

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.77							
15,000-20,999	1.48	1.15						
21,000-26,999	2.18	1.86	1.54					
27,000-32,999	2.89	2.57	2.24	1.92				
33,000-38,999	3.59	3.27	2.95	2.63	2.31			
39,000-44,999	4.30	3.98	3.66	3.33	3.01	2.69		
45,000-53,999	5.01	4.68	4.36	4.04	3.72	3.40	3.08	
54,000-64,999	6.42	6.10	5.77	5.45	5.13	4.81	4.49	3.84
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.78							
15,000-20,999	1.49	1.17						
21,000-26,999	2.19	1.88	1.56					
27,000-32,999	2.90	2.58	2.27	1.95				
33,000-38,999	3.61	3.29	2.97	2.66	2.34			
39,000-44,999	4.31	4.00	3.68	3.37	3.05	2.73		
45,000-53,999	5.02	4.70	4.39	4.07	3.76	3.44	3.12	
54,000-64,999	6.43	6.12	5.80	5.48	5.17	4.85	4.54	3.91
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.79							
15,000-20,999	1.50	1.19						
21,000-26,999	2.21	1.90	1.59					
27,000-32,999	2.91	2.60	2.29	1.98				
33,000-38,999	3.62	3.31	3.00	2.69	2.38			
39,000-44,999	4.32	4.01	3.70	3.39	3.08	2.77		
45,000-53,999	5.03	4.72	4.41	4.10	3.79	3.48	3.17	
54,000-64,999	6.44	6.13	5.82	5.51	5.20	4.89	4.58	3.96

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.80							
15,000-20,999	1.51	1.21						
21,000-26,999	2.22	1.91	1.61					
27,000-32,999	2.92	2.62	2.31	2.01				
33,000-38,999	3.63	3.32	3.02	2.72	2.41			
39,000-44,999	4.34	4.03	3.73	3.42	3.12	2.81		
45,000-53,999	5.04	4.74	4.43	4.13	3.82	3.52	3.22	
54,000-64,999	6.45	6.15	5.85	5.54	5.24	4.93	4.63	4.02
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.82							
15,000-20,999	1.52	1.22						
21,000-26,999	2.23	1.93	1.63					
27,000-32,999	2.93	2.64	2.34	2.04				
33,000-38,999	3.64	3.34	3.04	2.74	2.45			
39,000-44,999	4.35	4.05	3.75	3.45	3.15	2.85		
45,000-53,999	5.05	4.75	4.46	4.16	3.86	3.56	3.26	
54,000-64,999	6.46	6.17	5.87	5.57	5.27	4.97	4.67	4.08
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.82							
15,000-20,999	1.53	1.23						
21,000-26,999	2.23	1.94	1.64					
27,000-32,999	2.94	2.64	2.35	2.05				
33,000-38,999	3.65	3.35	3.06	2.76	2.46			
39,000-44,999	4.35	4.06	3.76	3.47	3.17	2.88		
45,000-53,999	5.06	4.76	4.47	4.17	3.88	3.58	3.29	
54,000-64,999	6.47	6.18	5.88	5.58	5.29	4.99	4.70	4.11

Table 478: Mini-Split Winter Demand Savings for 6.8 HSPF Baseline—Zone 1

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.86							
15,000-20,999	1.66	1.29						
21,000-26,999	2.46	2.09	1.72					
27,000-32,999	3.26	2.89	2.52	2.15				
33,000-38,999	4.06	3.69	3.32	2.95	2.58			
39,000-44,999	4.86	4.49	4.12	3.75	3.38	3.01		
45,000-53,999	5.66	5.29	4.92	4.55	4.18	3.81	3.45	
54,000-64,999	7.26	6.89	6.52	6.15	5.78	5.41	5.05	4.31
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.92							
15,000-20,999	1.72	1.39						
21,000-26,999	2.52	2.19	1.85					
27,000-32,999	3.32	2.99	2.65	2.31				
33,000-38,999	4.12	3.79	3.45	3.11	2.77			
39,000-44,999	4.92	4.59	4.25	3.91	3.57	3.23		
45,000-53,999	5.72	5.39	5.05	4.71	4.37	4.03	3.70	
54,000-64,999	7.32	6.99	6.65	6.31	5.97	5.63	5.30	4.62

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.96							
15,000-20,999	1.76	1.43						
21,000-26,999	2.56	2.23	1.91					
27,000-32,999	3.36	3.03	2.71	2.39				
33,000-38,999	4.16	3.83	3.51	3.19	2.87			
39,000-44,999	4.96	4.63	4.31	3.99	3.67	3.35		
45,000-53,999	5.76	5.43	5.11	4.79	4.47	4.15	3.83	
54,000-64,999	7.36	7.03	6.71	6.39	6.07	5.75	5.43	4.78
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.97							
15,000-20,999	1.77	1.45						
21,000-26,999	2.57	2.25	1.94					
27,000-32,999	3.37	3.05	2.74	2.42				
33,000-38,999	4.17	3.85	3.54	3.22	2.91			
39,000-44,999	4.97	4.65	4.34	4.02	3.71	3.39		
45,000-53,999	5.77	5.45	5.14	4.82	4.51	4.19	3.87	
54,000-64,999	7.37	7.05	6.74	6.42	6.11	5.79	5.47	4.84
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.98							
15,000-20,999	1.78	1.47						
21,000-26,999	2.58	2.27	1.96					
27,000-32,999	3.38	3.07	2.76	2.45				
33,000-38,999	4.18	3.87	3.56	3.25	2.94			
39,000-44,999	4.98	4.67	4.36	4.05	3.74	3.43		
45,000-53,999	5.78	5.47	5.16	4.85	4.54	4.23	3.92	
54,000-64,999	7.38	7.07	6.76	6.45	6.14	5.83	5.52	4.90

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.99							
15,000-20,999	1.79	1.49						
21,000-26,999	2.59	2.29	1.98					
27,000-32,999	3.39	3.09	2.78	2.48				
33,000-38,999	4.19	3.89	3.58	3.28	2.98			
39,000-44,999	4.99	4.69	4.38	4.08	3.78	3.47		
45,000-53,999	5.79	5.49	5.18	4.88	4.58	4.27	3.97	
54,000-64,999	7.39	7.09	6.78	6.48	6.18	5.87	5.57	4.96
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.00							
15,000-20,999	1.80	1.50						
21,000-26,999	2.60	2.30	2.01					
27,000-32,999	3.40	3.10	2.81	2.51				
33,000-38,999	4.20	3.90	3.61	3.31	3.01			
39,000-44,999	5.00	4.70	4.41	4.11	3.81	3.51		
45,000-53,999	5.80	5.50	5.21	4.91	4.61	4.31	4.01	
54,000-64,999	7.40	7.10	6.81	6.51	6.21	5.91	5.61	5.01
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.01							
15,000-20,999	1.81	1.51						
21,000-26,999	2.61	2.31	2.02					
27,000-32,999	3.41	3.11	2.82	2.52				
33,000-38,999	4.21	3.91	3.62	3.32	3.03			
39,000-44,999	5.01	4.71	4.42	4.12	3.83	3.53		
45,000-53,999	5.81	5.51	5.22	4.92	4.63	4.33	4.04	
54,000-64,999	7.41	7.11	6.82	6.52	6.23	5.93	5.64	5.05

Heating, Early Retirement of an Electric Resistance Furnace

Table 479: Mini-Split Winter Demand Savings for 3.412 HSPF Baseline—Zone 1

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.06							
15,000-20,999	3.46	3.09						
21,000-26,999	4.86	4.49	4.12					
27,000-32,999	6.26	5.89	5.52	5.15				
33,000-38,999	7.66	7.29	6.92	6.55	6.18			
39,000-44,999	9.06	8.69	8.32	7.95	7.58	7.21		
45,000-53,999	10.45	10.09	9.72	9.35	8.98	8.61	8.24	
54,000-64,999	13.25	12.88	12.51	12.14	11.78	11.41	11.04	10.30
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.12							
15,000-20,999	3.52	3.18						
21,000-26,999	4.92	4.58	4.24					
27,000-32,999	6.32	5.98	5.64	5.31				
33,000-38,999	7.72	7.38	7.04	6.70	6.37			
39,000-44,999	9.12	8.78	8.44	8.10	7.77	7.43		
45,000-53,999	10.52	10.18	9.84	9.50	9.17	8.83	8.49	
54,000-64,999	13.32	12.98	12.64	12.30	11.96	11.63	11.29	10.61

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.15							
15,000-20,999	3.55	3.23						
21,000-26,999	4.95	4.63	4.31					
27,000-32,999	6.35	6.03	5.71	5.39				
33,000-38,999	7.75	7.43	7.11	6.79	6.46			
39,000-44,999	9.15	8.83	8.51	8.19	7.86	7.54		
45,000-53,999	10.55	10.23	9.91	9.58	9.26	8.94	8.62	
54,000-64,999	13.35	13.03	12.70	12.38	12.06	11.74	11.42	10.77
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.17							
15,000-20,999	3.57	3.25						
21,000-26,999	4.97	4.65	4.33					
27,000-32,999	6.36	6.05	5.73	5.42				
33,000-38,999	7.76	7.45	7.13	6.82	6.50			
39,000-44,999	9.16	8.85	8.53	8.22	7.90	7.58		
45,000-53,999	10.56	10.25	9.93	9.61	9.30	8.98	8.67	
54,000-64,999	13.36	13.04	12.73	12.41	12.10	11.78	11.47	10.83
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.18							
15,000-20,999	3.58	3.27						
21,000-26,999	4.98	4.67	4.36					
27,000-32,999	6.38	6.07	5.76	5.45				
33,000-38,999	7.78	7.47	7.16	6.85	6.54			
39,000-44,999	9.17	8.86	8.56	8.25	7.94	7.63		
45,000-53,999	10.57	10.26	9.95	9.64	9.33	9.02	8.71	
54,000-64,999	13.37	13.06	12.75	12.44	12.13	11.82	11.51	10.89

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.19							
15,000-20,999	3.59	3.29						
21,000-26,999	4.99	4.68	4.38					
27,000-32,999	6.39	6.08	5.78	5.48				
33,000-38,999	7.79	7.48	7.18	6.87	6.57			
39,000-44,999	9.19	8.88	8.58	8.27	7.97	7.67		
45,000-53,999	10.59	10.28	9.98	9.67	9.37	9.06	8.76	
54,000-64,999	13.38	13.08	12.78	12.47	12.17	11.86	11.56	10.95
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.20							
15,000-20,999	3.60	3.30						
21,000-26,999	5.00	4.70	4.40					
27,000-32,999	6.40	6.10	5.80	5.50				
33,000-38,999	7.80	7.50	7.20	6.90	6.60			
39,000-44,999	9.20	8.90	8.60	8.30	8.00	7.70		
45,000-53,999	10.60	10.30	10.00	9.70	9.40	9.10	8.80	
54,000-64,999	13.39	13.10	12.80	12.50	12.20	11.90	11.60	11.01
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.21							
15,000-20,999	3.61	3.31						
21,000-26,999	5.01	4.71	4.41					
27,000-32,999	6.40	6.11	5.81	5.52				
33,000-38,999	7.80	7.51	7.21	6.92	6.62			
39,000-44,999	9.20	8.91	8.61	8.32	8.02	7.73		
45,000-53,999	10.60	10.31	10.01	9.72	9.42	9.13	8.83	
54,000-64,999	13.40	13.11	12.81	12.51	12.22	11.92	11.63	11.04

Climate Zone 2: North Region, Dallas/Fort Worth

Heating, New Construction/Replace-on-Burnout

Table 480: Mini-Split Winter Demand Savings for 8.2 HSPF Baseline—Zone 2

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.50							
15,000-20,999	1.12	0.75						
21,000-26,999	1.74	1.37	1.00					
27,000-32,999	2.36	1.99	1.62	1.25				
33,000-38,999	2.98	2.61	2.24	1.87	1.50			
39,000-44,999	3.61	3.23	2.86	2.49	2.12	1.75		
45,000-53,999	4.23	3.86	3.48	3.11	2.74	2.37	2.00	
54,000-64,999	5.47	5.10	4.73	4.36	3.98	3.61	3.24	2.50
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.56							
15,000-20,999	1.18	0.84						
21,000-26,999	1.81	1.47	1.13					
27,000-32,999	2.43	2.09	1.75	1.41				
33,000-38,999	3.05	2.71	2.37	2.03	1.69			
39,000-44,999	3.67	3.33	2.99	2.65	2.31	1.97		
45,000-53,999	4.29	3.95	3.61	3.27	2.93	2.59	2.25	
54,000-64,999	5.53	5.19	4.85	4.51	4.17	3.83	3.49	2.81

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.60							
15,000-20,999	1.22	0.89						
21,000-26,999	1.84	1.51	1.19					
27,000-32,999	2.46	2.14	1.81	1.49				
33,000-38,999	3.08	2.76	2.43	2.11	1.79			
39,000-44,999	3.70	3.38	3.05	2.73	2.41	2.08		
45,000-53,999	4.32	4.00	3.68	3.35	3.03	2.71	2.38	
54,000-64,999	5.57	5.24	4.92	4.60	4.27	3.95	3.62	2.98
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.61							
15,000-20,999	1.23	0.91						
21,000-26,999	1.85	1.53	1.22					
27,000-32,999	2.47	2.15	1.84	1.52				
33,000-38,999	3.09	2.78	2.46	2.14	1.82			
39,000-44,999	3.71	3.40	3.08	2.76	2.44	2.13		
45,000-53,999	4.34	4.02	3.70	3.38	3.07	2.75	2.43	
54,000-64,999	5.58	5.26	4.94	4.63	4.31	3.99	3.67	3.04
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.62							
15,000-20,999	1.24	0.93						
21,000-26,999	1.86	1.55	1.24					
27,000-32,999	2.48	2.17	1.86	1.55				
33,000-38,999	3.10	2.79	2.48	2.17	1.86			
39,000-44,999	3.73	3.41	3.10	2.79	2.48	2.17		
45,000-53,999	4.35	4.04	3.72	3.41	3.10	2.79	2.48	
54,000-64,999	5.59	5.28	4.97	4.66	4.34	4.03	3.72	3.10

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.63							
15,000-20,999	1.25	0.95						
21,000-26,999	1.87	1.57	1.26					
27,000-32,999	2.49	2.19	1.88	1.58				
33,000-38,999	3.12	2.81	2.50	2.20	1.89			
39,000-44,999	3.74	3.43	3.13	2.82	2.51	2.21		
45,000-53,999	4.36	4.05	3.75	3.44	3.14	2.83	2.52	
54,000-64,999	5.60	5.30	4.99	4.68	4.38	4.07	3.77	3.16
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.64							
15,000-20,999	1.26	0.96						
21,000-26,999	1.88	1.58	1.28					
27,000-32,999	2.51	2.21	1.91	1.61				
33,000-38,999	3.13	2.83	2.53	2.23	1.93			
39,000-44,999	3.75	3.45	3.15	2.85	2.55	2.25		
45,000-53,999	4.37	4.07	3.77	3.47	3.17	2.87	2.57	
54,000-64,999	5.61	5.31	5.01	4.71	4.41	4.11	3.81	3.21
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.65							
15,000-20,999	1.27	0.97						
21,000-26,999	1.89	1.59	1.30					
27,000-32,999	2.51	2.22	1.92	1.62				
33,000-38,999	3.13	2.84	2.54	2.24	1.95			
39,000-44,999	3.75	3.46	3.16	2.86	2.57	2.27		
45,000-53,999	4.38	4.08	3.78	3.48	3.19	2.89	2.59	
54,000-64,999	5.62	5.32	5.02	4.73	4.43	4.13	3.84	3.24

Heating, Early Retirement of a Heat Pump

Table 481: Mini-Split Winter Demand Savings for 7.7 HSPF Baseline—Zone 2

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.58							
15,000-20,999	1.24	0.87						
21,000-26,999	1.90	1.53	1.16					
27,000-32,999	2.56	2.19	1.82	1.45				
33,000-38,999	3.22	2.85	2.48	2.11	1.74			
39,000-44,999	3.88	3.51	3.14	2.77	2.40	2.02		
45,000-53,999	4.54	4.17	3.80	3.43	3.06	2.69	2.31	
54,000-64,999	5.86	5.49	5.12	4.75	4.38	4.01	3.63	2.89
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.64							
15,000-20,999	1.30	0.96						
21,000-26,999	1.96	1.62	1.28					
27,000-32,999	2.62	2.28	1.94	1.60				
33,000-38,999	3.28	2.94	2.60	2.26	1.92			
39,000-44,999	3.94	3.60	3.26	2.92	2.58	2.24		
45,000-53,999	4.60	4.26	3.92	3.58	3.25	2.91	2.57	
54,000-64,999	5.93	5.59	5.25	4.91	4.57	4.23	3.89	3.21

