IECC

- Windows:
 - CZ 1, 16 = 0.35 U-factor / 0.40 SHGC
 - CZ 2-15 = 0.65 U-factor / 0.40 SHGC
- Window area:
 - 18 percent glass-to-floor area



EDR PV System Credit

- Provides credit for PV systems
 - Simulates the proposed size of PV system
 - Uses PV system characteristics (azimuth, tilt)
 - Does not apply the PV compliance credit
- Extra run time
 - Simulates a third run to establish EDR reference



Results Screen for EDR

EDR of Standard Design

Energy Use Details | Summary | Energy Design Rating

EDR of Proposed Design: 51.6 EDR of Proposed PV: 31.3 Final Proposed EDR: 20.3

EDR of Standard Design: 62.1

End Use	Reference Design Site (kWh)	Reference Design Site (therms)	Reference Design (kTDV/ft²-yr)	Proposed Design Site (kWh)	Proposed Design Site (therms)	Proposed Design (kTDV/ft²-yr)	Design Rating Margin (kTDV/ft²-yr)
Space Heating	50	41.4	4.18	14	14.2	1.41	2.77
Space Cooling	10,108		156.60	4,121		71.49	85.11
IAQ Ventilation	112		1.12	112		1.12	0.00
Other HVAC			0.00			0.00	0.00
Water Heating		150.0	12.09		90.0	7.25	4.84
Photovoltaics				-6,979		-75.49	75.49
Inside Lighting	2,135		22.73	1,045		10.94	11.79
Appl. & Cooking	930	65.4	14.54	958	52.5	13.82	0.72
Plug Loads	2,638		27.12	2,206		22.32	4.80
Exterior	298		2.76	117		1.08	1.68
TOTAL	16,270	256.8	241.14	1,593	156.7	53.94	187.20



Results Screen for EDR

EDR of Proposed Design without PV applied

Energy Use Details Summary Energy Design Rating							
EDR of Proposed Design: 51.6 EDR of Proposed PV: 31.3 Final Proposed EDR: 20.3 EDR of Standard Design: 62.1							
End Use	Reference Design Site (kWh)	Reference Design Site (therms)	Reference Design (kTDV/ft²-yr)	Proposed Design Site (kWh)	Proposed Design Site (therms)	Proposed Design (kTDV/ft²-yr)	Design Rating Margin (kTDV/ft²-yr)
Space Heating	50	41.4	4.18	14	14.2	1.41	2.77
Space Cooling	10,108		156.60	4,121		71.49	85.11
IAQ Ventilation	112		1.12	112		1.12	0.00
Other HVAC			0.00			0.00	0.00
Water Heating		150.0	12.09		90.0	7.25	4.84
Photovoltaics				-6,979		-75.49	75.49
Inside Lighting	2,135		22.73	1,045		10.94	11.79
Appl. & Cooking	930	65.4	14.54	958	52.5	13.82	0.72
Plug Loads	2,638		27.12	2,206		22.32	4.80
Exterior	298		2.76	117		1.08	1.68
TOTAL	16,270	256.8	241.14	1,593	156.7	53.94	187.20



Results Screen for EDR

EDR of Proposed Design PV system only

Energy Use Details		Summary		Energy Design Rating						
EDR of Proposed Design:				51.6	EDR of Proposed PV:		31.3	Final Proposed EDR:		20.3
EDR of Standard Design:				62.1						
End Use	Reference Design Site (kWh)	Reference Design Site (therms)	Reference Design (kTDV/ft²-yr)	Proposed Design Site (kWh)	Proposed Design Site (therms)	Proposed Design (kTDV/ft²-yr)	Design Rating Margin (kTDV/ft²-yr)			
Space Heating	50	41.4	4.18	14	14.2	1.41	2.77			
Space Cooling	10,108		156.60	4,121		71.49	85.11			
IAQ Ventilation	112		1.12	112		1.12	0.00			
Other HVAC			0.00			0.00	0.00			
Water Heating		150.0	12.09		90.0	7.25	4.84			
Photovoltaics				-6,979		-75.49	75.49			
Inside Lighting	2,135		22.73	1,045		10.94	11.79			
Appl. & Cooking	930	65.4	14.54	958	52.5	13.82	0.72			
Plug Loads	2,638		27.12	2,206		22.32	4.80			
Exterior	298		2.76	117		1.08	1.68			
TOTAL	16,270	256.8	241.14	1,593	156.7	53.94	187.20			



