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Supplementary Material

Evaluating Building Energy Code Compliance and Savings Potential through Large Scale Simulation with Models Inferred by Field Data†

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† This paper is an extended version of our paper published in the 16th IBPSA International Conference / Building Simulation BS 2019, Rome, Italy, 4-9 September 2019; pp. 3886-3893.

Received: 28 February 2020; Accepted: 29 April 2020; Published: 7 May 2020

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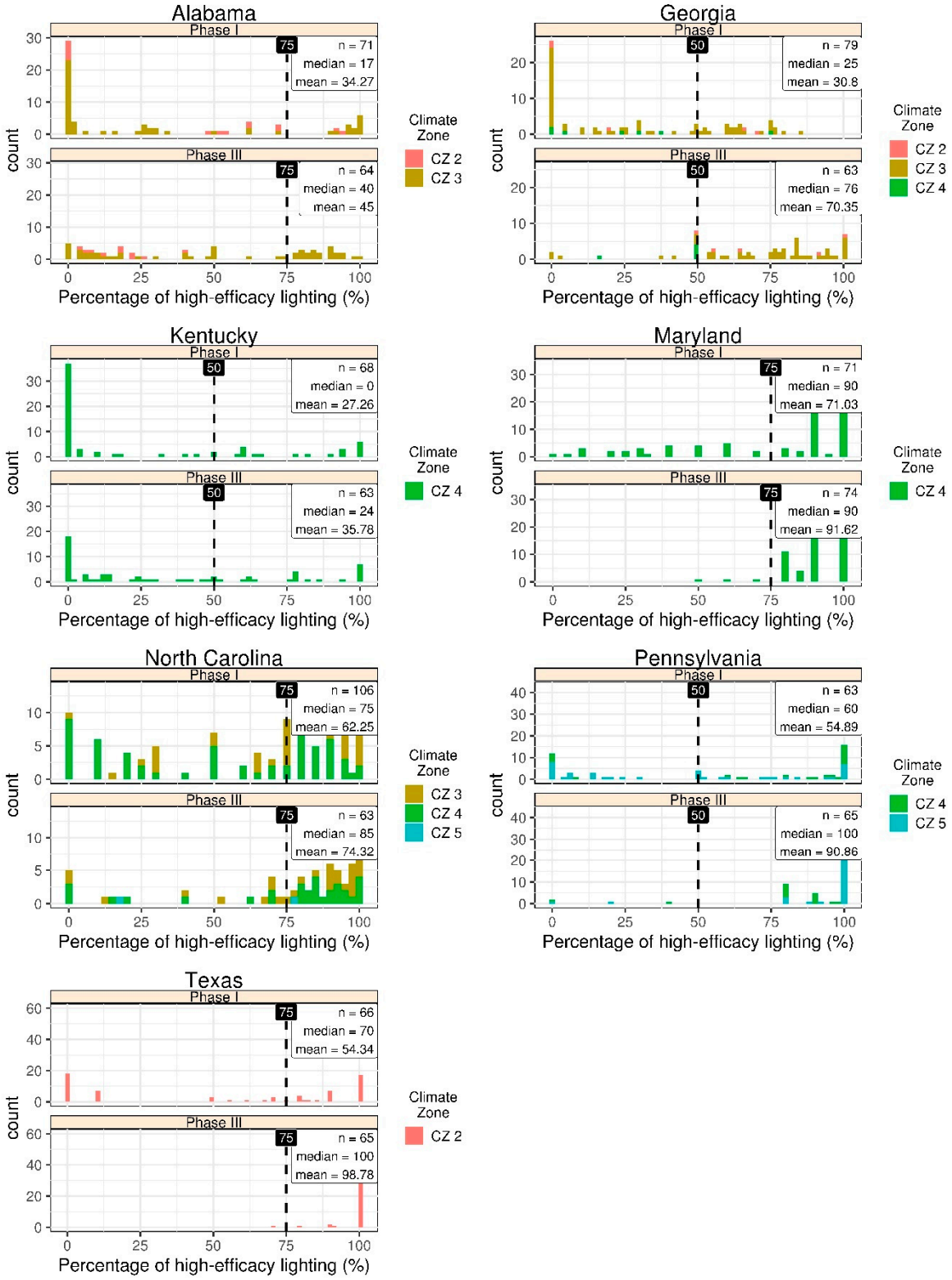

