

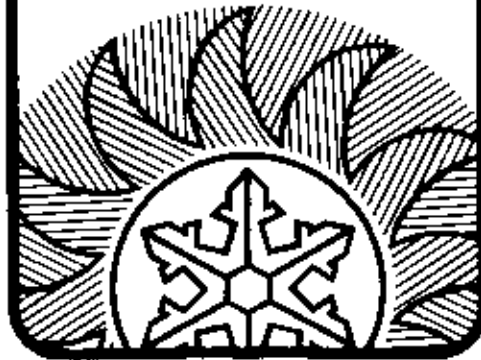
MANUAL 2100-072

**DUAL FUEL ADD-ON HEAT PUMP GUIDE
FOR OPERATIONAL COST SAVINGS**

REGION 4

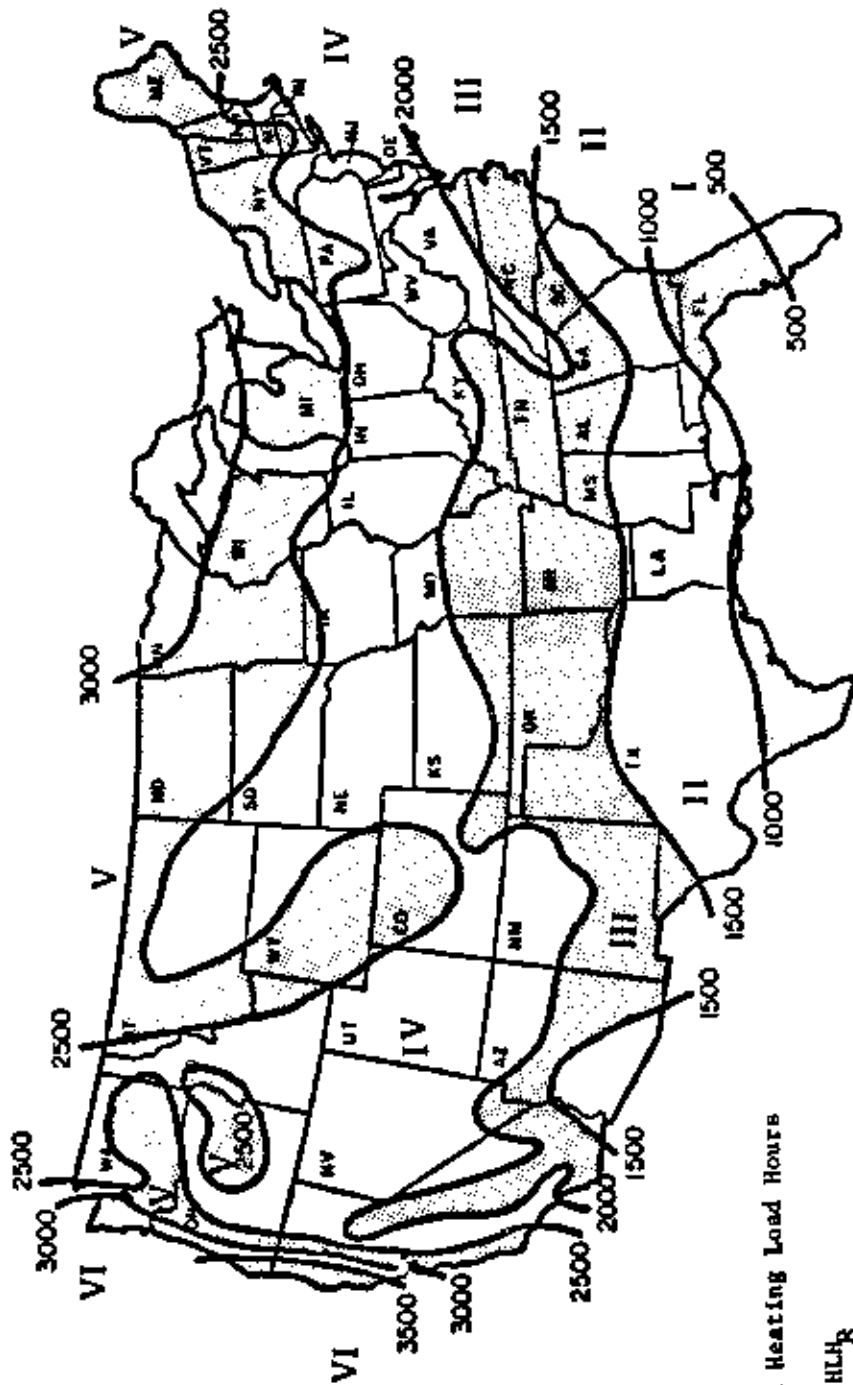
Bard[®]

**DUAL ENERGY
SYSTEMS**



BARD MANUFACTURING CO. • BRYAN, OHIO 43506

Dependable quality equipment since 1914



Regional Heating Load Hours

Region	HLH
I	750
II	1250
III	1750
IV	2250
V	2750
VI	2750

This map is reasonably accurate for most parts of the United States but is necessarily highly generalized and consequently not too accurate in mountainous regions, particularly in the Rockies.

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Heat Pump Outdoor Model	Heat Pump Indoor Model	Furnace Fuel	Furnace AFUE Efficiency Rating	Page
WQS30/WQSD30	H3AQ/H3AQ1	Electric	100%	1
		Natural Gas	65%	2
		Oil	65%	3
		Propane	65%	4
WQS36/WQSD36	H3AQ/H3AQ1	Electric	100%	5
		Natural Gas	65%	6
		Oil	65%	7
		Propane	65%	8
24HPQ2	H24QS1	Electric	100%	9
		Natural Gas	65%	10
		Oil	65%	11
		Propane	65%	12
30HPQ4	H3AQ/H3AQ1	Electric	100%	13
		Natural Gas	65%	14
		Oil	65%	15
		Propane	65%	16
36HPQ4	H3AQ/H3AQ1	Electric	100%	17
		Natural Gas	65%	18
		Oil	65%	19
		Propane	65%	20
42HPQ	H5AQ	Electric	100%	21
		Natural Gas	65%	22
		Oil	65%	23
		Propane	65%	24
48HPQ2	H5AQ	Electric	100%	25
		Natural Gas	65%	26
		Oil	65%	27
		Propane	65%	28

GENERAL DESCRIPTION

WHAT DOES THIS GUIDE SHOW?

This operational cost savings guide has been prepared to show theoretical cost savings for Bard dual fuel "add-on" heat pumps when used with either existing or new furnaces. It covers add-on applications for electric, oil, propane gas and natural gas type forced air furnaces. It includes both air source heat pumps and ground water source heat pumps at many combinations of gas, oil and electrical rates. It enables the user not only to make a theoretical operating cost comparison at today's fuel costs but also at future estimated higher energy costs.

It is important to understand that this is a theoretical comparison between fuels. Actual operation costs can vary depending on many difficult to predict variables such as the actual design heating or cooling load, air infiltration, and wind effects, solar effect, efficiency of existing furnace, severity of weather for a given heating or cooling season and also individual usage pattern.

SPECIAL FEATURE - FSM-1 FUEL SAVER MODULE

These estimates utilize the Bard FSM-1 Fuel Saver Module which permit the heat pump to operate below the balance point to maximize the energy savings. For each application an analysis should be made to determine the economic balance point which is the outdoor temperature at which it becomes more cost effective to shut the heat pump down with an outdoor thermostat. This temperature varies with each combination of fuel cost and furnace and heat pump efficiency level. Refer to tables included in the instructions with the FSM-1 module.

FURNACE EFFICIENCY

For purposes of these cost estimates, furnace efficiency levels of 100% AFUE for electric, 65% AFUE for natural and propane gas and 65% AFUE for oil was chosen. We recognize that any variation in efficiency from these values will change the operating cost somewhat. These values were chosen to best represent typical efficiency levels of most equipment in the field today. Bard standing pilot gas furnaces without flue dampers range from 60.6% to 67.9% AFUE with a 65.1% average. New Bard oil furnaces which utilize high speed flame retention head power burners range from 72% to 83.5% AFUE with the average at 78.5%. In order to represent the typical efficiency level of oil-fired furnaces currently installed in the field, it is necessary to recognize the fact that many older less efficient designs are still in use and that the efficiency level of any oil heating system will be reduced by improper adjustment or a lack of adequate maintenance and servicing on a regular basis. An oil-fired system typically requires more frequent and complex maintenance to prevent degradation of its efficiency level, hence, a 65% AFUE was chosen for these calculations. The AFUE efficiency varies, depending on the design of the specific piece of equipment and its maintenance and condition.

HOW TO USE DUAL FUEL ADD-ON
HEAT PUMP GUIDE TO ENERGY COST SAVINGS

1. Determine the heating Btuh loss and cooling Btuh gain for structure using a Bard "Whole-House Heat Loss and Gain Work Sheet," Form B008, or ACCA "Load Calculation," Manual J.
 - a. Heating house Btuh loss is _____.
 - b. Cooling house Btuh gain is _____.

2. Determine the type of fuel available at structure (what type of [fuel] heating system is already there).
 - a. Electricity
 - b. Natural Gas
 - c. Propane Gas
 - d. Fuel Oil
 - e. Good water supply and disposal

3. Call local utilities and determine area energy costs.
 - a. Electricity _____ \$/Kilowatt-hour
 - b. Natural Gas _____ \$/Therm
 - c. Propane Gas _____ \$/Gallon
 - d. Fuel Oil _____ \$/Gallon

4. Tentatively select an add-on heat pump system using Bard Manual 2100-057, "Heat Pump Sizing" as a guide, and a Bard equipment catalog.
 - a. Air to air heat pump
Model _____ Indoor Coil _____
Btuh _____ Heat Btuh _____ Cool _____
 - b. Water to air
Model _____ Indoor Coil _____
Btuh _____ Heat Btuh _____ Cool _____

5. Determine heating region where the structure is located. To do this, find the geographic location of house on regional heating load hours map. A map is located inside the front cover of this guide.
 - a. Region structure is located _____

YOU ARE NOW READY TO USE THE "DUAL FUEL ADD-ON HEAT PUMP GUIDE"

6. Select the "Dual Fuel Add-On Heat Pump Guide" for the region the structure is located. (See step 5 above)

7. Locate the add-on heat pump model or models you tentatively selected (Step 4) in the "Guide." Refer to Table of Contents.

EXAMPLE: 36HPQ4 w/H3AQ Indoor Coil

BARD MANUFACTURING COMPANY	
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS	
REGION <u>4</u>	INDOOR <u>H3AQ/H3AQ1</u>
HEAT PUMP MODEL: <u>OUTDOOR 36HPQ4</u>	
ARI RATED COOLING CAP.: BTUH <u>195</u> <u>16500</u> SEER <u>7.50</u>	
ARI RATED HEATING CAP.: BTUH <u>147</u> <u>40500</u> COP <u>1.7</u> <u>2.65</u> HSPF <u>6.40</u> MIN. OHR	
	BTUH <u>117</u> <u>24800</u> COP <u>1.7</u> <u>1.95</u>

8. Now locate the furnace type by fuel used (Step 2).

EXAMPLE: A fuel oil furnace with AFUE of 65%.

FURNACE TYPE <u>FUEL OIL</u>	FURNACE EFFICIENCY <u>65.00% AFUE</u>
------------------------------	---------------------------------------

9. You now have located the page or pages that will help you determine annual operating cost. See example - Figure 1.
- a. Locate the closest structure loss in Btuh column on left side of page (step 1).

EXAMPLE: 70,000 Btuh Heat Loss
 - b. Locate the heating cost per unit at top of page (step 3).

EXAMPLE: \$1.40 per gallon fuel oil.
 - c. Now read down the fuel cost column until directly across from structure heat loss in Btuh. This will be the theoretical annual heating cost using only the furnace.

EXAMPLE: 70,000 Btuh heat loss @ \$1.40 per gallon fuel oil, the annual cost will be \$1,878.
 - d. Next locate the electric cost \$/Kw under Heat Loss Btuh for structure (step 3).