Results Screen for EDR

Final EDR of Proposed Design with PV system

Energy Use Details		Summary		Energy Design Rating						
EDR of Proposed Design:				51.6	EDR of Proposed PV:		31.3	Final Proposed EDR:		20.3
EDR of Standard Design:				62.1						
End Use	Reference Design Site (kWh)	Reference Design Site (therms)	Reference Design (kTDV/ft²-yr)	Proposed Design Site (kWh)	Proposed Design Site (therms)	Proposed Design (kTDV/ft²-yr)	Design Rating Margin (kTDV/ft²-yr)			
Space Heating	50	41.4	4.18	14	14.2	1.41	2.77			
Space Cooling	10,108		156.60	4,121		71.49	85.11			
IAQ Ventilation	112		1.12	112		1.12	0.00			
Other HVAC			0.00			0.00	0.00			
Water Heating		150.0	12.09		90.0	7.25	4.84			
Photovoltaics				-6,979		-75.49	75.49			
Inside Lighting	2,135		22.73	1,045		10.94	11.79			
Appl. & Cooking	930	65.4	14.54	958	52.5	13.82	0.72			
Plug Loads	2,638		27.12	2,206		22.32	4.80			
Exterior	298		2.76	117		1.08	1.68			
TOTAL	16,270	256.8	241.14	1,593	156.7	53.94	187.20			



CF1R – Energy Design Rating

Meets Tier 1 prerequisite but does not have QII

ENERGY USE SUMMARY				
04	05	06	07	08
Energy Use (kTDV/ft ² -yr)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	15.96	15.30	0.66	4.1%
Space Cooling	23.48	23.73	-0.25	-1.1%
IAQ Ventilation	1.17	1.17	0.00	0.0%
Water Heating	9.63	9.63	0.00	0.0%
Photovoltaic Offset	---	-11.66	11.66	----
Compliance Energy Total	50.24	38.17	12.07	24.0%

ENERGY DESIGN RATING			
<p>Energy Design Rating (EDR) is an alternate way to express the energy performance of a building using a scoring system where 100 represents the energy performance of the Residential Energy Services (RESNET) reference home characterization of the 2006 International Energy Conservation Code (IECC). A score of zero represents the energy performance of a building that combines high levels of energy efficiency with renewable generation to "zero out" its TDV energy. Because EDR includes consideration of components not regulated by Title 24, Part 6 (such as domestic appliances and consumer electronics), it is not used to show compliance with Part 6 but may instead be used by local jurisdictions pursuing local ordinances under Title 24, Part 11 (CALGreen).</p> <p>As a Standard Design building under the 2016 Building Energy Efficiency Standards is significantly more efficient than the baseline EDR building, the EDR of the Standard Design building is provided for Information. Similarly, the EDR score of the Proposed Design is provided separately from the EDR value of installed PV so that the effects of efficiency and renewable energy can both be seen.</p>			
EDR of Standard Design	EDR of Proposed Design	EDR Value of Proposed PV	Final EDR of Proposed Design
55.2	54.9	20.7	34.3
<input type="checkbox"/>	Design includes Quality Insulation Installation (QII) prerequisite (CALGreen A4.203.1.1.2)		
<input checked="" type="checkbox"/>	Design meets Tier 1 prerequisite of 15% above code compliance margin (CALGreen A4.203.1.2.1)		
<input type="checkbox"/>	Design meets Tier 2 prerequisite of 30% above code compliance margin (CALGreen A4.203.1.2.2)		
<input type="checkbox"/>	Design meets ZNE Tier requirement for Single Family in climate zone CZ12 (Sacramento) (CALGreen A4.203.1.2.3)		



CF1R – Energy Design Rating

Meets Tier 2 prerequisite and Final EDR ≤ 0 but does not have QII (does not meet ZNE Design Designation)

ENERGY USE SUMMARY				
04	05	06	07	08
Energy Use (kTDV/ft ² -yr)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	15.96	14.57	1.39	8.7%
Space Cooling	23.48	14.19	9.29	39.6%
IAQ Ventilation	1.17	1.17	0.00	0.0%
Water Heating	9.63	9.63	0.00	0.0%
Photovoltaic Offset	---	-11.66	11.66	---
Compliance Energy Total	50.24	27.90	22.34	44.5%

