Summary of Residential ACM Tests (kTDV/ft2)

Comparison Date:	8/29/2017
Comparison Author:	Ken Nittler
Candidate Software:	CBECC-Res 2019 SVN 953
Reference Software:	CBECC-Res 2019 SVN 953
Type of Software:	Reference
Type of Construction:	New
Units for Summary:	kTDV/ft2
Tolerance:	0.04

Test	Pass/ Fail	Average Proposed kTDV/ft2	Average Standard kTDV/ft2	Description
V01	Pass	46.43	46.43	Standard Design in All Zones for Prototype S2100ft2
V02	Pass	42.83	42.83	Standard Design in All Zones for Prototype S2700ft2
V03	Pass	53.33	53.33	Standard Design in All Zones for Prototype S6960ft2
V04	Pass	42.99	46.43	Proposed Design in All Zones for Prototype P2100ft2
V05	Pass	38.84	42.83	Proposed Design in All Zones for Prototype P2700ft2
V06	Pass	49.92	53.33	Proposed Design in All Zones for Prototype P6960ft2
V07	Pass	46.88	50.52	Common Measures in Zone 12 for Prototype P2100ft2
V08	Pass	50.06	50.52	Water Heating in Zone 12 for Prototype P2100ft2
V09	Pass	50.55	50.52	Multiple Orientation in Zone 12 for Prototype S2100ft2/P2100ft2
V10	Pass	69.07	67.29	Multi Family Water Heating in Zone 12 for Prototype P6960ft2
V11	Pass	60.84	64.33	Source Energy in Zone 12 for Prototype P2100ft2
V12	n/a	#N/A	#N/A	E+A+A Base & Windows in Zone 12 for Prototype P1665ft2
V13	n/a	#N/A	#N/A	E+A+A Walls & HVAC in Zone 12 for Prototype P1665ft2

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 8/29/2017
Comparison Author: Ken Nittler
Candidate Software: CBECC-Res 2019 SVN 953

