

EUI STUDIES RELEVANT TO PRGS SITE

Baseline ASHRAE 90.1 2010 reference chart by Northwest Pacific National Labs for DOE

Table 6. Estimated Energy Use Intensity by Building Type – 2010 Edition

Building Type	Building Prototype	Building Type Floor Area Weight %	Whole Building EUI Data for Building Population		
			Site EUI kBtu/ft ² -yr	Source EUI kBtu/ft ² -yr	ECI \$/ft ² -yr
Office	Small Office	5.61	32.8	99.0	\$0.93
	Medium Office	6.05	37.1	106.3	\$1.00
	Large Office	3.33	33.3	96.8	\$0.91
Retail	Stand-Alone Retail	15.25	48.0	135.1	\$1.27
	Strip Mall	5.67	56.9	150.9	\$1.42
Education	Primary School	4.99	48.0	134.8	\$1.27
	Secondary School	10.36	39.8	114.9	\$1.08
Healthcare	Outpatient Health Care	4.37	125.4	340.9	\$3.20
	Hospital	3.45	118.1	299.5	\$2.81
Lodging	Small Hotel	1.72	66.6	165.7	\$1.55
	Large Hotel	4.95	139.8	282.5	\$2.64
Warehouse	Non-Refrigerated Warehouse	16.72	19.2	45.0	\$0.42
Food Service	Fast-Food Restaurant	0.59	519.9	976.5	\$9.12
	Sit-Down Restaurant	0.66	330.9	654.1	\$6.12
Apartment	Mid-Rise Apartment	7.32	41.2	118.3	\$1.11
	High-Rise Apartment	8.97	41.0	123.5	\$1.16
National		100	55.0	142.4	\$1.34

ASHRAE 90.1 2016 reference chart by Northwest Pacific National Labs for the Department of Energy. The 2018 Virginia Building Energy Code is based in reference to this document.

Table ES-1. Estimated Energy Use Intensity by Building Type – Standard 90.1-2016

		Whole Building Energy Metrics				
Building Type	Prototype Building	Floor Area Weight (%)	Site EUI (kBtu/ft ² -yr)	Source EUI (kBtu/ft ² -yr)	ECI (\$/ft ² -yr)	Carbon Emission (tons/kft ² -yr)
Office	Small Office	3.8%	27.1	77.6	\$0.82	5.5
	Medium Office	5.0%	30.8	84.2	\$0.88	5.9
	Large Office	3.9%	55.4	156.9	\$1.65	11.1
Retail	Stand-Alone Retail	10.9%	48.4	114.4	\$1.15	7.8
	Strip Mall	3.7%	52.8	133.8	\$1.37	9.2
Education	Primary School	4.8%	43.4	107.4	\$1.09	7.4
	Secondary School	10.9%	37.2	94.0	\$0.96	6.5
Healthcare	Outpatient Health Care	3.4%	107.6	276.3	\$2.84	19.1
	Hospital	4.5%	120.0	276.8	\$2.77	18.7
Lodging	Small Hotel	1.6%	54.8	118.0	\$1.16	7.8
	Large Hotel	4.2%	83.1	177.1	\$1.73	11.7
Warehouse	Non-Refrigerated Warehouse	18.6%	15.7	33.2	\$0.32	2.2
Food Service	Quick Service Restaurant	0.3%	493.4	863.7	\$7.87	53.7
	Full Service Restaurant	1.0%	336.5	649.8	\$6.14	41.7
Apartment	Mid-Rise Apartment	13.7%	37.8	104.4	\$1.09	7.3
	High-Rise Apartment	9.6%	41.3	92.0	\$0.91	6.2
National		100%	48.6	116.0	\$1.17	7.9