EXAMPLE: \$.06 Kw rate
 - e. Now once again read down the fuel cost column until directly across from electric cost \$/Kw. You now have located the annual heating cost for the house using an add-on heat pump with the furnace.

EXAMPLE: 70,000 Btuh structure heat loss, with \$.06 Kw cost and \$1.40 per gallon fuel oil. The annual cost using a 36HPQ4 Bard heat pump with the oil furnace would be \$1173 for an annual savings of \$705 (\$1878 minus \$1173).

Now repeat steps 8 through 9 for each type fuel and/or heat pump selected. This will enable you to select the best combination of furnace and heat pump to use for a structure.

10. The balance point (the outdoor temperature at which the heat pump is running 100% of the time and just meeting structure heat loss requirements) is located on right side of page.

EXAMPLE: For a structure with a 70,000 Btuh with a 36HPQ4 heat pump has a balance point of 31 Deg. F. Below this theoretical balance point, the heating load is automatically transferred between the heat pump and the furnace by the wall thermostat to maintain the desired temperature. This is accomplished with the FSM-1 Fuel Saver Module.

70,000	1342	1478	1613	1743	1875	2014	2149	2285	2423	2555	2706	3227	THEORETICAL HEATING COST - FURNACE ONLY
.03	\$ 663	858	1046	1239	1437	1640	1848	2061	2279	2502	2730	3074	THEORETICAL HEATING COST - FURNACE HEAT PUMP
.04	\$ 795	1023	1252	1486	1725	1969	2218	2472	2731	3005	3294	3698	\$ PER YEAR
.05	\$ 931	1207	1464	1726	1993	2265	2542	2824	3111	3403	3700	4012	
.06	\$ 1070	1387	1666	1950	2239	2533	2832	3136	3445	3759	4078	4402	
.07	\$ 1211	1530	1820	2115	2415	2720	3030	3345	3665	3990	4320	4655	
.08	\$ 1357	1686	1996	2306	2621	2941	3266	3596	3931	4271	4616	4966	
.09	\$ 1467	1807	2128	2449	2775	3106	3442	3783	4129	4480	4836	5197	
.10	\$ 1602	1930	2261	2592	2928	3269	3615	3966	4322	4683	5049	5420	
.12	\$ 1873	2201	2532	2863	3199	3540	3886	4237	4593	4954	5320	5691	

BALANCE POINT 31 DEG.F. **10**

11. To find annual cooling cost of heat pump, look at the bottom of page under annual air conditioning cost. Directly under the electric rate \$/Kw (step 3) line, is located the annual cooling cost.

EXAMPLE: At .06 \$/Kw rate for electricity, the cooling cost would be \$234.00 annually.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.										
	.03	.04	.05	.06	.07	.08	.09	.10	.12	
\$	117	156	195	234	273	312	351	390	429	THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERNS.

NOTE. The accuracy of the "Dual Fuel-Add-On Heat Pump Guide to Energy Cost Savings," is directly affected by how accurately you estimate the structure's heat loss and heat gain in step 1. Because of uncontrollable variables, Bard Manufacturing Company is not responsible for any variation in actual operating costs from these theoretical estimates.

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON													
		1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.20	2.40		
40,000	\$	767	840	919	998	1072	1151	1224	1303	1382	1534	1587	1639	←←-THEORETICAL HEATING COST + FURNACE ONLY	
+03	\$	332	318	308	304	303	305	308	311	315	312	318	328	THEORETICAL HEATING COST + FURN. + HEAT PUMP	
+04	\$	425	410	400	396	395	397	400	403	407	402	408	418	\$ PER YEAR	
+05	\$	524	510	500	496	495	497	500	503	507	502	508	518		
+06	\$	626	611	601	597	596	598	601	604	608	603	609	619		
+07	\$	722	707	697	693	692	694	697	700	704	699	705	715		
+08	\$	818	803	793	789	788	790	793	796	800	795	801	811		
+09	\$	919	904	894	890	889	891	894	897	901	896	902	912		
+10	\$	1015	1000	990	986	985	987	990	993	997	992	1000	1010	BALANCE POINT 16 DEG.F.	
+12	\$	1207	1213	1223	1238	1254	1270	1286	1302	1318	1241	1247	1252		
50,000	\$	959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←←-THEORETICAL HEATING COST + FURNACE ONLY	
+03	\$	428	440	445	457	462	473	485	493	502	519	536	552	THEORETICAL HEATING COST + FURN. + HEAT PUMP	
+04	\$	541	552	558	569	574	586	598	603	615	631	648	665	\$ PER YEAR	
+05	\$	656	665	671	682	687	699	710	716	727	744	761	778		
+06	\$	787	795	799	810	815	827	838	843	854	871	888	905		
+07	\$	889	897	899	910	915	927	938	943	954	971	988	1004		
+08	\$	993	1004	1010	1021	1026	1038	1049	1054	1065	1083	1100	1117		
+09	\$	1105	1117	1122	1134	1139	1151	1162	1167	1179	1196	1213	1230		
+10	\$	1218	1230	1235	1247	1252	1264	1275	1280	1292	1309	1326	1342		
+12	\$	1444	1455	1461	1472	1478	1490	1501	1506	1517	1534	1551	1568	BALANCE POINT 21 DEG.F.	
60,000	\$	1151	1293	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←←-THEORETICAL HEATING COST + FURNACE ONLY	
+03	\$	541	558	575	592	609	626	643	660	677	705	739	773	THEORETICAL HEATING COST + FURN. + HEAT PUMP	
+04	\$	653	671	689	710	731	750	767	784	801	829	863	897	\$ PER YEAR	
+05	\$	789	806	823	840	857	874	891	908	925	953	987	1021		
+06	\$	916	931	947	964	981	998	1015	1032	1049	1077	1111	1145		
+07	\$	1038	1055	1072	1089	1105	1122	1139	1156	1173	1201	1235	1269		
+08	\$	1187	1199	1216	1233	1250	1267	1284	1301	1317	1345	1379	1413		
+09	\$	1292	1309	1325	1342	1359	1376	1393	1410	1427	1455	1489	1523		
+10	\$	1416	1433	1450	1467	1484	1501	1518	1535	1551	1579	1613	1647		
+12	\$	1664	1681	1698	1715	1732	1749	1766	1783	1800	1828	1862	1895	BALANCE POINT 27 DEG.F.	
70,000	\$	1342	1478	1513	1743	1879	2014	2149	2285	2421	2695	2954	3227	←←-THEORETICAL HEATING COST + FURNACE ONLY	
+03	\$	667	698	710	739	767	795	818	840	865	925	976	1026	THEORETICAL HEATING COST + FURN. + HEAT PUMP	
+04	\$	795	823	835	874	902	931	953	981	1004	1063	1114	1164	\$ PER YEAR	
+05	\$	931	959	971	1010	1038	1067	1095	1123	1152	1196	1247	1297		
+06	\$	1071	1099	1111	1150	1178	1207	1235	1263	1292	1336	1387	1437		
+07	\$	1221	1230	1235	1282	1310	1338	1365	1393	1421	1467	1517	1568		
+08	\$	1331	1365	1373	1416	1444	1472	1499	1527	1554	1602	1653	1704		
+09	\$	1487	1495	1523	1566	1594	1622	1650	1678	1705	1732	1783	1833		
+10	\$	1602	1630	1658	1691	1719	1747	1775	1803	1831	1867	1915	1960		
+12	\$	1873	1901	1929	1952	1990	2033	2071	2109	2147	2188	2239	2280	BALANCE POINT 31 DEG.F.	
80,000	\$	1516	1687	1839	1997	2148	2302	2454	2612	2764	3069	3379	3684	←←-THEORETICAL HEATING COST + FURNACE ONLY	
+03	\$	812	852	891	931	970	1010	1049	1089	1128	1207	1284	1365	THEORETICAL HEATING COST + FURN. + HEAT PUMP	
+04	\$	951	991	1032	1072	1111	1151	1190	1230	1269	1348	1427	1507	\$ PER YEAR	
+05	\$	1094	1134	1173	1213	1252	1292	1331	1371	1410	1489	1568	1647		
+06	\$	1235	1275	1314	1354	1393	1433	1472	1512	1551	1630	1709	1788		
+07	\$	1376	1416	1455	1495	1534	1574	1613	1653	1692	1771	1850	1929		
+08	\$	1517	1557	1596	1636	1675	1715	1754	1794	1833	1912	1991	2070		
+09	\$	1658	1698	1737	1777	1816	1855	1895	1934	1973	2052	2131	2210		
+10	\$	1799	1839	1878	1917	1956	1995	2034	2073	2112	2191	2270	2349		
+12	\$	2078	2118	2157	2196	2235	2274	2313	2352	2391	2470	2549	2628	BALANCE POINT 34 DEG.F.	
ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.															
←←-ELECTRIC RATE \$/KWH															
X--THEORETICAL AIR CONDITIONING COST															

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

Figure 1.