Test	Run	Description	Pass/Fail	Reference Proposed	Candidate Proposed	Percent Difference	Within Tolerance	Standard Equals	Reference Standard	Candidate Standard	Percent Difference	Within Tolerance	Standard Equals Lookup	Margin
V01	Standard Design in All Zones for Prototype S2100ft2							Standard = Proposed for this test						
V01	R01	Zone 01	Pass	55.92	55.92	0.00%	Yes	55.92	55.92	55.92	0.00%	Yes	V01R01	0.00
V01	R02	Zone 02	Pass	40.11	40.11	0.00%	Yes	40.11	40.11	40.11	0.00%	Yes	V01R02	0.00
V01	R03	Zone 03	Pass	32.56	32.56	0.00%	Yes	32.56	32.56	32.56	0.00%	Yes	V01R03	0.00
V01	R04	Zone 04	Pass	32.02	32.02	0.00%	Yes	32.02	32.02	32.02	0.00%	Yes	V01R04	0.00
V01	R05	Zone 05	Pass	30.92	30.92	0.00%	Yes	30.92	30.92	30.92	0.00%	Yes	V01R05	0.00
V01	R06	Zone 06	Pass	23.80	23.80	0.00%	Yes	23.80	23.80	23.80	0.00%	Yes	V01R06	0.00
V01	R07	Zone 07	Pass	15.90	15.90	0.00%	Yes	15.90	15.90	15.90	0.00%	Yes	V01R07	0.00
V01	R08	Zone 08	Pass	24.62	24.62	0.00%	Yes	24.62	24.62	24.62	0.00%	Yes	V01R08	0.00
V01	R09	Zone 09	Pass	38.85	38.85	0.00%	Yes	38.85	38.85	38.85	0.00%	Yes	V01R09	0.00
V01	R10	Zone 10	Pass	40.52	40.52	0.00%	Yes	40.52	40.52	40.52	0.00%	Yes	V01R10	0.00
V01	R11	Zone 11	Pass	67.19	67.19	0.00%	Yes	67.19	67.19	67.19	0.00%	Yes	V01R11	0.00
V01	R12	Zone 12	Pass	50.52	50.52	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	0.00
V01	R13	Zone 13	Pass	69.05	69.05	0.00%	Yes	69.05	69.05	69.05	0.00%	Yes	V01R13	0.00
V01	R14	Zone 14	Pass	64.38	64.38	0.00%	Yes	64.38	64.38	64.38	0.00%	Yes	V01R14	0.00
V01	R15	Zone 15	Pass	97.59	97.59	0.00%	Yes	97.59	97.59	97.59	0.00%	Yes	V01R15	0.00
V01	R16	Zone 16	Pass	58.88	58.88	0.00%	Yes	58.88	58.88	58.88	0.00%	Yes	V01R16	0.00
Result V01			Pass	46.43	46.43	0.00%		46.43	46.43	46.43	0.00%		Min	0.00%	0.00
											Ave		Max	0.00%	
V02	Standard Design in All Zones for Prototype S2700ft2							Standard = Proposed for this test						
V02	R01	Zone 01	Pass	41.77	41.77	0.00%	Yes	41.77	41.77	41.77	0.00%	Yes	V02R01	0.00
V02	R02	Zone 02	Pass	35.97	35.97	0.00%	Yes	35.97	35.97	35.97	0.00%	Yes	V02R02	0.00
V02	R03	Zone 03	Pass	25.70	25.70	0.00%	Yes	25.70	25.70	25.70	0.00%	Yes	V02R03	0.00
V02	R04	Zone 04	Pass	31.72	31.72	0.00%	Yes	31.72	31.72	31.72	0.00%	Yes	V02R04	0.00
V02	R05	Zone 05	Pass	23.84	23.84	0.00%	Yes	23.84	23.84	23.84	0.00%	Yes	V02R05	0.00
V02	R06	Zone 06	Pass	22.04	22.04	0.00%	Yes	22.04	22.04	22.04	0.00%	Yes	V02R06	0.00
V02	R07	Zone 07	Pass	14.10	14.10	0.00%	Yes	14.10	14.10	14.10	0.00%	Yes	V02R07	0.00
V02	R08	Zone 08	Pass	25.63	25.63	0.00%	Yes	25.63	25.63	25.63	0.00%	Yes	V02R08	0.00
V02	R09	Zone 09	Pass	38.41	38.41	0.00%	Yes	38.41	38.41	38.41	0.00%	Yes	V02R09	0.00
V02	R10	Zone 10	Pass	40.31	40.31	0.00%	Yes	40.31	40.31	40.31	0.00%	Yes	V02R10	0.00
V02	R11	Zone 11	Pass	64.51	64.51	0.00%	Yes	64.51	64.51	64.51	0.00%	Yes	V02R11	0.00
V02	R12	Zone 12	Pass	49.37	49.37	0.00%	Yes	49.37	49.37	49.37	0.00%	Yes	V02R12	0.00
V02	R13	Zone 13	Pass	66.17	66.17	0.00%	Yes	66.17	66.17	66.17	0.00%	Yes	V02R13	0.00
V02	R14	Zone 14	Pass	61.85	61.85	0.00%	Yes	61.85	61.85	61.85	0.00%	Yes	V02R14	0.00
V02	R15	Zone 15	Pass	90.58	90.58	0.00%	Yes	90.58	90.58	90.58	0.00%	Yes	V02R15	0.00
V02	R16	Zone 16	Pass	53.25	53.25	0.00%	Yes	53.25	53.25	53.25	0.00%	Yes	V02R16	0.00
Result V02			Pass	42.83	42.83	0.00%		42.83	42.83	42.83	0.00%		Min	0.00%	0.00
											Ave		Max	0.00%	

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 8/29/2017
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Candidate Software: CBECC-Res 2019 SVN 953

