

Indianapolis, Indiana

Typical Year (TMY3) HDD65 5844 / CDD65 1043, Hot Year (2010) HDD65 5316 / CDD65 1566

Tables 169-172 show the impact of awnings on a typical house in Indianapolis with different window orientations over a typical year. Tables 173-176 repeat this analysis for a hot year in Indianapolis. The impact varies depending on the type of window glazing and whether the awnings are in place all twelve months or only during the cooling season. For a house with windows equally distributed in the four orientations, Table 169 shows the annual heating and cooling energy use as well as the peak electricity demand for each combination of glazing and shading condition. The table also shows the impact on the total cost for heating and cooling. In all cases, the net and percent savings are in reference to a house with no shading.

Table 169 shows that awnings reduce cooling energy use by 35-51 percent as compared to the unshaded house. The higher savings are for awnings at 165 degrees over windows with clear glazings, while the lower savings are for awnings at 90 degrees over windows with Low-E glazings. Because awnings block useful solar gain in winter, heating energy use increases when the awnings remain in place 12 months a year. Using the awnings only during the cooling season produces the largest net energy savings. The net energy savings are from 1 to 1 percent in Indianapolis when awnings are used only during the cooling season from March through September, while the penalties are from -7 to -4 percent when they are deployed throughout the year.

Table 169 also shows that awnings reduce peak electricity demand by 15-23 percent in Indianapolis, with larger reductions for the clear glazings and smaller reductions for the Low-E glazing. Tables 170, 171, and 172 show results for houses in Indianapolis where the windows predominantly face to the east, south, and west, respectively. Both the cooling energy savings and the peak demand reductions are largest on west-facing awnings. Tables 173-176 show the impact of awnings on a particularly hot year (2010) in Indianapolis. The main effect is to increase the cooling savings by 77 percent due to the hotter or longer summer.

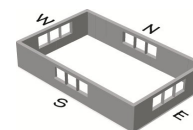


Table 169. Impact of awnings on a house in Indianapolis, Indiana with equally distributed windows on a typical year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		98.3			1939				1393			4.16		
	Black Awning	summer	102.3	-4.0	-50	1099	840	64	43	1379	14	1	3.32	0.84	20
		12 month	108.8	-10.4	-132	1093	846	65	44	1460	-67	-5	3.32	0.84	20
	Linen Awning	summer	101.7	-3.4	-43	1207	732	56	38	1380	13	1	3.44	0.72	17
		12 month	107.3	-8.9	-113	1201	738	57	38	1450	-56	-4	3.44	0.72	17
	Black Awning	summer	103.5	-5.1	-65	950	989	76	51	1383	11	1	3.20	0.96	23
		12 month	111.8	-13.4	-170	943	996	76	51	1487	-94	-7	3.20	0.96	23
	Linen Awning	summer	102.5	-4.2	-53	1087	852	65	44	1381	12	1	3.35	0.81	19
		12 month	109.4	-11.1	-140	1081	858	66	44	1468	-74	-5	3.35	0.81	19
Double Clear	None		80.5			1636				1144			3.64		
	Black Awning	summer	83.8	-3.3	-42	974	662	51	40	1136	9	1	2.96	0.68	19
		12 month	89.2	-8.7	-110	969	667	51	41	1203	-59	-5	2.96	0.68	19
	Linen Awning	summer	83.3	-2.8	-36	1058	578	44	35	1136	9	1	3.06	0.58	16
		12 month	88.0	-7.5	-95	1054	582	45	36	1194	-50	-4	3.06	0.58	16
	Black Awning	summer	84.8	-4.3	-54	855	781	60	48	1139	6	1	2.87	0.77	21
		12 month	91.7	-11.2	-141	850	786	60	48	1225	-81	-7	2.87	0.77	21
	Linen Awning	summer	84.0	-3.5	-44	964	672	52	41	1137	7	1	2.99	0.65	18
		12 month	89.7	-9.2	-117	959	677	52	41	1209	-65	-6	2.99	0.65	18
Double HiSol LowE	None		73.3			1601				1050			3.51		
	Black Awning	summer	76.5	-3.2	-41	953	648	50	40	1041	9	1	2.85	0.66	19
		12 month	81.7	-8.4	-107	949	652	50	41	1107	-57	-5	2.85	0.66	19
	Linen Awning	summer	76.0	-2.7	-34	1036	565	43	35	1041	9	1	2.94	0.56	16
		12 month	80.5	-7.2	-92	1032	569	44	36	1098	-48	-5	2.94	0.56	16
	Black Awning	summer	77.4	-4.1	-52	837	764	59	48	1044	7	1	2.76	0.75	21
		12 month	84.1	-10.8	-137	832	769	59	48	1128	-78	-7	2.76	0.75	21
	Linen Awning	summer	76.6	-3.4	-42	943	658	50	41	1042	8	1	2.88	0.63	18
		12 month	82.2	-8.9	-113	939	662	51	41	1113	-62	-6	2.88	0.63	18