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.67							
15,000-20,999	1.33	1.01						
21,000-26,999	1.99	1.67	1.35					
27,000-32,999	2.66	2.33	2.01	1.69				
33,000-38,999	3.32	2.99	2.67	2.35	2.02			
39,000-44,999	3.98	3.65	3.33	3.01	2.68	2.36		
45,000-53,999	4.64	4.31	3.99	3.67	3.34	3.02	2.70	
54,000-64,999	5.96	5.63	5.31	4.99	4.66	4.34	4.02	3.37
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.69							
15,000-20,999	1.35	1.03						
21,000-26,999	2.01	1.69	1.37					
27,000-32,999	2.67	2.35	2.03	1.72				
33,000-38,999	3.33	3.01	2.69	2.38	2.06			
39,000-44,999	3.99	3.67	3.35	3.04	2.72	2.40		
45,000-53,999	4.65	4.33	4.01	3.70	3.38	3.06	2.75	
54,000-64,999	5.97	5.65	5.34	5.02	4.70	4.38	4.07	3.43
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.70							
15,000-20,999	1.36	1.05						
21,000-26,999	2.02	1.71	1.40					
27,000-32,999	2.68	2.37	2.06	1.75				
33,000-38,999	3.34	3.03	2.72	2.41	2.09			
39,000-44,999	4.00	3.69	3.38	3.07	2.76	2.44		
45,000-53,999	4.66	4.35	4.04	3.73	3.42	3.10	2.79	
54,000-64,999	5.98	5.67	5.36	5.05	4.74	4.43	4.11	3.49

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.71							
15,000-20,999	1.37	1.06						
21,000-26,999	2.03	1.72	1.42					
27,000-32,999	2.69	2.39	2.08	1.77				
33,000-38,999	3.35	3.05	2.74	2.43	2.13			
39,000-44,999	4.01	3.71	3.40	3.09	2.79	2.48		
45,000-53,999	4.67	4.37	4.06	3.76	3.45	3.14	2.84	
54,000-64,999	5.99	5.69	5.38	5.08	4.77	4.46	4.16	3.55
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.72							
15,000-20,999	1.38	1.08						
21,000-26,999	2.04	1.74	1.44					
27,000-32,999	2.70	2.40	2.10	1.80				
33,000-38,999	3.36	3.06	2.76	2.46	2.16			
39,000-44,999	4.02	3.72	3.42	3.12	2.82	2.52		
45,000-53,999	4.68	4.38	4.08	3.78	3.48	3.18	2.88	
54,000-64,999	6.00	5.70	5.40	5.10	4.80	4.50	4.20	3.60
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.73							
15,000-20,999	1.39	1.09						
21,000-26,999	2.05	1.75	1.45					
27,000-32,999	2.71	2.41	2.11	1.82				
33,000-38,999	3.37	3.07	2.77	2.48	2.18			
39,000-44,999	4.03	3.73	3.44	3.14	2.84	2.54		
45,000-53,999	4.69	4.39	4.10	3.80	3.50	3.20	2.91	
54,000-64,999	6.01	5.71	5.42	5.12	4.82	4.53	4.23	3.63

Table 482: Mini-Split Winter Demand Savings for 6.8 HSPF Baseline—Zone 2

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.77							
15,000-20,999	1.52	1.15						
21,000-26,999	2.28	1.91	1.53					
27,000-32,999	3.03	2.66	2.29	1.92				
33,000-38,999	3.79	3.41	3.04	2.67	2.30			
39,000-44,999	4.54	4.17	3.80	3.43	3.06	2.68		
45,000-53,999	5.30	4.92	4.55	4.18	3.81	3.44	3.07	
54,000-64,999	6.80	6.43	6.06	5.69	5.32	4.95	4.58	3.84
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.83							
15,000-20,999	1.58	1.24						
21,000-26,999	2.34	2.00	1.66					
27,000-32,999	3.09	2.75	2.41	2.07				
33,000-38,999	3.85	3.51	3.17	2.83	2.49			
39,000-44,999	4.60	4.26	3.92	3.58	3.24	2.90		
45,000-53,999	5.36	5.02	4.68	4.34	4.00	3.66	3.32	
54,000-64,999	6.87	6.53	6.19	5.85	5.51	5.17	4.83	4.15

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.86							
15,000-20,999	1.62	1.29						
21,000-26,999	2.37	2.05	1.73					
27,000-32,999	3.13	2.80	2.48	2.16				
33,000-38,999	3.88	3.56	3.23	2.91	2.59			
39,000-44,999	4.64	4.31	3.99	3.67	3.34	3.02		
45,000-53,999	5.39	5.07	4.74	4.42	4.10	3.77	3.45	
54,000-64,999	6.90	6.58	6.25	5.93	5.61	5.28	4.96	4.31
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.87							
15,000-20,999	1.63	1.31						
21,000-26,999	2.38	2.07	1.75					
27,000-32,999	3.14	2.82	2.50	2.19				
33,000-38,999	3.89	3.58	3.26	2.94	2.62			
39,000-44,999	4.65	4.33	4.01	3.70	3.38	3.06		
45,000-53,999	5.40	5.09	4.77	4.45	4.13	3.82	3.50	
54,000-64,999	6.91	6.60	6.28	5.96	5.64	5.33	5.01	4.37
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.89							
15,000-20,999	1.64	1.33						
21,000-26,999	2.40	2.08	1.77					
27,000-32,999	3.15	2.84	2.53	2.22				
33,000-38,999	3.91	3.59	3.28	2.97	2.66			
39,000-44,999	4.66	4.35	4.04	3.73	3.41	3.10		
45,000-53,999	5.42	5.10	4.79	4.48	4.17	3.86	3.55	
54,000-64,999	6.92	6.61	6.30	5.99	5.68	5.37	5.06	4.43

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.90							
15,000-20,999	1.65	1.35						
21,000-26,999	2.41	2.10	1.80					
27,000-32,999	3.16	2.86	2.55	2.25				
33,000-38,999	3.92	3.61	3.31	3.00	2.69			
39,000-44,999	4.67	4.37	4.06	3.75	3.45	3.14		
45,000-53,999	5.43	5.12	4.82	4.51	4.20	3.90	3.59	
54,000-64,999	6.94	6.63	6.32	6.02	5.71	5.41	5.10	4.49
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.91							
15,000-20,999	1.66	1.36						
21,000-26,999	2.42	2.12	1.82					
27,000-32,999	3.17	2.87	2.57	2.27				
33,000-38,999	3.93	3.63	3.33	3.03	2.73			
39,000-44,999	4.68	4.38	4.08	3.78	3.48	3.18		
45,000-53,999	5.44	5.14	4.84	4.54	4.24	3.94	3.64	
54,000-64,999	6.95	6.65	6.35	6.05	5.75	5.45	5.15	4.55
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.92							
15,000-20,999	1.67	1.37						
21,000-26,999	2.42	2.13	1.83					
27,000-32,999	3.18	2.88	2.59	2.29				
33,000-38,999	3.93	3.64	3.34	3.04	2.75			
39,000-44,999	4.69	4.39	4.10	3.80	3.50	3.20		
45,000-53,999	5.44	5.15	4.85	4.55	4.26	3.96	3.66	
54,000-64,999	6.95	6.66	6.36	6.06	5.77	5.47	5.17	4.58

Heating, Early Retirement of an Electric Resistance Furnace

Table 483: Mini-Split Winter Demand Savings for 3.412 HSPF Baseline—Zone 2

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.00							
15,000-20,999	3.37	3.00						
21,000-26,999	4.74	4.37	4.00					
27,000-32,999	6.11	5.74	5.37	5.00				
33,000-38,999	7.48	7.11	6.74	6.37	6.00			
39,000-44,999	8.85	8.48	8.11	7.74	7.37	7.00		
45,000-53,999	10.22	9.85	9.48	9.11	8.74	8.37	8.00	
54,000-64,999	12.96	12.59	12.22	11.85	11.48	11.11	10.74	9.99
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.06							
15,000-20,999	3.43	3.09						
21,000-26,999	4.80	4.46	4.12					
27,000-32,999	6.17	5.83	5.49	5.15				
33,000-38,999	7.54	7.20	6.86	6.52	6.19			
39,000-44,999	8.91	8.58	8.24	7.90	7.56	7.22		
45,000-53,999	10.29	9.95	9.61	9.27	8.93	8.59	8.25	
54,000-64,999	13.03	12.69	12.35	12.01	11.67	11.33	10.99	10.31

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.09							
15,000-20,999	3.47	3.14						
21,000-26,999	4.84	4.51	4.19					
27,000-32,999	6.21	5.88	5.56	5.24				
33,000-38,999	7.58	7.25	6.93	6.61	6.28			
39,000-44,999	8.95	8.62	8.30	7.98	7.65	7.33		
45,000-53,999	10.32	9.99	9.67	9.35	9.02	8.70	8.38	
54,000-64,999	13.06	12.74	12.41	12.09	11.77	11.44	11.12	10.47
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.11							
15,000-20,999	3.48	3.16						
21,000-26,999	4.85	4.53	4.21					
27,000-32,999	6.22	5.90	5.58	5.27				
33,000-38,999	7.59	7.27	6.95	6.64	6.32			
39,000-44,999	8.96	8.64	8.33	8.01	7.69	7.37		
45,000-53,999	10.33	10.01	9.70	9.38	9.06	8.74	8.43	
54,000-64,999	13.07	12.75	12.44	12.12	11.80	11.49	11.17	10.53
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.12							
15,000-20,999	3.49	3.18						
21,000-26,999	4.86	4.55	4.24					
27,000-32,999	6.23	5.92	5.61	5.30				
33,000-38,999	7.60	7.29	6.98	6.67	6.36			
39,000-44,999	8.97	8.66	8.35	8.04	7.73	7.41		
45,000-53,999	10.34	10.03	9.72	9.41	9.10	8.79	8.47	
54,000-64,999	13.08	12.77	12.46	12.15	11.84	11.53	11.22	10.59

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.13							
15,000-20,999	3.50	3.19						
21,000-26,999	4.87	4.57	4.26					
27,000-32,999	6.24	5.94	5.63	5.32				
33,000-38,999	7.61	7.31	7.00	6.70	6.39			
39,000-44,999	8.98	8.68	8.37	8.07	7.76	7.45		
45,000-53,999	10.35	10.05	9.74	9.44	9.13	8.83	8.52	
54,000-64,999	13.09	12.79	12.48	12.18	11.87	11.57	11.26	10.65
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.14							
15,000-20,999	3.51	3.21						
21,000-26,999	4.88	4.58	4.28					
27,000-32,999	6.25	5.95	5.65	5.35				
33,000-38,999	7.62	7.32	7.02	6.72	6.42			
39,000-44,999	8.99	8.69	8.39	8.09	7.79	7.49		
45,000-53,999	10.36	10.06	9.76	9.46	9.16	8.86	8.56	
54,000-64,999	13.11	12.81	12.51	12.21	11.91	11.61	11.30	10.70
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	2.15							
15,000-20,999	3.52	3.22						
21,000-26,999	4.89	4.59	4.29					
27,000-32,999	6.26	5.96	5.67	5.37				
33,000-38,999	7.63	7.33	7.04	6.74	6.44			
39,000-44,999	9.00	8.70	8.41	8.11	7.81	7.52		
45,000-53,999	10.37	10.07	9.78	9.48	9.18	8.89	8.59	
54,000-64,999	13.11	12.82	12.52	12.22	11.92	11.63	11.33	10.74

Climate Zone 3: South Region, Houston

Heating, New Construction/Replace-on-Burnout

Table 484: Mini-Split Winter Demand Savings for 8.2 HSPF Baseline—Zone 3

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.05							
15,000-20,999	0.40	0.07						
21,000-26,999	0.76	0.43	0.10					
27,000-32,999	1.11	0.78	0.45	0.12				
33,000-38,999	1.47	1.14	0.81	0.48	0.15			
39,000-44,999	1.82	1.49	1.16	0.83	0.50	0.17		
45,000-53,999	2.17	1.84	1.51	1.19	0.86	0.53	0.20	
54,000-64,999	2.88	2.55	2.22	1.89	1.56	1.23	0.90	0.25
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.11							
15,000-20,999	0.46	0.16						
21,000-26,999	0.81	0.51	0.21					
27,000-32,999	1.17	0.87	0.56	0.26				
33,000-38,999	1.52	1.22	0.92	0.62	0.32			
39,000-44,999	1.88	1.57	1.27	0.97	0.67	0.37		
45,000-53,999	2.23	1.93	1.63	1.32	1.02	0.72	0.42	
54,000-64,999	2.94	2.64	2.33	2.03	1.73	1.43	1.13	0.53

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.13							
15,000-20,999	0.49	0.20						
21,000-26,999	0.84	0.56	0.27					
27,000-32,999	1.20	0.91	0.62	0.34				
33,000-38,999	1.55	1.26	0.98	0.69	0.40			
39,000-44,999	1.90	1.62	1.33	1.04	0.76	0.47		
45,000-53,999	2.26	1.97	1.68	1.40	1.11	0.82	0.54	
54,000-64,999	2.97	2.68	2.39	2.11	1.82	1.53	1.24	0.67
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.14							
15,000-20,999	0.50	0.22						
21,000-26,999	0.85	0.57	0.29					
27,000-32,999	1.21	0.93	0.64	0.36				
33,000-38,999	1.56	1.28	1.00	0.72	0.43			
39,000-44,999	1.92	1.63	1.35	1.07	0.79	0.51		
45,000-53,999	2.27	1.99	1.71	1.42	1.14	0.86	0.58	
54,000-64,999	2.98	2.70	2.41	2.13	1.85	1.57	1.29	0.72
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.16							
15,000-20,999	0.51	0.23						
21,000-26,999	0.86	0.59	0.31					
27,000-32,999	1.22	0.94	0.66	0.39				
33,000-38,999	1.57	1.30	1.02	0.74	0.47			
39,000-44,999	1.93	1.65	1.37	1.10	0.82	0.54		
45,000-53,999	2.28	2.00	1.73	1.45	1.17	0.90	0.62	
54,000-64,999	2.99	2.71	2.44	2.16	1.88	1.61	1.33	0.78

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.17							
15,000-20,999	0.52	0.25						
21,000-26,999	0.87	0.60	0.33					
27,000-32,999	1.23	0.96	0.69	0.41				
33,000-38,999	1.58	1.31	1.04	0.77	0.50			
39,000-44,999	1.94	1.66	1.39	1.12	0.85	0.58		
45,000-53,999	2.29	2.02	1.75	1.48	1.20	0.93	0.66	
54,000-64,999	3.00	2.73	2.46	2.18	1.91	1.64	1.37	0.83
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.18							
15,000-20,999	0.53	0.26						
21,000-26,999	0.88	0.62	0.35					
27,000-32,999	1.24	0.97	0.70	0.44				
33,000-38,999	1.59	1.33	1.06	0.79	0.53			
39,000-44,999	1.95	1.68	1.41	1.15	0.88	0.61		
45,000-53,999	2.30	2.03	1.77	1.50	1.23	0.97	0.70	
54,000-64,999	3.01	2.74	2.47	2.21	1.94	1.68	1.41	0.88
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.18							
15,000-20,999	0.53	0.27						
21,000-26,999	0.89	0.63	0.36					
27,000-32,999	1.24	0.98	0.72	0.45				
33,000-38,999	1.60	1.33	1.07	0.81	0.54			
39,000-44,999	1.95	1.69	1.42	1.16	0.90	0.63		
45,000-53,999	2.31	2.04	1.78	1.51	1.25	0.99	0.72	
54,000-64,999	3.01	2.75	2.49	2.22	1.96	1.70	1.43	0.90