Test	Run	Description	Pass/Fail	Reference Proposed	Candidate Proposed	Percent Difference	Within Tolerance	Standard Equals	Reference Standard	Candidate Standard	Percent Difference	Within Tolerance	Standard Equals Lookup	Margin
V03	Standard Design in All Zones for Prototype S6960ft2							Standard = Proposed for this test						
V03	R01	Zone 01	Pass	42.20	42.20	0.00%	Yes	42.20	42.20	42.20	0.00%	Yes	V03R01	0.00
V03	R02	Zone 02	Pass	43.90	43.90	0.00%	Yes	43.90	43.90	43.90	0.00%	Yes	V03R02	0.00
V03	R03	Zone 03	Pass	31.16	31.16	0.00%	Yes	31.16	31.16	31.16	0.00%	Yes	V03R03	0.00
V03	R04	Zone 04	Pass	42.17	42.17	0.00%	Yes	42.17	42.17	42.17	0.00%	Yes	V03R04	0.00
V03	R05	Zone 05	Pass	30.30	30.30	0.00%	Yes	30.30	30.30	30.30	0.00%	Yes	V03R05	0.00
V03	R06	Zone 06	Pass	34.03	34.03	0.00%	Yes	34.03	34.03	34.03	0.00%	Yes	V03R06	0.00
V03	R07	Zone 07	Pass	30.41	30.41	0.00%	Yes	30.41	30.41	30.41	0.00%	Yes	V03R07	0.00
V03	R08	Zone 08	Pass	42.65	42.65	0.00%	Yes	42.65	42.65	42.65	0.00%	Yes	V03R08	0.00
V03	R09	Zone 09	Pass	51.59	51.59	0.00%	Yes	51.59	51.59	51.59	0.00%	Yes	V03R09	0.00
V03	R10	Zone 10	Pass	53.85	53.85	0.00%	Yes	53.85	53.85	53.85	0.00%	Yes	V03R10	0.00
V03	R11	Zone 11	Pass	74.21	74.21	0.00%	Yes	74.21	74.21	74.21	0.00%	Yes	V03R11	0.00
V03	R12	Zone 12	Pass	61.97	61.97	0.00%	Yes	61.97	61.97	61.97	0.00%	Yes	V03R12	0.00
V03	R13	Zone 13	Pass	77.37	77.37	0.00%	Yes	77.37	77.37	77.37	0.00%	Yes	V03R13	0.00
V03	R14	Zone 14	Pass	72.03	72.03	0.00%	Yes	72.03	72.03	72.03	0.00%	Yes	V03R14	0.00
V03	R15	Zone 15	Pass	108.22	108.22	0.00%	Yes	108.22	108.22	108.22	0.00%	Yes	V03R15	0.00
V03	R16	Zone 16	Pass	57.27	57.27	0.00%	Yes	57.27	57.27	57.27	0.00%	Yes	V03R16	0.00
Result V03			Pass	53.33	53.33	0.00%		53.33	53.33	53.33	0.00%		Min	0.00%	0.00
											Ave		Max	0.00%	
V04	Proposed Design in All Zones for Prototype P2100ft2							Standard = T01 Standard for this test						
V04	R01	Zone 01	Pass	54.75	54.75	0.00%	Yes	55.92	55.92	55.92	0.00%	Yes	V01R01	1.17
V04	R02	Zone 02	Pass	38.17	38.17	0.00%	Yes	40.11	40.11	40.11	0.00%	Yes	V01R02	1.94
V04	R03	Zone 03	Pass	30.66	30.66	0.00%	Yes	32.56	32.56	32.56	0.00%	Yes	V01R03	1.90
V04	R04	Zone 04	Pass	30.26	30.26	0.00%	Yes	32.02	32.02	32.02	0.00%	Yes	V01R04	1.76
V04	R05	Zone 05	Pass	28.92	28.92	0.00%	Yes	30.92	30.92	30.92	0.00%	Yes	V01R05	2.00
V04	R06	Zone 06	Pass	21.73	21.73	0.00%	Yes	23.80	23.80	23.80	0.00%	Yes	V01R06	2.07
V04	R07	Zone 07	Pass	14.96	14.96	0.00%	Yes	15.90	15.90	15.90	0.00%	Yes	V01R07	0.94
V04	R08	Zone 08	Pass	21.79	21.79	0.00%	Yes	24.62	24.62	24.62	0.00%	Yes	V01R08	2.83
V04	R09	Zone 09	Pass	35.10	35.10	0.00%	Yes	38.85	38.85	38.85	0.00%	Yes	V01R09	3.75
V04	R10	Zone 10	Pass	36.52	36.52	0.00%	Yes	40.52	40.52	40.52	0.00%	Yes	V01R10	4.00
V04	R11	Zone 11	Pass	61.70	61.70	0.00%	Yes	67.19	67.19	67.19	0.00%	Yes	V01R11	5.49
V04	R12	Zone 12	Pass	45.65	45.65	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.87
V04	R13	Zone 13	Pass	63.58	63.58	0.00%	Yes	69.05	69.05	69.05	0.00%	Yes	V01R13	5.47
V04	R14	Zone 14	Pass	57.82	57.82	0.00%	Yes	64.38	64.38	64.38	0.00%	Yes	V01R14	6.56
V04	R15	Zone 15	Pass	91.96	91.96	0.00%	Yes	97.59	97.59	97.59	0.00%	Yes	V01R15	5.63
V04	R16	Zone 16	Pass	54.34	54.34	0.00%	Yes	58.88	58.88	58.88	0.00%	Yes	V01R16	4.54
Result V04			Pass	42.99	42.99	0.00%		46.43	46.43	46.43	0.00%		Min	0.00%	3.43
											Ave		Max	0.00%	