Figure S1: Distributions of High Efficacy Lighting

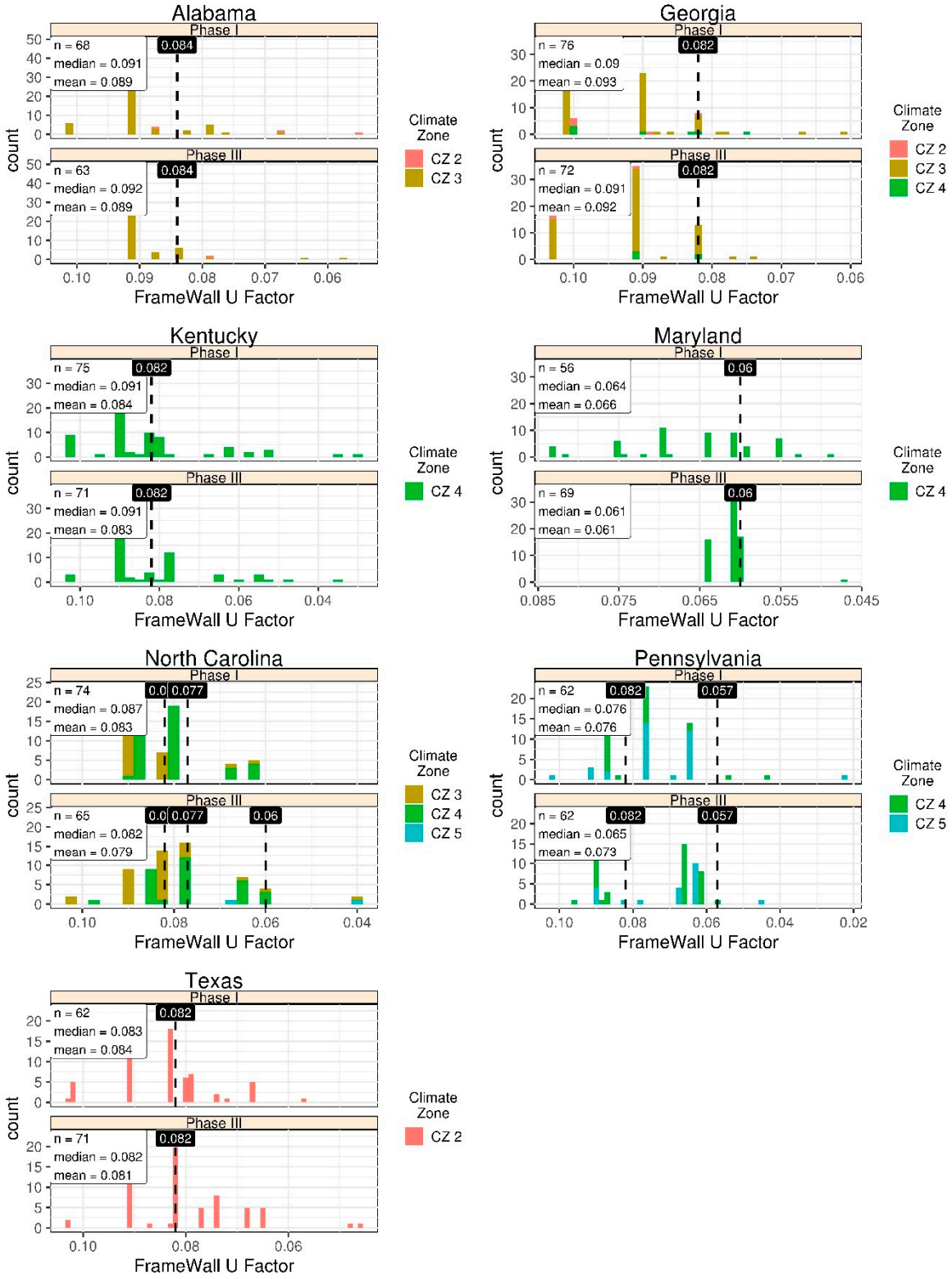

Figure S2: Distributions of