

New York, New York

Awnings

Typical Year (TMY3) HDD65 4884 / CDD65 1133, Hot Year (2010) HDD65 4607 / CDD65 1350

Tables 283-286 show the impact of awnings on a typical house in New York with different window orientations over a typical year. Tables 287-290 repeat this analysis for a hot year in New York. 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 283 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 283 shows that awnings reduce cooling energy use by 31-46 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 4 to 6 percent in New York when awnings are used only during the cooling season from May through October, while the penalties are from -5 to -2 percent when they are deployed throughout the year.

Table 283 also shows that awnings reduce peak electricity demand by 16-22 percent in New York, with larger reductions for the clear glazings and smaller reductions for the Low-E glazing. Tables 284, 285, and 286 show results for houses in New York 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 287-290 show the impact of awnings on a particularly hot year (2010) in New York. The main effect is to increase the cooling savings by 38 percent due to the hotter or longer summer.

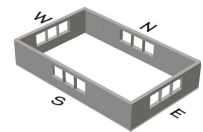


Table 283. Impact of awnings on a house in New York, New York with equally distributed windows on a typical year

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		87.1			1734				1581			3.38		
	Black Awning 90°	summer	89.2	-2.1	-32	1064	670	110	39	1503	78	5	2.74	0.64	19
		12 month	97.6	-10.5	-157	1061	673	110	39	1627	-46	-3	2.74	0.64	19
	Linen Awning 90°	summer	88.8	-1.8	-26	1155	579	95	33	1512	69	4	2.82	0.56	17
		12 month	96.1	-9.0	-135	1152	582	96	34	1620	-39	-2	2.82	0.56	17
	Black Awning 165°	summer	89.9	-2.8	-42	942	792	130	46	1493	88	6	2.66	0.72	21
		12 month	100.7	-13.7	-203	938	796	131	46	1654	-73	-5	2.66	0.72	21
	Linen Awning 165°	summer	89.2	-2.2	-32	1059	675	111	39	1502	78	5	2.76	0.63	18
12 month		98.3	-11.3	-167	1055	679	111	39	1637	-56	-4	2.76	0.63	18	
Double Clear	None		71.9			1496				1317			2.89		
	Black Awning 90°	summer	73.7	-1.8	-26	960	536	88	36	1255	62	5	2.35	0.54	19
		12 month	80.7	-8.8	-131	958	538	88	36	1359	-42	-3	2.35	0.54	19
	Linen Awning 90°	summer	73.4	-1.5	-22	1034	462	76	31	1262	54	4	2.42	0.48	16
		12 month	79.5	-7.5	-112	1032	464	76	31	1353	-36	-3	2.42	0.48	16
	Black Awning 165°	summer	74.2	-2.3	-34	861	635	104	42	1246	70	5	2.28	0.62	21
		12 month	83.2	-11.3	-168	859	637	105	43	1380	-64	-5	2.28	0.62	21
	Linen Awning 165°	summer	73.7	-1.8	-27	954	542	89	36	1254	62	5	2.36	0.53	18
12 month		81.3	-9.3	-139	952	544	89	36	1366	-50	-4	2.36	0.53	18	
Double HiSol LowE	None		65.7			1469				1220			2.80		
	Black Awning 90°	summer	67.4	-1.7	-25	946	523	86	36	1159	61	5	2.24	0.56	20
		12 month	74.3	-8.5	-127	944	525	86	36	1260	-41	-3	2.24	0.56	20
	Linen Awning 90°	summer	67.1	-1.4	-20	1018	451	74	31	1166	54	4	2.30	0.50	18
		12 month	73.0	-7.3	-109	1016	453	74	31	1254	-35	-3	2.30	0.50	18
	Black Awning 165°	summer	67.9	-2.1	-32	849	620	102	42	1150	70	6	2.16	0.64	23
		12 month	76.7	-10.9	-163	847	622	102	42	1280	-61	-5	2.16	0.64	23
	Linen Awning 165°	summer	67.4	-1.7	-25	939	530	87	36	1158	62	5	2.25	0.56	20
12 month		74.8	-9.0	-135	937	532	87	36	1267	-47	-4	2.25	0.56	20	

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 16.4 cents per kWh and natural gas costs are \$15.35 per MBTU, which are the average costs in 2009 for the state of New York according to the Energy Information Administration (see Appendix E for details).