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Candidate Software: CBECC-Res 2019 SVN 953

Test	Run	Description	Pass/Fail	Reference Proposed	Candidate Proposed	Percent Difference	Within Tolerance	Standard Equals	Reference Standard	Candidate Standard	Percent Difference	Within Tolerance	Standard Equals Lookup	Margin
V05	Proposed Design in All Zones for Prototype P2700ft2							Standard = T02 Standard for this test						
V05	R01	Zone 01	Pass	40.41	40.41	0.00%	Yes	41.77	41.77	41.77	0.00%	Yes	V02R01	1.36
V05	R02	Zone 02	Pass	32.42	32.42	0.00%	Yes	35.97	35.97	35.97	0.00%	Yes	V02R02	3.55
V05	R03	Zone 03	Pass	23.89	23.89	0.00%	Yes	25.70	25.70	25.70	0.00%	Yes	V02R03	1.81
V05	R04	Zone 04	Pass	26.03	26.03	0.00%	Yes	31.72	31.72	31.72	0.00%	Yes	V02R04	5.69
V05	R05	Zone 05	Pass	21.88	21.88	0.00%	Yes	23.84	23.84	23.84	0.00%	Yes	V02R05	1.96
V05	R06	Zone 06	Pass	20.02	20.02	0.00%	Yes	22.04	22.04	22.04	0.00%	Yes	V02R06	2.02
V05	R07	Zone 07	Pass	13.31	13.31	0.00%	Yes	14.10	14.10	14.10	0.00%	Yes	V02R07	0.79
V05	R08	Zone 08	Pass	23.03	23.03	0.00%	Yes	25.63	25.63	25.63	0.00%	Yes	V02R08	2.60
V05	R09	Zone 09	Pass	34.32	34.32	0.00%	Yes	38.41	38.41	38.41	0.00%	Yes	V02R09	4.09
V05	R10	Zone 10	Pass	36.31	36.31	0.00%	Yes	40.31	40.31	40.31	0.00%	Yes	V02R10	4.00
V05	R11	Zone 11	Pass	58.31	58.31	0.00%	Yes	64.51	64.51	64.51	0.00%	Yes	V02R11	6.20
V05	R12	Zone 12	Pass	44.22	44.22	0.00%	Yes	49.37	49.37	49.37	0.00%	Yes	V02R12	5.15
V05	R13	Zone 13	Pass	60.15	60.15	0.00%	Yes	66.17	66.17	66.17	0.00%	Yes	V02R13	6.02
V05	R14	Zone 14	Pass	54.99	54.99	0.00%	Yes	61.85	61.85	61.85	0.00%	Yes	V02R14	6.86
V05	R15	Zone 15	Pass	83.91	83.91	0.00%	Yes	90.58	90.58	90.58	0.00%	Yes	V02R15	6.67
V05	R16	Zone 16	Pass	48.25	48.25	0.00%	Yes	53.25	53.25	53.25	0.00%	Yes	V02R16	5.00
Result V05			Pass	38.84	38.84	0.00%		42.83	42.83	42.83	0.00%		Min	0.00%	3.99
											Ave		Max	0.00%	
V06	Proposed Design in All Zones for Prototype P6960ft2							Standard = T03 Standard for this test						
V06	R01	Zone 01	Pass	42.88	42.88	0.00%	Yes	42.20	42.20	42.20	0.00%	Yes	V03R01	-0.68
V06	R02	Zone 02	Pass	41.77	41.77	0.00%	Yes	43.90	43.90	43.90	0.00%	Yes	V03R02	2.13
V06	R03	Zone 03	Pass	30.13	30.13	0.00%	Yes	31.16	31.16	31.16	0.00%	Yes	V03R03	1.03
V06	R04	Zone 04	Pass	38.06	38.06	0.00%	Yes	42.17	42.17	42.17	0.00%	Yes	V03R04	4.11
V06	R05	Zone 05	Pass	29.45	29.45	0.00%	Yes	30.30	30.30	30.30	0.00%	Yes	V03R05	0.85
V06	R06	Zone 06	Pass	31.59	31.59	0.00%	Yes	34.03	34.03	34.03	0.00%	Yes	V03R06	2.44
V06	R07	Zone 07	Pass	28.04	28.04	0.00%	Yes	30.41	30.41	30.41	0.00%	Yes	V03R07	2.37
V06	R08	Zone 08	Pass	39.74	39.74	0.00%	Yes	42.65	42.65	42.65	0.00%	Yes	V03R08	2.91
V06	R09	Zone 09	Pass	47.13	47.13	0.00%	Yes	51.59	51.59	51.59	0.00%	Yes	V03R09	4.46
V06	R10	Zone 10	Pass	49.56	49.56	0.00%	Yes	53.85	53.85	53.85	0.00%	Yes	V03R10	4.29
V06	R11	Zone 11	Pass	69.19	69.19	0.00%	Yes	74.21	74.21	74.21	0.00%	Yes	V03R11	5.02
V06	R12	Zone 12	Pass	57.63	57.63	0.00%	Yes	61.97	61.97	61.97	0.00%	Yes	V03R12	4.34
V06	R13	Zone 13	Pass	71.58	71.58	0.00%	Yes	77.37	77.37	77.37	0.00%	Yes	V03R13	5.79
V06	R14	Zone 14	Pass	66.52	66.52	0.00%	Yes	72.03	72.03	72.03	0.00%	Yes	V03R14	5.51
V06	R15	Zone 15	Pass	100.82	100.82	0.00%	Yes	108.22	108.22	108.22	0.00%	Yes	V03R15	7.40
V06	R16	Zone 16	Pass	54.59	54.59	0.00%	Yes	57.27	57.27	57.27	0.00%	Yes	V03R16	2.68
Result V06			Pass	49.92	49.92	0.00%		53.33	53.33	53.33	0.00%		Min	0.00%	3.42
											Ave		Max	0.00%	