Heating, Early Retirement of a Heat Pump

Table 485: Mini-Split Winter Demand Savings for 7.7 HSPF Baseline—Zone 3

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.12							
15,000-20,999	0.51	0.18						
21,000-26,999	0.90	0.57	0.24					
27,000-32,999	1.29	0.96	0.63	0.30				
33,000-38,999	1.67	1.34	1.02	0.69	0.36			
39,000-44,999	2.06	1.73	1.40	1.07	0.75	0.42		
45,000-53,999	2.45	2.12	1.79	1.46	1.13	0.80	0.48	
54,000-64,999	3.23	2.90	2.57	2.24	1.91	1.58	1.25	0.59
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.17							
15,000-20,999	0.56	0.26						
21,000-26,999	0.95	0.65	0.35					
27,000-32,999	1.34	1.04	0.74	0.44				
33,000-38,999	1.73	1.43	1.13	0.83	0.52			
39,000-44,999	2.12	1.82	1.52	1.21	0.91	0.61		
45,000-53,999	2.51	2.21	1.90	1.60	1.30	1.00	0.70	
54,000-64,999	3.29	2.98	2.68	2.38	2.08	1.78	1.48	0.87

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.20							
15,000-20,999	0.59	0.31						
21,000-26,999	0.98	0.69	0.41					
27,000-32,999	1.37	1.08	0.80	0.51				
33,000-38,999	1.76	1.47	1.19	0.90	0.61			
39,000-44,999	2.15	1.86	1.57	1.29	1.00	0.71		
45,000-53,999	2.54	2.25	1.96	1.68	1.39	1.10	0.81	
54,000-64,999	3.31	3.03	2.74	2.45	2.17	1.88	1.59	1.02
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.21							
15,000-20,999	0.60	0.32						
21,000-26,999	0.99	0.71	0.43					
27,000-32,999	1.38	1.10	0.82	0.54				
33,000-38,999	1.77	1.49	1.21	0.93	0.64			
39,000-44,999	2.16	1.88	1.60	1.31	1.03	0.75		
45,000-53,999	2.55	2.27	1.98	1.70	1.42	1.14	0.86	
54,000-64,999	3.33	3.04	2.76	2.48	2.20	1.92	1.64	1.07
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.23							
15,000-20,999	0.61	0.34						
21,000-26,999	1.00	0.73	0.45					
27,000-32,999	1.39	1.12	0.84	0.56				
33,000-38,999	1.78	1.50	1.23	0.95	0.68			
39,000-44,999	2.17	1.89	1.62	1.34	1.06	0.79		
45,000-53,999	2.56	2.28	2.01	1.73	1.45	1.18	0.90	
54,000-64,999	3.34	3.06	2.78	2.51	2.23	1.95	1.68	1.13

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.24							
15,000-20,999	0.62	0.35						
21,000-26,999	1.01	0.74	0.47					
27,000-32,999	1.40	1.13	0.86	0.59				
33,000-38,999	1.79	1.52	1.25	0.98	0.71			
39,000-44,999	2.18	1.91	1.64	1.37	1.09	0.82		
45,000-53,999	2.57	2.30	2.03	1.75	1.48	1.21	0.94	
54,000-64,999	3.35	3.07	2.80	2.53	2.26	1.99	1.72	1.18
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.24							
15,000-20,999	0.63	0.37						
21,000-26,999	1.02	0.76	0.49					
27,000-32,999	1.41	1.15	0.88	0.61				
33,000-38,999	1.80	1.53	1.27	1.00	0.73			
39,000-44,999	2.19	1.92	1.66	1.39	1.12	0.86		
45,000-53,999	2.58	2.31	2.05	1.78	1.51	1.25	0.98	
54,000-64,999	3.36	3.09	2.82	2.56	2.29	2.02	1.76	1.22
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.25							
15,000-20,999	0.64	0.38						
21,000-26,999	1.03	0.76	0.50					
27,000-32,999	1.42	1.15	0.89	0.63				
33,000-38,999	1.81	1.54	1.28	1.02	0.75			
39,000-44,999	2.19	1.93	1.67	1.40	1.14	0.88		
45,000-53,999	2.58	2.32	2.06	1.79	1.53	1.27	1.00	
54,000-64,999	3.36	3.10	2.83	2.57	2.31	2.04	1.78	1.25

Table 486: Mini-Split Winter Demand Savings for 6.8 HSPF Baseline—Zone 3

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.29							
15,000-20,999	0.76	0.43						
21,000-26,999	1.23	0.90	0.57					
27,000-32,999	1.70	1.37	1.04	0.72				
33,000-38,999	2.18	1.85	1.52	1.19	0.86			
39,000-44,999	2.65	2.32	1.99	1.66	1.33	1.00		
45,000-53,999	3.12	2.79	2.46	2.13	1.80	1.47	1.14	
54,000-64,999	4.07	3.74	3.41	3.08	2.75	2.42	2.09	1.43
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.34							
15,000-20,999	0.81	0.51						
21,000-26,999	1.29	0.99	0.68					
27,000-32,999	1.76	1.46	1.16	0.85				
33,000-38,999	2.23	1.93	1.63	1.33	1.03			
39,000-44,999	2.70	2.40	2.10	1.80	1.50	1.20		
45,000-53,999	3.18	2.88	2.57	2.27	1.97	1.67	1.37	
54,000-64,999	4.12	3.82	3.52	3.22	2.92	2.61	2.31	1.71

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.37							
15,000-20,999	0.84	0.56						
21,000-26,999	1.32	1.03	0.74					
27,000-32,999	1.79	1.50	1.21	0.93				
33,000-38,999	2.26	1.97	1.69	1.40	1.11			
39,000-44,999	2.73	2.45	2.16	1.87	1.59	1.30		
45,000-53,999	3.21	2.92	2.63	2.34	2.06	1.77	1.48	
54,000-64,999	4.15	3.86	3.58	3.29	3.00	2.72	2.43	1.85
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.38							
15,000-20,999	0.85	0.57						
21,000-26,999	1.33	1.05	0.76					
27,000-32,999	1.80	1.52	1.24	0.95				
33,000-38,999	2.27	1.99	1.71	1.43	1.15			
39,000-44,999	2.74	2.46	2.18	1.90	1.62	1.34		
45,000-53,999	3.22	2.94	2.65	2.37	2.09	1.81	1.53	
54,000-64,999	4.16	3.88	3.60	3.32	3.04	2.75	2.47	1.91
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.39							
15,000-20,999	0.86	0.59						
21,000-26,999	1.34	1.06	0.78					
27,000-32,999	1.81	1.53	1.26	0.98				
33,000-38,999	2.28	2.01	1.73	1.45	1.18			
39,000-44,999	2.75	2.48	2.20	1.93	1.65	1.37		
45,000-53,999	3.23	2.95	2.67	2.40	2.12	1.85	1.57	
54,000-64,999	4.17	3.90	3.62	3.34	3.07	2.79	2.51	1.96

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.40							
15,000-20,999	0.87	0.60						
21,000-26,999	1.35	1.08	0.80					
27,000-32,999	1.82	1.55	1.28	1.01				
33,000-38,999	2.29	2.02	1.75	1.48	1.21			
39,000-44,999	2.77	2.49	2.22	1.95	1.68	1.41		
45,000-53,999	3.24	2.97	2.70	2.42	2.15	1.88	1.61	
54,000-64,999	4.18	3.91	3.64	3.37	3.10	2.83	2.55	2.01
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.41							
15,000-20,999	0.88	0.62						
21,000-26,999	1.36	1.09	0.82					
27,000-32,999	1.83	1.56	1.30	1.03				
33,000-38,999	2.30	2.04	1.77	1.50	1.24			
39,000-44,999	2.77	2.51	2.24	1.98	1.71	1.44		
45,000-53,999	3.25	2.98	2.71	2.45	2.18	1.92	1.65	
54,000-64,999	4.19	3.93	3.66	3.39	3.13	2.86	2.59	2.06
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.42							
15,000-20,999	0.89	0.63						
21,000-26,999	1.36	1.10	0.84					
27,000-32,999	1.84	1.57	1.31	1.04				
33,000-38,999	2.31	2.04	1.78	1.52	1.25			
39,000-44,999	2.78	2.52	2.25	1.99	1.73	1.46		
45,000-53,999	3.25	2.99	2.73	2.46	2.20	1.94	1.67	
54,000-64,999	4.20	3.93	3.67	3.41	3.14	2.88	2.62	2.09

Heating, Early Retirement of an Electric Resistance Furnace

Table 487: Mini-Split Winter Demand Savings for 3.412 HSPF Baseline—Zone 3

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.51							
15,000-20,999	2.60	2.27						
21,000-26,999	3.68	3.35	3.02					
27,000-32,999	4.77	4.44	4.11	3.78				
33,000-38,999	5.85	5.52	5.19	4.86	4.53			
39,000-44,999	6.94	6.61	6.28	5.95	5.62	5.29		
45,000-53,999	8.02	7.69	7.36	7.03	6.70	6.37	6.05	
54,000-64,999	10.19	9.86	9.53	9.20	8.87	8.54	8.22	7.56
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.57							
15,000-20,999	2.65	2.35						
21,000-26,999	3.74	3.44	3.13					
27,000-32,999	4.82	4.52	4.22	3.92				
33,000-38,999	5.91	5.61	5.30	5.00	4.70			
39,000-44,999	6.99	6.69	6.39	6.09	5.79	5.48		
45,000-53,999	8.08	7.78	7.47	7.17	6.87	6.57	6.27	
54,000-64,999	10.25	9.95	9.64	9.34	9.04	8.74	8.44	7.84

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.60							
15,000-20,999	2.68	2.39						
21,000-26,999	3.77	3.48	3.19					
27,000-32,999	4.85	4.56	4.28	3.99				
33,000-38,999	5.94	5.65	5.36	5.08	4.79			
39,000-44,999	7.02	6.73	6.45	6.16	5.87	5.59		
45,000-53,999	8.11	7.82	7.53	7.25	6.96	6.67	6.38	
54,000-64,999	10.28	9.99	9.70	9.42	9.13	8.84	8.55	7.98
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.61							
15,000-20,999	2.69	2.41						
21,000-26,999	3.78	3.50	3.21					
27,000-32,999	4.86	4.58	4.30	4.02				
33,000-38,999	5.95	5.67	5.38	5.10	4.82			
39,000-44,999	7.03	6.75	6.47	6.19	5.91	5.62		
45,000-53,999	8.12	7.84	7.55	7.27	6.99	6.71	6.43	
54,000-64,999	10.29	10.01	9.72	9.44	9.16	8.88	8.60	8.03
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.62							
15,000-20,999	2.70	2.43						
21,000-26,999	3.79	3.51	3.23					
27,000-32,999	4.87	4.60	4.32	4.04				
33,000-38,999	5.96	5.68	5.41	5.13	4.85			
39,000-44,999	7.04	6.77	6.49	6.21	5.94	5.66		
45,000-53,999	8.13	7.85	7.58	7.30	7.02	6.75	6.47	
54,000-64,999	10.30	10.02	9.75	9.47	9.19	8.92	8.64	8.09

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.63							
15,000-20,999	2.71	2.44						
21,000-26,999	3.80	3.53	3.26					
27,000-32,999	4.88	4.61	4.34	4.07				
33,000-38,999	5.97	5.70	5.43	5.15	4.88			
39,000-44,999	7.05	6.78	6.51	6.24	5.97	5.70		
45,000-53,999	8.14	7.87	7.60	7.32	7.05	6.78	6.51	
54,000-64,999	10.31	10.04	9.77	9.49	9.22	8.95	8.68	8.14
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.64							
15,000-20,999	2.72	2.46						
21,000-26,999	3.81	3.54	3.27					
27,000-32,999	4.89	4.63	4.36	4.09				
33,000-38,999	5.98	5.71	5.44	5.18	4.91			
39,000-44,999	7.06	6.80	6.53	6.26	6.00	5.73		
45,000-53,999	8.15	7.88	7.62	7.35	7.08	6.82	6.55	
54,000-64,999	10.32	10.05	9.79	9.52	9.25	8.99	8.72	8.19
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.64							
15,000-20,999	2.73	2.46						
21,000-26,999	3.81	3.55	3.29					
27,000-32,999	4.90	4.63	4.37	4.11				
33,000-38,999	5.98	5.72	5.46	5.19	4.93			
39,000-44,999	7.07	6.80	6.54	6.28	6.01	5.75		
45,000-53,999	8.15	7.89	7.63	7.36	7.10	6.84	6.57	
54,000-64,999	10.32	10.06	9.80	9.53	9.27	9.01	8.74	8.22

Climate Zone 4: Valley Region, Corpus Christi

Heating, New Construction/Replace-on-Burnout

Table 488: Mini-Split Winter Demand Savings for 8.2 HSPF Baseline—Zone 4

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.04							
15,000-20,999	0.30	0.06						
21,000-26,999	0.57	0.32	0.07					
27,000-32,999	0.84	0.59	0.34	0.09				
33,000-38,999	1.10	0.85	0.61	0.36	0.11			
39,000-44,999	1.37	1.12	0.87	0.62	0.38	0.13		
45,000-53,999	1.63	1.39	1.14	0.89	0.64	0.40	0.15	
54,000-64,999	2.17	1.92	1.67	1.42	1.18	0.93	0.68	0.18
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.08							
15,000-20,999	0.35	0.12						
21,000-26,999	0.61	0.38	0.16					
27,000-32,999	0.88	0.65	0.42	0.20				
33,000-38,999	1.14	0.92	0.69	0.46	0.24			
39,000-44,999	1.41	1.18	0.96	0.73	0.50	0.28		
45,000-53,999	1.68	1.45	1.22	1.00	0.77	0.54	0.32	
54,000-64,999	2.21	1.98	1.75	1.53	1.30	1.07	0.85	0.39

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.10							
15,000-20,999	0.37	0.15						
21,000-26,999	0.63	0.42	0.20					
27,000-32,999	0.90	0.68	0.47	0.25				
33,000-38,999	1.17	0.95	0.73	0.52	0.30			
39,000-44,999	1.43	1.22	1.00	0.78	0.57	0.35		
45,000-53,999	1.70	1.48	1.27	1.05	0.83	0.62	0.40	
54,000-64,999	2.23	2.01	1.80	1.58	1.37	1.15	0.94	0.50

10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.11							
15,000-20,999	0.38	0.16						
21,000-26,999	0.64	0.43	0.22					
27,000-32,999	0.91	0.70	0.48	0.27				
33,000-38,999	1.17	0.96	0.75	0.54	0.33			
39,000-44,999	1.44	1.23	1.02	0.80	0.59	0.38		
45,000-53,999	1.71	1.49	1.28	1.07	0.86	0.65	0.44	
54,000-64,999	2.24	2.03	1.81	1.60	1.39	1.18	0.97	0.54

10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.12							
15,000-20,999	0.38	0.18						
21,000-26,999	0.65	0.44	0.23					
27,000-32,999	0.92	0.71	0.50	0.29				
33,000-38,999	1.18	0.97	0.77	0.56	0.35			
39,000-44,999	1.45	1.24	1.03	0.82	0.62	0.41		
45,000-53,999	1.71	1.51	1.30	1.09	0.88	0.67	0.47	
54,000-64,999	2.25	2.04	1.83	1.62	1.41	1.21	1.00	0.58

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.12							
15,000-20,999	0.39	0.19						
21,000-26,999	0.66	0.45	0.25					
27,000-32,999	0.92	0.72	0.51	0.31				
33,000-38,999	1.19	0.98	0.78	0.58	0.37			
39,000-44,999	1.45	1.25	1.05	0.84	0.64	0.44		
45,000-53,999	1.72	1.52	1.31	1.11	0.91	0.70	0.50	
54,000-64,999	2.25	2.05	1.85	1.64	1.44	1.23	1.03	0.62
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.13							
15,000-20,999	0.40	0.20						
21,000-26,999	0.66	0.46	0.26					
27,000-32,999	0.93	0.73	0.53	0.33				
33,000-38,999	1.20	1.00	0.80	0.60	0.40			
39,000-44,999	1.46	1.26	1.06	0.86	0.66	0.46		
45,000-53,999	1.73	1.53	1.33	1.13	0.93	0.73	0.53	
54,000-64,999	2.26	2.06	1.86	1.66	1.46	1.26	1.06	0.66
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.14							
15,000-20,999	0.40	0.20						
21,000-26,999	0.67	0.47	0.27					
27,000-32,999	0.93	0.74	0.54	0.34				
33,000-38,999	1.20	1.00	0.80	0.61	0.41			
39,000-44,999	1.47	1.27	1.07	0.87	0.67	0.48		
45,000-53,999	1.73	1.53	1.34	1.14	0.94	0.74	0.54	
54,000-64,999	2.26	2.07	1.87	1.67	1.47	1.27	1.08	0.68