Window Type	Frame	U-factor	SHGC
Single Clear	Aluminum	1.16	0.77
Double Clear	Wood/vinyl	0.49	0.56
Double HiSol LowE	Wood/vinyl	0.37	0.53

The costs shown here are annual costs for heating and cooling only and thus will be less than the total utility bill. Heating is assumed to be provided by a gas furnace and cooling by a central air-conditioner. Electricity costs used in the analysis are 7.7 cents per kWh and natural gas costs are \$13.05 per MBTU, which are the average costs in 2009 for the state of Indiana according to the Energy Information Administration (see Appendix E for details).

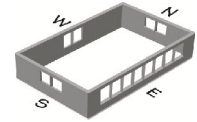


Table 170. Impact of awnings on a house in Indianapolis, Indiana with east-facing windows on a typical year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		93.4			1815				1321			3.79		
	Black Awning	summer	97.0	-3.7	-46	998	817	63	45	1304	16	1	3.05	0.74	20
	90°	12 month	101.5	-8.1	-103	996	819	63	45	1361	-40	-3	3.05	0.74	20
	Linen Awning	summer	96.4	-3.1	-39	1107	708	54	39	1305	16	1	3.10	0.69	18
	90°	12 month	100.3	-7.0	-88	1105	710	54	39	1355	-34	-3	3.10	0.69	18
	Black Awning	summer	98.5	-5.2	-65	840	975	75	54	1312	9	1	2.97	0.82	22
	165°	12 month	104.3	-10.9	-138	837	978	75	54	1384	-63	-5	2.97	0.82	22
	Linen Awning	summer	97.5	-4.1	-52	981	834	64	46	1309	12	1	3.05	0.75	20
165°	12 month	102.3	-8.9	-113	978	837	64	46	1370	-49	-4	3.05	0.75	20	
Double Clear	None		79.3			1555				1123			3.21		
	Black Awning	summer	82.4	-3.1	-39	895	660	51	42	1111	12	1	2.78	0.43	13
	90°	12 month	86.1	-6.8	-86	893	662	51	43	1158	-35	-3	2.78	0.43	13
	Linen Awning	summer	81.9	-2.6	-33	983	572	44	37	1112	11	1	2.82	0.38	12
	90°	12 month	85.1	-5.8	-74	982	573	44	37	1153	-30	-3	2.82	0.38	12
	Black Awning	summer	83.6	-4.3	-54	769	786	60	51	1117	6	1	2.72	0.49	15
	165°	12 month	88.4	-9.1	-115	767	788	60	51	1177	-54	-5	2.72	0.49	15
	Linen Awning	summer	82.7	-3.4	-43	883	672	52	43	1115	8	1	2.78	0.43	13
165°	12 month	86.7	-7.4	-94	881	674	52	43	1165	-42	-4	2.78	0.43	13	
Double HiSol LowE	None		73.6			1514				1047			3.07		
	Black Awning	summer	76.5	-3.0	-37	877	637	49	42	1036	12	1	2.69	0.38	13
	90°	12 month	80.2	-6.6	-84	875	639	49	42	1082	-35	-3	2.69	0.38	13
	Linen Awning	summer	76.0	-2.5	-31	964	550	42	36	1036	11	1	2.73	0.34	11
	90°	12 month	79.2	-5.7	-72	962	552	42	36	1077	-30	-3	2.73	0.34	11
	Black Awning	summer	77.7	-4.1	-52	755	759	58	50	1041	6	1	2.63	0.44	14
	165°	12 month	82.4	-8.8	-112	753	761	58	50	1100	-53	-5	2.63	0.44	14
	Linen Awning	summer	76.9	-3.3	-42	865	649	50	43	1039	8	1	2.69	0.38	13
165°	12 month	80.8	-7.2	-92	863	651	50	43	1089	-42	-4	2.69	0.38	13	