BARD MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION # MODEL COMPRESSOR SECTION HRS30/HRS10 INDOOR H2A2/H3A1
HEAT PUMP MODEL: COMPRESSOR SECTION HRS30/HRS10 INDOOR H2A2/H3A1
COOLING CAPACITY AT 72 DEG.F. ENTERING WATER TEMP. 77 31500 BTUH 14.0 EER
HEATING CAPACITY AT 22 DEG.F. ENTERING WATER TEMP. 12200 BTUH 1.8 COP
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100% AFUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	BALANCE POINT
30,000			--- THEORETICAL ANNUAL HEATING COST ---	--- THEORETICAL ANNUAL HEATING COST ---	
			HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY	
	+03	\$ 163		451	
	+04	\$ 174		603	
	+05	\$ 276		756	
	+06	\$ 332		908	
	+07	\$ 383		1060	
	+08	\$ 440		1213	
	+09	\$ 496		1365	
	+10	\$ 547		1517	
	+12	\$ 654		1822	BALANCE POINT -11 DEG.F.
35,000			--- THEORETICAL ANNUAL HEATING COST ---	--- THEORETICAL ANNUAL HEATING COST ---	
			HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY	
	+03	\$ 186		530	
	+04	\$ 253		703	
	+05	\$ 315		885	
	+06	\$ 378		1060	
	+07	\$ 442		1241	
	+08	\$ 507		1416	
	+09	\$ 569		1596	
	+10	\$ 637		1771	
	+12	\$ 761		2127	BALANCE POINT 0 DEG.F.
40,000			--- THEORETICAL ANNUAL HEATING COST ---	--- THEORETICAL ANNUAL HEATING COST ---	
			HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY	
	+03	\$ 214		603	
	+04	\$ 287		806	
	+05	\$ 361		1010	
	+06	\$ 434		1213	
	+07	\$ 507		1416	
	+08	\$ 581		1619	
	+09	\$ 646		1822	
	+10	\$ 727		2025	
	+12	\$ 868		2431	BALANCE POINT 8 DEG.F.
50,000			--- THEORETICAL ANNUAL HEATING COST ---	--- THEORETICAL ANNUAL HEATING COST ---	
			HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY	
	+03	\$ 282		756	
	+04	\$ 378		1010	
	+05	\$ 473		1263	
	+06	\$ 569		1517	
	+07	\$ 660		1771	
	+08	\$ 750		2025	
	+09	\$ 846		2279	
	+10	\$ 942		2533	
	+12	\$ 1134		3041	BALANCE POINT 19 DEG.F.
60,000			--- THEORETICAL ANNUAL HEATING COST ---	--- THEORETICAL ANNUAL HEATING COST ---	
			HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY	
	+03	\$ 366		908	
	+04	\$ 488		1213	
	+05	\$ 609		1517	
	+06	\$ 733		1822	
	+07	\$ 852		2127	
	+08	\$ 976		2431	
	+09	\$ 1100		2736	
	+10	\$ 1218		3041	
	+12	\$ 1467		3650	BALANCE POINT 27 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	C--ELECTRIC RATE \$/KWH
\$	60	80	100	120	140	160	180	200	240	C--THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION MODEL: COMPRESSOR SECTION NOS.10/NO.5310 (NO.00R H3A0/H3A0)----
 HEAT PUMP CAPACITY AT 53 DEG.F. ENTERING WATER TEMP. T 11500 BTUH. H3A0 H3A0
 COOLING CAPACITY AT 53 DEG.F. ENTERING WATER TEMP. T 11500 BTUH. H3A0 H3A0
 HEATING CAPACITY AT 53 DEG.F. ENTERING WATER TEMP. T 11500 BTUH. H3A0 H3A0
 FURNACE TYPE GAS GAS FURNACE EFFICIENCY 85% 85% APUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00		
30,000		\$ 276	315	355	394	434	479	519	558	598	637	716	795	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 163	163	163	163	163	163	163	163	163	163	163	169	169	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+04	\$ 214	214	214	214	214	214	214	214	214	214	214	220	220	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+05	\$ 270	270	270	270	270	270	270	270	270	270	270	276	276	\$ PER YEAR	
+06	\$ 327	327	327	327	327	327	327	327	327	327	327	332	332		
+07	\$ 378	378	378	378	378	378	378	378	378	378	378	383	383		
+08	\$ 434	434	434	434	434	434	434	434	434	434	434	440	440		
+09	\$ 490	490	490	490	490	490	490	490	490	490	490	496	496		
+10	\$ 541	541	541	541	541	541	541	541	541	541	541	547	547	BALANCE POINT=11 DEG.F.	
+12	\$ 648	648	648	648	648	648	648	648	648	648	648	654	654		
35,000		\$ 321	372	417	462	507	558	603	648	694	744	835	931	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 186	186	186	186	186	186	186	191	191	191	191	191	191	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+04	\$ 248	248	248	248	248	248	248	253	253	253	253	253	253	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+05	\$ 310	310	310	310	310	310	310	315	315	315	315	315	315	\$ PER YEAR	
+06	\$ 372	372	372	372	372	372	372	378	378	378	378	378	378		
+07	\$ 440	440	440	440	440	440	440	445	445	445	445	445	445		
+08	\$ 502	502	502	502	502	502	502	507	507	507	507	507	507		
+09	\$ 564	564	564	564	564	564	564	569	569	569	569	569	569		
+10	\$ 626	626	626	626	626	626	626	631	631	631	631	631	631		
+12	\$ 750	750	750	750	750	750	756	756	756	756	756	762	762	BALANCE POINT 0 DEG.F.	
40,000		\$ 372	423	479	530	581	637	688	744	795	852	959	1060	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 214	214	214	214	214	214	214	214	214	214	220	220	220	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+04	\$ 287	287	287	287	287	287	287	287	287	287	293	293	293	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+05	\$ 355	355	355	355	355	355	355	355	355	355	361	361	361	\$ PER YEAR	
+06	\$ 428	428	428	428	428	428	428	428	428	428	434	434	434		
+07	\$ 496	496	496	496	496	496	496	496	496	496	502	502	502		
+08	\$ 569	569	569	569	569	569	569	569	569	569	575	575	575		
+09	\$ 637	637	637	637	637	637	637	637	637	637	643	643	643		
+10	\$ 710	710	710	710	710	710	710	710	710	710	716	716	716		
+12	\$ 852	852	852	852	852	852	852	852	852	852	857	857	857	BALANCE POINT 8 DEG.F.	
50,000		\$ 462	530	599	665	727	795	863	931	998	1060	1196	1331	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 270	270	276	276	282	282	287	287	293	293	293	299	304	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+04	\$ 355	355	361	361	366	366	372	372	378	378	378	383	389	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+05	\$ 440	440	445	445	451	451	457	457	462	462	462	468	473	\$ PER YEAR	
+06	\$ 524	524	530	530	536	536	541	541	547	547	547	552	558		
+07	\$ 609	609	615	615	620	620	626	626	631	631	631	637	643		
+08	\$ 694	694	694	694	699	699	705	705	710	710	710	716	722		
+09	\$ 778	778	778	778	784	784	789	789	795	795	795	801	806		
+10	\$ 857	857	863	863	868	868	874	874	880	880	880	885	891		
+12	\$ 1026	1026	1032	1032	1038	1038	1043	1043	1049	1049	1049	1055	1060	BALANCE POINT 19 DEG.F.	
60,000		\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 332	344	349	355	366	372	378	389	394	400	400	417	428	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+04	\$ 423	434	440	445	457	462	468	479	485	490	490	507	519	THEORETICAL HEATING COST = FURN.+ HEAT PUMP	
+05	\$ 519	530	536	541	552	558	564	575	581	586	586	603	615	\$ PER YEAR	
+06	\$ 615	626	631	637	648	654	660	671	677	682	682	699	710		
+07	\$ 705	716	722	727	739	744	750	761	767	773	773	789	801		
+08	\$ 801	812	818	823	835	840	846	857	863	868	868	885	897		
+09	\$ 897	908	914	919	931	936	942	953	959	964	964	981	993		
+10	\$ 987	998	1004	1010	1021	1026	1032	1043	1049	1055	1055	1072	1083		
+12	\$ 1173	1184	1190	1196	1207	1213	1218	1230	1235	1241	1241	1258	1269	BALANCE POINT 27 DEG.F.	
ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.															
	\$.03	.04	.05	.06	.07	.08	.09	.10	.12	<--ELECTRIC RATE \$/KWH				
	\$	60	80	100	120	140	160	180	200	240	<--THEORETICAL AIR CONDITIONING COST				

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BARG MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4 MODEL COMPRESSOR SECTION NO. 307 (1000) INDOOR UNIT (H140) ---
 HEAT PUMP CAPACITY AT -23 DEG. F. ENTERING WATER TEMP. 55.000 BTU/H. ---
 COOLING CAPACITY AT -23 DEG. F. ENTERING WATER TEMP. 55.000 BTU/H. ---
 HEATING CAPACITY AT -23 DEG. F. ENTERING WATER TEMP. 55.000 BTU/H. ---
 FURNACE TYPE FUEL OIL --- FURNACE EFFICIENCY 82.500 % FUE

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON														
		1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.20	2.40			
30+000	\$ 575	631	688	744	806	863	919	976	1032	1151	1263	1382	←-THEORETICAL HEATING COST = FURNACE ONLY			
+03	\$ 163	163	199	169	169	169	169	169	169	169	169	169	169	169	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 214	214	220	220	220	220	220	220	220	220	220	220	220	220		
+05	\$ 270	270	326	326	326	326	326	326	326	326	326	326	326	326		
+06	\$ 327	327	383	383	383	383	383	383	383	383	383	383	383	383		
+07	\$ 378	378	434	434	434	434	434	434	434	434	434	434	434	434		
+08	\$ 434	434	490	490	490	490	490	490	490	490	490	490	490	490		
+09	\$ 490	490	547	547	547	547	547	547	547	547	547	547	547	547		
+10	\$ 541	541	597	597	597	597	597	597	597	597	597	597	597	597		
+12	\$ 648	648	654	654	654	654	654	654	654	654	654	654	654	654		
35+000	\$ 671	739	806	868	936	1004	1072	1139	1207	1342	1478	1613	←-THEORETICAL HEATING COST = FURNACE ONLY			
+03	\$ 191	191	191	191	191	191	191	191	191	191	191	191	191	191		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 253	253	253	253	253	253	253	253	253	253	253	253	253	253		
+05	\$ 315	315	315	315	315	315	315	315	315	315	315	315	315	315		
+06	\$ 378	378	378	378	378	378	378	378	378	378	378	378	378	378		
+07	\$ 445	445	445	445	445	445	445	445	445	445	445	445	445	445		
+08	\$ 507	507	507	507	507	507	507	507	507	507	507	507	507	507		
+09	\$ 569	569	569	569	569	569	569	569	569	569	569	569	569	569		
+10	\$ 631	631	631	631	631	631	631	631	631	631	631	631	631	631		
+12	\$ 756	756	756	756	756	756	756	756	756	756	756	756	756	756		
40+000	\$ 767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839	←-THEORETICAL HEATING COST = FURNACE ONLY			
+03	\$ 214	220	220	220	220	220	220	220	220	225	225	225	225	225	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 287	293	293	293	293	293	293	293	293	299	299	299	299	299		
+05	\$ 355	361	361	361	361	361	361	361	361	366	366	366	366	366		
+06	\$ 428	434	434	434	434	434	434	434	434	440	440	440	440	440		
+07	\$ 496	502	502	502	502	502	502	502	502	507	507	507	507	507		
+08	\$ 569	575	575	575	575	575	575	575	575	581	581	581	581	581		
+09	\$ 637	643	643	643	643	643	643	643	643	648	648	648	648	648		
+10	\$ 710	716	716	716	716	716	716	716	716	722	722	722	722	722		
+12	\$ 852	857	857	857	857	857	857	857	857	863	863	863	863	863		
50+000	\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←-THEORETICAL HEATING COST = FURNACE ONLY			
+03	\$ 281	293	299	299	304	310	315	315	321	332	338	344	344	344		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 372	378	383	383	389	394	400	405	409	417	423	429	429	429		
+05	\$ 457	462	468	468	473	479	485	488	490	502	507	513	513	513		
+06	\$ 541	547	552	552	558	564	569	569	575	586	592	598	598	598		
+07	\$ 626	631	637	637	643	648	654	654	660	671	677	682	682	682		
+08	\$ 709	716	716	716	722	727	733	733	739	750	756	761	761	761		
+09	\$ 789	795	801	801	806	812	818	818	823	835	840	846	846	846		
+10	\$ 874	880	885	885	891	897	902	902	908	919	925	931	931	931		
+12	\$ 1043	1049	1055	1055	1060	1066	1072	1072	1077	1089	1094	1100	1100	1100		
60+000	\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←-THEORETICAL HEATING COST = FURNACE ONLY			
+03	\$ 389	400	411	423	434	445	457	462	473	496	519	541	541	541	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 479	490	502	513	524	536	547	552	564	586	609	631	631	631		
+05	\$ 575	586	598	609	620	631	643	648	660	682	705	727	727	727		
+06	\$ 671	682	694	705	716	727	739	744	756	778	801	823	823	823		
+07	\$ 761	773	784	795	806	818	829	835	846	868	891	914	914	914		
+08	\$ 857	868	880	891	902	914	925	931	946	966	987	1010	1010	1010		
+09	\$ 953	964	976	987	998	1010	1021	1026	1038	1060	1083	1105	1105	1105		
+10	\$ 1043	1055	1066	1077	1089	1100	1111	1117	1128	1151	1173	1196	1196	1196		
+12	\$ 1230	1241	1252	1263	1275	1286	1297	1303	1314	1337	1359	1382	1382	1382		

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

\$	+03	+04	+05	+06	+07	+08	+09	+10	+12	←-ELECTRIC RATE \$/KWH
	60	80	100	120	140	160	180	200	240	←-THEORETICAL AIR CONDITIONING COST

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BARO MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: COMPRESSOR SECTION 10570/105030 INDOOR BTU/H (1200) ---
 COOLING CAPACITY AT 45 DEG. F. ENTERING WATER TEMP. = 31500 BTU/H (1200) EER ---
 HEATING CAPACITY AT 45 DEG. F. ENTERING WATER TEMP. = 28200 BTU/H COP ---
 FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 82% AFUE