Heating, Early Retirement of a Heat Pump

Table 489: Mini-Split Winter Demand Savings for 7.7 HSPF Baseline—Zone 4

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.09							
15,000-20,999	0.38	0.13						
21,000-26,999	0.67	0.43	0.18					
27,000-32,999	0.97	0.72	0.47	0.22				
33,000-38,999	1.26	1.01	0.76	0.52	0.27			
39,000-44,999	1.55	1.30	1.06	0.81	0.56	0.31		
45,000-53,999	1.84	1.60	1.35	1.10	0.85	0.60	0.36	
54,000-64,999	2.43	2.18	1.93	1.68	1.44	1.19	0.94	0.45
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.13							
15,000-20,999	0.42	0.20						
21,000-26,999	0.72	0.49	0.26					
27,000-32,999	1.01	0.78	0.55	0.33				
33,000-38,999	1.30	1.07	0.85	0.62	0.39			
39,000-44,999	1.59	1.37	1.14	0.91	0.69	0.46		
45,000-53,999	1.89	1.66	1.43	1.21	0.98	0.75	0.53	
54,000-64,999	2.47	2.24	2.02	1.79	1.56	1.34	1.11	0.66

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.15							
15,000-20,999	0.45	0.23						
21,000-26,999	0.74	0.52	0.31					
27,000-32,999	1.03	0.81	0.60	0.38				
33,000-38,999	1.32	1.11	0.89	0.67	0.46			
39,000-44,999	1.61	1.40	1.18	0.97	0.75	0.54		
45,000-53,999	1.91	1.69	1.48	1.26	1.04	0.83	0.61	
54,000-64,999	2.49	2.28	2.06	1.84	1.63	1.41	1.20	0.77
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.16							
15,000-20,999	0.45	0.24						
21,000-26,999	0.75	0.53	0.32					
27,000-32,999	1.04	0.83	0.61	0.40				
33,000-38,999	1.33	1.12	0.91	0.70	0.48			
39,000-44,999	1.62	1.41	1.20	0.99	0.78	0.56		
45,000-53,999	1.92	1.70	1.49	1.28	1.07	0.86	0.65	
54,000-64,999	2.50	2.29	2.08	1.86	1.65	1.44	1.23	0.81
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.17							
15,000-20,999	0.46	0.25						
21,000-26,999	0.75	0.55	0.34					
27,000-32,999	1.05	0.84	0.63	0.42				
33,000-38,999	1.34	1.13	0.92	0.72	0.51			
39,000-44,999	1.63	1.42	1.22	1.01	0.80	0.59		
45,000-53,999	1.92	1.72	1.51	1.30	1.09	0.88	0.68	
54,000-64,999	2.51	2.30	2.09	1.88	1.68	1.47	1.26	0.85

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.18							
15,000-20,999	0.47	0.27						
21,000-26,999	0.76	0.56	0.35					
27,000-32,999	1.05	0.85	0.65	0.44				
33,000-38,999	1.35	1.14	0.94	0.73	0.53			
39,000-44,999	1.64	1.43	1.23	1.03	0.82	0.62		
45,000-53,999	1.93	1.73	1.52	1.32	1.11	0.91	0.71	
54,000-64,999	2.52	2.31	2.11	1.90	1.70	1.50	1.29	0.88
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.18							
15,000-20,999	0.48	0.28						
21,000-26,999	0.77	0.57	0.37					
27,000-32,999	1.06	0.86	0.66	0.46				
33,000-38,999	1.35	1.15	0.95	0.75	0.55			
39,000-44,999	1.65	1.45	1.25	1.04	0.84	0.64		
45,000-53,999	1.94	1.74	1.54	1.34	1.14	0.94	0.74	
54,000-64,999	2.52	2.32	2.12	1.92	1.72	1.52	1.32	0.92
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.19							
15,000-20,999	0.48	0.28						
21,000-26,999	0.77	0.57	0.38					
27,000-32,999	1.07	0.87	0.67	0.47				
33,000-38,999	1.36	1.16	0.96	0.76	0.57			
39,000-44,999	1.65	1.45	1.25	1.06	0.86	0.66		
45,000-53,999	1.94	1.74	1.55	1.35	1.15	0.95	0.75	
54,000-64,999	2.53	2.33	2.13	1.93	1.73	1.54	1.34	0.94

Table 490: Mini-Split Winter Demand Savings for 6.8 HSPF Baseline—Zone 4

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.22							
15,000-20,999	0.57	0.32						
21,000-26,999	0.93	0.68	0.43					
27,000-32,999	1.28	1.03	0.79	0.54				
33,000-38,999	1.64	1.39	1.14	0.89	0.65			
39,000-44,999	1.99	1.74	1.50	1.25	1.00	0.75		
45,000-53,999	2.35	2.10	1.85	1.60	1.36	1.11	0.86	
54,000-64,999	3.06	2.81	2.56	2.31	2.07	1.82	1.57	1.08
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.26							
15,000-20,999	0.61	0.39						
21,000-26,999	0.97	0.74	0.51					
27,000-32,999	1.32	1.10	0.87	0.64				
33,000-38,999	1.68	1.45	1.22	1.00	0.77			
39,000-44,999	2.03	1.81	1.58	1.35	1.13	0.90		
45,000-53,999	2.39	2.16	1.93	1.71	1.48	1.25	1.03	
54,000-64,999	3.10	2.87	2.65	2.42	2.19	1.97	1.74	1.29

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.28							
15,000-20,999	0.63	0.42						
21,000-26,999	0.99	0.77	0.56					
27,000-32,999	1.34	1.13	0.91	0.70				
33,000-38,999	1.70	1.48	1.27	1.05	0.84			
39,000-44,999	2.05	1.84	1.62	1.41	1.19	0.98		
45,000-53,999	2.41	2.19	1.98	1.76	1.55	1.33	1.12	
54,000-64,999	3.12	2.90	2.69	2.47	2.26	2.04	1.83	1.39
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.29							
15,000-20,999	0.64	0.43						
21,000-26,999	1.00	0.79	0.57					
27,000-32,999	1.35	1.14	0.93	0.72				
33,000-38,999	1.71	1.50	1.28	1.07	0.86			
39,000-44,999	2.06	1.85	1.64	1.43	1.22	1.00		
45,000-53,999	2.42	2.21	1.99	1.78	1.57	1.36	1.15	
54,000-64,999	3.13	2.92	2.71	2.49	2.28	2.07	1.86	1.44
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.29							
15,000-20,999	0.65	0.44						
21,000-26,999	1.01	0.80	0.59					
27,000-32,999	1.36	1.15	0.95	0.74				
33,000-38,999	1.72	1.51	1.30	1.09	0.88			
39,000-44,999	2.07	1.86	1.66	1.45	1.24	1.03		
45,000-53,999	2.43	2.22	2.01	1.80	1.60	1.39	1.18	
54,000-64,999	3.14	2.93	2.72	2.51	2.31	2.10	1.89	1.47

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.30							
15,000-20,999	0.66	0.45						
21,000-26,999	1.01	0.81	0.61					
27,000-32,999	1.37	1.16	0.96	0.76				
33,000-38,999	1.72	1.52	1.32	1.11	0.91			
39,000-44,999	2.08	1.87	1.67	1.47	1.26	1.06		
45,000-53,999	2.43	2.23	2.03	1.82	1.62	1.41	1.21	
54,000-64,999	3.14	2.94	2.74	2.53	2.33	2.12	1.92	1.51
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.31							
15,000-20,999	0.67	0.46						
21,000-26,999	1.02	0.82	0.62					
27,000-32,999	1.38	1.18	0.97	0.77				
33,000-38,999	1.73	1.53	1.33	1.13	0.93			
39,000-44,999	2.09	1.89	1.69	1.48	1.28	1.08		
45,000-53,999	2.44	2.24	2.04	1.84	1.64	1.44	1.24	
54,000-64,999	3.15	2.95	2.75	2.55	2.35	2.15	1.95	1.55
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.31							
15,000-20,999	0.67	0.47						
21,000-26,999	1.02	0.83	0.63					
27,000-32,999	1.38	1.18	0.98	0.79				
33,000-38,999	1.73	1.54	1.34	1.14	0.94			
39,000-44,999	2.09	1.89	1.69	1.50	1.30	1.10		
45,000-53,999	2.45	2.25	2.05	1.85	1.65	1.45	1.26	
54,000-64,999	3.16	2.96	2.76	2.56	2.36	2.16	1.97	1.57

Heating, Early Retirement of an Electric Resistance Furnace

Table 491: Mini-Split Winter Demand Savings for 3.412 HSPF Baseline—Zone 4

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.16							
15,000-20,999	1.99	1.74						
21,000-26,999	2.82	2.57	2.32					
27,000-32,999	3.65	3.40	3.15	2.90				
33,000-38,999	4.47	4.23	3.98	3.73	3.48			
39,000-44,999	5.30	5.05	4.81	4.56	4.31	4.06		
45,000-53,999	6.13	5.88	5.63	5.39	5.14	4.89	4.64	
54,000-64,999	7.79	7.54	7.29	7.04	6.80	6.55	6.30	5.80
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.20							
15,000-20,999	2.03	1.80						
21,000-26,999	2.86	2.63	2.41					
27,000-32,999	3.69	3.46	3.23	3.01				
33,000-38,999	4.52	4.29	4.06	3.84	3.61			
39,000-44,999	5.34	5.12	4.89	4.66	4.44	4.21		
45,000-53,999	6.17	5.94	5.72	5.49	5.26	5.04	4.81	
54,000-64,999	7.83	7.60	7.37	7.15	6.92	6.69	6.47	6.01

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.22							
15,000-20,999	2.05	1.84						
21,000-26,999	2.88	2.67	2.45					
27,000-32,999	3.71	3.49	3.28	3.06				
33,000-38,999	4.54	4.32	4.11	3.89	3.67			
39,000-44,999	5.37	5.15	4.93	4.72	4.50	4.29		
45,000-53,999	6.19	5.98	5.76	5.55	5.33	5.11	4.90	
54,000-64,999	7.85	7.63	7.42	7.20	6.99	6.77	6.55	6.12
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.23							
15,000-20,999	2.06	1.85						
21,000-26,999	2.89	2.68	2.47					
27,000-32,999	3.72	3.51	3.29	3.08				
33,000-38,999	4.55	4.33	4.12	3.91	3.70			
39,000-44,999	5.37	5.16	4.95	4.74	4.53	4.32		
45,000-53,999	6.20	5.99	5.78	5.57	5.35	5.14	4.93	
54,000-64,999	7.86	7.65	7.43	7.22	7.01	6.80	6.59	6.16
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.24							
15,000-20,999	2.07	1.86						
21,000-26,999	2.90	2.69	2.48					
27,000-32,999	3.73	3.52	3.31	3.10				
33,000-38,999	4.55	4.35	4.14	3.93	3.72			
39,000-44,999	5.38	5.17	4.97	4.76	4.55	4.34		
45,000-53,999	6.21	6.00	5.79	5.59	5.38	5.17	4.96	
54,000-64,999	7.87	7.66	7.45	7.24	7.03	6.83	6.62	6.20

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.25							
15,000-20,999	2.08	1.87						
21,000-26,999	2.90	2.70	2.50					
27,000-32,999	3.73	3.53	3.32	3.12				
33,000-38,999	4.56	4.36	4.15	3.95	3.75			
39,000-44,999	5.39	5.18	4.98	4.78	4.57	4.37		
45,000-53,999	6.22	6.01	5.81	5.61	5.40	5.20	4.99	
54,000-64,999	7.87	7.67	7.47	7.26	7.06	6.85	6.65	6.24
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.26							
15,000-20,999	2.08	1.88						
21,000-26,999	2.91	2.71	2.51					
27,000-32,999	3.74	3.54	3.34	3.14				
33,000-38,999	4.57	4.37	4.17	3.97	3.77			
39,000-44,999	5.40	5.20	5.00	4.80	4.60	4.39		
45,000-53,999	6.22	6.02	5.82	5.62	5.42	5.22	5.02	
54,000-64,999	7.88	7.68	7.48	7.28	7.08	6.88	6.68	6.28
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.26							
15,000-20,999	2.09	1.89						
21,000-26,999	2.92	2.72	2.52					
27,000-32,999	3.74	3.55	3.35	3.15				
33,000-38,999	4.57	4.37	4.18	3.98	3.78			
39,000-44,999	5.40	5.20	5.00	4.81	4.61	4.41		
45,000-53,999	6.23	6.03	5.83	5.63	5.44	5.24	5.04	
54,000-64,999	7.88	7.69	7.49	7.29	7.09	6.89	6.70	6.30

Climate Zone 5: West Region, El Paso

Heating, New Construction/Replace-on-Burnout

Table 492: Mini-Split Winter Demand Savings for 8.2 HSPF Baseline—Zone 5

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.03							
15,000-20,999	0.26	0.05						
21,000-26,999	0.49	0.28	0.06					
27,000-32,999	0.72	0.50	0.29	0.08				
33,000-38,999	0.95	0.73	0.52	0.31	0.10			
39,000-44,999	1.17	0.96	0.75	0.54	0.32	0.11		
45,000-53,999	1.40	1.19	0.98	0.77	0.55	0.34	0.13	
54,000-64,999	1.86	1.65	1.43	1.22	1.01	0.80	0.58	0.16
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.07							
15,000-20,999	0.30	0.10						
21,000-26,999	0.52	0.33	0.14					
27,000-32,999	0.75	0.56	0.36	0.17				
33,000-38,999	0.98	0.79	0.59	0.40	0.20			
39,000-44,999	1.21	1.02	0.82	0.63	0.43	0.24		
45,000-53,999	1.44	1.24	1.05	0.86	0.66	0.47	0.27	
54,000-64,999	1.90	1.70	1.51	1.31	1.12	0.92	0.73	0.34

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.09							
15,000-20,999	0.32	0.13						
21,000-26,999	0.54	0.36	0.17					
27,000-32,999	0.77	0.59	0.40	0.22				
33,000-38,999	1.00	0.82	0.63	0.44	0.26			
39,000-44,999	1.23	1.04	0.86	0.67	0.49	0.30		
45,000-53,999	1.46	1.27	1.09	0.90	0.72	0.53	0.35	
54,000-64,999	1.92	1.73	1.54	1.36	1.17	0.99	0.80	0.43
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.09							
15,000-20,999	0.32	0.14						
21,000-26,999	0.55	0.37	0.19					
27,000-32,999	0.78	0.60	0.42	0.23				
33,000-38,999	1.01	0.83	0.64	0.46	0.28			
39,000-44,999	1.24	1.05	0.87	0.69	0.51	0.33		
45,000-53,999	1.46	1.28	1.10	0.92	0.74	0.56	0.37	
54,000-64,999	1.92	1.74	1.56	1.38	1.19	1.01	0.83	0.47
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.10							
15,000-20,999	0.33	0.15						
21,000-26,999	0.56	0.38	0.20					
27,000-32,999	0.79	0.61	0.43	0.25				
33,000-38,999	1.01	0.84	0.66	0.48	0.30			
39,000-44,999	1.24	1.06	0.89	0.71	0.53	0.35		
45,000-53,999	1.47	1.29	1.11	0.94	0.76	0.58	0.40	
54,000-64,999	1.93	1.75	1.57	1.39	1.22	1.04	0.86	0.50

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.11							
15,000-20,999	0.34	0.16						
21,000-26,999	0.56	0.39	0.21					
27,000-32,999	0.79	0.62	0.44	0.27				
33,000-38,999	1.02	0.85	0.67	0.50	0.32			
39,000-44,999	1.25	1.07	0.90	0.72	0.55	0.37		
45,000-53,999	1.48	1.30	1.13	0.95	0.78	0.60	0.43	
54,000-64,999	1.94	1.76	1.59	1.41	1.23	1.06	0.88	0.53
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.11							
15,000-20,999	0.34	0.17						
21,000-26,999	0.57	0.40	0.23					
27,000-32,999	0.80	0.63	0.45	0.28				
33,000-38,999	1.03	0.86	0.68	0.51	0.34			
39,000-44,999	1.26	1.08	0.91	0.74	0.57	0.40		
45,000-53,999	1.48	1.31	1.14	0.97	0.80	0.62	0.45	
54,000-64,999	1.94	1.77	1.60	1.43	1.25	1.08	0.91	0.57
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.12							
15,000-20,999	0.35	0.18						
21,000-26,999	0.57	0.40	0.23					
27,000-32,999	0.80	0.63	0.46	0.29				
33,000-38,999	1.03	0.86	0.69	0.52	0.35			
39,000-44,999	1.26	1.09	0.92	0.75	0.58	0.41		
45,000-53,999	1.49	1.32	1.15	0.98	0.81	0.64	0.47	
54,000-64,999	1.95	1.78	1.61	1.43	1.26	1.09	0.92	0.58

