

Calculation of MONTHLY HEATING DEMAND based on Local Heating Degree Days

Marquette-MI - HDD for the last 3 years

Customer: BillsWS
 Address: ?
 Location: Marquette-MI

Propane:	\$2.57 /gallon
#2 Heating oil:	\$3.67 /gallon
wood pellets:	\$185 /ton

Square Footage: **4,000** Square Footage of the home

Propane used: **1,100** gallons of propane used from Jan <> Dec

Cost of propane: **\$2,827** cost for propane from Jan <> Dec

BTUs from Propane: 101,686,200 BTUs (Propane has 92,442 BTU/gallon)

Lbs of wood pellets: 12,711 Based on 8000 BTU/Lbs of wood pellets real heating value

Short Tons of pellets: 6.4 Sh Tons Bags 318 **40 Fills of 8 bags of pellets into the BioWIN dayhopper**

\$1,176 Cost of wood pellets

Estimated savings: **\$1,651** cost savings per year with wood pellets

58%

Add efficiency gain/loss: **-4%** Efficient pellet boiler <> efficient propane boiler

54%

\$1,538 overall cost savings

Month	HDD	% heat	Oil gallons		Oil BTU's	24h			12h	
						BTU/day	BTU/24h	BTU/12h	BTU/SF	BTU/SF
1/1/2011	1,591	0.18		198	27,277,366 BTU	909,246	37,885	75,770	9.5	18.9
2/1/2011	1,294	0.15		161	22,185,363 BTU	739,512	30,813	61,626	7.7	15.4
3/1/2011	1,219	0.14		151	20,899,503 BTU	696,650	29,027	58,054	7.3	14.5
4/1/2011	830	0.09		103	14,230,178 BTU	474,339	19,764	39,528	4.9	9.9
5/1/2011	482	0.05		60	8,263,790 BTU	275,460	11,477	22,955	2.9	5.7
6/1/2011	222	0.03		28	3,806,144 BTU	126,871	5,286	10,573	1.3	2.6
7/1/2011	60	0.01		7	1,028,688 BTU	34,290	1,429	2,857	0.4	0.7
8/1/2011	86	0.01		11	1,474,452 BTU	49,148	2,048	4,096	0.5	1.0
9/1/2011	318	0.04		40	5,452,044 BTU	181,735	7,572	15,145	1.9	3.8
10/1/2011	571	0.06		71	9,789,677 BTU	326,323	13,597	27,194	3.4	6.8
11/1/2011	912	0.10	HDD	113	15,636,052 BTU	521,202	21,717	43,433	5.4	10.9
12/1/2011	1,269	0.14	8854	158	1,100 21,756,743 BTU	725,225	30,218	60,435	7.6	15.1
1/1/2012	1,355	0.17		187	25,869,576 BTU	862,319	35,930	71,860	9.0	18.0
2/1/2012	1,150	0.14		159	21,955,729 BTU	731,858	30,494	60,988	7.6	15.2
3/1/2012	786	0.10		109	15,006,263 BTU	500,209	20,842	41,684	5.2	10.4
4/1/2012	767	0.10		106	14,643,517 BTU	488,117	20,338	40,676	5.1	10.2
5/1/2012	350	0.04		48	6,682,178 BTU	222,739	9,281	18,562	2.3	4.6
6/1/2012	137	0.02		19	2,615,596 BTU	87,187	3,633	7,266	0.9	1.8
7/1/2012	47	0.01		7	897,321 BTU	29,911	1,246	2,493	0.3	0.6
8/1/2012	118	0.01		16	2,252,849 BTU	75,095	3,129	6,258	0.8	1.6
9/1/2012	386	0.05		53	7,369,488 BTU	245,650	10,235	20,471	2.6	5.1
10/1/2012	673	0.08		93	12,848,874 BTU	428,296	17,846	35,691	4.5	8.9
11/1/2012	971	0.12	HDD	134	18,538,272 BTU	617,942	25,748	51,495	6.4	12.9
12/1/2012	1,211	0.15	7951	168	1,100 23,120,337 BTU	770,678	32,112	64,223	8.0	16.1
1/1/2013	1,468	0.15		167	23,106,844 BTU	770,228	32,093	64,186	8.0	16.0
2/1/2013	1,341	0.14		153	21,107,818 BTU	703,594	29,316	58,633	7.3	14.7
3/1/2013	1,277	0.13		146	20,100,436 BTU	670,015	27,917	55,835	7.0	14.0
4/1/2013	932	0.10		106	14,670,012 BTU	489,000	20,375	40,750	5.1	10.2
5/1/2013	518	0.05		59	8,153,505 BTU	271,783	11,324	22,649	2.8	5.7
6/1/2013	231	0.02		26	3,636,022 BTU	121,201	5,050	10,100	1.3	2.5
7/1/2013	139	0.01		16	2,187,910 BTU	72,930	3,039	6,078	0.8	1.5
8/1/2013	137	0.01		16	2,156,429 BTU	71,881	2,995	5,990	0.7	1.5
9/1/2013	292	0.03		33	4,596,184 BTU	153,206	6,384	12,767	1.6	3.2
10/1/2013	633	0.07		72	9,963,646 BTU	332,122	13,838	27,677	3.5	6.9
11/1/2013	1,039	0.11	HDD	119	16,354,231 BTU	545,141	22,714	45,428	5.7	11.4
12/1/2013	1,637	0.17	9644	187	1,100 25,766,964 BTU	858,899	35,787	71,575	8.9	17.9

Marquette-MI

Heating Degree Days 3-year average: 2011, 2012 & 2013

15 kW BioWIN150

	HDD	%	Oil gallons	Oil BTU's	BTU/day	BTU/24h	BTU/16h	BTU/12h
Jan average	1,471	0.17	184	25,417,929 BTU	847,264	35,303	52,954	70,605
Feb average	1,262	0.14	158	21,749,637 BTU	724,988	30,208	45,312	60,416
Mar average	1,094	0.12	135	18,668,734 BTU	622,291	25,929	38,893	51,858
Apr average	843	0.10	105	14,514,569 BTU	483,819	20,159	30,239	40,318
May average	450	0.05	56	7,699,824 BTU	256,661	10,694	16,041	21,388
Jun average	197	0.02	24	3,352,587 BTU	111,753	4,656	6,985	9,313
Jul average	82	0.01	10	1,371,306 BTU	45,710	1,905	2,857	3,809
Aug average	114	0.01	14	1,961,243 BTU	65,375	2,724	4,086	5,448
Sep average	332	0.04	42	5,805,906 BTU	193,530	8,064	12,096	16,128
Oct average	626	0.07	79	10,867,399 BTU	362,247	15,094	22,640	30,187
Nov average	974	0.11	122	16,842,851 BTU	561,428	23,393	35,089	46,786
Dec average	1,372	0.16	171	23,548,015 BTU	784,934	32,706	49,058	65,411
	8,816	1.00						

51180 BTU/hr Nominal

69% Output

59%

51%

39%

21%

9%

4%

5%

16%

29%

46%

64%

Description: Fahrenheit-based heating degree days for a base temperature of 65F

Source: www.degreedays.net (using temperature data from www.wunderground.com)

Accuracy: Estimates were made to account for missing data: the "% Estimated" column shows how much each figure was affected (0% is best, 100% is worst)

Station: Marquette, Sawyer International Airport, MI, US (87.40W,46.35N)

Station ID: KSAW