HEAT LOSS BTU/H	ELEC. COST \$/KWH	PROPANE GAS COST - \$/GALLON													
		.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10	1.20	1.20		
30,000	\$	524	569	615	654	699	744	789	829	874	964	1049	1049	C--THEORETICAL HEATING COST = FURNACE ONLY	
.03	\$	163	163	163	169	169	169	169	169	169	169	169	169	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
.04	\$	214	214	214	220	220	220	220	220	220	220	220	220		
.05	\$	270	270	270	276	276	276	276	276	276	276	276	276		
.06	\$	327	327	327	332	332	332	332	332	332	332	332	332		
.07	\$	378	378	378	383	383	383	383	383	383	383	383	383		
.08	\$	434	434	434	440	440	440	440	440	440	440	440	440		
.09	\$	490	490	490	496	496	496	496	496	496	496	496	496		
.10	\$	541	541	541	547	547	547	547	547	547	547	547	547		
.12	\$	648	648	648	654	654	654	654	654	654	654	654	654		
															BALANCE POINT-11 DEG.F.
35,000	\$	615	665	716	767	818	868	919	970	1021	1122	1230	1230		C--THEORETICAL HEATING COST = FURNACE ONLY
.03	\$	191	191	191	191	191	191	191	191	191	191	191	191		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
.04	\$	253	253	253	253	253	253	253	253	253	253	253	253		
.05	\$	315	315	315	315	315	315	315	315	315	315	315	315		
.06	\$	378	378	378	378	378	378	378	378	378	378	378	378		
.07	\$	445	445	445	445	445	445	445	445	445	445	445	445		
.08	\$	507	507	507	507	507	507	507	507	507	507	507	507		
.09	\$	569	569	569	569	569	569	569	569	569	569	569	569		
.10	\$	631	631	631	631	631	631	631	631	631	631	631	631		
.12	\$	756	756	756	756	756	756	756	756	756	756	756	756		
														BALANCE POINT 0 DEG.F.	
40,000	\$	699	756	818	874	936	993	1049	1111	1168	1286	1405	1405	C--THEORETICAL HEATING COST = FURNACE ONLY	
.03	\$	214	214	214	220	220	220	220	220	220	220	220	220	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
.04	\$	287	287	287	293	293	293	293	293	293	293	293	293		
.05	\$	355	355	355	361	361	361	361	361	361	361	361	361		
.06	\$	428	428	428	434	434	434	434	434	434	434	434	434		
.07	\$	496	496	496	502	502	502	502	502	502	502	502	502		
.08	\$	569	569	569	575	575	575	575	575	575	575	575	575		
.09	\$	637	637	637	643	643	643	643	643	643	643	643	643		
.10	\$	710	710	710	716	716	716	716	716	716	716	716	716		
.12	\$	852	852	852	857	857	857	857	857	857	857	857	857		
															BALANCE POINT 8 DEG.F.
50,000	\$	874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754		C--THEORETICAL HEATING COST = FURNACE ONLY
.03	\$	287	287	293	293	299	299	304	310	310	315	321	321		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
.04	\$	372	372	378	378	383	383	389	394	394	400	406	406		
.05	\$	457	457	462	462	468	468	473	479	479	485	490	490		
.06	\$	541	541	547	547	552	552	558	564	564	569	575	575		
.07	\$	626	626	631	631	637	637	643	648	648	654	660	660		
.08	\$	705	705	710	710	716	716	722	727	727	733	739	739		
.09	\$	789	789	795	795	801	801	806	812	812	818	823	823		
.10	\$	874	874	880	880	885	885	891	897	897	902	908	908		
.12	\$	1043	1043	1049	1049	1055	1055	1060	1066	1066	1072	1077	1077		
														BALANCE POINT 19 DEG.F.	
60,000	\$	1049	1139	1230	1314	1405	1489	1579	1664	1754	1929	2104	2104	C--THEORETICAL HEATING COST = FURNACE ONLY	
.03	\$	378	384	394	406	411	423	428	440	445	462	479	479	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
.04	\$	468	479	485	496	502	513	519	530	536	552	569	569		
.05	\$	564	575	581	592	598	609	615	626	631	648	665	665		
.06	\$	660	671	677	688	694	705	710	722	727	744	761	761		
.07	\$	750	761	767	778	784	795	801	812	818	835	852	852		
.08	\$	846	857	863	874	880	891	897	908	914	931	947	947		
.09	\$	947	953	959	970	976	987	993	1004	1010	1027	1043	1043		
.10	\$	1032	1043	1049	1060	1066	1077	1083	1094	1100	1117	1134	1134		
.12	\$	1218	1230	1235	1247	1252	1263	1269	1280	1286	1303	1320	1320		
															BALANCE POINT 27 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	.03	.04	.05	.06	.07	.08	.09	.10	.12	
\$	60	80	100	120	140	160	180	200	240	C--ELECTRIC RATE \$/KWH
										C--THEORETICAL AIR CONDITIONING COST

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SARG MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4 MODEL: COMPRESSOR SECTION HQS16/KQ2028 (INDOOR UNIT/43821)-----
 HEAT PUMP MODEL: HQS16/KQ2028 (INDOOR UNIT/43821)-----
 COOLING CAPACITY AT 53 DEG.F. ENTERING WATER TEMP.: 12100 BTUH @ 6.4% EER
 HEATING CAPACITY AT 23 DEG.F. ENTERING WATER TEMP.: 12100 BTUH @ 1.0% COP
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100%

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	
35,000					
					BALANCE POINT -14 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	
40,000					
					BALANCE POINT -4 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	
50,000					
					BALANCE POINT 10 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	
60,000					
					BALANCE POINT 19 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	
70,000					
					BALANCE POINT 25 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.
 \$ 03 04 05 06 07 08 09 10 12 ← ELECTRIC RATE \$/KWH
 94 101 126 151 176 202 227 252 303 ← THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 6
HEAT PUMP MODEL: COMPRESSION SECTION W5510 (10000) (11000) (12000) (13000) (14000) (15000) (16000) (17000) (18000) (19000) (20000)
COOLING CAPACITY AT -33 DEG.F. ENTERING WATER TEMP. --- 15703 BTUH --- 14478 BTUH --- 13253 BTUH --- 12028 BTUH --- 10803 BTUH --- 9578 BTUH --- 8353 BTUH --- 7128 BTUH --- 5903 BTUH --- 4678 BTUH --- 3453 BTUH --- 2228 BTUH --- 1003 BTUH ---
HEATING CAPACITY AT -23 DEG.F. ENTERING WATER TEMP. --- 15703 BTUH --- 14478 BTUH --- 13253 BTUH --- 12028 BTUH --- 10803 BTUH --- 9578 BTUH --- 8353 BTUH --- 7128 BTUH --- 5903 BTUH --- 4678 BTUH --- 3453 BTUH --- 2228 BTUH --- 1003 BTUH ---
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 85% 85% 85% 85% 85% 85% 85% 85% 85% 85% 85% 85% 85% 85%

HEAT LOSS BTUH	ELEC. COST \$/KWH	GAS COST - \$/THERM													
		.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00		
35,000		\$ 321	372	417	462	507	558	603	648	694	744	835	931	<--THEORETICAL HEATING COST = FURNACE ONLY	
	.03	\$ 197	197	197	197	197	197	197	203	203	203	203	203	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
	.04	\$ 265	265	265	265	265	265	270	270	270	270	270	270		
	.05	\$ 327	327	327	327	327	327	332	332	332	332	332	332		
	.06	\$ 394	394	394	394	394	394	400	400	400	400	400	400		
	.07	\$ 462	462	462	462	462	462	468	468	468	468	468	468		
	.08	\$ 530	530	530	530	530	530	536	536	536	536	536	536		
	.09	\$ 592	592	592	592	592	592	598	598	598	598	598	598		
	.10	\$ 660	660	660	660	660	660	666	666	666	666	666	666		
	.12	\$ 789	789	789	789	789	789	795	795	795	795	795	795		
40,000		\$ 372	423	479	530	581	637	688	744	795	852	959	1060		<--THEORETICAL HEATING COST = FURNACE ONLY
	.03	\$ 225	225	225	225	225	231	231	231	231	231	231	231		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
	.04	\$ 299	299	299	299	299	304	304	304	304	304	304	304		
	.05	\$ 372	372	372	372	372	378	378	378	378	378	378	378		
	.06	\$ 445	445	445	445	445	451	451	451	451	451	451	451		
	.07	\$ 524	524	524	524	524	530	530	530	530	530	530	530		
	.08	\$ 598	598	598	598	598	603	603	603	603	603	603	603		
	.09	\$ 671	671	671	671	671	677	677	677	677	677	677	677		
	.10	\$ 744	744	744	744	744	750	750	750	750	750	750	750		
	.12	\$ 897	897	897	897	897	902	902	902	902	902	902	902		
50,000		\$ 462	530	598	665	727	795	863	931	999	1060	1196	1331	<--THEORETICAL HEATING COST = FURNACE ONLY	
	.03	\$ 276	276	276	276	282	282	282	282	282	282	282	282	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
	.04	\$ 372	372	372	372	378	378	378	378	378	378	378	378		
	.05	\$ 462	462	462	462	468	468	468	468	468	468	468	468		
	.06	\$ 552	552	552	552	558	558	558	558	558	558	558	558		
	.07	\$ 643	643	643	643	648	648	648	648	648	648	648	648		
	.08	\$ 733	733	733	733	739	739	739	739	739	739	739	739		
	.09	\$ 823	823	823	823	829	829	829	829	829	829	829	829		
	.10	\$ 914	914	914	914	919	919	919	919	919	919	919	919		
	.12	\$ 1100	1100	1100	1100	1105	1105	1105	1105	1105	1105	1105	1105		
60,000		\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596		<--THEORETICAL HEATING COST = FURNACE ONLY
	.03	\$ 338	344	344	349	349	355	361	366	366	366	372	378		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
	.04	\$ 440	445	445	451	451	457	462	468	468	468	473	479		
	.05	\$ 547	552	552	558	558	564	569	574	574	574	581	586		
	.06	\$ 648	654	654	660	660	665	671	677	677	677	682	688		
	.07	\$ 756	761	761	767	767	773	778	784	784	784	789	795		
	.08	\$ 857	863	863	868	868	874	880	885	885	885	891	897		
	.09	\$ 964	970	970	976	976	981	987	993	993	993	998	1004		
	.10	\$ 1069	1072	1072	1077	1077	1083	1089	1094	1094	1094	1100	1105		
	.12	\$ 1285	1286	1286	1292	1292	1297	1303	1309	1309	1309	1314	1320		
70,000		\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862	<--THEORETICAL HEATING COST = FURNACE ONLY	
	.03	\$ 394	406	411	423	428	434	445	457	457	468	479	496	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
	.04	\$ 513	524	530	541	547	552	564	569	575	586	598	615		
	.05	\$ 626	637	643	654	660	665	677	682	688	699	710	727		
	.06	\$ 744	756	763	773	778	784	795	801	806	814	829	846		
	.07	\$ 857	868	874	885	891	897	908	914	919	931	942	959		
	.08	\$ 976	987	993	1004	1010	1015	1026	1032	1038	1049	1060	1077		
	.09	\$ 1089	1100	1104	1117	1122	1128	1139	1145	1151	1162	1173	1190		
	.10	\$ 1207	1218	1224	1235	1241	1247	1258	1263	1269	1280	1292	1309		
	.12	\$ 1438	1450	1455	1467	1472	1478	1489	1495	1500	1512	1523	1540		

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	.03	.04	.05	.06	.07	.08	.09	.10	.12	
\$	75	101	125	151	176	202	227	252	303	<--ELECTRIC RATE \$/KWH
										<--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARO MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION: MODEL: COMPRESSOR SECTION NO. 5324/MD4036 TYPED: H117/H117
 HEAT PUMP MODEL: COMPRESSOR SECTION NO. 5324/MD4036 TYPED: H117/H117
 COOLING CAPACITY AT 32 DEG.F. ENTERING WATER TEMP.: 35700 BTUH - 12240 PER
 HEATING CAPACITY AT 32 DEG.F. ENTERING WATER TEMP.: 18240 BTUH - 9240 COP
 FURNACE TYPE: EUEL OIL FURNACE EFFICIENCY: .85