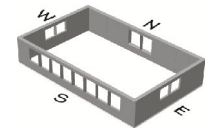


Table 171. Impact of awnings on a house in Indianapolis, Indiana with south-facing windows on a typical year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		87.3			1516				1222			3.18		
	Black Awning	summer	91.5	-4.2	-53	900	616	47	41	1228	-6	0	2.92	0.26	8
	90°	12 month	101.4	-14.1	-178	899	617	47	41	1353	-131	-11	2.92	0.26	8
	Linen Awning	summer	90.8	-3.5	-44	973	543	42	36	1224	-3	0	2.96	0.22	7
	90°	12 month	99.2	-11.9	-150	971	545	42	36	1330	-109	-9	2.96	0.22	7
	Black Awning	summer	92.2	-4.9	-62	834	682	52	45	1231	-9	-1	2.88	0.30	9
	165°	12 month	105.3	-17.9	-227	833	683	52	45	1396	-175	-14	2.88	0.30	9
	Linen Awning	summer	91.3	-3.9	-50	923	593	45	39	1226	-4	0	2.93	0.25	8
165°	12 month	101.9	-14.6	-185	921	595	46	39	1361	-139	-11	2.93	0.25	8	
Double Clear	None		73.8			1274				1032			2.85		
	Black Awning	summer	77.4	-3.6	-45	810	464	36	36	1042	-9	-1	2.65	0.20	7
	90°	12 month	85.7	-11.8	-149	810	464	36	36	1146	-114	-11	2.65	0.20	7
	Linen Awning	summer	76.8	-3.0	-38	865	409	31	32	1039	-6	-1	2.68	0.18	6
	90°	12 month	83.9	-10.0	-127	865	409	31	32	1128	-95	-9	2.68	0.18	6
	Black Awning	summer	77.9	-4.1	-52	757	517	40	41	1044	-12	-1	2.61	0.24	8
	165°	12 month	88.7	-14.9	-188	757	517	40	41	1181	-149	-14	2.61	0.24	8
	Linen Awning	summer	77.2	-3.3	-42	826	448	34	35	1040	-8	-1	2.65	0.20	7
165°	12 month	86.0	-12.2	-154	826	448	34	35	1152	-120	-12	2.65	0.20	7	
Double HiSol LowE	None		68.3			1246				960			2.76		
	Black Awning	summer	71.7	-3.4	-43	796	450	35	36	969	-9	-1	2.56	0.20	7
	90°	12 month	79.7	-11.4	-144	796	450	35	36	1069	-109	-11	2.56	0.20	7
	Linen Awning	summer	71.2	-2.9	-36	849	397	30	32	966	-6	-1	2.59	0.17	6
	90°	12 month	78.0	-9.7	-122	849	397	30	32	1052	-92	-10	2.59	0.17	6
	Black Awning	summer	72.3	-4.0	-50	743	503	39	40	972	-12	-1	2.53	0.23	8
	165°	12 month	82.6	-14.3	-181	743	503	39	40	1103	-143	-15	2.53	0.23	8
	Linen Awning	summer	71.5	-3.2	-41	810	436	33	35	967	-7	-1	2.56	0.20	7
165°	12 month	80.0	-11.7	-148	810	436	33	35	1075	-115	-12	2.56	0.20	7	