ENERGY DESIGN RATING

Energy Design Rating (EDR) is an alternate way to express the energy performance of a building using a scoring system where 100 represents the energy performance of the Residential Energy Services (RESNET) reference home characterization of the 2006 International Energy Conservation Code (IECC). A score of zero represents the energy performance of a building that combines high levels of energy efficiency with renewable generation to "zero out" its TDV energy. Because EDR includes consideration of components not regulated by Title 24, Part 6 (such as domestic appliances and consumer electronics), it is not used to show compliance with Part 6 but may instead be used by local jurisdictions pursuing local ordinances under Title 24, Part 11 (CALGreen).

As a Standard Design building under the 2016 Building Energy Efficiency Standards is significantly more efficient than the baseline EDR building, the EDR of the Standard Design building is provided for information. Similarly, the EDR score of the Proposed Design is provided separately from the EDR value of installed PV so that the effects of efficiency and renewable energy can both be seen.

EDR of Standard Design	EDR of Proposed Design	EDR Value of Proposed PV	Final EDR of Proposed Design
55.2	48.9	72.3	-23.4
<input type="checkbox"/>	Design includes Quality Insulation Installation (QII) prerequisite (CALGreen A4.203.1.1.2)		
<input checked="" type="checkbox"/>	Design meets Tier 1 prerequisite of 15% above code compliance margin (CALGreen A4.203.1.2.1)		
<input checked="" type="checkbox"/>	Design meets Tier 2 prerequisite of 30% above code compliance margin (CALGreen A4.203.1.2.2)		
<input type="checkbox"/>	Design meets ZNE Tier requirement for Single Family in climate zone CZ12 (Sacramento) (CALGreen A4.203.1.2.3)		



CF1R – Energy Design Rating

Meets Tier 2 prerequisite and Final EDR ≤ 0 and has QII (now meets ZNE Design Designation requirements)

ENERGY USE SUMMARY				
04	05	06	07	08
Energy Use (kTDV/ft ² -yr)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	15.96	11.72	4.24	26.6%
Space Cooling	23.48	22.11	1.37	5.8%
IAQ Ventilation	1.17	1.17	0.00	0.0%
Water Heating	9.63	9.63	0.00	0.0%
Photovoltaic Offset	---	-11.66	11.66	---
Compliance Energy Total	50.24	32.97	17.27	34.4%

ENERGY DESIGN RATING			
<p>Energy Design Rating (EDR) is an alternate way to express the energy performance of a building using a scoring system where 100 represents the energy performance of the Residential Energy Services (RESNET) reference home characterization of the 2006 International Energy Conservation Code (IECC). A score of zero represents the energy performance of a building that combines high levels of energy efficiency with renewable generation to "zero out" its TDV energy. Because EDR includes consideration of components not regulated by Title 24, Part 6 (such as domestic appliances and consumer electronics), it is not used to show compliance with Part 6 but may instead be used by local jurisdictions pursuing local ordinances under Title 24, Part 11 (CALGreen).</p> <p>As a Standard Design building under the 2016 Building Energy Efficiency Standards is significantly more efficient than the baseline EDR building, the EDR of the Standard Design building is provided for Information. Similarly, the EDR score of the Proposed Design is provided separately from the EDR value of installed PV so that the effects of efficiency and renewable energy can both be seen.</p>			
EDR of Standard Design	EDR of Proposed Design	EDR Value of Proposed PV	Final EDR of Proposed Design
55.2	51.7	58.9	-7.2
<input checked="" type="checkbox"/>	Design includes Quality Insulation Installation (QII) prerequisite (CALGreen A4.203.1.1.2)		
<input checked="" type="checkbox"/>	Design meets Tier 1 prerequisite of 15% above code compliance margin (CALGreen A4.203.1.2.1)		
<input checked="" type="checkbox"/>	Design meets Tier 2 prerequisite of 30% above code compliance margin (CALGreen A4.203.1.2.2)		
<input checked="" type="checkbox"/>	Design meets ZNE Tier requirement for Single Family in climate zone CZ12 (Sacramento) (CALGreen A4.203.1.2.3)		