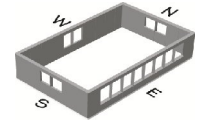


Table 284. Impact of awnings on a house in New York, New York with east-facing windows on a typical year

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		87.0			1870				1602			3.58		
	Black Awning	summer	89.2	-2.2	-32	1077	793	130	42	1505	98	6	2.75	0.84	23
	90°	12 month	97.1	-10.1	-151	1073	797	131	43	1622	-20	-1	2.75	0.84	23
	Linen Awning	summer	88.8	-1.8	-26	1184	686	113	37	1516	86	5	2.88	0.71	20
	90°	12 month	95.7	-8.7	-129	1180	690	113	37	1618	-16	-1	2.88	0.71	20
	Black Awning	summer	90.2	-3.1	-47	923	947	155	51	1494	109	7	2.60	0.98	27
	165°	12 month	100.5	-13.5	-201	920	950	156	51	1647	-45	-3	2.60	0.98	27
	Linen Awning	summer	89.4	-2.4	-35	1065	805	132	43	1506	97	6	2.77	0.81	23
165°	12 month	98.0	-11.0	-164	1061	809	133	43	1634	-31	-2	2.77	0.81	23	
Double Clear	None		72.4			1643				1347			3.08		
	Black Awning	summer	74.2	-1.9	-28	986	657	108	40	1267	80	6	2.40	0.68	22
	90°	12 month	81.0	-8.7	-129	984	659	108	40	1368	-21	-2	2.40	0.68	22
	Linen Awning	summer	73.9	-1.5	-22	1078	565	93	34	1277	70	5	2.50	0.58	19
	90°	12 month	79.8	-7.5	-111	1075	568	93	35	1365	-18	-1	2.50	0.58	19
	Black Awning	summer	75.0	-2.6	-39	860	783	128	48	1257	90	7	2.27	0.81	26
	165°	12 month	83.8	-11.5	-171	858	785	129	48	1389	-42	-3	2.27	0.81	26
	Linen Awning	summer	74.4	-2.0	-30	976	667	109	41	1268	80	6	2.41	0.66	22
165°	12 month	81.8	-9.4	-140	974	669	110	41	1378	-31	-2	2.41	0.66	22	
Double HiSol LowE	None		65.9			1607				1244			2.92		
	Black Awning	summer	67.6	-1.7	-26	972	635	104	40	1166	78	6	2.28	0.65	22
	90°	12 month	74.3	-8.4	-126	970	637	105	40	1266	-21	-2	2.28	0.65	22
	Linen Awning	summer	67.3	-1.4	-21	1060	547	90	34	1176	69	6	2.38	0.55	19
	90°	12 month	73.1	-7.3	-108	1058	549	90	34	1262	-18	-1	2.38	0.55	19
	Black Awning	summer	68.3	-2.4	-36	848	759	125	47	1156	88	7	2.15	0.77	26
	165°	12 month	77.0	-11.1	-166	847	760	125	47	1285	-41	-3	2.15	0.77	26
	Linen Awning	summer	67.8	-1.9	-28	961	646	106	40	1166	78	6	2.29	0.63	22
165°	12 month	75.0	-9.2	-136	960	647	106	40	1275	-30	-2	2.29	0.63	22	

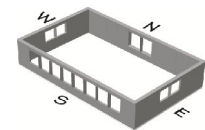


Table 285. Impact of awnings on a house in New York, New York with south-facing windows on a typical year