Heating, Early Retirement of a Heat Pump

Table 493: Mini-Split Winter Demand Savings for 7.7 HSPF Baseline—Zone 5

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.08							
15,000-20,999	0.33	0.12						
21,000-26,999	0.58	0.37	0.15					
27,000-32,999	0.83	0.62	0.40	0.19				
33,000-38,999	1.08	0.87	0.66	0.44	0.23			
39,000-44,999	1.33	1.12	0.91	0.69	0.48	0.27		
45,000-53,999	1.58	1.37	1.16	0.94	0.73	0.52	0.31	
54,000-64,999	2.09	1.87	1.66	1.45	1.23	1.02	0.81	0.38
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.11							
15,000-20,999	0.36	0.17						
21,000-26,999	0.61	0.42	0.23					
27,000-32,999	0.87	0.67	0.48	0.28				
33,000-38,999	1.12	0.92	0.73	0.53	0.34			
39,000-44,999	1.37	1.17	0.98	0.78	0.59	0.39		
45,000-53,999	1.62	1.42	1.23	1.04	0.84	0.65	0.45	
54,000-64,999	2.12	1.93	1.73	1.54	1.34	1.15	0.95	0.56

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.13							
15,000-20,999	0.38	0.20						
21,000-26,999	0.63	0.45	0.26					
27,000-32,999	0.88	0.70	0.51	0.33				
33,000-38,999	1.14	0.95	0.77	0.58	0.39			
39,000-44,999	1.39	1.20	1.02	0.83	0.65	0.46		
45,000-53,999	1.64	1.45	1.27	1.08	0.90	0.71	0.53	
54,000-64,999	2.14	1.95	1.77	1.58	1.40	1.21	1.03	0.66
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.14							
15,000-20,999	0.39	0.21						
21,000-26,999	0.64	0.46	0.28					
27,000-32,999	0.89	0.71	0.53	0.35				
33,000-38,999	1.14	0.96	0.78	0.60	0.42			
39,000-44,999	1.39	1.21	1.03	0.85	0.67	0.48		
45,000-53,999	1.64	1.46	1.28	1.10	0.92	0.74	0.55	
54,000-64,999	2.15	1.97	1.78	1.60	1.42	1.24	1.06	0.69
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.15							
15,000-20,999	0.40	0.22						
21,000-26,999	0.65	0.47	0.29					
27,000-32,999	0.90	0.72	0.54	0.36				
33,000-38,999	1.15	0.97	0.79	0.61	0.44			
39,000-44,999	1.40	1.22	1.04	0.87	0.69	0.51		
45,000-53,999	1.65	1.47	1.29	1.12	0.94	0.76	0.58	
54,000-64,999	2.15	1.98	1.80	1.62	1.44	1.26	1.08	0.73

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.15							
15,000-20,999	0.40	0.23						
21,000-26,999	0.65	0.48	0.30					
27,000-32,999	0.90	0.73	0.55	0.38				
33,000-38,999	1.16	0.98	0.81	0.63	0.46			
39,000-44,999	1.41	1.23	1.06	0.88	0.71	0.53		
45,000-53,999	1.66	1.48	1.31	1.13	0.96	0.78	0.61	
54,000-64,999	2.16	1.99	1.81	1.63	1.46	1.28	1.11	0.76
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.16							
15,000-20,999	0.41	0.24						
21,000-26,999	0.66	0.49	0.32					
27,000-32,999	0.91	0.74	0.57	0.40				
33,000-38,999	1.16	0.99	0.82	0.65	0.47			
39,000-44,999	1.41	1.24	1.07	0.90	0.73	0.55		
45,000-53,999	1.66	1.49	1.32	1.15	0.98	0.80	0.63	
54,000-64,999	2.17	1.99	1.82	1.65	1.48	1.31	1.13	0.79
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.16							
15,000-20,999	0.41	0.24						
21,000-26,999	0.66	0.49	0.32					
27,000-32,999	0.91	0.74	0.57	0.40				
33,000-38,999	1.17	1.00	0.83	0.66	0.49			
39,000-44,999	1.42	1.25	1.08	0.91	0.74	0.57		
45,000-53,999	1.67	1.50	1.33	1.16	0.99	0.82	0.65	
54,000-64,999	2.17	2.00	1.83	1.66	1.49	1.32	1.15	0.81

Table 494: Mini-Split Winter Demand Savings for 6.8 HSPF Baseline—Zone 5

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.18							
15,000-20,999	0.49	0.28						
21,000-26,999	0.79	0.58	0.37					
27,000-32,999	1.10	0.89	0.67	0.46				
33,000-38,999	1.40	1.19	0.98	0.77	0.55			
39,000-44,999	1.71	1.50	1.28	1.07	0.86	0.65		
45,000-53,999	2.02	1.80	1.59	1.38	1.16	0.95	0.74	
54,000-64,999	2.63	2.41	2.20	1.99	1.77	1.56	1.35	0.92
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.22							
15,000-20,999	0.53	0.33						
21,000-26,999	0.83	0.64	0.44					
27,000-32,999	1.14	0.94	0.75	0.55				
33,000-38,999	1.44	1.25	1.05	0.86	0.66			
39,000-44,999	1.75	1.55	1.36	1.16	0.97	0.77		
45,000-53,999	2.05	1.86	1.66	1.47	1.27	1.08	0.88	
54,000-64,999	2.66	2.47	2.27	2.08	1.88	1.69	1.49	1.10

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.24							
15,000-20,999	0.54	0.36						
21,000-26,999	0.85	0.66	0.48					
27,000-32,999	1.15	0.97	0.78	0.60				
33,000-38,999	1.46	1.27	1.09	0.90	0.72			
39,000-44,999	1.76	1.58	1.39	1.21	1.02	0.84		
45,000-53,999	2.07	1.88	1.70	1.51	1.33	1.14	0.96	
54,000-64,999	2.68	2.49	2.31	2.12	1.94	1.75	1.57	1.20
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.25							
15,000-20,999	0.55	0.37						
21,000-26,999	0.86	0.67	0.49					
27,000-32,999	1.16	0.98	0.80	0.62				
33,000-38,999	1.47	1.28	1.10	0.92	0.74			
39,000-44,999	1.77	1.59	1.41	1.23	1.04	0.86		
45,000-53,999	2.08	1.90	1.71	1.53	1.35	1.17	0.99	
54,000-64,999	2.69	2.51	2.32	2.14	1.96	1.78	1.60	1.23
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.25							
15,000-20,999	0.56	0.38						
21,000-26,999	0.86	0.69	0.51					
27,000-32,999	1.17	0.99	0.81	0.63				
33,000-38,999	1.47	1.30	1.12	0.94	0.76			
39,000-44,999	1.78	1.60	1.42	1.24	1.06	0.89		
45,000-53,999	2.08	1.91	1.73	1.55	1.37	1.19	1.01	
54,000-64,999	2.69	2.52	2.34	2.16	1.98	1.80	1.62	1.27

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.26							
15,000-20,999	0.56	0.39						
21,000-26,999	0.87	0.69	0.52					
27,000-32,999	1.18	1.00	0.82	0.65				
33,000-38,999	1.48	1.30	1.13	0.95	0.78			
39,000-44,999	1.79	1.61	1.43	1.26	1.08	0.91		
45,000-53,999	2.09	1.92	1.74	1.56	1.39	1.21	1.04	
54,000-64,999	2.70	2.53	2.35	2.17	2.00	1.82	1.65	1.30
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.27							
15,000-20,999	0.57	0.40						
21,000-26,999	0.88	0.70	0.53					
27,000-32,999	1.18	1.01	0.84	0.67				
33,000-38,999	1.49	1.31	1.14	0.97	0.80			
39,000-44,999	1.79	1.62	1.45	1.28	1.10	0.93		
45,000-53,999	2.10	1.92	1.75	1.58	1.41	1.24	1.06	
54,000-64,999	2.71	2.53	2.36	2.19	2.02	1.85	1.67	1.33
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	0.27							
15,000-20,999	0.57	0.40						
21,000-26,999	0.88	0.71	0.54					
27,000-32,999	1.18	1.01	0.84	0.67				
33,000-38,999	1.49	1.32	1.15	0.98	0.81			
39,000-44,999	1.80	1.62	1.45	1.28	1.11	0.94		
45,000-53,999	2.10	1.93	1.76	1.59	1.42	1.25	1.08	
54,000-64,999	2.71	2.54	2.37	2.20	2.03	1.86	1.69	1.35

Heating, Early Retirement of an Electric Resistance Furnace

Table 495: Mini-Split Winter Demand Savings for 3.412 HSPF Baseline—Zone 5

8.5-8.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.00							
15,000-20,999	1.72	1.50						
21,000-26,999	2.43	2.22	2.00					
27,000-32,999	3.14	2.93	2.72	2.51				
33,000-38,999	3.86	3.65	3.43	3.22	3.01			
39,000-44,999	4.57	4.36	4.15	3.93	3.72	3.51		
45,000-53,999	5.29	5.07	4.86	4.65	4.43	4.22	4.01	
54,000-64,999	6.71	6.50	6.29	6.08	5.86	5.65	5.44	5.01
9.0-9.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.04							
15,000-20,999	1.75	1.56						
21,000-26,999	2.47	2.27	2.08					
27,000-32,999	3.18	2.99	2.79	2.60				
33,000-38,999	3.89	3.70	3.50	3.31	3.12			
39,000-44,999	4.61	4.41	4.22	4.02	3.83	3.63		
45,000-53,999	5.32	5.13	4.93	4.74	4.54	4.35	4.15	
54,000-64,999	6.75	6.55	6.36	6.17	5.97	5.78	5.58	5.19

9.5-9.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.06							
15,000-20,999	1.77	1.59						
21,000-26,999	2.48	2.30	2.11					
27,000-32,999	3.20	3.01	2.83	2.64				
33,000-38,999	3.91	3.73	3.54	3.36	3.17			
39,000-44,999	4.63	4.44	4.26	4.07	3.89	3.70		
45,000-53,999	5.34	5.16	4.97	4.78	4.60	4.41	4.23	
54,000-64,999	6.77	6.58	6.40	6.21	6.03	5.84	5.66	5.29
10.0-10.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.06							
15,000-20,999	1.78	1.60						
21,000-26,999	2.49	2.31	2.13					
27,000-32,999	3.21	3.02	2.84	2.66				
33,000-38,999	3.92	3.74	3.56	3.37	3.19			
39,000-44,999	4.63	4.45	4.27	4.09	3.91	3.72		
45,000-53,999	5.35	5.17	4.98	4.80	4.62	4.44	4.26	
54,000-64,999	6.78	6.59	6.41	6.23	6.05	5.87	5.68	5.32
10.5-10.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.07							
15,000-20,999	1.78	1.61						
21,000-26,999	2.50	2.32	2.14					
27,000-32,999	3.21	3.03	2.86	2.68				
33,000-38,999	3.93	3.75	3.57	3.39	3.21			
39,000-44,999	4.64	4.46	4.28	4.11	3.93	3.75		
45,000-53,999	5.35	5.18	5.00	4.82	4.64	4.46	4.28	
54,000-64,999	6.78	6.60	6.43	6.25	6.07	5.89	5.71	5.35

11.0-11.4 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.08							
15,000-20,999	1.79	1.62						
21,000-26,999	2.51	2.33	2.15					
27,000-32,999	3.22	3.04	2.87	2.69				
33,000-38,999	3.93	3.76	3.58	3.41	3.23			
39,000-44,999	4.65	4.47	4.30	4.12	3.95	3.77		
45,000-53,999	5.36	5.19	5.01	4.84	4.66	4.48	4.31	
54,000-64,999	6.79	6.61	6.44	6.26	6.09	5.91	5.74	5.39
11.5-11.9 HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.08							
15,000-20,999	1.80	1.63						
21,000-26,999	2.51	2.34	2.17					
27,000-32,999	3.23	3.05	2.88	2.71				
33,000-38,999	3.94	3.77	3.60	3.42	3.25			
39,000-44,999	4.65	4.48	4.31	4.14	3.97	3.79		
45,000-53,999	5.37	5.19	5.02	4.85	4.68	4.51	4.34	
54,000-64,999	6.79	6.62	6.45	6.28	6.11	5.93	5.76	5.42
12.0+ HSPF								
Size (Btuh) Post	< 15,000	15,000-20,999	21,000-26,999	27,000-32,999	33,000-38,999	39,000-44,999	45,000-53,999	54,000-64,999
Size (Btuh) Pre								
< 15,000	1.09							
15,000-20,999	1.80	1.63						
21,000-26,999	2.52	2.35	2.17					
27,000-32,999	3.23	3.06	2.89	2.72				
33,000-38,999	3.94	3.77	3.60	3.43	3.26			
39,000-44,999	4.66	4.49	4.32	4.15	3.98	3.81		
45,000-53,999	5.37	5.20	5.03	4.86	4.69	4.52	4.35	
54,000-64,999	6.80	6.63	6.46	6.29	6.12	5.95	5.78	5.44

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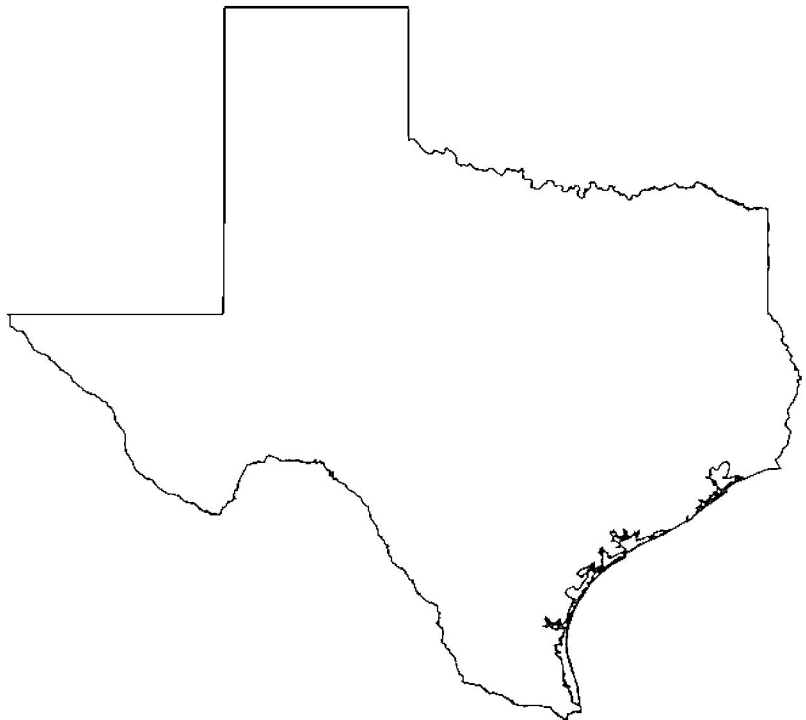
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Acknowledgments

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TRM Technical Support

Technical support and questions can be emailed to the EM&V project manager (lark.lee@tetrattech.com) and PUCT staff (therese.harris@puc.texas.gov).

1. INTRODUCTION

This volume of the TRM contains the deemed savings for nonresidential measures that have been approved for use in Texas by the PUCT. This volume includes instructions regarding various savings calculators and reference sources of the information. The TRM serves as a centralized source of deemed savings values; where appropriate, measurement and verification (M&V) methods by measure category are noted for informational purposes only regarding the basis of projected and claimed savings.

Table 1 provides an overview of the nonresidential measures contained within Volume 3 and the types of deemed savings estimates available for each one. There are five types of deemed savings estimates identified:

- Point estimates that provide a single deemed savings value that corresponds to a single measure or type of technology.
- Deemed saving tables that provide energy and peak savings as a function of size, capacity, building type, efficiency level, or other inputs.
- Savings algorithms that require user-defined inputs that must be gathered on-site and the identification of default inputs where primary data could not be collected. In many cases, these algorithms are provided as references to deemed savings tables, point estimates, or calculator explanations.
- Calculators are used by different utilities and implementers to calculate energy savings for different measures. In many cases, there are several different calculators available for a single measure. Sometimes their background calculators are similar, and in other cases, estimates can vary greatly between each calculator.
- M&V methods are also used for some measures to calculate savings in the event that standard equipment is not used, or the specified building types do not apply. For some of these measures, both a simplified M&V approach and a full M&V approach may be allowed by the utility. M&V methods as a source of claimed and projected savings are noted for informational purposes only. Standardized M&V approaches that have been reviewed by the EM&V team are incorporated into Volume 4: Measurement and Verification Protocols of this TRM.