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON													
		1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.20	2.40		
35,000		\$ 671	739	806	868	936	1004	1072	1139	1207	1274	1342	1478	1613	←--THEORETICAL HEATING COST = FURNACE ONLY
	.03	\$ 203	203	203	203	203	203	203	203	203	203	203	203	203	THEORETICAL HEATING COST = FURN. + HEAT PUMP
	.04	\$ 270	270	270	270	270	270	270	270	270	270	270	270	270	\$ PER YEAR
	.05	\$ 332	332	332	332	332	332	332	332	332	332	332	332	332	
	.06	\$ 400	400	400	400	400	400	400	400	400	400	400	400	400	
	.07	\$ 468	468	468	468	468	468	468	468	468	468	468	468	468	
	.08	\$ 536	536	536	536	536	536	536	536	536	536	536	536	536	
	.09	\$ 604	604	604	604	604	604	604	604	604	604	604	604	604	
	.10	\$ 672	672	672	672	672	672	672	672	672	672	672	672	672	BALANCE POINT 14 DEG.F.
	.12	\$ 795	795	795	795	795	795	795	795	795	795	795	795	795	
40,000		\$ 767	840	919	998	1072	1151	1224	1303	1382	1464	1548	1687	1839	←--THEORETICAL HEATING COST = FURNACE ONLY
	.03	\$ 231	231	231	231	231	231	231	231	231	231	231	231	231	THEORETICAL HEATING COST = FURN. + HEAT PUMP
	.04	\$ 304	304	304	304	304	304	304	304	304	304	304	304	304	\$ PER YEAR
	.05	\$ 378	378	378	378	378	378	378	378	378	378	378	378	378	
	.06	\$ 451	451	451	451	451	451	451	451	451	451	451	451	451	
	.07	\$ 530	530	530	530	530	530	530	530	530	530	530	530	530	
	.08	\$ 603	603	603	603	603	603	603	603	603	603	603	603	603	
	.09	\$ 677	677	677	677	677	677	677	677	677	677	677	677	677	BALANCE POINT 4 DEG.F.
	.10	\$ 750	750	750	750	750	750	750	750	750	750	750	750	750	
	.12	\$ 902	902	902	902	902	902	902	902	902	902	902	902	902	
50,000		\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1816	1916	2110	2302	←--THEORETICAL HEATING COST = FURNACE ONLY
	.03	\$ 282	282	282	282	282	282	282	282	282	282	282	282	282	THEORETICAL HEATING COST = FURN. + HEAT PUMP
	.04	\$ 378	378	378	378	378	378	378	378	378	378	378	378	378	\$ PER YEAR
	.05	\$ 468	468	468	468	468	468	468	468	468	468	468	468	468	
	.06	\$ 558	558	558	558	558	558	558	558	558	558	558	558	558	
	.07	\$ 648	648	648	648	648	648	648	648	648	648	648	648	648	
	.08	\$ 739	739	739	739	739	739	739	739	739	739	739	739	739	
	.09	\$ 829	829	829	829	829	829	829	829	829	829	829	829	829	BALANCE POINT 10 DEG.F.
	.10	\$ 919	919	919	919	919	919	919	919	919	919	919	919	919	
	.12	\$ 1109	1109	1109	1109	1109	1109	1109	1109	1109	1109	1109	1109	1109	
60,000		\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←--THEORETICAL HEATING COST = FURNACE ONLY	
	.03	\$ 361	361	372	378	383	383	389	396	400	406	417	428	THEORETICAL HEATING COST = FURN. + HEAT PUMP	
	.04	\$ 462	468	473	479	485	485	490	496	502	507	519	530	\$ PER YEAR	
	.05	\$ 569	572	581	586	592	592	598	601	609	615	626	637		
	.06	\$ 671	677	682	688	694	694	699	705	710	716	727	739		
	.07	\$ 778	784	789	795	801	801	806	812	818	823	835	846		
	.08	\$ 880	885	891	897	902	902	908	914	919	925	936	947		
	.09	\$ 987	993	998	1004	1010	1010	1016	1021	1026	1032	1043	1055	BALANCE POINT 19 DEG.F.	
	.10	\$ 1089	1094	1100	1105	1111	1111	1117	1122	1128	1134	1145	1156		
	.12	\$ 1303	1309	1314	1320	1326	1326	1331	1337	1342	1348	1359	1371		
70,000		\$ 1342	1478	1613	1743	1878	2014	2149	2285	2420	2685	2956	3227	←--THEORETICAL HEATING COST = FURNACE ONLY	
	.03	\$ 457	462	473	485	496	507	519	530	541	564	586	609	THEORETICAL HEATING COST = FURN. + HEAT PUMP	
	.04	\$ 575	581	592	603	615	626	637	648	660	682	705	727	\$ PER YEAR	
	.05	\$ 688	694	705	716	727	739	750	761	773	795	818	840		
	.06	\$ 805	812	823	835	846	857	868	880	891	914	936	959		
	.07	\$ 919	925	936	947	959	970	981	993	1004	1026	1049	1072		
	.08	\$ 1038	1043	1055	1066	1077	1089	1100	1111	1122	1145	1168	1190		
	.09	\$ 1151	1156	1168	1179	1190	1201	1213	1224	1235	1258	1280	1303	BALANCE POINT 25 DEG.F.	
	.10	\$ 1269	1275	1286	1297	1309	1320	1331	1342	1354	1376	1399	1421		
	.12	\$ 1500	1506	1517	1529	1540	1551	1563	1574	1585	1608	1630	1653		

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	.03	.04	.05	.06	.07	.08	.09	.10	.12	←--ELECTRIC RATE \$/KWH	←--THEORETICAL AIR CONDITIONING COST
	\$ 75	101	126	141	176	202	227	252	303		

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BARD MANUFACTURING COMPANY

DUAL FUEL ADD-DN HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: COMPRESSOR SECTION HOUSING WOODS-AT-1510J INDOOR UNIT-1220V
 COOLING CAPACITY AT -24 DEG.F. ENTERING WATER TEMP. 55.0 12.0
 HEATING CAPACITY AT -24 DEG.F. ENTERING WATER TEMP. 55.0 12.0
 FURNACE TYPE PROGRAM-423

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPANE GAS COST - 1/GALLON												
		.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10	1.20	1.20	
35,000	\$	615	665	716	767	818	868	919	970	1021	1122	1230	1230	←-THEORETICAL HEATING COST = FURNACE ONLY
+03	\$	197	203	203	203	203	203	203	203	203	203	203	203	THEORETICAL HEATING COST = FURN. + HEAT PUMP
+04	\$	265	270	270	270	270	270	270	270	270	270	270	270	\$ PER YEAR
+05	\$	327	332	332	332	332	332	332	332	332	332	332	332	
+06	\$	394	400	400	400	400	400	400	400	400	400	400	400	
+07	\$	462	468	468	468	468	468	468	468	468	468	468	468	
+08	\$	530	536	536	536	536	536	536	536	536	536	536	536	
+09	\$	592	598	598	598	598	598	598	598	598	598	598	598	
+10	\$	660	665	665	665	665	665	665	665	665	665	665	665	BALANCE POINT 14 DEG.F.
+12	\$	789	795	795	795	795	795	795	795	795	795	795	795	
40,000	\$	699	756	818	874	936	993	1049	1111	1168	1286	1405	1405	←-THEORETICAL HEATING COST = FURNACE ONLY
+03	\$	231	231	231	231	231	231	231	231	231	231	231	231	THEORETICAL HEATING COST = FURN. + HEAT PUMP
+04	\$	304	304	304	304	304	304	304	304	304	304	304	304	\$ PER YEAR
+05	\$	378	378	378	378	378	378	378	378	378	378	378	378	
+06	\$	451	451	451	451	451	451	451	451	451	451	451	451	
+07	\$	530	530	530	530	530	530	530	530	530	530	530	530	
+08	\$	603	603	603	603	603	603	603	603	603	603	603	603	
+09	\$	677	677	677	677	677	677	677	677	677	677	677	677	
+10	\$	750	750	750	750	750	750	750	750	750	750	750	750	BALANCE POINT 4 DEG.F.
+12	\$	902	902	902	902	902	902	902	902	902	902	902	902	
50,000	\$	874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754	←-THEORETICAL HEATING COST = FURNACE ONLY
+03	\$	282	282	282	282	282	282	282	282	282	282	282	282	THEORETICAL HEATING COST = FURN. + HEAT PUMP
+04	\$	378	378	378	378	378	378	378	378	378	378	378	378	\$ PER YEAR
+05	\$	468	468	468	468	468	468	468	468	468	468	468	468	
+06	\$	458	558	558	558	558	558	558	558	558	558	558	558	
+07	\$	648	648	648	648	648	648	648	648	648	648	648	648	
+08	\$	739	739	739	739	739	739	739	739	739	739	739	739	
+09	\$	829	829	829	829	829	829	829	829	829	829	829	829	
+10	\$	919	919	919	919	919	919	919	919	919	919	919	919	BALANCE POINT 10 DEG.F.
+12	\$	1105	1105	1105	1105	1111	1111	1111	1111	1111	1117	1117	1117	
60,000	\$	1049	1139	1230	1314	1405	1489	1579	1664	1754	1929	2104	2104	←-THEORETICAL HEATING COST = FURNACE ONLY
+03	\$	361	361	366	366	372	378	378	383	389	396	400	400	THEORETICAL HEATING COST = FURN. + HEAT PUMP
+04	\$	462	462	468	468	473	479	479	485	490	496	502	502	\$ PER YEAR
+05	\$	569	569	575	575	581	587	587	592	598	603	609	609	
+06	\$	671	671	677	677	682	688	688	694	699	705	710	710	
+07	\$	778	778	784	784	789	795	795	801	806	812	818	818	
+08	\$	880	880	885	885	891	897	897	902	908	914	919	919	
+09	\$	987	987	993	993	998	1004	1004	1010	1016	1021	1026	1026	
+10	\$	1089	1089	1094	1094	1100	1105	1105	1111	1117	1122	1128	1128	BALANCE POINT 19 DEG.F.
+12	\$	1303	1303	1309	1309	1314	1320	1320	1326	1331	1337	1342	1342	
70,000	\$	1230	1331	1433	1534	1636	1737	1845	1946	2048	2251	2460	2460	←-THEORETICAL HEATING COST = FURNACE ONLY
+03	\$	444	444	462	468	479	485	496	502	513	530	547	547	THEORETICAL HEATING COST = FURN. + HEAT PUMP
+04	\$	564	569	581	587	598	603	615	620	631	648	665	665	\$ PER YEAR
+05	\$	677	682	694	699	710	716	727	733	744	761	778	778	
+06	\$	795	801	812	818	829	835	846	852	863	880	897	897	
+07	\$	908	914	925	931	942	947	959	964	976	993	1010	1010	
+08	\$	1026	1032	1043	1049	1060	1066	1077	1083	1094	1111	1128	1128	
+09	\$	1139	1145	1156	1162	1173	1179	1190	1196	1207	1224	1241	1241	
+10	\$	1258	1263	1275	1280	1292	1297	1309	1314	1326	1342	1359	1359	
+12	\$	1489	1495	1506	1512	1523	1529	1540	1546	1557	1574	1591	1591	BALANCE POINT 25 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

+03	+04	+05	+06	+07	+08	+09	+10	+12	←-ELECTRIC RATE \$/KWH
\$ 75	\$ 101	\$ 126	\$ 151	\$ 176	\$ 202	\$ 227	\$ 252	\$ 303	←-THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 1
 HEAT PUMP MODEL: OUTDOOR 24HP02 INDOOR M24Q51
 RATED COOLING CAP.: BTUH 785 SEER 7.8
 RATED HEATING CAP.: BTUH 647 COP 1.7
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100%
 MINS. OMR REG IV

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST ELECTRIC HEAT ONLY	BALANCE POINT
25,000				
-03	\$	208	378	BALANCE POINT 19 DEG.F.
-04	\$	210	402	
-05	\$	338	631	
-06	\$	406	756	
-07	\$	473	885	
-08	\$	547	1010	
-09	\$	615	1139	
-10	\$	682	1263	
-11	\$	749	1388	
-12	\$	812	1517	
30,000				
-03	\$	248	451	BALANCE POINT 24 DEG.F.
-04	\$	327	603	
-05	\$	406	756	
-06	\$	490	908	
-07	\$	575	1060	
-08	\$	654	1213	
-09	\$	739	1366	
-10	\$	818	1517	
-11	\$	897	1670	
-12	\$	987	1822	
35,000				
-03	\$	293	530	BALANCE POINT 28 DEG.F.
-04	\$	389	708	
-05	\$	490	885	
-06	\$	581	1060	
-07	\$	682	1241	
-08	\$	778	1416	
-09	\$	874	1596	
-10	\$	970	1771	
-11	\$	1066	1951	
-12	\$	1166	2127	
40,000				
-03	\$	344	603	BALANCE POINT 31 DEG.F.
-04	\$	451	806	
-05	\$	569	1010	
-06	\$	682	1213	
-07	\$	795	1416	
-08	\$	908	1619	
-09	\$	1026	1822	
-10	\$	1134	2025	
-11	\$	1242	2228	
-12	\$	1359	2431	
50,000				
-03	\$	451	756	BALANCE POINT 36 DEG.F.
-04	\$	603	1010	
-05	\$	756	1263	
-06	\$	908	1517	
-07	\$	1060	1771	
-08	\$	1213	2025	
-09	\$	1359	2279	
-10	\$	1512	2533	
-11	\$	1666	2787	
-12	\$	1816	3041	