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Test	Run	Description	Pass/Fail	Reference Proposed	Candidate Proposed	Percent Difference	Within Tolerance	Standard Equals	Reference Standard	Candidate Standard	Percent Difference	Within Tolerance	Standard Equals Lookup	Margin
V07	Common Measures in Zone 12 for Prototype P2100ft2							Standard = T01 Standard for this test						
V07	R01	Package	Pass	45.65	45.65	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.87
V07	R02	Fenestration U 0.40/S 0.40	Pass	51.56	51.56	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-1.04
V07	R03	Wall R13/Roof Deck Above R6	Pass	45.64	45.64	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.88
V07	R04	Ceiling R49 /Roof Deck Below R0/Radiant Barrier	Pass	53.92	53.92	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-3.40
V07	R05	Furnace AFUE 92	Pass	43.15	43.15	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	7.37
V07	R06	Air Conditioner SEER 16/EER 14	Pass	43.88	43.88	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	6.64
V07	R07	No Cool Vent	Pass	49.25	49.25	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	1.27
V07	R08	Ducts 2% Leakage	Pass	45.65	45.65	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.87
V07	R09	Insulation Construction Quality Improved	Pass	45.65	45.65	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.87
V07	R10	Air Leakage ACH50 2.0	Pass	44.41	44.41	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	6.11
Result V07			Pass	46.88	46.88	0.00%		50.52	50.52	50.52	0.00%		Min	0.00%	3.64
											Ave		Max	0.00%	
V08	Water Heating in Zone 12 for Prototype P2100ft2							Standard = T01 Standard for this test						
V08	R01	Package	Pass	45.65	45.65	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.87
V08	R02	Parallel Piping	Pass	45.77	45.77	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.75
V08	R03	Small Tankless EF 0.80/Input 195000/0 gal	Pass	45.20	45.20	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	5.32
V08	R04	Large Tankless RE 0.76/Input 300000/0 gal	Pass	45.76	45.76	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.76
V08	R05	Large Storage RE 0.77/Input 100000/75gal/Stby 0.01	Pass	48.31	48.31	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	2.21
V08	R06	Large Storage RE 0.77/Input 100000/75gal/Stby 0.03	Pass	55.44	55.44	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-4.92
V08	R07	Electric Resistance EF 0.92/Input 4500	Pass	71.66	71.66	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-21.14
V08	R08	Heat Pump EF 2.4/Input 4500	Pass	47.69	47.69	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	2.83
V08	R09	2 Water Heaters using Multiplier	Pass	47.58	47.58	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	2.94
V08	R10	2 Water Heaters Using 2 entries	Pass	47.58	47.58	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	2.94
Result V08			Pass	50.06	50.06	0.00%		50.52	50.52	50.52	0.00%		Min	0.00%	0.46
											Ave		Max	0.00%	
V09	Multiple Orientation in Zone 12 for Prototype S2100ft2/P2100ft2							Standard = T01 Standard for this test						
V09	R01	Single Standard Front 45	Pass	52.14	52.14	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-1.62
V09	R02	East Standard	Pass	50.52	50.52	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	0.00
V09	R03	South Standard	Pass	50.52	50.52	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	0.00
V09	R04	West Standard	Pass	50.52	50.52	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	0.00
V09	R05	North Standard	Pass	50.52	50.52	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	0.00
V09	R06	Single Proposed front 45	Pass	51.71	51.71	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-1.19
V09	R07	East Proposed	Pass	54.76	54.76	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-4.24
V09	R08	South Proposed	Pass	47.39	47.39	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	3.13
V09	R09	West Proposed	Pass	51.75	51.75	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	-1.23
V09	R10	North Proposed	Pass	45.65	45.65	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V01R12	4.87
Result V09			Pass	50.55	50.55	0.00%		50.52	50.52	50.52	0.00%		Min	0.00%	-0.03
											Ave		Max	0.00%	