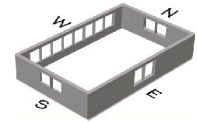


Table 172. Impact of awnings on a house in Indianapolis, Indiana with west-facing windows on a typical year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		96.6			1965				1373			5.20		
	Black Awning	summer	99.8	-3.2	-41	1038	927	71	47	1343	31	2	3.29	1.91	37
	90°	12 month	103.9	-7.3	-93	1033	932	71	47	1395	-21	-2	3.29	1.91	37
	Linen Awning	summer	99.3	-2.7	-34	1157	808	62	41	1346	28	2	3.57	1.63	31
	90°	12 month	102.9	-6.3	-79	1153	812	62	41	1391	-17	-1	3.57	1.63	31
	Black Awning	summer	101.0	-4.4	-55	857	1108	85	56	1344	30	2	2.99	2.20	42
	165°	12 month	106.4	-9.8	-124	851	1114	85	57	1412	-38	-3	2.99	2.20	42
	Linen Awning	summer	100.1	-3.5	-44	1014	951	73	48	1345	29	2	3.33	1.87	36
165°	12 month	104.6	-8.0	-101	1010	955	73	49	1401	-28	-2	3.33	1.87	36	
Double Clear	None		81.1			1656				1153			4.48		
	Black Awning	summer	83.8	-2.7	-35	923	733	56	44	1132	22	2	2.93	1.55	35
	90°	12 month	87.3	-6.2	-79	919	737	57	45	1175	-22	-2	2.93	1.55	35
	Linen Awning	summer	83.4	-2.3	-29	1018	638	49	39	1134	20	2	3.16	1.32	30
	90°	12 month	86.4	-5.3	-68	1015	641	49	39	1172	-18	-2	3.16	1.32	30
	Black Awning	summer	84.8	-3.7	-47	781	875	67	53	1133	20	2	2.72	1.76	39
	165°	12 month	89.3	-8.2	-104	776	880	67	53	1190	-36	-3	2.72	1.76	39
	Linen Awning	summer	84.0	-3.0	-37	907	749	57	45	1133	20	2	2.99	1.49	33
165°	12 month	87.8	-6.7	-85	903	753	58	45	1181	-27	-2	2.99	1.49	33	
Double HiSol LowE	None		75.0			1613				1074			4.32		
	Black Awning	summer	77.7	-2.6	-33	904	709	54	44	1053	21	2	2.83	1.49	34
	90°	12 month	81.1	-6.0	-77	900	713	55	44	1095	-22	-2	2.83	1.49	34
	Linen Awning	summer	77.3	-2.3	-28	995	618	47	38	1055	19	2	3.05	1.27	29
	90°	12 month	80.3	-5.2	-66	992	621	48	38	1092	-18	-2	3.05	1.27	29
	Black Awning	summer	78.6	-3.6	-45	766	847	65	53	1054	20	2	2.62	1.69	39
	165°	12 month	83.0	-8.0	-101	761	852	65	53	1109	-36	-3	2.62	1.69	39
	Linen Awning	summer	77.9	-2.9	-36	889	724	56	45	1054	19	2	2.89	1.43	33
165°	12 month	81.6	-6.5	-83	885	728	56	45	1100	-27	-3	2.89	1.43	33	