Frame Wall Insulation

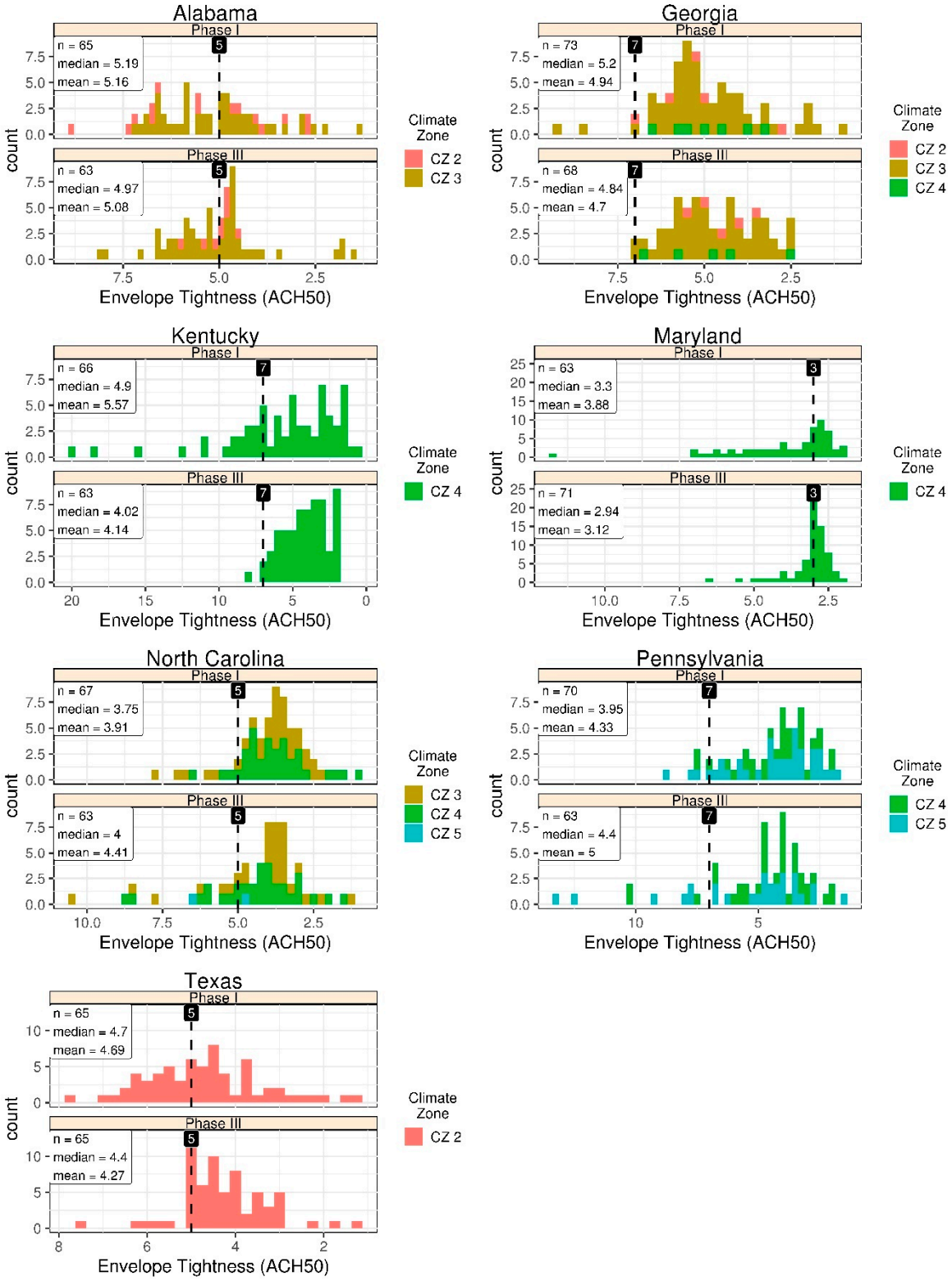

Figure S3: Distributions of Envelope Tightness (ACH50)