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	-03	-04	-05	-06	-07	-08	-09	-10	-12	
\$	71	94	118	142	166	189	213	237	284	
										←-ELECTRIC RATE \$/KWH
										←-THEORETICAL AIR CONDITIONING COST

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BARO MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION: HEAT PUMP MODEL: OUTDOOR 24000 INDOOR M24251
 ARI RATED COOLING CAP.: BTU/H 197 SEER 7.89
 ARI RATED HEATING CAP.: BTU/H 147 COP 4.71 MSPF 6.22 MIN. OHR REG IV
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 0.8203 AFUE

HEAT LOSS BTU/H	ELEC. COST \$/KWH	NATURAL GAS COST - \$/THERM													
		.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00		
25,000		\$ 231	265	299	332	361	394	428	462	496	530	598	665	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 203	208	214	220	225	231	236	242	248	259	270	282	288	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 253	259	265	270	276	282	287	293	299	310	321	332	338		
+05	\$ 304	310	315	321	327	332	338	344	349	361	372	383	389		
+06	\$ 355	361	366	372	378	383	389	394	400	411	423	434	440		
+07	\$ 406	411	417	423	428	434	440	445	451	462	473	485	496		
+08	\$ 462	468	473	479	485	490	496	502	507	519	529	541	552		
+09	\$ 513	519	524	530	536	541	547	552	558	569	581	592	603		
+10	\$ 564	569	575	581	586	592	598	603	609	620	631	643	654		
+12	\$ 665	671	677	682	688	694	699	705	710	722	733	744	755		
															BALANCE POINT 19 DEG.F.
30,000		\$ 276	315	355	394	434	479	519	558	598	637	716	795		<--THEORETICAL HEATING COST = FURNACE ONLY
+03	\$ 236	248	259	270	282	293	304	315	327	338	361	383	389		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 293	304	315	327	338	349	361	372	383	394	417	440	446		
+05	\$ 344	355	366	378	389	400	411	423	434	445	468	490	496		
+06	\$ 394	406	417	428	440	451	462	473	485	496	519	541	547		
+07	\$ 451	462	473	485	496	507	519	530	541	552	574	596	602		
+08	\$ 502	513	524	535	547	558	569	581	592	603	626	648	654		
+09	\$ 553	564	575	586	598	609	620	631	643	666	688	709	715		
+10	\$ 604	615	626	637	648	659	670	681	692	715	737	758	764		
+12	\$ 716	727	738	750	761	772	783	794	805	828	849	870	876		
														BALANCE POINT 24 DEG.F.	
35,000		\$ 321	372	417	462	507	558	603	648	694	744	835	931	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 282	304	321	344	361	383	400	423	440	462	502	541	547	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 332	355	372	394	411	434	451	473	490	513	552	592	598		
+05	\$ 383	406	423	440	457	479	496	519	536	558	598	637	643		
+06	\$ 434	457	473	490	507	530	547	569	586	609	648	688	694		
+07	\$ 485	507	524	541	558	581	598	620	637	659	699	738	744		
+08	\$ 536	558	575	592	609	631	648	666	681	703	743	782	788		
+09	\$ 587	609	626	643	660	682	703	724	743	765	795	835	841		
+10	\$ 638	660	677	694	716	737	758	779	801	840	880	920	926		
+12	\$ 744	766	783	805	826	847	868	889	910	949	989	1029	1035		
															BALANCE POINT 28 DEG.F.
40,000		\$ 372	423	479	530	581	637	688	744	795	852	959	1060		<--THEORETICAL HEATING COST = FURNACE ONLY
+03	\$ 321	344	366	389	411	434	457	479	502	524	569	615	621		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 372	400	423	445	468	490	513	536	558	581	626	671	677		
+05	\$ 423	451	473	496	519	541	564	586	609	631	677	722	728		
+06	\$ 474	507	530	552	575	598	620	643	666	688	733	778	784		
+07	\$ 525	558	581	603	626	648	670	692	715	737	782	827	833		
+08	\$ 576	609	631	654	677	700	722	744	766	788	833	878	884		
+09	\$ 627	660	682	705	727	750	772	794	816	838	883	928	934		
+10	\$ 678	711	733	756	778	801	823	845	867	889	934	979	985		
+12	\$ 784	817	839	862	884	906	928	950	972	1015	1060	1105	1111		
														BALANCE POINT 31 DEG.F.	
50,000		\$ 462	530	598	665	727	795	863	931	998	1060	1196	1331	<--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 411	451	490	530	575	615	654	694	733	773	852	931	937	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 462	507	546	586	626	666	705	745	784	824	893	976	982		
+05	\$ 513	558	603	648	694	734	773	812	851	891	960	1043	1049		
+06	\$ 564	609	654	700	746	791	836	881	926	971	1040	1123	1129		
+07	\$ 615	660	705	750	795	840	885	930	975	1020	1089	1172	1178		
+08	\$ 666	711	756	801	846	891	936	981	1026	1071	1140	1223	1229		
+09	\$ 717	762	807	852	897	942	987	1032	1077	1122	1191	1274	1280		
+10	\$ 768	813	858	903	948	993	1038	1083	1128	1173	1242	1325	1331		
+12	\$ 874	919	964	1009	1054	1099	1144	1189	1234	1279	1348	1431	1437		
															BALANCE POINT 36 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
\$	71	94	108	142	166	189	213	237	284	<--ELECTRIC RATE \$/KWH
										<--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARO MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 24HQ22----- INDOOR H2AR51-----
 ART RATED COOLING CAP.: BTU/H 195 SEER 1.82
 ARI RATED HEATING CAP.: BTU/H 147 COP 1.70 MSPP 2.15 MIN. DHR 25 IV
 FURNACE TYPE EVER-DILL----- FURNACE EFFICIENCY .65003.8EWE

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON													
		1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00		2.20	2.40	
25,000		\$ 479	524	575	620	671	716	767	812	863	959	1055	1151	<--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 214	214	220	225	229	231	231	236	247	248	253	259	259	THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 276	276	282	287	291	293	293	299	304	310	315	321	321		
+05	\$ 332	332	338	344	349	349	349	355	361	366	372	378	378		
+06	\$ 394	394	400	406	411	411	411	417	423	428	434	440	440		
+07	\$ 457	457	462	468	473	473	473	479	485	490	496	502	502		
+08	\$ 513	513	519	524	524	530	530	536	541	547	552	558	558		
+09	\$ 575	575	581	586	592	592	598	603	609	615	621	627	627		
+10	\$ 631	631	637	643	648	648	654	660	665	671	677	683	683		
+12	\$ 756	756	761	767	773	773	778	784	789	795	801	807	807		
															BALANCE POINT 19 DEG.F.
30,000		\$ 575	631	689	744	806	863	919	975	1032	1151	1263	1382		<--THEORETICAL HEATING COST - FURNACE ONLY
+03	\$ 265	270	276	282	287	293	299	304	315	327	338	349	349		THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 332	338	344	349	355	361	366	372	383	394	406	417	417		
+05	\$ 400	406	411	417	423	428	434	440	451	462	473	485	485		
+06	\$ 468	473	479	485	490	496	502	507	519	530	541	552	552		
+07	\$ 536	541	547	552	558	564	569	575	586	598	609	621	621		
+08	\$ 603	609	615	620	626	631	637	643	654	665	677	688	688		
+09	\$ 671	677	682	688	694	699	705	710	722	733	744	755	755		
+10	\$ 733	739	744	750	756	761	767	773	784	795	806	818	818		
+12	\$ 868	874	880	885	891	897	902	908	919	931	942	953	953		
														BALANCE POINT 24 DEG.F.	
35,000		\$ 671	739	806	868	936	1004	1072	1139	1207	1342	1478	1613	<--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 321	327	338	349	361	366	378	389	400	417	440	457	457	THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 394	400	411	423	434	440	451	462	473	490	513	536	536		
+05	\$ 468	473	485	496	507	513	524	536	547	564	586	609	609		
+06	\$ 541	547	558	569	580	586	598	609	620	637	654	677	677		
+07	\$ 615	620	631	643	654	660	671	682	694	710	733	755	755		
+08	\$ 688	694	705	716	727	733	744	756	767	784	806	828	828		
+09	\$ 761	767	778	789	801	806	818	829	840	857	880	897	897		
+10	\$ 835	840	852	863	874	880	891	902	914	931	953	970	970		
+12	\$ 981	987	998	1010	1021	1026	1038	1049	1060	1077	1100	1117	1117		
															BALANCE POINT 28 DEG.F.
40,000		\$ 767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839		<--THEORETICAL HEATING COST - FURNACE ONLY
+03	\$ 383	400	411	428	445	457	473	490	502	510	564	592	592		THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 457	473	485	502	519	530	547	564	575	603	637	669	669		
+05	\$ 536	547	558	569	580	586	598	609	620	637	654	677	677		
+06	\$ 615	620	631	643	654	660	671	682	694	710	733	755	755		
+07	\$ 694	705	716	727	733	744	756	767	784	806	828	840	840		
+08	\$ 773	778	789	801	812	818	829	840	857	880	897	919	919		
+09	\$ 852	858	869	880	891	897	908	919	931	953	970	998	998		
+10	\$ 925	942	953	964	970	981	991	1002	1014	1032	1049	1072	1072		
+12	\$ 1083	1100	1111	1128	1145	1156	1173	1190	1201	1230	1263	1292	1292		
														BALANCE POINT 31 DEG.F.	
50,000		\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1916	2110	2302	<--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 530	558	586	615	643	665	694	722	750	806	863	919	919	THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 615	643	671	699	727	750	778	806	834	891	947	1004	1004		
+05	\$ 694	722	750	778	806	829	857	885	914	970	1024	1083	1083		
+06	\$ 778	806	835	863	891	914	942	970	998	1055	1111	1169	1169		
+07	\$ 863	891	919	947	976	998	1026	1055	1083	1139	1198	1252	1252		
+08	\$ 947	976	1004	1032	1060	1083	1111	1139	1169	1224	1280	1337	1337		
+09	\$ 1032	1060	1089	1117	1145	1168	1196	1224	1252	1308	1365	1421	1421		
+10	\$ 1117	1145	1173	1201	1230	1252	1280	1308	1337	1393	1450	1506	1506		
+12	\$ 1286	1314	1342	1371	1399	1421	1448	1478	1506	1563	1619	1675	1675		
															BALANCE POINT 36 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
\$	111	94	118	142	166	189	213	237	284	<--ELECTRIC RATE \$/KWH
										<--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 24HP02 INDOOR H25J11
 RATED COOLING CAP.: BTUH 147,000 COP 1.85
 RATED HEATING CAP.: BTUH 147,000 COP 1.85
 FURNACE TYPE PROGRAM GAS FURNACE EFFICIENCY 85.0%
 MIN. OHR REG IV