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		80.2			1729				1478			3.30		
	Black Awning	summer	82.7	-2.5	-37	1023	706	116	41	1399	79	5	2.69	0.61	19
	90°	12 month	96.3	-16.0	-239	1016	713	117	41	1600	-122	-8	2.69	0.61	19
	Linen Awning	summer	82.1	-1.9	-29	1112	617	101	36	1405	73	5	2.78	0.52	16
	90°	12 month	93.8	-13.6	-203	1105	624	102	36	1578	-100	-7	2.78	0.52	16
	Black Awning	summer	83.2	-3.0	-45	935	794	130	46	1392	86	6	2.62	0.68	21
	165°	12 month	100.9	-20.7	-308	928	801	131	46	1655	-177	-12	2.62	0.68	21
	Linen Awning	summer	82.4	-2.2	-33	1043	686	113	40	1399	79	5	2.73	0.57	17
165°	12 month	97.1	-16.9	-251	1037	692	114	40	1616	-138	-9	2.73	0.57	17	
Double Clear	None		66.7			1493				1238			2.85		
	Black Awning	summer	68.8	-2.1	-31	939	554	91	37	1178	60	5	2.35	0.51	18
	90°	12 month	80.3	-13.6	-202	935	558	92	37	1349	-111	-9	2.35	0.51	18
	Linen Awning	summer	68.3	-1.7	-25	1010	483	79	32	1183	55	4	2.41	0.44	15
	90°	12 month	78.3	-11.6	-172	1006	487	80	33	1330	-92	-7	2.41	0.44	15
	Black Awning	summer	69.2	-2.5	-38	864	629	103	42	1172	66	5	2.28	0.57	20
	165°	12 month	84.0	-17.3	-258	860	633	104	42	1392	-154	-12	2.28	0.57	20
	Linen Awning	summer	68.6	-1.9	-29	951	542	89	36	1177	60	5	2.37	0.49	17
165°	12 month	80.9	-14.2	-212	946	547	90	37	1360	-122	-10	2.37	0.49	17	
Double HiSol LowE	None		60.5			1466				1141			2.75		
	Black Awning	summer	62.4	-2.0	-29	924	542	89	37	1081	60	5	2.23	0.52	19
	90°	12 month	73.5	-13.1	-195	920	546	90	37	1246	-105	-9	2.23	0.52	19
	Linen Awning	summer	62.0	-1.6	-23	996	470	77	32	1087	54	5	2.30	0.46	17
	90°	12 month	71.6	-11.1	-166	992	474	78	32	1229	-88	-8	2.30	0.46	17
	Black Awning	summer	62.8	-2.4	-35	852	614	101	42	1075	65	6	2.16	0.59	21
	165°	12 month	77.2	-16.7	-248	849	617	101	42	1288	-147	-13	2.16	0.59	21
	Linen Awning	summer	62.3	-1.8	-27	935	531	87	36	1080	60	5	2.25	0.50	18
165°	12 month	74.2	-13.7	-204	931	535	88	36	1257	-116	-10	2.25	0.50	18	

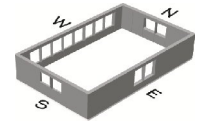


Table 286. Impact of awnings on a house in New York, New York with west-facing windows on a typical year