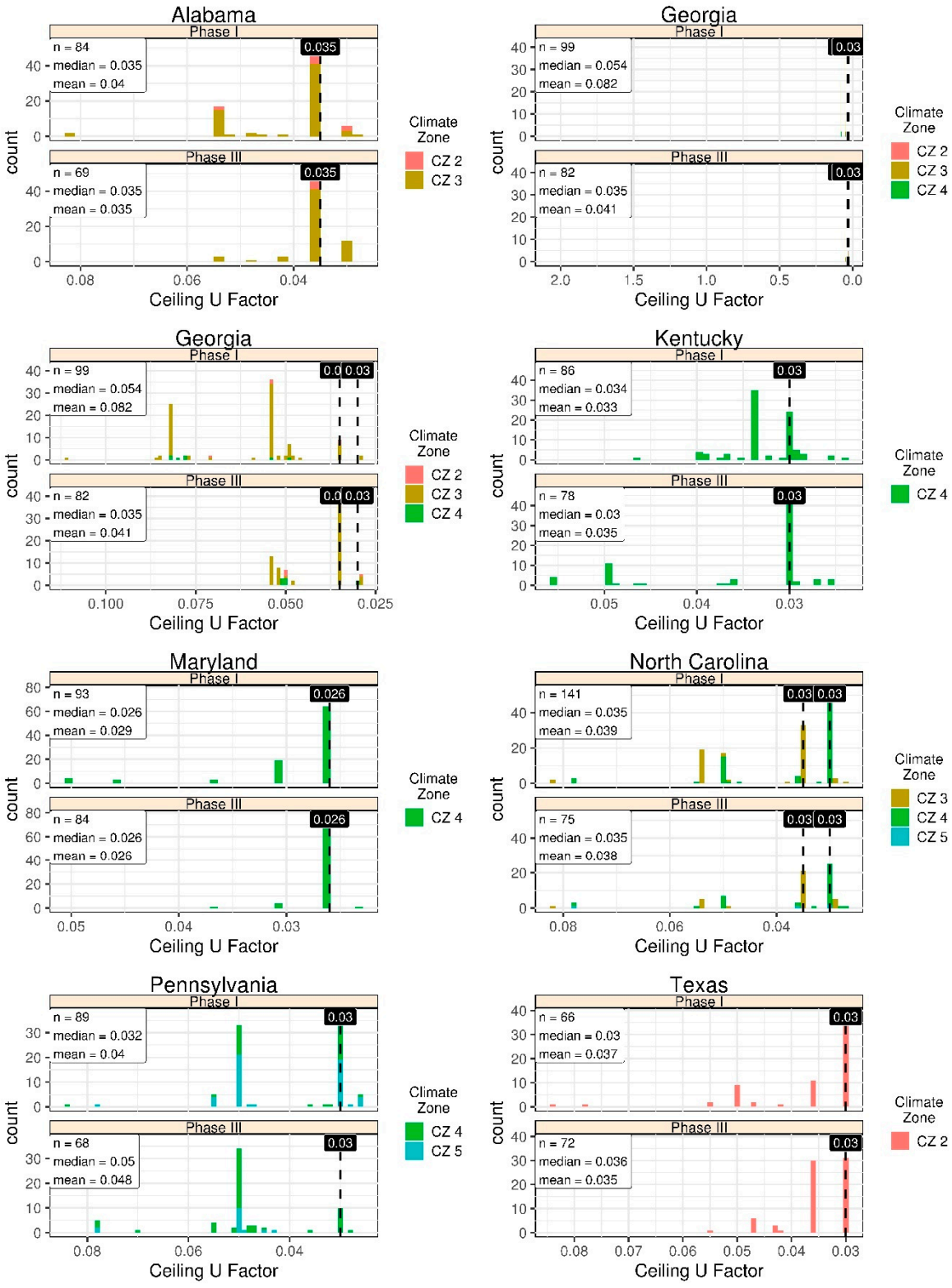

Figure S4: Distributions of Ceiling Insulation. For state of Georgia, two plots were included due to the distortion caused by an outlier. The two plots show the histogram before and after the outlier is removed from the display.