Please consult Volume I: Overview and User Guide, Section 4: Structure and Content, for details on the organization of the measure templates presented in this volume.

Table 1. Nonresidential Deemed Savings by Measure Category

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	9.0 update
Lighting	Lamps and Fixtures	–	–	X	X	X	General reference checks and text edits; added guidance for certification of incremented length products; added upstream clarification; combined greater and less than 100 W GSLs and reflectors for upstream/midstream; adjusted upstream/midstream residential vs. commercial split and ISRs; updated upstream/midstream outdoor hours of use; added guidance for LED model number, performance characteristics certification, and dates of certification; changed LSF references to fixture wattage table
	Lighting Controls	–	–	X	X	X	Added eligibility criteria for new construction applications
	LED Traffic Signals	–	–	X	X	X	No revisions

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	9.0 update
HVAC	Air conditioning and heat pump tune-ups	–	–	X	–	X	Updated EUL reference
	Split and packaged air conditioners and heat pumps	–	–	X	X	X	General reference checks and text edits; removed baseline efficiency splits between heating section types for air conditioners and defaulted to “All Other” efficiencies; clarified approach for system types conversion to split/package AC systems; updated EUL methodology; incorporated building type weighted savings coefficients for upstream/midstream; incremented RUL table for code compliance
	HVAC chillers	–	–	X	X	X	General reference checks and text edits; updated default age of system to match EUL; incorporated upstream/midstream building type weighting for savings coefficients; incremented RUL table for code compliance
	Package terminal air conditioners/heat pumps, and room air conditioners	–	–	X	X	X	General reference checks and text edits; incorporated upstream/midstream building type weighted savings coefficients; clarified default age and RUL; incremented RUL table for code compliance
	Computer room air conditioners	–	–	X	X	–	Updated baseline table citation; added capacity conversion from kW to btu/hr
	Computer room air handler motor efficiency	–	–	X	X	–	No revisions
	HVAC variable frequency drives	–	X	X	–	–	Expanded available building types and updated occupancy schedules
	Condenser air evaporative pre-cooling	–	–	X	–	X	Specified that formulas use tons and kW/ton values and added conversion factors from other units
	High-volume low-speed fans	–	–	X	–	–	No revisions
	Small commercial evaporative cooling	–	X	X	–	–	TRM v9.0 origin

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	9.0 update
Building envelope	ENERGY STAR® cool roofs	X	–	X	X	–	Added building type to tracking data requirements; updated EUL reference
	Window treatments	X	–	X	X	–	Corrected footnote for SC to SHGC conversion; updated performance factors to 2017 ASHRAE Fundamentals; updated EUL reference
	Entrance and exit door air infiltration	–	X	X	–	–	Updated EUL reference
Food service	ENERGY STAR® combination ovens	–	X	X	–	–	Incorporated March 2021 calculator updates; corrected ENERGY STAR® idle rate formulas; updated tracking system requirements and EUL reference
	ENERGY STAR® electric convection ovens	–	X	X	–	–	Incorporated changes from March 2021 calculator update; updated EUL reference
	ENERGY STAR® dishwashers	–	X	X	–	–	General reference checks and text edits; incorporated March 2021 calculator update; updated variable definitions
	ENERGY STAR® hot food holding cabinets	–	X	X	–	–	Incorporated March 2021 calculator update; updated EUL reference
	ENERGY STAR® electric fryers	–	X	X	–	–	Incorporated March 2021 calculator update; updated EUL reference
	ENERGY STAR® electric steam cookers	–	X	X	–	–	Incorporated March 2021 calculator update; corrected formula errors; updated EUL reference
	ENERGY STAR® ice makers	–	X	X	–	–	Incorporated March 2021 calculator update
	Demand controlled kitchen ventilation	–	X	X	–	–	Updated EUL reference
	Pre-rinse spray valves	–	X	X	–	–	General reference checks; updates to input assumptions; updated peak demand savings; updated EUL reference
	Vacuum-sealing and packaging machines	–	X	–	–	–	No revisions

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	9.0 update
Refrigeration	Door heater controls	–	X	X	–	–	Updated peak demand methodology to follow Volume 1 methods; changed Zone 4 reference location from McAllen to Corpus Christi; updated EUL reference
	ECM evaporator fan motors	–	–	X	–	–	Updated methodology based on the load shape from original workpaper; updated EUL reference
	Electronic defrost controls	–	–	X	–	–	Updated methodology based on the load shape from original workpaper
	Evaporator fan controls	–	–	X	–	–	Updated EUL reference
	Night covers for open refrigerated display cases	–	X	X	–	–	Updated methodology based on the load shape from original workpaper; updated reference city for Climate Zone 4; added “linear feet” for tracking data requirements; updated EUL reference
	Solid and glass door reach-ins	–	–	X	–	–	Updated EUL reference
	Strip curtains for walk-in refrigerated storage	–	X	–	–	–	Added documentation for calculation methodology; updated tracking data requirements; updated EUL reference
	Zero-energy doors for refrigerated cases	–	X	X	–	–	Clarified energy and demand savings are in kW/door rather than kW/feet; updated EUL reference
	Door gaskets for walk-in and reach-in coolers and freezers	–	X	X	–	–	General reference checks and text edits; updated EUL reference
	High speed doors for cold storage	–	X	X	–	–	General reference checks and text edits

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	9.0 update
Water heating	Central domestic hot water controls	–	X	X	–	–	Updated EUL reference
	Showerhead temperature sensitive restrictor valves	–	–	X	–	–	Restricted measure to electricity savings and removed gas savings coefficients; updated EUL reference
	Tab spout and showerhead temperature sensitive restrictor valves	–	–	X	–	–	Restricted measure to electricity savings and removed gas savings coefficients; updated EUL reference
Miscellaneous	Vending machine controls	–	X	X	–	–	General text edits
	Lodging guest room occupancy sensor controls	–	X	–	–	–	No revisions
	Pump-off controllers	–	X	X	–	–	General text edits
	ENERGY STAR® pool pumps	–	X	X	–	–	General text edits; corrected turnovers/day values in the assumptions table
	Computer power management	–	X	X	–	–	Updated peak demand savings coefficients and deemed savings; added application type to documentation requirements; eliminated winter demand savings
	Premium efficiency motors	–	–	X	–	–	General reference checks and text edits
	ENERGY STAR® electric vehicle supply equipment	–	X	X	–	–	General reference checks and text edits
	Variable frequency drives for water pumping	–	X	X	–	–	TRM v9.0 origin
	Steam trap repair and replacement	–	X	X	–	–	TRM v9.0 origin
	Hydraulic gear lubricants	–	–	X	–	–	TRM v9.0 origin
Hydraulic Oils	–	–	X	–	–	TRM v9.0 origin	

2. NONRESIDENTIAL MEASURES

2.1 NONRESIDENTIAL: LIGHTING

2.1.1 Lamps and Fixtures Measure Overview

TRM Measure ID: NR-LT-LF

Market Sector: Commercial

Measure Category: Lighting

Applicable Building Types: All commercial, multifamily common areas

Fuels Affected: Electricity (interactive HVAC effects: electric/gas space heating)

Decision/Action Types: Retrofit, and new construction

Program Delivery Type: Prescriptive, custom, direct install

Deemed Savings Type: Deemed savings calculation

Savings Methodology: Engineering algorithms and estimates

Measure Description

This section provides estimates of the energy and peak savings resulting from the installation of energy efficient lamps and/or ballasts. The installation can be the result of new construction or the replacement of existing lamps and/or ballasts. This TRM Measure ID covers the following lighting technologies:

- Linear fluorescent T5s; high performance or reduced watt T8s. Linear fluorescent measures may also involve delamping¹ with or without the use of reflectors.
- Fluorescent electrodeless induction lamps and fixtures
- Compact fluorescent lamp (CFL) screw-based lamps and hard-wired pin-based fixtures
- Pulse-start (PSMH) and ceramic metal halide (CMH) lamps; high-intensity discharge (HID) lamps
- Light emitting diode (LED) screw-based lamps; hard-wired LED fixtures.

Energy and demand savings are based on operating hours, coincident-load factors, and changes in pre-existing and post-installation lighting loads, as determined using an approved lighting *Standard Fixture Wattage* table², available for download from the Texas Efficiency website and in the Fixture Codes tab in the latest version of the *Lighting Survey Form (LSF)*. The LSF is one example of a calculator that is used to determine energy and demand savings.

¹ Delamping energy savings are eligible if done in conjunction with T-8 lamp and electronic ballast retrofits.

² Maintained by EUMMOT/Frontier Energy: <http://texasefficiency.com/index.php/regulatory-filings/lighting>.

Pre- and post-retrofit lighting inventories are entered and used with the pre-loaded stipulated values and algorithms needed to calculate energy and demand savings. Components of the calculator include:

- Instructions and project information.
- Pre- and post-retrofit lighting inventories. A tab for exempt fixtures and a description of the exemptions is also present in the calculator.
- Fixture wattages and descriptions are defined in a Standard Fixture Wattage table.
- Factor tables that contain stipulated operating hours, coincidence factors, interactive HVAC factors, control adjustment factors, and new construction lighting power density factors.
- A summary tab displaying the final energy and demand calculations. The data from this tab is entered into the utility program tracking data as the claimed savings values.

Although the generic LSF calculator is publicly available on the Texas Energy Efficiency website, several utilities have their own versions.

Eligibility Criteria

This section describes the system information and certified wattage values that must be used to estimate energy and peak savings from lighting systems installed as part of the Texas utility energy efficiency programs. The fixture codes and the demand values listed in the Table of Standard Fixture Wattages are used to calculate energy and demand savings for lighting efficiency projects.

Existing lighting fixtures must be removed or demolished in place after retrofit to count towards reduced pre-install wattage. Existing lighting fixtures that remain operable after retrofit should be listed in both the pre- and post-retrofit lighting inventory.

In addition, LED and linear fluorescent T8s need to be qualified, as follows:

- High-performance (HP) and reduced-watt (RW) T8 linear fluorescent lamps need to be qualified by the Consortium for Energy Efficiency (CEE). Their respective ballasts need to be qualified by NEMA.³ See the High-efficiency Condition section for additional details.
- LED lamps and fixtures must have their input power (wattage) and an L70 rated life (hours) verified through some combination of the following references: DesignLights Consortium® (DLC), ENERGY STAR®, or independent lab testing⁴ (e.g., LM-79, LM-80,

³ While CEE stopped qualifying ballasts in January 2015, the NEMA Premium Electronic Ballast Program has continued to be maintained and is consistent with the prior CEE specifications for high performance lamps and ballasts, tested in accordance with ANSI C82 Standards.

⁴ DLC test lab requirements: <https://www.designlights.org/solid-state-lighting/qualification-requirements/testing-lab-requirements/>.

TM-21, ISTMT). Rated life for LED fixtures should be greater than or equal to 50,000 hours⁵ and greater than or equal to 10,000 hours⁶ for integrated-ballast LED lamps.

- DLC- and ENERGY STAR®-certified model numbers should closely align with the installed model number. However, small variances are allowed for portions of the model number that may refer to aspects of the fixture that do not affect energy performance (e.g., color temperature, fixture housing). This allowance is provided at the discretion of the state evaluator and reported model numbers should always default to the closest match available.
- DLC and ENERGY STAR® specifications are periodically updated. Projects may report fixture wattage from older versions of product certifications according to the following certification date guidelines if a copy of the original certification is preserved.
 - New construction: permit date
 - Small business: date of customer acceptance or project proposal
 - All other: installation date
- If a product is available in various length increments but is DLC-certified for a specific fixture length, the specified DLC power may be converted to a watts-per-square-foot value to be multiplied against the installed fixture length instead of reporting as a non-qualified fixture.

Exempt lighting for new construction. Some types of new construction lighting fixtures are exempt from inclusion in the interior lighting demand savings calculation, but they are still included in the total installed lighting power calculations for a project. Exempt fixtures are those that do not provide general/ambient/area lighting, have separate control devices, and are installed in one of the following applications:⁷

1. The connected power associated with the following lighting equipment is not included in calculating total connected lighting power
 - 1.1. Professional sports arena playing-field lighting
 - 1.2. Sleeping-unit lighting in hotels, motels, boarding houses, or similar buildings
 - 1.3. Emergency lighting automatically off during normal building operation
 - 1.4. Lighting in spaces specifically designed for use by occupants with special lighting needs including visual impairment and other medical and age-related issues

⁵ Equivalent to the L⁷⁰ rated life requirement for all categories as specified in DesignLights Consortium™ (DLC) technical requirements v4.3.

https://www.designlights.org/default/assets/File/Workplan/DLC_Technical-Requirements-V-4-3.pdf.

⁶ Equivalent to the rated life requirement for all lamps as specified in the ENERGY STAR® lamps specification v2.1.

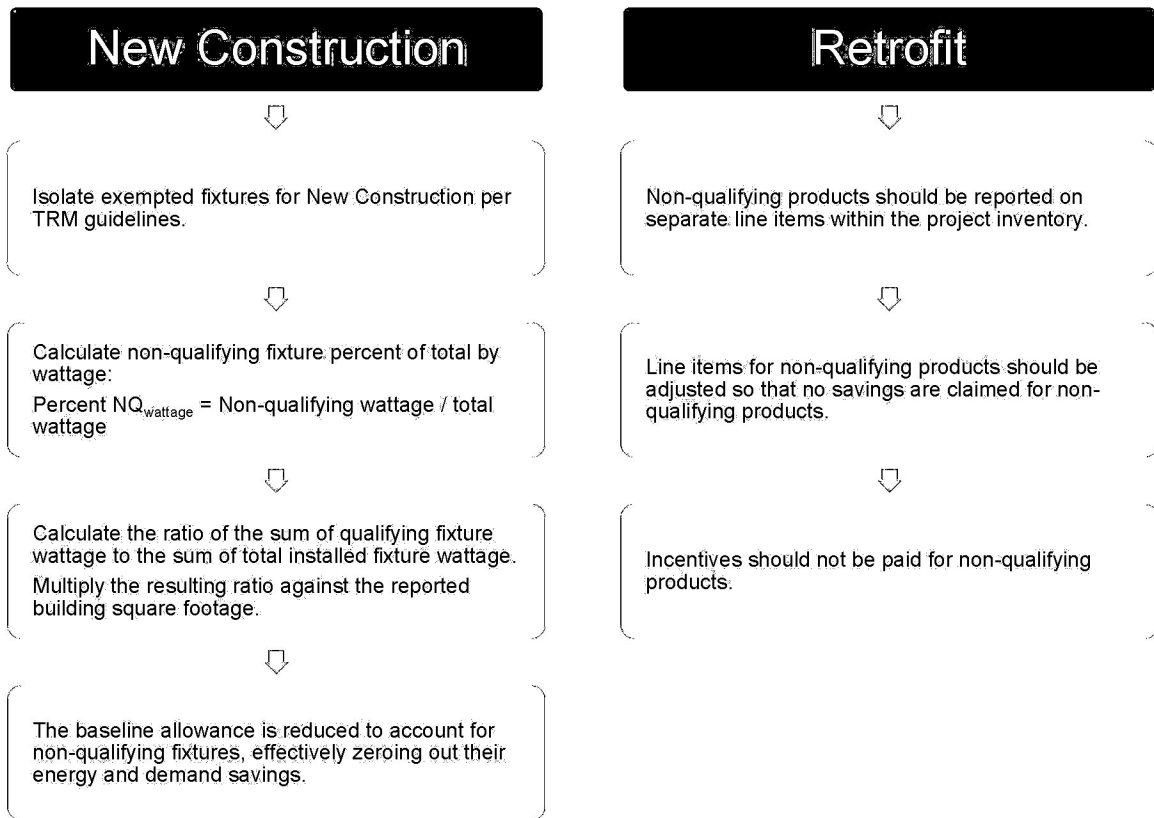
<https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Lamps%20V2.1%20Final%20Specification.pdf>.

⁷ IECC 2015, Section C405.4.1.