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		89.3			1934				1647			4.00		
	Black Awning	summer	91.2	-1.9	-29	1092	842	138	44	1537	110	7	2.75	1.25	31
	90°	12 month	98.7	-9.4	-140	1088	846	139	44	1649	-2	0	2.75	1.25	31
	Linen Awning	summer	90.9	-1.5	-23	1202	732	120	38	1550	97	6	2.92	1.08	27
	90°	12 month	97.4	-8.0	-120	1198	736	121	38	1646	1	0	2.92	1.08	27
	Black Awning	summer	92.0	-2.7	-41	928	1006	165	52	1523	124	8	2.67	1.33	33
	165°	12 month	101.9	-12.6	-187	924	1010	166	52	1669	-22	-1	2.67	1.33	33
	Linen Awning	summer	91.4	-2.1	-31	1076	858	141	44	1537	110	7	2.75	1.26	31
165°	12 month	99.6	-10.3	-153	1072	862	141	45	1659	-12	-1	2.75	1.26	31	
Double Clear	None		73.6			1690				1373			3.46		
	Black Awning	summer	75.3	-1.6	-24	999	691	113	41	1284	89	6	2.44	1.03	30
	90°	12 month	81.7	-8.1	-121	996	694	114	41	1380	-7	0	2.44	1.03	30
	Linen Awning	summer	75.0	-1.3	-20	1090	600	98	36	1295	79	6	2.58	0.88	25
	90°	12 month	80.6	-7.0	-103	1087	603	99	36	1378	-5	0	2.58	0.88	25
	Black Awning	summer	75.9	-2.3	-34	860	830	136	49	1271	102	7	2.31	1.15	33
	165°	12 month	84.3	-10.7	-160	857	833	137	49	1396	-23	-2	2.31	1.15	33
	Linen Awning	summer	75.4	-1.8	-26	985	705	116	42	1284	89	7	2.38	1.08	31
165°	12 month	82.5	-8.8	-132	982	708	116	42	1389	-15	-1	2.38	1.08	31	
Double HiSol LowE	None		66.9			1655				1267			3.36		
	Black Awning	summer	68.4	-1.5	-23	983	672	110	41	1180	88	7	2.34	1.02	30
	90°	12 month	74.8	-7.9	-117	980	675	111	41	1274	-7	-1	2.34	1.02	30
	Linen Awning	summer	68.1	-1.3	-19	1072	583	96	35	1190	77	6	2.48	0.88	26
	90°	12 month	73.7	-6.8	-101	1069	586	96	35	1272	-5	0	2.48	0.88	26
	Black Awning	summer	69.0	-2.1	-32	850	805	132	49	1167	101	8	2.19	1.17	35
	165°	12 month	77.3	-10.4	-155	847	808	133	49	1290	-23	-2	2.19	1.17	35
	Linen Awning	summer	68.5	-1.6	-24	970	685	112	41	1179	88	7	2.30	1.06	32
165°	12 month	75.5	-8.6	-128	967	688	113	42	1282	-15	-1	2.30	1.06	32	

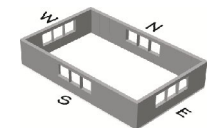


Table 287. Impact of awnings on a house in New York, New York with equally distributed windows on a hot year