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 8/29/2017
Comparison Author: Ken Nittler
Candidate Software: CBECC-Res 2019 SVN 953

Test	Run	Description	Pass/Fail	Reference Proposed	Candidate Proposed	Percent Difference	Within Tolerance	Standard Equals	Reference Standard	Candidate Standard	Percent Difference	Within Tolerance	Standard Equals Lookup	Margin
V10	Multi Family Water Heating in Zone 12 for Prototype P6960ft2							Standard = Varies for this test						
V10	R01	8 Storage	Pass	69.53	69.53	0.00%	Yes	61.97	61.97	61.97	0.00%	Yes	V06R12	-7.56
V10	R02	8 Storage 2 Systems	Pass	69.53	69.53	0.00%	Yes	61.97	61.97	61.97	0.00%	Yes	V06R12	-7.56
V10	R03	8 LgStor	Pass	77.62	77.62	0.00%	Yes	61.97	61.97	61.97	0.00%	Yes	V06R12	-15.65
V10	R04	2 LgStor Central Solar	Pass	62.43	62.43	0.00%	Yes	65.09	65.09	65.09	0.00%	Yes	V10R04	2.66
V10	R05	2 LgStor Central Solar Recirc	Pass	70.53	70.53	0.00%	Yes	73.19	73.19	73.19	0.00%	Yes	V10R05	2.66
V10	R06	2 LgStor Central Recirc	Pass	76.20	76.20	0.00%	Yes	73.19	73.19	73.19	0.00%	Yes	V10R05	-3.01
V10	R07	2 SmInstantant Central Solar	Pass	58.18	58.18	0.00%	Yes	60.84	60.84	60.84	0.00%	Yes	V10R07	2.66
V10	R08	2 SmInstantant Central Solar Recirc	Pass	66.63	66.63	0.00%	Yes	69.29	69.29	69.29	0.00%	Yes	V10R08	2.66
V10	R09	1 Indirect Central Solar	Pass	65.74	65.74	0.00%	Yes	68.40	68.40	68.40	0.00%	Yes	V10R09	2.66
V10	R10	1 Indirect Central Solar Recirc	Pass	74.34	74.34	0.00%	Yes	77.00	77.00	77.00	0.00%	Yes	V10R10	2.66
Result V10			Pass	69.07	69.07	0.00%		67.29	67.29	67.29	0.00%		Min	0.00%	-1.78
											Ave		Max	0.00%	
V11	Source Energy in Zone 12 for Prototype P2100ft2							Standard = Varies for this test						
V11	R01	Package	Pass	44.95	44.95	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V04R12	5.57
V11	R02	Package No Natural Gas	Pass	80.05	80.05	0.00%	Yes	86.29	86.29	86.29	0.00%	Yes	V11R02	6.24
V11	R03	Electric DHW	Pass	70.34	70.34	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V04R12	-19.82
V11	R04	Electric DHW no Natural Gas	Pass	92.74	92.74	0.00%	Yes	86.29	86.29	86.29	0.00%	Yes	V11R02	-6.45
V11	R05	Heatpump DHW	Pass	47.69	47.69	0.00%	Yes	50.52	50.52	50.52	0.00%	Yes	V04R12	2.83
V11	R06	Heatpump DHW no Natural Gas	Pass	70.36	70.36	0.00%	Yes	86.29	86.29	86.29	0.00%	Yes	V11R02	15.93
V11	R07	Heatpump HVAC	Pass	46.07	46.07	0.00%	Yes	52.19	52.19	52.19	0.00%	Yes	V11R07	6.12
V11	R08	Heatpump HVAC no Natural Gas	Pass	58.67	58.67	0.00%	Yes	64.25	64.25	64.25	0.00%	Yes	V11R08	5.58
V11	R09	Heatpump HVAC & DHW	Pass	48.80	48.80	0.00%	Yes	52.19	52.19	52.19	0.00%	Yes	V11R07	3.39
V11	R10	Heatpump HVAC & DHW no Natural Gas	Pass	48.72	48.72	0.00%	Yes	64.25	64.25	64.25	0.00%	Yes	V11R08	15.53
Result V11			Pass	60.84	60.84	0.00%		64.33	64.33	64.33	0.00%		Min	0.00%	3.49
											Ave		Max	0.00%	