- 1.5. Lighting in interior spaces that have been specifically designated as a registered interior historic landmark
- 1.6. Casino gaming areas
- 1.7. Mirror lighting in dressing rooms
2. Lighting equipment used for the following shall be exempt provided that it is in addition to general lighting and is controlled by an independent control device
 - 2.1. Task lighting for medical and dental purposes
 - 2.2. Display lighting for exhibits in galleries, museums, and monuments
3. Lighting for theatrical purposes, including performance, stage, film production, and video production
4. Lighting for photographic processes
5. Lighting integral to equipment or instrumentation and installed by the manufacturer
6. Task lighting for plant growth or maintenance
7. Advertising signage or directional signage
8. In restaurant building and areas, lighting for food warming or integral to food preparation equipment
9. Lighting equipment that is for sale
10. Lighting demonstration equipment in education facilities
11. Lighting approved because of safety or emergency considerations, inclusive of exit lights
12. Lighting integral to both open and glass-enclosed refrigerator and freezer cases
13. Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions
14. Furniture-mounted supplemental task lighting that is controlled by automatic shut off
15. Exit signs

Non-Qualifying LEDs. This section provides guidance to assess and calculate nonresidential lighting project savings that include non-qualifying LEDs. Figure 1 summarizes the recommended protocol for lighting system projects with non-qualifying LEDs when square footage cannot be isolated. Additional explanations and criteria for use follow.

Figure 1. Non-Qualifying LED Process for Lighting Projects



Step 1: Qualify New Construction Projects. Calculate non-qualifying LED project percentage:

- Based as a percentage of demand (percent $NQ_{wattage}$ = wattage of non-qualifying fixtures / wattage of total fixtures)

Step 2: New Construction Projects Only. Non-qualifying fixtures that pass Step 1 would follow all instructions for excluded fixtures.

- List non-qualifying LEDs on separate lines (e.g., separate on lighting inventory worksheet of deemed savings calculator). Non-qualifying fixtures are identified by a unique fixture code.
- Adjust code allowable baseline wattage so that non-qualifying fixture wattage is not included as part of the lighting power density (LPD) code limit requirements. To do so, calculate the sum of the qualifying fixture wattage and the sum of the total installed fixture wattage. Take the ratio of qualifying fixture wattage to total fixture wattage and multiply the resulting ratio against the total treated square footage for space. The adjusted square footage is included as part of the overall LPD calculation and will decrease the total allowable baseline wattage for the project.

- **Fixture Isolation Method.** If non-qualifying fixtures are isolated to a section of the building whose square footage can be easily segmented from the total building square footage, the non-qualifying fixtures and affected square footage can be excluded from the lighting inventory. Excluded fixtures must be documented when using the fixture isolation method.

Step 3: Retrofit Projects. List non-qualifying LEDs on separate lines (e.g., separate on lighting inventory worksheet of deemed savings calculator).

- Include unique identifiers/markers for the non-qualifying LEDs within the inventory (e.g., fixture code, description, or another designator within the deemed savings tool).
- Adjust non-qualifying LED wattages, so their demand and energy savings are not included as part of the project savings. Demand and energy savings for non-qualifying LEDs shall result in zero-project savings.
- Adjust non-qualifying LED quantities so they are not included as part of the project incentive. Incentives shall not be paid on non-qualifying LEDs.
- Provide clear visibility for all changes within the savings calculation (e.g., deemed savings calculator), including changes to all input assumptions and calculation methodologies to implement the above procedure.
- All other savings procedures and requirements, as specified within the TRM for lighting measures apply to all fixtures of a lighting project.

Baseline Condition

The baseline condition or assumed baseline efficiency used in the savings calculations depends on the decision-type used for the measure. For new construction, the baseline will be based on a lighting power density (LPD) in watts per square foot by building type, as specified by the relevant energy code/standard applied to a specific project. For *retrofit* applications, the baseline efficiency would typically reflect the in-situ, pre-existing equipment, with the exception of linear fluorescent T12s and first-generation T8s, as explained below. Eligible baseline fixture types and wattages are specified in the Standard Fixture Wattages table.

Major renovation projects should use a new construction baseline (for the building type after the improvement) if either of the following conditions are met:

- Building type changes in combination with the renovation
- Renovation scope includes removing drywall and gutting existing building to the studs

Linear Fluorescent T12 Special Conditions

The U.S. Energy Policy Act of 1992 (EPACT) set energy efficiency standards that preclude certain lamps and ballasts from being manufactured or imported into the U.S. The latest standards covering general service linear fluorescents went into full effect July 2014. Under this provision, almost all 4-foot and some 8-foot T12 lamps, as well as first-generation 4-foot, 700 series T8 lamps were prohibited from manufacture. Because all lighting equipment for Texas energy efficiency programs must be EPACT compliant, including existing or baseline equipment,

adjustments were made to the T12 fixtures in the Standard Fixture Wattage table. Certain T12 lamp/ballast combinations which are non-EPACT compliant are assigned EPACT demand values.

As such, 4-foot and 8-foot T12s are no longer an approved baseline technology for Texas energy efficiency programs. 4-foot and 8-foot T12s are still eligible for lighting retrofit projects, but an assumed electronic T8 baseline will be used for estimating the energy and demand savings instead of the existing T12 equipment. T12 fixtures will remain in the Standard Fixture Wattage table, but the label for these records will be changed to “T12 (T8 baseline)” and the fixture wattage for these records will be adjusted to use the adjusted fixture wattages shown in Table 2.

Table 2. Adjusted Baseline Wattages for T12 Equipment

T12 length	Lamp count	Revised lamp wattage	Revised system wattage
48-inch—std, HO, and VHO (4 feet)	1	32	31
	2	32	58
	3	32	85
	4	32	112
	6	32	170
	8	32	224
96-inch—std (8 feet) 60/75 W	1	59	69
	2	59	110
	3	59	179
	4	59	219
	6	59	330
	8	59	438*
96-inch HO and VHO (8 feet) 95/110 W	1	86	101
	2	86	160
	3	86	261
	4	86	319
	6	86	481
	8	86	638
2-foot u-tube	1	32	32
	2	32	60
	3	32	89

*8 lamp fixture wattage approximated by doubling 4 lamp fixture wattage.

Key: HO = high output, VHO—very high output.

General Service Lamps

The baseline is assumed to be the first-tier Energy Independence and Security Act of 2007 (EISA)-mandated maximum wattage for a general service or standard incandescent or halogen lamp (see Table 3).

Baseline wattages should be adjusted as EISA regulations dictate higher efficiency standards. A potential second-tier EISA baseline adjustment was scheduled to go into effect beginning January 2020. At that time, general service lamps would need to comply with a 45 lumen-per-watt efficacy standard. However, the Department of Energy (DOE) issued a definition for general service lamps on September 5, 2019, concluding that “no backstop energy conservation has been imposed.”⁸ Therefore, no additional baseline adjustment will be imposed starting in 2020. However, standard practice must also be considered in determining an appropriate baseline for this measure. To account for a rapidly changing market, measure life assumptions have been reduced as described later in this measure.

Table 3. EISA 2007 Baseline Adjustment for GSILs⁹

Minimum lumens	Maximum lumens	Incandescent equivalent wattage pre-EISA 2007	1 st Tier EISA 2007 baseline wattage
310	749	40	29
750	1,049	60	43
1,050	1,489	75	53
1,490	2,600	100	72

High-Efficiency Condition

Eligible efficient fixture types and wattages are specified in the Standard Fixture Wattages table. In addition, some technologies such as LEDs must meet the additional requirements specified under Eligibility Criteria.

High-Efficiency/Performance Linear Fluorescent T8s

All 4-foot T8 post-retrofit technologies and new construction projects must use electronic ballasts manufactured after November 2014,¹⁰ and high-performance T8 lamps that are on the T8 Replacement Lamp products list developed by the Consortium for Energy Efficiency (CEE) as published on its website.

⁸ “Energy Conservation Program: Definition for General Service Lamps”, Department of Energy. 9/5/2019. <https://www.federalregister.gov/documents/2019/09/05/2019-18940/energy-conservation-program-definition-for-general-service-lamps>.

⁹ Energy Independence and Security Act of 2007. <https://www.govinfo.gov/content/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>.

¹⁰ Changes to the DOE Federal standards for electronic ballasts effective November 2014 met both the CEE performance specification and the NEMA Premium requirements, so CEE discontinued their specification and qualifying product lists. A legacy ballast list from January 2015 is still available.

If CEE does not have efficiency guidelines for a T8 system (such as for 8-foot, 3-foot, 2-foot, and U-bend T8 products), the product must have higher light output or reduced wattage than its standard equivalent product (minimum efficacy of 75 mean lumens per watt), while also providing a CRI (color rendering index) greater than 80, and an average rated life of 24,000 hours at three hours per start. In addition, 2-foot and 3-foot ballasts must also use electronic ballasts manufactured after November 2014.

Energy and Demand Savings Methodology

Savings Algorithms and Input Variables

This section describes the deemed savings methodology for both energy and demand savings for all lighting projects. Savings are calculated using separate methods for retrofit and new construction projects.

***Retrofit*^{11,12}**

$$Energy\ Savings = (kW_{pre} \times Hours_{pre} \times EAF_{pre} - kW_{installed} \times Hours_{installed}) \times HVAC_{energy}$$

Equation 1

$$Peak\ Summer\ Demand\ Savings = (kW_{pre} \times CF_{pre} \times PAF_{pre} - kW_{installed} \times CF_{installed}) \times HVAC_{demand}$$

Equation 2

New Construction

$$Energy\ Savings = \left(\frac{LPD \times FloorArea}{1000} - kW_{installed} \right) \times Hours \times HVAC_{energy}$$

Equation 3

$$Peak\ Summer\ Demand\ Savings = \left(\frac{LPD \times FloorArea}{1000} - kW_{installed} \right) \times CF \times HVAC_{demand}$$

Equation 4

¹¹ For non-operating fixtures, the baseline demand may be adjusted by using values from the Standard Wattage Table. The number of non-operating fixtures will be limited to 10% of the total fixture count per facility.

¹² The energy and demand savings calculations should also account for lighting controls that are present on existing lighting systems. The EAF and PAF factors in the Lighting Controls measure section should be used for these calculations to adjust the deemed hours and coincidence factors on the pre-side of the equations. Savings for controls installed on new fixtures are accounted for in the Lighting Controls measure.

Where:

kW_{pre} = Total kW of existing measure(s) (Approved baseline fixture code wattage from deemed savings tool divided by 1000 and multiplied by fixture/lamp quantity)

$kW_{installed}$ = Total kW of retrofit measure(s) (Verified installed fixture code wattage from deemed savings tool divided by 1000 and multiplied by fixture/lamp quantity)¹³

Note: wattage for installed LED fixtures may be rounded up or down to the nearest half watt; all other wattages should be rounded to the nearest watt.

LPD = Acceptable Lighting Power Density based on building type from efficiency codes from Table 4 (W/ft²)

Floor Area = Floor area of the treated space where the lights were installed

Hours = Hours by building type from Table 8

EAF = Energy Adjustment Factor from Lighting Controls measure (set equal to 1 if no controls are installed on the existing fixture)

CF = Coincidence factor by building type from Table 9 or Table 10

PAF = Power Adjustment Factor from Lighting Controls measure (set equal to 1 if no controls are installed on the existing fixture)

HVAC_{energy} = Energy Interactive HVAC factor by building type

HVAC_{demand} = Demand Interactive HVAC factor by building type

ISR = In-Service Rate, the percentage of incentivized units that are installed and in use (rather than removed, stored, or burnt out) to account for units incentivized but not operating = 1.0 unless otherwise specified for midstream/upstream applications (see Table 12)

Each of the parameters in these equations, and the approach or their stipulated values, are discussed in detail below.

¹³ Installed fixture wattage for fixtures defined by DLC as having “field-adjustable light output capability under the product features tab should be reported at the “default,” or maximum lumen output, setting. These fixtures may also utilize the Institutional Tuning control type. Field adjustments should be tracked in project inventories and verified with lumen measurements conducted during field inspections.

Lamp and Fixture Wattages (kW_{pre} , $kW_{installed}$)

Existing construction: standard fixture wattage table.¹⁴ Another example of standard fixture wattage can be found in the Fixture Codes tab of the latest version of the LSF. This table is used to assign identification codes and demand values (watts) to common fixture types (e.g., fluorescent, incandescent, HID, LED) used in commercial applications. The table is subdivided into lamp types (e.g., linear fluorescent, compact fluorescent, mercury vapor) with each subdivision sorted by fixture code. Each record (or row) in the table contains a fixture code, serving as a unique identifier. A legend explains the rules behind the fixture codes.

Each record also includes a description of the fixture, the number of lamps, the number of ballasts if applicable, and the fixture wattage. The table wattage values for each fixture type are averages of various manufacturers' laboratory tests performed to ANSI test standards. By using standardized demand values for each fixture type, the Table simplifies the accounting procedures for lighting equipment retrofits. The table is updated periodically as new fixtures are added.

The fixture codes and the demand values listed in the watt/fixture column in the Table of Standard Fixture Wattages are used to calculate energy and demand savings for any lighting efficiency project.

For implementers interested in adding new fixtures to EUMMOT's lighting table, a request should be submitted to Frontier. The request should include all information required to uniquely identify the fixture type and to fix its demand, as well as other contextual information needed for the table. If possible, the request should also be supported by manufacturer's ANSI test data. Frontier periodically releases updated versions of the LSF with new fixture codes.

New construction: lighting power density table. For new construction projects, the post-retrofit lighting wattages are determined as they are for the existing construction projects, from the Standard Fixture Wattage table. However, the baseline wattage is determined from the treated floor area and a lighting power density (LPD) value, which are the allowable watts per square foot of lit floor area as specified by the relevant energy code. The applicable baseline is the code that was in effect at the time of building permit issuance. The current Commercial code for the state of Texas is IECC 2015. These values for interior space types are presented in Table 4.

In Table 5 the zones used for exterior space types are:

- Zone 1: Developed areas of national parks, state parks, forest lands, and rural areas
- Zone 2: Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited night-time use, and residential mixed-use areas
- Zone 3: All other areas
- Zone 4: High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority.

¹⁴ Maintained by EUMMOT/Frontier Energy: <http://texasefficiency.com/index.php/regulatory-filings/lighting>.

Table 4. New Construction LPDs for Interior Space Types by Building Type¹⁵

Facility type	Lighting power density (W/ft ²)	Facility type	Lighting power density (W/ft ²)
Automotive facility	0.80	Multifamily	0.51
Convention center	1.01	Museum	1.02
Courthouse	1.01	Office	0.82
Dining: bar/lounge/leisure	1.01	Parking garage	0.21
Dining: cafeteria/fast food	0.90	Penitentiary	0.81
Dining: family	0.95	Performing arts	1.39
Dormitory	0.57	Police stations	0.87
Exercise center	0.84	Post office	0.87
Fire station	0.67	Religious buildings	1.00
Gymnasium	0.94	Retail	1.26
Health care/clinic	0.90	School/university	0.87
Hospital	1.05	Sports arena	0.91
Hotel/motel	0.87	Town hall	0.89
Library	1.19	Transportation	0.70
Manufacturing facility	1.17	Warehouse	0.66
Motion picture theater	0.76	Workshop	1.19

The total exterior lighting power allowance for all exterior building applications is the sum of the base site allowance plus the individual allowances for areas that are to be illuminated and are permitted in Table 5.

Table 5. New Construction LPDs for Exterior Space Types¹⁶

Facility type	Lighting power density (W/ft ²)			
	Zone 1	Zone 2	Zone 3	Zone 4
Base site allowance	500 W	600 W	750 W	1,300 W
Uncovered parking: Parking areas and drives	0.04	0.06	0.10	0.13
Building Grounds: Walkways \geq 10 ft. wide, plaza areas, and special feature areas	0.14	0.14	0.16	0.20
Building grounds: Stairways	0.75	1.00	1.00	1.00
Building grounds: Pedestrian tunnels	0.15	0.15	0.20	0.30

¹⁵ IECC 2015 Table C405.4.2(1) and ANSI/ASHRAE/IESNA Standard 90.1-2013 Table 9.5.1.

¹⁶ IECC 2015 Table C405.5.1(2) and ANSI/ASHRAE/IESNA Standard 90.1-2013 Table 9.4.2-2. Differences between the two standards are noted.

Facility type	Lighting power density (W/ft ²)			
	Zone 1	Zone 2	Zone 3	Zone 4
Building grounds: Landscaping (ASHRAE 90.1-2013 only) ¹⁷	0.04	0.05	0.05	0.05
Building entrances and exits: Entry canopies	0.25	0.25	0.40	0.40
Building entrances, exits, and loading docks: Loading docks (ASHRAE 90.1-2013 specific) ¹⁸	0.50	0.50	0.50	0.50
Sales canopies: Free-standing and attached	0.60	0.60	0.80	1.00
Outdoor sales: Open areas	0.25	0.25	0.50	0.70
Building facades ¹⁹	--	0.075	0.113	0.150
Entrances and gatehouse inspection stations	0.75	0.75	0.75	0.75
Loading areas for emergency vehicles	0.50	0.50	0.50	0.50

The following default metal halide baseline wattage assumptions have been approved for exterior athletic fields and courts, which are not included in the above LPD table. These baseline wattages were derived based on a review of reported lumen range for available LED products and their reported equivalent metal halide (MH) wattage.