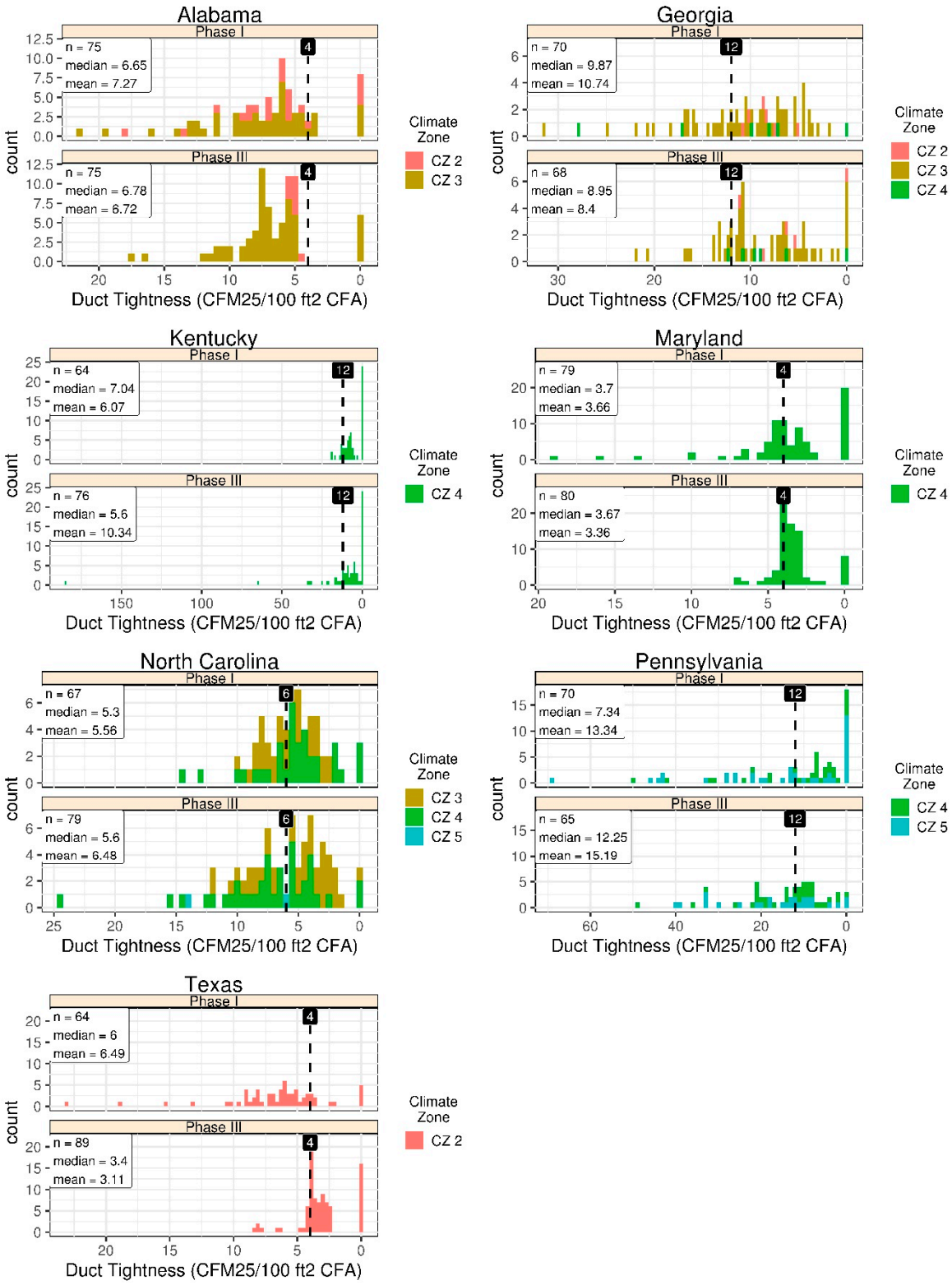

Figure S5: Distributions of Duct Leakage

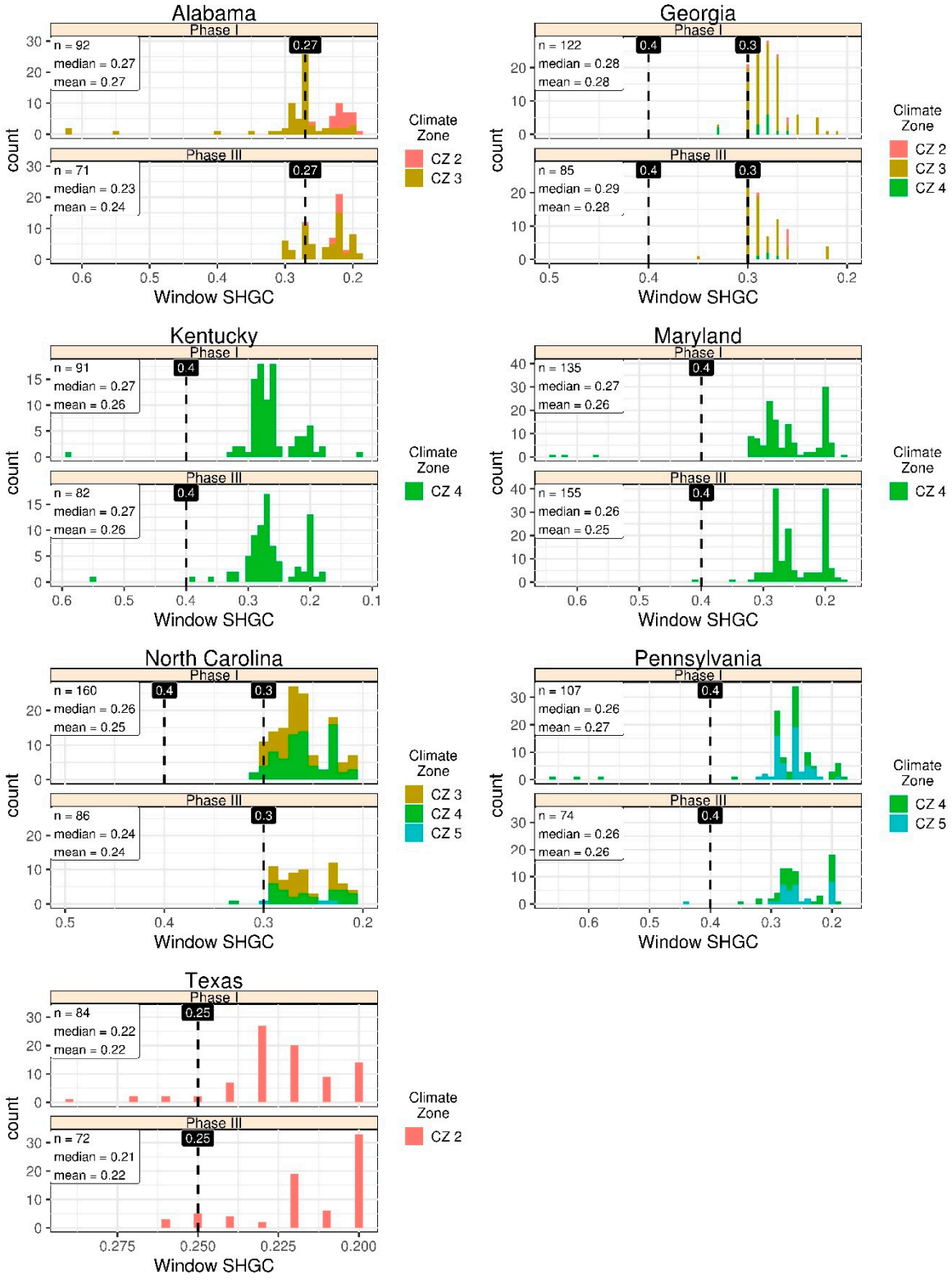

Figure S6: Distributions of Window SHGC

Table S1: Measure Level Annual Savings Potential by state (Phase III vs Phase I)