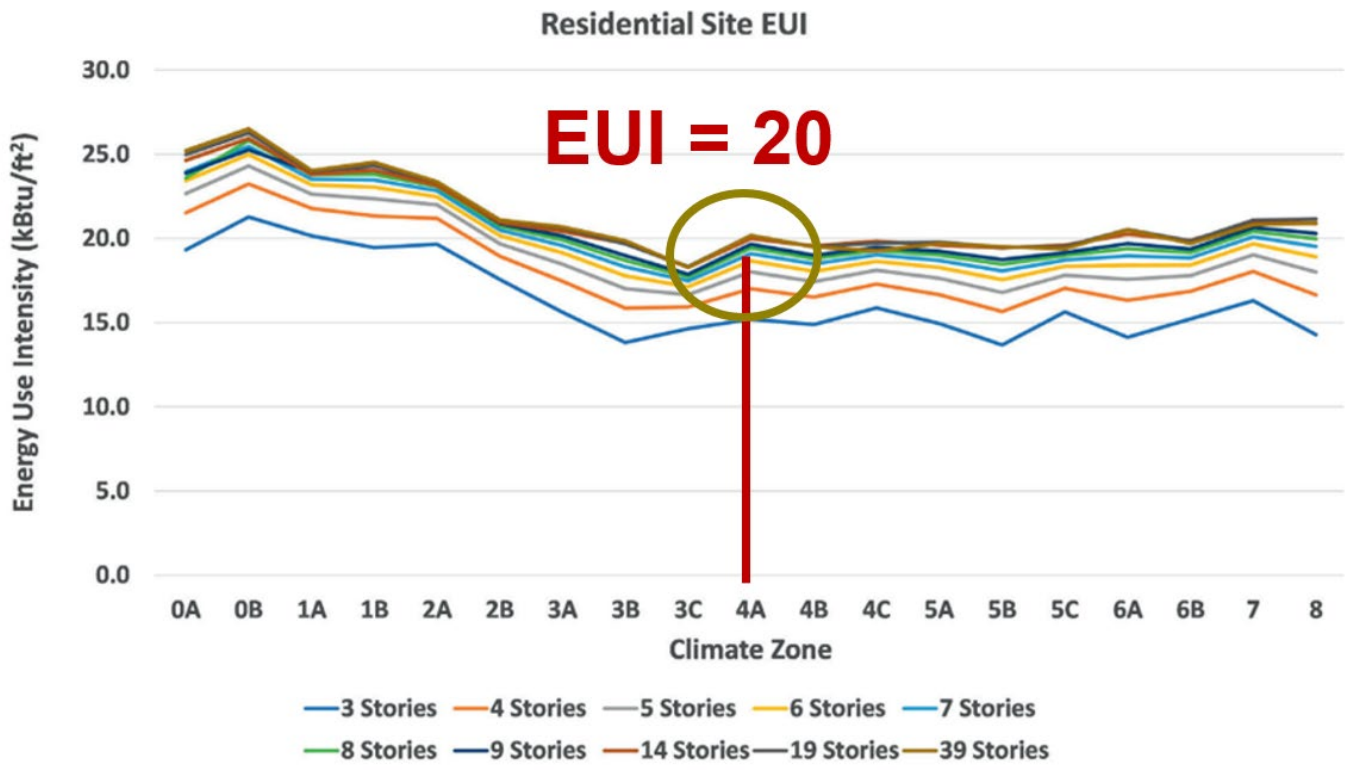
2018 IECC Table CC103.1 – Cited by Hilco’s CSS Reporting and Tracking document as alternate EUI target.

2018 IECC

TABLE CC103.1 ENERGY UTILIZATION INTENSITY FOR BUILDING TYPES AND CLIMATES (kBtu/ft² – yr)

BUILDING AREA TYPE	CLIMATE ZONE																
	0A/1A	0B/1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	kBtu/ft ² – yr																
Healthcare/hospital (I-2)	119	120	119	113	116	109	106	116	109	106	118	110	105	126	116	131	142
Hotel/motel (R-1)	73	76	73	68	70	67	65	69	66	65	71	68	65	77	72	81	89
Multiple-family (R-2)	43	45	41	41	43	42	36	45	43	41	47	46	41	53	48	53	59
Office (B)	31	32	30	29	29	28	25	28	27	25	29	28	25	33	30	32	36
Restaurant (A-2)	389	426	411	408	444	420	395	483	437	457	531	484	484	589	538	644	750
Retail (M)	46	50	45	46	44	44	37	48	44	44	52	50	46	60	52	64	77
School (E)	42	46	42	40	40	39	36	39	40	40	39	43	37	44	40	45	54
Warehouse (S)	9	12	9	11	12	11	10	17	13	14	23	17	15	32	23	32	32
All others	55	58	54	53	53	51	48	54	52	51	57	54	50	63	57	65	73

2022 ASHRAE Advanced Energy Design Guide for Multifamily Buildings Achieving Zero Energy



Summary of Possible EUI Targets for the PRGS Site

	ASHRAE 90.1 2010 EUI	ASHRAE 90.1 2016 EUI	Hilco Proposed - either/or		ASHRAE 2022 NZ
			either 25% improvement over ASHRAE 90.1 2010	2018 IECC Table 103.1	
Medium office	37.1	30.8	27.8	28	
Retail	48	48.4	36.0		
Small hotel	66.6	54.8	50.0	69	
Large hotel	139.8	83.1	104.9	69	
Multifamily	41	41.3	30.8	45	20
Notes:					
1. Ashrae 90.1 2010 EUI numbers are based on ANSI/ASHRAE/IESNA Standard 90.1-2010 Final Determination Quantitative Analysis prepared for DOE by Pacific Northwest Labs. (https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20882.pdf)					
2. ASHRAE 2022 numbers are taken from ASHRAE'S Advanced Energy Design Guide for Multifamily Buildings - Achieving Zero Energy.					