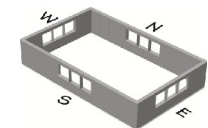


Table 173. Impact of awnings on a house in Indianapolis, Indiana with equally distributed windows on a hot year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		86.3			2968				1320			4.23		
	Black Awning	summer	88.2	-1.8	-23	1927	1041	80	35	1264	57	4	3.36	0.87	21
	90°	12 month	94.8	-8.5	-108	1879	1089	84	37	1345	-25	-2	3.36	0.87	21
	Linen Awning	summer	87.8	-1.5	-19	2064	904	69	30	1270	50	4	3.48	0.75	18
	90°	12 month	93.6	-7.3	-92	2021	947	73	32	1340	-19	-1	3.48	0.75	18
	Black Awning	summer	88.8	-2.5	-32	1713	1255	96	42	1256	64	5	3.20	1.03	24
	165°	12 month	97.6	-11.3	-143	1663	1305	100	44	1363	-43	-3	3.20	1.03	24
	Linen Awning	summer	88.3	-2.0	-25	1895	1073	82	36	1263	57	4	3.36	0.87	21
165°	12 month	95.5	-9.2	-117	1850	1118	86	38	1351	-31	-2	3.36	0.87	21	
Double Clear	None		70.5			2545				1088			3.68		
	Black Awning	summer	72.1	-1.6	-20	1727	818	63	32	1045	42	4	3.01	0.67	18
	90°	12 month	77.7	-7.2	-91	1693	852	65	33	1113	-26	-2	3.01	0.67	18
	Linen Awning	summer	71.9	-1.3	-17	1834	711	55	28	1050	38	3	3.10	0.58	16
	90°	12 month	76.7	-6.1	-78	1804	741	57	29	1109	-21	-2	3.10	0.58	16
	Black Awning	summer	72.7	-2.2	-27	1555	990	76	39	1039	48	4	2.89	0.79	22
	165°	12 month	79.9	-9.4	-119	1519	1026	79	40	1128	-40	-4	2.89	0.79	22
	Linen Awning	summer	72.3	-1.7	-22	1700	845	65	33	1045	43	4	3.01	0.68	18
165°	12 month	78.2	-7.7	-98	1669	876	67	34	1118	-31	-3	3.01	0.68	18	
Double HiSol LowE	None		64.1			2478				1002			3.54		
	Black Awning	summer	65.7	-1.6	-20	1684	794	61	32	961	41	4	2.90	0.64	18
	90°	12 month	71.1	-6.9	-88	1652	826	63	33	1026	-25	-2	2.90	0.64	18
	Linen Awning	summer	65.4	-1.3	-16	1790	688	53	28	965	36	4	2.99	0.55	16
	90°	12 month	70.0	-5.9	-75	1760	718	55	29	1022	-20	-2	2.99	0.55	16
	Black Awning	summer	66.2	-2.1	-27	1519	959	74	39	955	47	5	2.78	0.76	21
	165°	12 month	73.2	-9.1	-115	1484	994	76	40	1041	-39	-4	2.78	0.76	21
	Linen Awning	summer	65.8	-1.7	-21	1659	819	63	33	960	42	4	2.89	0.65	18
165°	12 month	71.6	-7.5	-95	1629	849	65	34	1031	-30	-3	2.89	0.65	18	

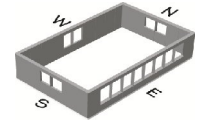


Table 174. Impact of awnings on a house in Indianapolis, Indiana with east-facing windows on a hot year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		81.5			2794				1246			3.76		
	Black Awning	summer	83.3	-1.8	-22	1761	1033	79	37	1189	57	5	3.06	0.70	19
		12 month	88.3	-6.8	-86	1736	1058	81	38	1250	-4	0	3.06	0.70	19
	Linen Awning	summer	83.0	-1.5	-18	1900	894	69	32	1196	50	4	3.14	0.61	16
		12 month	87.3	-5.8	-73	1878	916	70	33	1249	-3	0	3.14	0.61	16
	Black Awning	summer	84.3	-2.8	-35	1505	1289	99	46	1182	64	5	2.93	0.83	22
		12 month	91.0	-9.5	-121	1476	1318	101	47	1266	-20	-2	2.93	0.83	22
	Linen Awning	summer	83.6	-2.1	-27	1702	1092	84	39	1189	57	5	3.05	0.71	19
		12 month	89.2	-7.7	-98	1676	1118	86	40	1258	-12	-1	3.05	0.71	19
	Double Clear	None		69.0			2445				1061			3.31	
Black Awning		summer	70.5	-1.6	-20	1618	827	63	34	1017	44	4	2.82	0.49	15
		12 month	74.7	-5.7	-72	1599	846	65	35	1068	-7	-1	2.82	0.49	15
Linen Awning		summer	70.3	-1.3	-16	1731	714	55	29	1022	39	4	2.89	0.42	13
		12 month	73.9	-4.9	-62	1714	731	56	30	1066	-6	-1	2.89	0.42	13
Black Awning		summer	71.3	-2.4	-30	1411	1034	79	42	1011	49	5	2.73	0.59	18
		12 month	76.9	-8.0	-101	1389	1056	81	43	1080	-20	-2	2.73	0.59	18
Linen Awning		summer	70.8	-1.8	-23	1571	874	67	36	1017	44	4	2.81	0.50	15
		12 month	75.5	-6.5	-82	1552	893	68	37	1075	-14	-1	2.81	0.50	15
Double HiSol LowE		None		63.9			2376				991			3.20	
	Black Awning	summer	65.4	-1.5	-19	1583	793	61	33	949	42	4	2.74	0.47	15
		12 month	69.4	-5.5	-70	1565	811	62	34	999	-8	-1	2.74	0.47	15
	Linen Awning	summer	65.1	-1.2	-16	1691	685	53	29	954	37	4	2.80	0.40	13
		12 month	68.6	-4.8	-60	1675	701	54	30	997	-6	-1	2.80	0.40	13
	Black Awning	summer	66.2	-2.3	-29	1384	992	76	42	943	47	5	2.64	0.56	18
		12 month	71.6	-7.7	-98	1363	1013	78	43	1011	-20	-2	2.64	0.56	18
	Linen Awning	summer	65.7	-1.8	-22	1537	839	64	35	949	42	4	2.73	0.48	15
		12 month	70.2	-6.3	-80	1519	857	66	36	1005	-14	-1	2.73	0.48	15