State	Key items	Total Energy Savings (GJ)			Total Cost Savings ($)		
		Phase I	Phase III	Change %	Phase I	Phase III	Change %
Alabama (2015 IECC)	Duct Leakage	15,214	12,440	18	$395,063	$323,238	18
	Lighting	11,492	8,663	25	$385,451	$290,649	25
	Envelope Air Leakage	11,823	8,319	30	$263,089	$185,084	30
	Exterior Wall Insulation	8,464	7,370	13	$201,105	$175,080	13
	Window SHGC	1,381	102	93	$54,674	$4,534	92
	Ceiling Insulation	4,504	1,064	76	$109,596	$25,247	77
	TOTAL	52,877	37,959	28	$1,408,977	$1,003,832	29
Georgia (Amended 2009 IECC)	Lighting	16,643	2,085	87	$799,065	$104,101	87
	Ceiling Insulation	77,094	21,839	72	$1,880,668	$494,910	74
	Duct Leakage	30,946	9,192	70	$793,336	$215,305	73
	Exterior Wall Insulation	49,661	43,918	12	$1,151,262	$936,827	19
	Envelope Air Leakage	4,096			$83,363		
	TOTAL	178,440	77,034	57	$4,707,694	$1,751,143	63
Kentucky (2009 IECC)	Envelope Air Leakage	28,679	613	98	$484,314	$10,321	98
	Ceiling Insulation	11,999	5,103	57	$215,656	$91,786	57
	Exterior Wall Insulation	9,788	8,699	11	$171,044	$151,974	11
	Foundation Insulation	8,018	12,319	-54	$120,299	$178,905	-49
	Lighting	6,058	4,704	22	$197,544	$153,383	22
	Duct Leakage	2,253	18,101	-704	$43,142	$342,217	-693
	TOTAL	66,795	49,540	26	$1,232,001	$928,585	25
Maryland (2015 IECC)	Envelope Air Leakage	56,834	14,687	74	$754,946	$194,899	74
	Exterior Wall Insulation	26,619	4,846	82	$401,480	$73,498	82
	Lighting	3,762	1,397	63	$195,378	$24,595	87
	Duct Leakage	8,554	164	98	$146,619	$8,115	94
	Ceiling Insulation	2,711	630	77	$44,366	$10,307	77
	TOTAL	98,480	21,725	78	$1,542,790	$311,414	80

Table S1: Measure Level Annual Savings Potential by state (Phase III vs Phase I) Continued

State	Key items	Total Energy Savings (GJ)			Total Cost Savings ($)		
		Phase I	Phase III	Change %	Phase I	Phase III	Change %
North Carolina (Amended 2012 IECC)	Lighting	14,583	8,367	43	$520,839	$298,634	43
	Envelope Air Leakage	12,844	34,123	-166	$211,315	$561,908	-166
	Duct Leakage	16,585	33,551	-102	$334,527	$677,227	-102
	Exterior Wall Insulation	21,437	17,911	16	$390,827	$326,455	16
	Ceiling Insulation	26,290	22,741	13	$503,364	$435,289	14
	Foundation Insulation	4,400	4,595	-4	$64,105	$66,820	-4
	TOTAL	96,139	121,287	-26	$2,024,976	$2,366,332	-17
Pennsylvania (2009 IECC)	Duct Leakage	91,300	77,140	16	$1,360,493	$1,160,783	15
	Exterior Wall Insulation	57,588	65,227	-13	$798,031	$903,673	-13
	Foundation Insulation	18,689	3,539	81	$175,676	$14,477	92
	Lighting	5,138	49	99	$365,254	$41,178	89
	Envelope Air Leakage	6,624	41,081	-520	$81,668	$506,777	-521
	Ceiling Insulation	33,576	60,114	-79	$499,392	$893,386	-79
	TOTAL	212,914	247,150	-16	$3,280,515	$3,520,274	-7
Texas (Amended 2015 IECC)	Lighting	74,457	193	100	$2,774,421	$7,249	100
	Envelope Air Leakage	332,227	229,215	31	$4,656,869	$3,179,965	32
	Ceiling Insulation	46,012	61,428	-34	$809,827	$1,090,432	-35
	Duct Leakage	191,164	16,836	91	$3,582,893	$316,613	91
	Exterior Wall Insulation	309,175	272,718	12	$5,029,864	$4,426,562	12
	TOTAL	953,034	580,390	39	$16,853,876	$9,020,821	46