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROpane GAS COST - \$/GALLON													
		.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10		1.20		
25,000		\$ 434	473	507	547	581	620	654	694	727	801	874	874	←--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 208	214	214	220	220	225	225	225	231	236	242	242	242	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 270	276	276	282	282	287	287	287	293	299	304	304	304		
+05	\$ 327	332	332	338	338	344	344	344	344	349	355	355	355		
+06	\$ 389	394	394	400	400	406	406	406	411	417	423	423	423		
+07	\$ 451	457	457	462	462	468	468	468	473	479	485	485	485		
+08	\$ 507	513	513	519	519	524	524	524	530	536	541	541	541		
+09	\$ 569	575	575	581	581	586	586	586	592	598	603	603	603		
+10	\$ 626	631	631	637	637	643	643	643	648	654	660	660	660		
+12	\$ 750	756	756	761	761	767	767	767	773	778	784	784	784		
															BALANCE POINT 19 DEG.F.
30,000		\$ 524	569	615	654	699	744	789	829	874	964	1049	1049		←--THEORETICAL HEATING COST = FURNACE ONLY
+03	\$ 259	265	270	270	276	282	287	287	293	299	304	315	315		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 327	332	338	338	344	349	355	355	361	366	372	383	383		
+05	\$ 394	400	406	406	411	417	423	423	428	434	440	451	451		
+06	\$ 462	468	473	473	479	485	490	490	496	502	507	519	519		
+07	\$ 530	536	541	541	547	552	558	558	564	569	575	586	586		
+08	\$ 598	603	609	609	615	620	626	626	631	637	643	654	654		
+09	\$ 665	671	677	677	682	688	694	694	699	705	710	722	722		
+10	\$ 727	733	739	739	744	750	756	756	761	767	773	784	784		
+12	\$ 863	868	874	874	880	885	891	891	897	902	908	919	919		
														BALANCE POINT 24 DEG.F.	
35,000		\$ 615	665	716	767	818	868	919	970	1021	1122	1230	1230	←--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 310	315	327	332	344	349	355	355	366	372	389	400	400	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 383	389	400	406	411	417	423	423	428	434	440	451	451		
+05	\$ 457	462	473	473	479	485	490	490	496	502	507	519	519		
+06	\$ 530	536	541	541	547	552	558	558	564	569	575	586	586		
+07	\$ 603	609	620	626	637	643	648	648	654	660	666	677	677		
+08	\$ 677	682	688	688	694	699	705	705	710	716	722	733	733		
+09	\$ 750	756	767	773	784	789	795	795	801	807	812	829	829		
+10	\$ 823	829	840	846	857	863	868	868	874	880	885	902	902		
+12	\$ 970	976	987	993	1004	1010	1015	1026	1032	1049	1066	1066	1066		
															BALANCE POINT 28 DEG.F.
40,000		\$ 699	756	818	874	936	993	1049	1111	1168	1286	1405	1405		←--THEORETICAL HEATING COST = FURNACE ONLY
+03	\$ 372	383	394	406	417	423	428	434	440	446	462	507	507		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 445	457	468	479	490	496	502	507	513	519	536	581	581		
+05	\$ 524	536	547	558	569	581	592	603	615	637	660	705	705		
+06	\$ 603	615	626	637	648	660	671	682	694	716	739	784	784		
+07	\$ 682	694	705	716	727	739	750	761	773	795	818	863	863		
+08	\$ 761	773	784	795	806	818	829	840	852	874	897	942	942		
+09	\$ 840	852	863	874	885	897	908	919	931	953	976	1021	1021		
+10	\$ 914	925	936	947	959	970	981	993	1004	1026	1069	1114	1114		
+12	\$ 1072	1083	1094	1105	1117	1128	1139	1151	1162	1184	1207	1207	1207		
														BALANCE POINT 31 DEG.F.	
50,000		\$ 874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754	←--THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$ 507	530	547	569	592	609	631	654	677	716	761	761	761	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 592	615	631	654	677	694	716	739	761	801	846	846	846		
+05	\$ 671	694	710	733	756	779	801	824	846	880	925	925	925		
+06	\$ 756	778	795	818	840	857	880	902	925	964	1010	1010	1010		
+07	\$ 840	863	880	902	925	942	964	987	1010	1049	1094	1094	1094		
+08	\$ 925	947	964	987	1010	1026	1049	1072	1094	1134	1179	1179	1179		
+09	\$ 1010	1033	1049	1072	1094	1111	1134	1156	1179	1218	1263	1263	1263		
+10	\$ 1094	1117	1134	1156	1179	1196	1218	1241	1263	1303	1348	1348	1348		
+12	\$ 1263	1286	1303	1326	1348	1365	1388	1410	1433	1472	1517	1517	1517		
															BALANCE POINT 36 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
	\$ 71	\$ 94	\$ 116	\$ 142	\$ 166	\$ 189	\$ 213	\$ 237	\$ 284	←--ELECTRIC RATE \$/KWH
										←--THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 3
 HEAT PUMP MODEL: OUTDOOR 10HE25 INDOOR H140_QB_H140L
 ARI RATED COOLING CAP.: BTUH 195 22200 SEER 8.70
 ARI RATED HEATING CAP.: BTUH 147 32000 COP 12.1 NSPF 6.20 MIN. OHR REG IV
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.0% AEME

HEAT LOSS BTUH	ELEC. COST \$/KWH	--- THEORETICAL ANNUAL HEATING COST ---	
		HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
30,000			
+03	\$	242	451
+04	\$	321	603
+05	\$	394	756
+06	\$	473	908
+07	\$	558	1060
+08	\$	637	1213
+09	\$	710	1365
+10	\$	795	1517
+12	\$	959	1822
			BALANCE POINT 14 DEG.F.
35,000			
+03	\$	276	530
+04	\$	366	705
+05	\$	452	885
+06	\$	552	1060
+07	\$	648	1241
+08	\$	739	1416
+09	\$	829	1596
+10	\$	919	1771
+12	\$	1105	2127
			BALANCE POINT 18 DEG.F.
40,000			
+03	\$	315	603
+04	\$	423	806
+05	\$	524	1010
+06	\$	631	1213
+07	\$	739	1416
+08	\$	846	1619
+09	\$	953	1822
+10	\$	1060	2025
+12	\$	1269	2431
			BALANCE POINT 22 DEG.F.
50,000			
+03	\$	406	756
+04	\$	541	1010
+05	\$	677	1263
+06	\$	812	1517
+07	\$	947	1771
+08	\$	1083	2025
+09	\$	1224	2279
+10	\$	1354	2533
+12	\$	1625	3041
			BALANCE POINT 28 DEG.F.
60,000			
+03	\$	507	908
+04	\$	682	1213
+05	\$	849	1517
+06	\$	1015	1822
+07	\$	1190	2127
+08	\$	1354	2431
+09	\$	1523	2736
+10	\$	1698	3041
+12	\$	2036	3650
			BALANCE POINT 33 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
\$	85	113	141	170	198	226	255	283	340	C--ELECTRIC RATE \$/KWH C--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARO MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION #
HEAT PUMP MODEL: OUTDOOR SOURCE INDOOR HEATING
ARI RATED COOLING CAP. BTU/HR TONS SEER 13.0 14.0 15.0 16.0 17.0 18.0 19.0
ARI RATED HEATING CAP. BTU/HR COP 1.6 1.7 1.8 1.9 2.0 2.1 2.2 HSPF 35 40 45 50 55 60 65 MIN. DHR REG IV
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 85% 90% 95%

HEAT LOSS BTU/H	ELEC. COST \$/KWH	NATURAL GAS COST - \$/THERM															
		.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00				
30,000		\$ 276	315	355	394	434	474	514	558	598	637	716	795	<small>---THEORETICAL HEATING COST - FURNACE ONLY</small>			
+03	\$	236	236	242	248	253	259	259	265	270	276	282	293	<small>THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR</small>			
+04	\$	304	304	310	315	321	327	327	332	338	344	349	361				
+05	\$	372	372	378	383	389	394	394	400	406	411	417	428				
+06	\$	434	434	440	445	451	457	457	462	468	473	479	490				
+07	\$	502	502	507	513	519	524	524	530	536	541	547	558				
+08	\$	569	569	575	581	586	592	592	598	603	609	615	626				
+09	\$	637	637	643	648	654	660	660	666	671	677	682	694				
+10	\$	705	705	710	716	722	727	727	733	739	744	750	761				
+12	\$	840	840	846	852	857	863	863	869	874	880	885	897				
		\$ 321	372	417	462	507	558	603	648	694	744	835	931			<small>---THEORETICAL HEATING COST - FURNACE ONLY</small>	
+03	\$	270	270	287	293	304	310	321	332	338	349	366	383				
+04	\$	349	349	361	366	378	383	394	406	411	423	440	457				
+05	\$	417	417	428	434	445	451	462	473	479	490	507	524				
+06	\$	479	485	496	502	513	519	530	541	547	558	575	592				
+07	\$	552	558	569	575	586	592	603	615	620	631	648	665				
+08	\$	620	626	637	643	654	660	671	682	688	699	716	733				
+09	\$	694	699	710	716	727	733	744	756	761	773	789	806				
+10	\$	761	767	778	784	795	801	812	823	829	840	857	874				
+12	\$	902	908	919	925	936	942	953	964	970	981	998	1015				
40,000		\$ 372	423	479	530	581	637	688	744	795	842	959	1060	<small>---THEORETICAL HEATING COST - FURNACE ONLY</small>			
+03	\$	310	327	338	355	372	383	400	417	428	445	473	507				
+04	\$	383	400	411	428	445	457	473	490	502	519	547	581				
+05	\$	451	468	479	496	513	524	541	558	569	586	615	648				
+06	\$	519	536	547	564	581	592	609	626	637	654	682	716				
+07	\$	586	603	615	631	648	660	677	694	705	722	750	784				
+08	\$	654	671	682	699	716	727	744	761	773	789	818	852				
+09	\$	722	739	750	767	784	795	812	829	840	857	885	919				
+10	\$	789	806	818	835	852	863	880	897	909	925	953	987				
+12	\$	931	947	959	976	993	1004	1021	1038	1049	1066	1094	1128				
50,000		\$ 462	530	598	665	727	795	863	931	998	1060	1196	1331	<small>---THEORETICAL HEATING COST - FURNACE ONLY</small>			
+03	\$	394	423	451	479	507	536	564	592	620	648	705	761				
+04	\$	462	490	519	547	575	603	631	660	688	716	773	829				
+05	\$	530	558	586	615	643	671	699	727	756	784	840	897				
+06	\$	592	620	648	677	705	733	761	789	818	846	902	959				
+07	\$	654	682	710	744	773	801	829	857	885	914	970	1026				
+08	\$	727	756	784	812	840	868	897	925	953	981	1038	1094				
+09	\$	795	823	852	880	908	936	964	993	1021	1049	1105	1162				
+10	\$	863	885	914	942	970	998	1026	1055	1083	1111	1168	1224				
+12	\$	993	1021	1049	1077	1105	1134	1162	1190	1218	1247	1303	1359				
60,000		\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596	<small>---THEORETICAL HEATING COST - FURNACE ONLY</small>			
+03	\$	490	541	586	637	682	727	778	823	874	919	1015	1111				
+04	\$	547	598	643	694	739	784	835	880	931	976	1072	1168				
+05	\$	598	648	694	744	789	835	885	931	981	1026	1122	1218				
+06	\$	654	705	750	801	846	891	942	987	1038	1083	1179	1275				
+07	\$	705	756	801	852	897	942	993	1044	1089	1134	1230	1326				
+08	\$	761	812	857	908	953	998	1049	1094	1145	1190	1286	1382				
+09	\$	812	863	908	959	1004	1049	1100	1145	1196	1241	1337	1433				
+10	\$	868	919	964	1015	1060	1105	1156	1201	1252	1297	1393	1489				
+12	\$	976	1026	1072	1122	1168	1213	1263	1309	1359	1405	1500	1596				

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
\$	85	113	141	170	198	226	255	283	340	<small>---ELECTRIC RATE \$/KWH</small> <small>---THEORETICAL AIR CONDITIONING COST</small>

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BARD MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR COOLING CAP.: BTUH 147,000 INDOOR HEATING CAP.: BTUH 147,000
 RATED COOLING CAP.: BTUH 147,000 COP 1.47 RATED HEATING CAP.: BTUH 147,000 COP 1.47
 FURNACE TYPE: OIL FURNACE EFFICIENCY: 85%