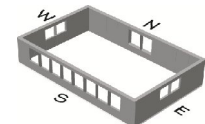


Table 175. Impact of awnings on a house in Indianapolis, Indiana with south-facing windows on a hot year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		77.9			2517				1179			3.77		
	Black Awning	summer	80.4	-2.5	-32	1642	875	67	35	1144	35	3	3.05	0.72	19
		12 month	89.2	-11.3	-143	1607	910	70	36	1252	-73	-6	3.05	0.72	19
	Linen Awning	summer	79.9	-2.0	-25	1752	765	59	30	1145	33	3	3.14	0.63	17
		12 month	87.3	-9.5	-120	1717	800	61	32	1237	-59	-5	3.14	0.63	17
	Black Awning	summer	80.8	-2.9	-37	1552	965	74	38	1142	37	3	2.94	0.83	22
		12 month	92.4	-14.5	-184	1517	1000	77	40	1286	-107	-9	2.94	0.83	22
	Linen Awning	summer	80.1	-2.2	-28	1688	829	64	33	1143	36	3	3.06	0.72	19
		12 month	89.5	-11.7	-148	1652	865	66	34	1260	-81	-7	3.06	0.72	19
	Double Clear	None		65.7			2149				997			3.26	
Black Awning		summer	67.9	-2.2	-28	1490	659	51	31	974	23	2	2.75	0.50	15
		12 month	75.3	-9.6	-122	1469	680	52	32	1066	-69	-7	2.75	0.50	15
Linen Awning		summer	67.5	-1.8	-22	1572	577	44	27	975	22	2	2.82	0.43	13
		12 month	73.8	-8.1	-102	1551	598	46	28	1053	-57	-6	2.82	0.43	13
Black Awning		summer	68.3	-2.5	-32	1417	732	56	34	973	24	2	2.67	0.59	18
		12 month	77.9	-12.2	-154	1396	753	58	35	1093	-96	-10	2.67	0.59	18
Linen Awning		summer	67.7	-1.9	-24	1521	628	48	29	973	24	2	2.76	0.50	15
		12 month	75.6	-9.8	-125	1500	649	50	30	1071	-75	-8	2.76	0.50	15
Double HiSol LowE		None		60.8			2094				930			3.14	
	Black Awning	summer	62.9	-2.1	-27	1457	637	49	30	907	22	2	2.66	0.48	15
		12 month	70.0	-9.2	-117	1440	654	50	31	996	-67	-7	2.66	0.48	15
	Linen Awning	summer	62.4	-1.7	-21	1536	558	43	27	908	22	2	2.73	0.41	13
		12 month	68.5	-7.8	-98	1519	575	44	27	984	-54	-6	2.73	0.41	13
	Black Awning	summer	63.2	-2.4	-31	1385	709	54	34	906	24	3	2.58	0.56	18
		12 month	72.4	-11.7	-148	1368	726	56	35	1022	-92	-10	2.58	0.56	18
	Linen Awning	summer	62.6	-1.9	-24	1486	608	47	29	907	23	2	2.67	0.47	15
		12 month	70.2	-9.5	-120	1468	626	48	30	1001	-72	-8	2.67	0.47	15