V12	E+A+A Base & Windows in Zone 12 for Prototype P1665ft2							Standard = Varies for this test						
V12	R01	E 1440ft2 as New Construction	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R01	#N/A
V12	R02	E 1440ft2 as Addition/Alteration	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R02	#N/A
V12	R03	EA 1665ft2	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
V12	R04	EAA Ceiling R38 Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
V12	R05	EAA Ceiling R38 Verified Wind U0.41/S0.36	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R05	#N/A
V12	R06	EAA Ceiling R38 Verified Wind U0.41/S0.36 Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R05	#N/A
V12	R07	EAA Ceiling R38 Verified Wind U0.40/S0.35	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R05	#N/A
V12	R08	EAA Ceiling R38 Verified Wind U0.40/S0.35 Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
V12	R09	EAA Ceiling R38 Verified Wind U0.39/S0.34	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R05	#N/A
V12	R10	EAA Ceiling R38 Verified Wind U0.39/S0.34 Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
Result V12			n/a	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A		Min	#N/A	#N/A
											Ave		Max	#N/A	

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 8/29/2017
Comparison Author: Ken Nittler
Candidate Software: CBECC-Res 2019 SVN 953

Test	Run	Description	Pass/Fail	Reference Proposed	Candidate Proposed	Percent Difference	Within Tolerance	Standard Equals	Reference Standard	Candidate Standard	Percent Difference	Within Tolerance	Standard Equals Lookup	Margin
V13	E+A+A Walls & HVAC in Zone 12 for Prototype P1665ft2							Standard = Varies for this test						
V13	R01	EAA Ceiling R38 Verified Wall R11	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R01	#N/A
V13	R02	EAA Ceiling R38 Verified Wall R11 Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R01	#N/A
V13	R03	EAA Ceiling R38 Verified Wall R13	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R01	#N/A
V13	R04	EAA Ceiling R38 Verified Wall R13 Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
V13	R05	EAA Ceiling R38 Verified HVAC Worse	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R05	#N/A
V13	R06	EAA Ceiling R38 Verified HVAC Worse Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R05	#N/A
V13	R07	EAA Ceiling R38 Verified HVAC Equal	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R05	#N/A
V13	R08	EAA Ceiling R38 Verified HVAC Equal Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
V13	R09	EAA Ceiling R38 Verified HVAC Better	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V13R05	#N/A
V13	R10	EAA Ceiling R38 Verified HVAC Better Verified	n/a	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	V12R03	#N/A
Result V13			n/a	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	Min	#N/A	#N/A
												Ave	Max	#N/A