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		81.7			2312				1596			3.99		
	Black Awning	summer	82.5	-0.8	-11	1519	793	130	34	1477	119	7	3.44	0.56	14
	90°	12 month	92.9	-11.2	-167	1517	795	130	34	1633	-36	-2	3.44	0.56	14
	Linen Awning	summer	82.4	-0.6	-9	1630	682	112	29	1494	103	6	3.52	0.48	12
	90°	12 month	91.4	-9.6	-143	1628	684	112	30	1627	-31	-2	3.52	0.48	12
	Black Awning	summer	82.8	-1.1	-16	1350	962	158	42	1454	142	9	3.34	0.65	16
	165°	12 month	96.7	-15.0	-223	1348	964	158	42	1661	-64	-4	3.34	0.65	16
	Linen Awning	summer	82.6	-0.8	-13	1494	818	134	35	1475	122	8	3.44	0.55	14
165°	12 month	94.1	-12.3	-184	1491	821	135	36	1645	-49	-3	3.44	0.55	14	
Double Clear	None		67.3			1999				1330			3.49		
	Black Awning	summer	68.0	-0.6	-9	1370	629	103	31	1237	94	7	3.05	0.44	13
	90°	12 month	76.6	-9.3	-138	1369	630	103	32	1365	-35	-3	3.05	0.44	13
	Linen Awning	summer	67.8	-0.5	-8	1456	543	89	27	1249	82	6	3.12	0.37	11
	90°	12 month	75.3	-8.0	-119	1455	544	89	27	1360	-30	-2	3.12	0.37	11
	Black Awning	summer	68.2	-0.9	-13	1231	768	126	38	1218	113	8	2.97	0.52	15
	165°	12 month	79.6	-12.3	-183	1230	769	126	38	1387	-56	-4	2.97	0.52	15
	Linen Awning	summer	68.0	-0.7	-10	1349	650	107	33	1234	96	7	3.06	0.43	12
165°	12 month	77.5	-10.2	-151	1348	651	107	33	1375	-44	-3	3.06	0.43	12	
Double HiSol LowE	None		61.4			1884				1224			3.26		
	Black Awning	summer	62.0	-0.6	-9	1292	592	97	31	1135	89	7	2.85	0.41	13
	90°	12 month	70.4	-9.0	-133	1291	593	97	31	1260	-36	-3	2.85	0.41	13
	Linen Awning	summer	61.9	-0.5	-7	1368	516	85	27	1146	78	6	2.91	0.35	11
	90°	12 month	69.2	-7.7	-115	1367	517	85	27	1254	-30	-2	2.91	0.35	11
	Black Awning	summer	62.3	-0.8	-12	1163	721	118	38	1118	106	9	2.77	0.49	15
	165°	12 month	73.3	-11.8	-176	1162	722	118	38	1282	-58	-5	2.77	0.49	15
	Linen Awning	summer	62.1	-0.6	-10	1270	614	101	33	1133	91	7	2.85	0.41	13
165°	12 month	71.2	-9.8	-146	1269	615	101	33	1269	-45	-4	2.85	0.41	13	

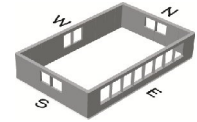


Table 288. Impact of awnings on a house in New York, New York with east-facing windows on a hot year

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		82.5			2555				1647			5.27		
	Black Awning 90°	summer	83.3	-0.8	-12	1546	1009	166	39	1494	153	9	3.47	1.81	34
		12 month	93.2	-10.7	-159	1544	1011	166	40	1640	6	0	3.47	1.81	34
	Linen Awning 90°	summer	83.1	-0.7	-10	1677	878	144	34	1513	134	8	3.63	1.64	31
		12 month	91.6	-9.2	-137	1675	880	144	34	1639	8	0	3.62	1.65	31
	Black Awning 165°	summer	83.8	-1.3	-20	1310	1245	204	49	1462	185	11	3.25	2.02	38
		12 month	97.3	-14.9	-221	1308	1247	205	49	1664	-17	-1	3.25	2.02	38
	Linen Awning 165°	summer	83.4	-1.0	-15	1497	1058	174	41	1488	159	10	3.47	1.81	34
		12 month	94.6	-12.2	-181	1495	1060	174	41	1654	-7	0	3.47	1.81	34
Double Clear	None		68.4			2218				1382			4.46		
	Black Awning 90°	summer	69.1	-0.7	-11	1402	816	134	37	1259	123	9	3.09	1.38	31
		12 month	77.6	-9.2	-137	1400	818	134	37	1384	-2	0	3.09	1.38	31
	Linen Awning 90°	summer	69.0	-0.6	-8	1504	714	117	32	1274	109	8	3.21	1.25	28
		12 month	76.3	-7.9	-117	1503	715	117	32	1382	0	0	3.21	1.25	28
	Black Awning 165°	summer	69.5	-1.1	-16	1206	1012	166	46	1232	150	11	2.91	1.55	35
		12 month	81.0	-12.6	-188	1205	1013	166	46	1404	-21	-2	2.91	1.55	35
	Linen Awning 165°	summer	69.2	-0.8	-12	1360	858	141	39	1254	129	9	3.09	1.38	31
		12 month	78.8	-10.4	-154	1359	859	141	39	1396	-13	-1	3.09	1.38	31
Double HiSol LowE	None		62.2			2151				1279			4.24		
	Black Awning 90°	summer	62.8	-0.7	-10	1365	786	129	37	1160	119	9	2.95	1.29	30
		12 month	71.1	-8.9	-133	1364	787	129	37	1282	-3	0	2.95	1.29	30
	Linen Awning 90°	summer	62.7	-0.5	-8	1463	688	113	32	1174	105	8	3.07	1.18	28
		12 month	69.8	-7.7	-114	1461	690	113	32	1280	-1	0	3.07	1.18	28
	Black Awning 165°	summer	63.2	-1.0	-15	1178	973	160	45	1134	145	11	2.78	1.46	34
		12 month	74.4	-12.2	-181	1176	975	160	45	1300	-21	-2	2.78	1.46	34
	Linen Awning 165°	summer	63.0	-0.8	-11	1324	827	136	38	1154	124	10	2.95	1.30	31
		12 month	72.2	-10.0	-149	1323	828	136	38	1292	-14	-1	2.95	1.30	31