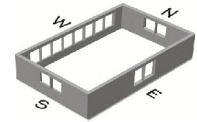


Table 176. Impact of awnings on a house in Indianapolis, Indiana with west-facing windows on a hot year

Window Type	Awning	Operation	Heating			Cooling				Heat+Cool			Peak Cooling		
			Energy (MBtu)	Savings (MBtu)	Savings (\$)	Cool (kWh)	Savings (kWh)	Savings (\$)	Savings (%)	Cost (\$)	Savings (\$)	Savings (%)	Peak (kW)	Savings (kW)	Savings (%)
Single Clear	None		84.3			2847				1285			4.89		
	Black Awning	summer	85.9	-1.6	-20	1782	1065	82	37	1223	62	5	3.19	1.70	35
	90°	12 month	90.3	-6.0	-76	1753	1094	84	38	1277	8	1	3.19	1.70	35
	Linen Awning	summer	85.6	-1.3	-16	1921	926	71	33	1231	55	4	3.41	1.48	30
	90°	12 month	89.4	-5.1	-65	1894	953	73	33	1277	9	1	3.41	1.48	30
	Black Awning	summer	86.6	-2.3	-29	1538	1309	100	46	1214	71	6	2.98	1.91	39
	165°	12 month	92.5	-8.3	-104	1503	1344	103	47	1287	-1	0	2.98	1.91	39
	Linen Awning	summer	86.1	-1.8	-23	1730	1117	86	39	1222	63	5	3.22	1.67	34
165°	12 month	91.0	-6.7	-85	1699	1148	88	40	1282	3	0	3.22	1.67	34	
Double Clear	None		70.7			2446				1083			4.18		
	Black Awning	summer	72.1	-1.4	-18	1609	837	64	34	1036	46	4	2.84	1.34	32
	90°	12 month	75.8	-5.1	-65	1589	857	66	35	1082	1	0	2.84	1.34	32
	Linen Awning	summer	71.9	-1.2	-15	1716	730	56	30	1042	41	4	3.02	1.16	28
	90°	12 month	75.1	-4.4	-55	1698	748	57	31	1081	2	0	3.02	1.16	28
	Black Awning	summer	72.8	-2.0	-26	1416	1030	79	42	1030	53	5	2.71	1.47	35
	165°	12 month	77.7	-7.0	-88	1391	1055	81	43	1090	-7	-1	2.71	1.47	35
	Linen Awning	summer	72.3	-1.6	-20	1568	878	67	36	1036	47	4	2.88	1.30	31
165°	12 month	76.4	-5.7	-72	1547	899	69	37	1086	-3	0	2.88	1.30	31	
Double HiSol LowE	None		65.4			2377				1010			4.04		
	Black Awning	summer	66.8	-1.4	-18	1572	805	62	34	966	44	4	2.74	1.29	32
	90°	12 month	70.4	-5.0	-63	1553	824	63	35	1010	0	0	2.74	1.29	32
	Linen Awning	summer	66.6	-1.2	-15	1675	702	54	30	971	39	4	2.92	1.12	28
	90°	12 month	69.7	-4.3	-54	1657	720	55	30	1009	1	0	2.92	1.12	28
	Black Awning	summer	67.4	-2.0	-25	1385	992	76	42	959	51	5	2.62	1.41	35
	165°	12 month	72.2	-6.8	-86	1362	1015	78	43	1018	-8	-1	2.62	1.41	35
	Linen Awning	summer	67.0	-1.6	-20	1533	844	65	36	965	45	4	2.78	1.26	31
165°	12 month	70.9	-5.5	-70	1512	865	66	36	1014	-4	0	2.78	1.26	31	