Table 6. New Construction Baseline Wattages for Athletic Field/Court LEDs

Equivalent MH wattage	Number of lamps	LED rated lumen range
175	1	< 7,500
250	1	7,500-12,499
400	1	12,500-19,999
400	2	20,000-39,999
1,000	1	40,000-59,999
1,500	1	60,000-74,999
1,000	2	75,000-99,999
1,000	3	100,000-124,999
1,000	4	125,000-149,999

¹⁷ In June 2016, the Texas Comptroller issued a state certification letter adopting ASHRAE 90.1-2013 as the energy code for state buildings while the Commercial building code remains IECC 2015. State-funded buildings are required to submit SECO compliance certificates as part of the NC/Renovation process. More details can be found at the Comptroller website: <https://comptroller.texas.gov/programs/seco/code/state-funded.php>. This space type is missing from the IECC 2015 LPD table, but the TRM authorizes the use of these LPDs for non-state-funded buildings.

¹⁸ Ibid.

¹⁹ ASHRAE 90.1-2013 reflects a higher baseline. The TRM specifies the higher, more conservative, baseline to allow the same LPD to apply to all buildings, regardless of whether they are state-funded.

Equivalent MH wattage	Number of lamps	LED rated lumen range
1,000	5	150,000-199,999
1,000	6 plus 1 additional lamp for every 50,000 lumens above 200,000 (rounded down)	> 200,000

Operating Hours (Hours) and Coincidence Factors (CFs)

Operating hours and peak demand coincidence factors are assigned by building type, as shown in Table 8 through

Table 10. The building types used in this table are based on Commercial Buildings Energy Consumption Survey (CBECS)²⁰ building types but have been modified for Texas. Refer to Volume 1, Section 4 for a description of the Texas peak demand methodology. Winter peak coincidence factors are only specified for outdoor fixtures, including for the “Parking Garage” building type.

The “Manufacturing” building type is specified with 1, 2, and 3 shift options:

- Shift 1: Typical operation of 9.5-11.5 hours per day and 4-6 days per week (< 70 hours per week)
- Shift 2: Typical operation of 18-20 hours per day and 5-6 days per week (70-120 hours per week)
- Shift 3: Typical operation of 24 hours per day and 5-6 days per week (> 120 hours per week).

“Outdoor Dusk-to-Dawn” applies to outdoor fixtures controlled by a photocell or timer with dusk-to-dawn operation throughout the entire year. Outdoor fixtures controlled by timers with less than dusk-to-dawn operation (excluding for athletic fields and courts) may be claimed separately using the “Outdoor Less than Dusk-to-Dawn” building type or using a custom timer schedule.

These tables also include an “Other” building type, which can be used for business types that are not explicitly listed. The hours and CF values used for other are the most conservative values from the explicitly listed building types (with the exception of the CF values specified for “Education: K-12 without Summer Session” and “Lodging: Hotel/Motel/Dorm, Common Areas”, which are associated with very specific operating schedules that experience low coincidence with the summer peak period). When the Other building type is used, a description of the actual building type, the primary business activity, the business hours, and the lighting schedule must be collected for the project site and stored in the utility tracking data system.

The operating hours and coincidence factors specified in this section have been calculated at the facility level and should be applied to the entire facility. Outdoor fixtures that are not associated with the typical building lighting schedule may be claimed separately. These can include parking lot, walkway, wall pack, or another lighting, while building-mounted lighting with an operating schedule that more closely approximates the interior lighting schedule typically should not be claimed separately.

²⁰ DOE-EIA Commercial Building Energy Consumption Survey.

Table 7. Commercial Lighting Building Type Descriptions and Examples

Building type	Principal building activity	Definition	Detailed business type examples²¹
Agriculture	Dairy buildings	Buildings used to house dairy livestock and collect milk from dairy cows.	1) Dairy buildings
	Grow house	Buildings used to grow herbs, fruits, or vegetables under artificial lighting.	1) 24-hour grow house 2) Non-24-hour grow house
Data center	Data center	Buildings used to house computer systems and associated components.	1) Data center
Education	College/university	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."	1) College or university 2) Career or vocational training 3) Adult education
	Primary school		1) Elementary or middle school 2) Preschool or daycare
	Secondary school		1) High school 2) Religious education
Food sales	Convenience	Buildings used for retail or wholesale of food.	1) Gas station with a convenience store 2) Convenience store
	Supermarket		1) Grocery store or food market
Food service	Full-service restaurant	Buildings used for the preparation and sale of food and beverages for consumption.	1) Restaurant or cafeteria
	Quick-service restaurant		1) Fast food

²¹ Principal Building Activities are based on sub-categories from 2003 CBECS questionnaire.

Building type	Principal building activity	Definition	Detailed business type examples²¹
Healthcare	Hospital	Buildings used as diagnostic and treatment facilities for inpatient care.	1) Hospital 2) Inpatient rehabilitation
	Outpatient healthcare	Buildings used as diagnostic and treatment facilities for outpatient care. Medical offices are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).	1) Medical office 2) Clinic or outpatient health care 3) Veterinarian
Multifamily	Common area	Buildings containing multifamily dwelling units, having multiple stories, and equipped with elevators.	1) Common area
Lodging	Large hotel	Buildings used to offer multiple accommodations for short-term or long-term residents.	1) Motel or inn 2) Hotel 3) Dormitory, fraternity, or sorority 4) Retirement home, nursing home, assisted living, or other residential care 5) Convent or monastery
	Nursing home		
	Small hotel/motel		

Building type	Principal building activity	Definition	Detailed business type examples²¹
Manufacturing	1 Shift (<70 hr/week)	Buildings used for manufacturing/industrial applications.	1) Apparel 2) Beverage, food, and tobacco products 3) Chemicals 4) Computer and electronic products 5) Appliances and components 6) Fabricated metal products 7) Furniture 8) Leather and allied products 9) Machinery 10) Nonmetallic mineral products 11) Paper 12) Petroleum and coal products 13) Plastics and rubber products 14) Primary metals 15) Printing and related support 16) Textile mills 17) Transportation equipment 18) Wood products
	2 Shift (70-120 hr/week)		
	3 Shift (>120 hr/week)		
Mercantile	Stand-alone retail	Buildings used for the sale and display of goods other than food.	1) Retail store 2) Beer, wine, or liquor store 3) Rental center 4) Dealership or showroom for vehicles or boats 5) Studio or gallery
	Strip mall/enclosed mall	Shopping malls comprised of multiple connected establishments.	1) Strip shopping center 2) Enclosed malls

Building type	Principal building activity	Definition	Detailed business type examples²¹
Office	Large office	Buildings used for general office space, professional office, or administrative offices. Medical offices are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).	1) Administrative or professional office 2) Government office 3) Mixed-use office 4) Bank or other financial institution 5) Medical office 6) Sales office 7) Contractor's office (e.g., construction, plumbing, HVAC) 8) Non-profit or social services 9) Research and development 10) City hall or city center 11) Religious office 12) Call center
	Medium office		
	Small office		
Parking	Parking garage	Buildings used for parking applications.	No sub-categories collected.

Building type	Principal building activity	Definition	Detailed business type examples ²¹
Public Assembly	Public assembly	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.	1) Social or meeting (e.g., community center, lodge, meeting hall, convention center, senior center) 2) Recreation (e.g., gymnasium, health club, bowling alley, ice rink, field house, indoor racquet sports) 3) Entertainment or culture (e.g., museum, theater, cinema, sports arena, casino, night club) 4) Library 5) Funeral home 6) Student activities center 7) Armory 8) Exhibition hall 9) Broadcasting studio 10) Transportation terminal
Public Order and Safety	Jail and prison	Government establishments engaged in justice, public order, and safety.	1) Correctional institutions 2) Prison administration and operation
	Other		1) Police protection 2) Legal counsel and prosecution 3) Fire protection 4) Public order and safety, not elsewhere classified
Religious Worship	Religious worship	Buildings in which people gather for religious activities (such as chapels, churches, mosques, synagogues, and temples).	No sub-categories collected.

Building type	Principal building activity	Definition	Detailed business type examples²¹
Service	Service	Buildings in which some type of service is provided, other than food service or retail sales of goods.	<ul style="list-style-type: none"> 1) Vehicle service or vehicle repair shop 2) Vehicle storage/maintenance 3) Repair shop 4) Dry cleaner or laundromat 5) Post office or postal center 6) Car wash 7) Gas station with no convenience store 8) Photo processing shop 9) Beauty parlor or barber shop 10) Tanning salon 11) Copy center or printing shop 12) Kennel
Warehouse	Warehouse	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).	<ul style="list-style-type: none"> 1) Refrigerated warehouse 2) Non-refrigerated warehouse 3) Distribution or shipping center
Other	Other	For building types not explicitly listed.	Values used for other are the most conservative values from the explicitly listed building types.

Table 8. Operating Hours by Building Type

Building type	Operating hours
Agriculture: Long-day lighting ²²	6,209
Agriculture: Non-24 hour grow lighting ²³	5,479
Data center	4,008
Education: K-12 with summer session, college, university, vocational, and day care	3,577
Education: K-12 with partial summer session ²⁴	3,177
Education: K-12 without summer session	2,777
Food Sales: Non-24-hour supermarket or convenience store	4,706
Food service: Full-service restaurant	4,368
Food service: Quick-service restaurant	6,188
Food service: 24-hour restaurant	7,311
Health care: Inpatient	5,730
Health care: Outpatient	3,386
Health care: Resident care and nursing home	4,271
Lodging: Hotel/motel/dorm, common area	6,630
Lodging: Hotel/motel/dorm, room	3,055
Manufacturing: 1 Shift (<70 hr/week)	2,786
Manufacturing: 2 Shift (70-120 hr/week)	5,188
Manufacturing: 3 Shift (>120 hr/week)	6,414
Mercantile: Non-24-hour stand-alone retail	3,668
Mercantile: Enclosed mall	4,813
Mercantile: Strip center and non-enclosed mall	3,965
Mercantile/food sales: 24-hour stand-alone retail, supermarket, or convenience store	6,900
Multifamily: Common area	4,772
Office	3,737
Outdoor: Athletic field and court ²⁵	767

²² Daily operating hours are 17 hours/day based on assumptions from the Minnesota and Wisconsin TRMs and market research indicating average 16–18 hours of daily operation. Annual operating hours are derived by multiplying 17 hours/day by 365.25 days/year.

²³ Daily operating hours are 15 hours/day based on market research indicating 14-16 hours of daily operation. Annual operating hours are derived by multiplying 15 hours/day by 365.25 days/year.

²⁴ Assuming a partial summer session in June with no summer session in July.

²⁵ “2015 U.S. Lighting Market Characterization”, U.S. Department of Energy. November 2017. Value derived by multiplying average daily operating hours from Table 2-30 by 365.25 hours/year.

Building type	Operating hours
Outdoor: Billboard ²⁶	3,470
Outdoor: Dusk-to-dawn ²⁷	4,161
Outdoor: Less than dusk-to-dawn ²⁸	1,998
Parking garage	7,884
Public assembly	2,638
Public order and safety: Jail and prison	7,264
Public order and safety: Other	3,472
Religious worship	1,824
Service: Excluding food	3,406
Warehouse: Non-refrigerated	3,501
Warehouse: Refrigerated	3,798
Other	2,638

Table 9. Summer Peak Coincidence Factors by Building Type²⁹

Building type	Summer peak CF				
	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5
Agriculture: Long-day lighting	1.00	1.00	1.00	1.00	1.00
Agriculture: Non-24-hour grow lighting	1.00	1.00	1.00	1.00	1.00
Data center	0.85	0.85	0.85	0.85	0.85
Education: K-12 with summer session, college, university, vocational, and day care	0.90	0.90	0.90	0.90	0.90
Education: K-12 with partial summer session ³⁰	0.42	0.39	0.90	0.90	0.57
Education: K-12 without summer session	0.39	0.39	0.90	0.87	0.40

²⁶ Ibid.

²⁷ This space type refers to fixtures controlled either by photocells or by timers operating on a dusk-to-dawn schedule. Calculated based on average dark hours for Amarillo (northernmost) and Corpus Christi (southernmost) climate zones from sunrise to sunset excluding ½ of civil twilight period. <https://www.timeanddate.com/sun/>. Note: pending update to US Naval Observatory annual data once website maintenance has completed. http://aa.usno.navy.mil/data/docs/RS_OneYear.php.

²⁸ This space type refers to fixtures controlled by timers operating on a less than dusk-to-dawn schedule.

²⁹ Building operating schedules are adapted from COMNET Appendix C – Schedules (Rev. 3). <https://comnet.org/appendix-c-schedules>. Updated 7/25/2016.

³⁰ Assuming a partial summer session in June with no summer session in July.

Building type	Summer peak CF				
	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5
Food sales: Non-24-hour supermarket or convenience Store	0.90	0.90	0.90	0.90	0.90
Food service: Full-service restaurant	0.90	0.90	0.90	0.90	0.90
Food service: Quick-service restaurant	0.90	0.90	0.90	0.90	0.90
Food service: 24-hour restaurant	0.90	0.90	0.90	0.90	0.90
Health care: Inpatient	0.80	0.83	0.81	0.80	0.90
Health care: Outpatient	0.70	0.75	0.72	0.71	0.90
Health care: Resident care and nursing home	0.70	0.75	0.72	0.71	0.90
Lodging: Hotel/motel/dorm, common area	0.90	0.90	0.90	0.90	0.90
Lodging: Hotel/motel/dorm, room	0.30	0.30	0.30	0.30	0.30
Manufacturing: 1 Shift (<70 hr/week)	0.83	0.84	0.83	0.85	0.85
Manufacturing: 2 Shift (70-120 hr/week)	0.85	0.85	0.85	0.85	0.85
Manufacturing: 3 Shift (>120 hr/week)	0.85	0.85	0.85	0.85	0.85
Multifamily: Common area	0.90	0.90	0.90	0.90	0.90
Office	0.87	0.88	0.86	0.90	0.90
Outdoor: Athletic field and court	--	--	--	--	--
Outdoor: Billboard	--	--	--	--	--
Outdoor: Dusk-to-dawn	--	--	--	--	--
Outdoor: Less than dusk-to-dawn	--	--	--	--	--
Parking garage	1.00	1.00	1.00	1.00	1.00
Public assembly	0.65	0.65	0.65	0.65	0.65
Public order and safety: Jail and prison	0.90	0.90	0.90	0.90	0.90
Public order and safety: Other	0.70	0.75	0.72	0.71	0.90
Religious worship	0.65	0.65	0.65	0.65	0.65

Building type	Summer peak CF				
	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5
Retail: All Non-24-hour retail excluding mall and strip	0.90	0.90	0.90	0.90	0.90
Retail: Enclosed mall	0.90	0.90	0.90	0.90	0.90
Retail: Strip center and non-enclosed mall	0.90	0.90	0.90	0.90	0.90
Retail/food sales: 24-hour retail or supermarket	0.90	0.90	0.90	0.90	0.90
Service: Excluding food	0.90	0.90	0.90	0.90	0.90
Warehouse: Non-refrigerated	0.79	0.81	0.79	0.80	0.85
Warehouse: Refrigerated	0.79	0.81	0.79	0.80	0.85
Other	0.65	0.65	0.65	0.65	0.65

Table 10. Winter Peak Coincidence Factors by Building Type³¹

Space type	Winter peak CF				
	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5
Outdoor: Athletic field and court	0.26	0.27	0.24	0.29	0.38
Outdoor: Billboards	0.59	0.62	0.53	0.65	0.87
Outdoor: Dusk-to-dawn ³²	0.67	0.71	0.61	0.75	1.00
Outdoor: Less than dusk-to-dawn ³³	0.67	0.71	0.61	0.75	1.00
Parking garage	1.00	1.00	1.00	1.00	1.00

³¹ Operating schedules are based on sunrise/sunset times for each climate-zone reference city, adjusted for compliance with IESNA-DG-13-96 and IESNA-DG-13-98 recommendations.

³² This space type refers to fixtures controlled either by photocells or by timers operating on a dusk-to-dawn schedule.

³³ This space type refers to fixtures controlled by timers operating on a less than dusk-to-dawn schedule.