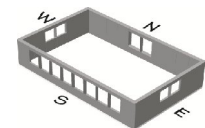


Table 289. Impact of awnings on a house in New York, New York with south-facing windows on a hot year

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		75.0			2124				1466			3.88		
	Black Awning 90°	summer	75.7	-0.7	-10	1382	742	122	35	1354	111	8	3.19	0.69	18
		12 month	91.6	-16.5	-246	1377	747	123	35	1589	-124	-8	3.19	0.69	18
	Linen Awning 90°	summer	75.6	-0.6	-8	1482	642	105	30	1369	97	7	3.27	0.62	16
		12 month	89.0	-14.0	-209	1478	646	106	30	1568	-103	-7	3.27	0.62	16
	Black Awning 165°	summer	75.9	-0.9	-14	1277	847	139	40	1340	125	9	3.14	0.75	19
		12 month	97.0	-22.0	-327	1272	852	140	40	1653	-188	-13	3.14	0.75	19
	Linen Awning 165°	summer	75.7	-0.7	-11	1398	726	119	34	1357	109	7	3.23	0.66	17
		12 month	92.9	-17.9	-266	1393	731	120	34	1612	-146	-10	3.23	0.66	17
Double Clear	None		62.3			1837				1229			3.31		
	Black Awning 90°	summer	62.9	-0.6	-9	1255	582	96	32	1143	86	7	2.85	0.46	14
		12 month	76.4	-14.1	-210	1252	585	96	32	1343	-114	-9	2.85	0.46	14
	Linen Awning 90°	summer	62.8	-0.5	-7	1328	509	84	28	1153	76	6	2.91	0.41	12
		12 month	74.3	-12.0	-179	1325	512	84	28	1324	-95	-8	2.91	0.41	12
	Black Awning 165°	summer	63.1	-0.8	-12	1166	671	110	37	1131	98	8	2.80	0.51	15
		12 month	80.8	-18.5	-275	1163	674	111	37	1394	-165	-13	2.80	0.51	15
	Linen Awning 165°	summer	63.0	-0.6	-9	1260	577	95	31	1144	85	7	2.87	0.44	13
		12 month	77.5	-15.1	-225	1257	580	95	32	1359	-130	-11	2.87	0.44	13
Double HiSol LowE	None		56.5			1787				1135			3.18		
	Black Awning 90°	summer	57.1	-0.6	-8	1224	563	92	32	1051	84	7	2.73	0.45	14
		12 month	70.1	-13.5	-202	1221	566	93	32	1243	-109	-10	2.73	0.45	14
	Linen Awning 90°	summer	57.0	-0.5	-7	1295	492	81	28	1061	74	7	2.78	0.40	12
		12 month	68.1	-11.5	-172	1292	495	81	28	1225	-91	-8	2.78	0.40	12
	Black Awning 165°	summer	57.3	-0.7	-11	1137	650	107	36	1039	96	8	2.68	0.50	16
		12 month	74.3	-17.7	-264	1134	653	107	37	1292	-157	-14	2.68	0.50	16
	Linen Awning 165°	summer	57.1	-0.6	-9	1229	558	92	31	1052	83	7	2.75	0.43	14
		12 month	71.0	-14.5	-216	1226	561	92	31	1259	-124	-11	2.75	0.43	14

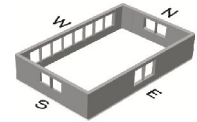


Table 290. Impact of awnings on a house in New York, New York with west-facing windows on a hot year

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		84.8			2528				1677			4.80		
	Black Awning	summer	85.5	-0.7	-10	1525	1003	165	40	1523	154	9	3.37	1.44	30
	90°	12 month	94.9	-10.2	-151	1523	1005	165	40	1663	14	1	3.37	1.44	30
	Linen Awning	summer	85.3	-0.6	-8	1657	871	143	34	1542	135	8	3.52	1.29	27
	90°	12 month	93.5	-8.7	-130	1655	873	143	35	1663	14	1	3.52	1.29	27
	Black Awning	summer	85.8	-1.1	-16	1301	1227	201	49	1491	186	11	3.30	1.50	31
	165°	12 month	98.8	-14.0	-209	1298	1230	202	49	1684	-7	0	3.30	1.50	31
	Linen Awning	summer	85.6	-0.8	-12	1473	1055	173	42	1516	161	10	3.36	1.44	30
165°	12 month	96.2	-11.4	-170	1471	1057	173	42	1674	3	0	3.36	1.44	30	
Double Clear	None		69.4			2169				1390			4.10		
	Black Awning	summer	70.0	-0.6	-9	1373	796	131	37	1268	122	9	3.00	1.10	27
	90°	12 month	78.1	-8.7	-129	1371	798	131	37	1388	2	0	3.00	1.10	27
	Linen Awning	summer	69.9	-0.5	-7	1475	694	114	32	1283	107	8	3.06	1.05	26
	90°	12 month	76.9	-7.5	-111	1474	695	114	32	1387	3	0	3.06	1.05	26
	Black Awning	summer	70.3	-0.9	-13	1193	976	160	45	1243	147	11	2.94	1.16	28
	165°	12 month	81.3	-11.9	-177	1191	978	160	45	1406	-17	-1	2.94	1.16	28
	Linen Awning	summer	70.1	-0.7	-10	1334	835	137	38	1263	127	9	3.00	1.11	27
165°	12 month	79.2	-9.8	-145	1333	836	137	39	1398	-8	-1	3.00	1.11	27	
Double HiSol LowE	None		63.0			2111				1284			3.95		
	Black Awning	summer	63.5	-0.5	-8	1336	775	127	37	1165	119	9	2.87	1.08	27
	90°	12 month	71.4	-8.4	-125	1335	776	127	37	1282	2	0	2.87	1.08	27
	Linen Awning	summer	63.4	-0.4	-7	1437	674	111	32	1180	104	8	2.93	1.02	26
	90°	12 month	70.3	-7.3	-108	1435	676	111	32	1281	3	0	2.93	1.02	26
	Black Awning	summer	63.8	-0.8	-12	1164	947	155	45	1141	143	11	2.81	1.13	29
	165°	12 month	74.5	-11.5	-171	1163	948	156	45	1300	-16	-1	2.81	1.13	29
	Linen Awning	summer	63.6	-0.6	-9	1301	810	133	38	1161	124	10	2.87	1.08	27
165°	12 month	72.5	-9.5	-141	1299	812	133	38	1292	-7	-1	2.87	1.08	27	