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON											2.00	2.20	2.40		
		1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00					
30,000	\$	575	631	688	744	800	863	919	975	1032	1151	1263	1382	←--THEORETICAL HEATING COST ÷ FURNACE ONLY			
+03	\$	242	248	248	253	253	253	259	259	265	270	270	276	THEORETICAL HEATING COST ÷ FURN. + HEAT PUMP			
+04	\$	315	321	321	327	327	327	332	332	338	344	344	349	\$ PER YEAR			
+05	\$	389	394	394	400	400	400	406	406	411	417	417	423				
+06	\$	462	468	468	473	473	473	479	479	485	490	490	496				
+07	\$	536	541	541	547	547	547	552	552	558	564	564	569				
+08	\$	609	615	615	620	620	620	626	626	631	637	637	643				
+09	\$	683	694	694	699	699	699	705	705	710	716	716	722				
+10	\$	761	767	767	773	773	773	778	778	784	789	789	795				
+12	\$	908	914	914	919	919	919	925	925	931	936	936	942	BALANCE POINT 14 DEG.F.			
35,000	\$	671	739	805	868	936	1004	1072	1139	1207	1342	1478	1613	←--THEORETICAL HEATING COST ÷ FURNACE ONLY			
+03	\$	293	293	299	304	310	310	315	321	327	332	344	349	THEORETICAL HEATING COST ÷ FURN. + HEAT PUMP			
+04	\$	372	372	378	383	389	389	394	400	406	411	423	428	\$ PER YEAR			
+05	\$	457	457	462	468	473	473	479	485	490	496	501	507				
+06	\$	536	536	541	547	552	552	558	564	569	575	580	586				
+07	\$	621	621	626	631	637	637	643	648	654	660	671	677				
+08	\$	699	699	705	710	716	716	722	727	733	739	750	756				
+09	\$	784	784	789	795	801	801	806	812	818	823	835	840				
+10	\$	868	868	874	880	885	885	891	897	902	908	919	925				
+12	\$	1032	1032	1038	1043	1049	1049	1055	1060	1066	1072	1083	1089	BALANCE POINT 18 DEG.F.			
40,000	\$	767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839	←--THEORETICAL HEATING COST ÷ FURNACE ONLY			
+03	\$	338	344	349	361	366	372	378	383	394	406	417	434	THEORETICAL HEATING COST ÷ FURN. + HEAT PUMP			
+04	\$	423	428	434	445	451	457	462	468	479	490	502	519	\$ PER YEAR			
+05	\$	513	519	524	536	541	547	552	558	569	580	592	609				
+06	\$	603	609	615	626	631	637	643	648	654	660	671	682				
+07	\$	694	699	705	716	722	727	733	739	750	761	773	789				
+08	\$	784	789	795	806	812	818	823	829	840	852	863	880				
+09	\$	874	880	885	897	902	908	914	919	931	942	953	970				
+10	\$	964	970	976	987	993	998	1004	1010	1021	1032	1043	1060				
+12	\$	1139	1145	1151	1162	1168	1173	1179	1184	1196	1207	1218	1235	BALANCE POINT 22 DEG.F.			
50,000	\$	959	1055	1151	1247	1342	1438	1534	1630	1726	1914	2110	2302	←--THEORETICAL HEATING COST ÷ FURNACE ONLY			
+03	\$	451	462	479	496	507	524	536	552	564	598	626	654	THEORETICAL HEATING COST ÷ FURN. + HEAT PUMP			
+04	\$	547	558	575	592	603	620	631	648	660	694	722	750	\$ PER YEAR			
+05	\$	648	660	677	694	705	722	733	750	761	795	823	852				
+06	\$	750	761	778	795	806	823	835	852	863	897	925	953				
+07	\$	852	863	880	897	908	925	936	953	964	998	1026	1055				
+08	\$	953	964	981	998	1010	1026	1038	1055	1066	1100	1128	1156				
+09	\$	1055	1066	1083	1100	1111	1128	1139	1156	1169	1201	1230	1259				
+10	\$	1156	1168	1184	1201	1213	1230	1241	1258	1269	1303	1331	1359				
+12	\$	1354	1365	1382	1399	1410	1427	1438	1455	1467	1500	1529	1557	BALANCE POINT 28 DEG.F.			
60,000	\$	1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←--THEORETICAL HEATING COST ÷ FURNACE ONLY			
+03	\$	581	603	631	654	682	705	733	756	784	835	885	936	THEORETICAL HEATING COST ÷ FURN. + HEAT PUMP			
+04	\$	688	710	739	761	789	812	840	863	891	942	993	1043	\$ PER YEAR			
+05	\$	795	818	846	868	897	919	947	970	998	1049	1100	1151				
+06	\$	902	925	953	976	1004	1026	1055	1077	1105	1156	1207	1258				
+07	\$	1015	1038	1066	1089	1117	1139	1168	1190	1218	1269	1320	1371				
+08	\$	1122	1145	1173	1196	1224	1247	1275	1297	1326	1376	1427	1478				
+09	\$	1230	1252	1280	1303	1331	1354	1382	1405	1433	1484	1534	1585				
+10	\$	1337	1359	1388	1410	1438	1461	1488	1512	1540	1591	1642	1692				
+12	\$	1557	1579	1608	1630	1658	1681	1709	1732	1760	1811	1862	1912	BALANCE POINT 33 DEG.F.			

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12		
	\$	85	113	141	170	198	226	255	283	340	←--ELECTRIC RATE \$/KWH
											←--THEORETICAL AIR CONDITIONING COST

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BARO MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR CONDENSER INDOOR COILS
 ARI RATED COOLING CAP: BTUH 125,000 YEAR 8.10
 ARI RATED HEATING CAP: BTUH 47,000 COP 1.7
 FURNACE TYPE: PROpane GAS FURNACE EFFICIENCY: 82.0%
 MIN. DMR REG IV

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROpane GAS COST - \$/GALLON													
		.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10	1.20	1.30		
30,000		\$ 524	569	615	654	699	744	789	829	874	964	1049	1049	←--THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$ 242	242	248	248	248	248	253	253	253	259	259	265	265	THEORETICAL HEATING COST * FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 313	318	321	321	321	327	327	327	332	332	338	338			
+05	\$ 389	394	394	394	394	400	400	400	406	406	411	411			
+06	\$ 462	462	468	468	468	473	473	473	479	479	485	485			
+07	\$ 536	536	541	541	541	547	547	547	552	552	558	558			
+08	\$ 609	609	615	615	615	620	620	620	626	626	631	631			
+09	\$ 688	688	694	694	694	699	699	699	705	705	710	710			
+10	\$ 761	761	767	767	767	773	773	773	778	778	784	784			
+12	\$ 908	908	914	914	914	919	919	919	925	925	931	931	BALANCE POINT 14 DEG.F.		
35,000		\$ 615	665	716	767	818	868	919	970	1021	1122	1230	1230		←--THEORETICAL HEATING COST * FURNACE ONLY
+03	\$ 267	267	293	299	299	304	304	310	315	321	327	327	THEORETICAL HEATING COST * FURN. + HEAT PUMP \$ PER YEAR		
+04	\$ 366	366	372	378	378	383	383	389	394	400	406	406			
+05	\$ 461	461	467	462	462	468	468	473	479	485	490	490			
+06	\$ 530	530	536	541	541	547	547	552	558	564	569	569			
+07	\$ 615	615	620	626	626	631	631	637	643	648	654	654			
+08	\$ 694	694	699	705	705	710	710	716	722	727	733	733			
+09	\$ 778	778	784	789	789	795	795	801	806	812	818	818			
+10	\$ 863	863	869	874	874	880	880	885	891	897	902	902			
+12	\$ 1026	1026	1032	1038	1038	1043	1043	1049	1055	1060	1066	1066		BALANCE POINT 18 DEG.F.	
40,000		\$ 699	756	818	874	936	993	1049	1111	1168	1266	1405		1405	←--THEORETICAL HEATING COST * FURNACE ONLY
+03	\$ 332	338	344	349	355	361	361	366	372	383	394	394		THEORETICAL HEATING COST * FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 417	423	428	434	440	445	445	451	457	468	479	479			
+05	\$ 507	513	519	524	530	536	536	541	547	558	569	569			
+06	\$ 596	603	609	615	620	626	626	631	637	648	660	660			
+07	\$ 688	694	699	705	710	716	716	722	727	739	750	750			
+08	\$ 784	784	789	795	801	806	806	812	818	829	840	840			
+09	\$ 868	874	880	885	891	897	897	902	908	919	931	931			
+10	\$ 959	964	970	976	981	987	987	993	998	1010	1021	1021			
+12	\$ 1134	1139	1145	1151	1156	1162	1162	1168	1173	1184	1196	1196	BALANCE POINT 22 DEG.F.		
50,000		\$ 874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754		←--THEORETICAL HEATING COST * FURNACE ONLY
+03	\$ 440	451	462	468	479	490	490	502	513	524	547	569	569		THEORETICAL HEATING COST * FURN. + HEAT PUMP \$ PER YEAR
+04	\$ 539	547	558	564	575	586	586	598	609	620	643	665	665		
+05	\$ 637	648	660	665	677	688	688	699	710	721	744	767	767		
+06	\$ 739	750	761	767	778	789	789	801	812	823	846	868	868		
+07	\$ 840	852	863	868	880	891	891	902	914	925	949	970	970		
+08	\$ 942	953	964	970	981	993	993	1004	1015	1026	1049	1072	1072		
+09	\$ 1043	1055	1066	1072	1083	1094	1105	1117	1128	1151	1173	1173			
+10	\$ 1145	1156	1168	1173	1184	1196	1207	1218	1230	1252	1275	1275			
+12	\$ 1342	1354	1365	1371	1382	1393	1405	1416	1427	1450	1472	1472	BALANCE POINT 28 DEG.F.		
60,000		\$ 1049	1139	1230	1314	1405	1489	1579	1664	1754	1929	2104	2104	←--THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$ 538	575	598	615	637	654	654	677	694	710	750	789	789	THEORETICAL HEATING COST * FURN. + HEAT PUMP \$ PER YEAR	
+04	\$ 665	682	705	722	744	761	761	784	801	818	857	897	897		
+05	\$ 773	789	812	829	852	868	868	891	908	925	964	1004	1004		
+06	\$ 880	897	914	936	959	976	976	998	1015	1032	1072	1111	1111		
+07	\$ 993	1010	1032	1048	1072	1089	1089	1111	1128	1145	1184	1224	1224		
+08	\$ 1100	1117	1139	1156	1179	1196	1196	1218	1235	1252	1292	1331	1331		
+09	\$ 1207	1224	1247	1263	1286	1303	1303	1326	1342	1359	1399	1438	1438		
+10	\$ 1314	1331	1354	1371	1393	1410	1410	1433	1450	1467	1506	1546	1546		
+12	\$ 1534	1551	1574	1591	1613	1630	1630	1653	1670	1687	1726	1766	1766		BALANCE POINT 33 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
\$	85	113	141	170	198	226	255	283	340	←--ELECTRIC RATE \$/KWH
										←--THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR_36HP04 INDOOR_H119_08_H201
 ARI RATED COOLING CAP.: BTUH 195 T-26600 SEER 7.4
 ARI RATED HEATING CAP.: BTUH 147 T-20200 COP147 T-2.83 HSPF_6.50 MIN.DHR REG IV
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.0% A/EVE

HEAT LOSS BTUH	ELEC. COST \$/KWH	--- THEORETICAL ANNUAL HEATING COST ---	
		HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
40,000			
+03	\$	321	603
+04	\$	428	806
+05	\$	536	1010
+06	\$	643	1213
+07	\$	750	1416
+08	\$	857	1619
+09	\$	964	1822
+10	\$	1066	2025
+12	\$	1280	2431
BALANCE POINT 16 DEG.F.			
50,000			
+03	\$	406	756
+04	\$	536	1010
+05	\$	671	1263
+06	\$	806	1517
+07	\$	942	1771
+08	\$	1072	2025
+09	\$	1213	2279
+10	\$	1342	2533
+12	\$	1608	3041
BALANCE POINT 23 DEG.F.			
60,000			
+03	\$	490	908
+04	\$	654	1213
+05	\$	823	1517
+06	\$	987	1822
+07	\$	1151	2127
+08	\$	1314	2431
+09	\$	1478	2736
+10	\$	1642	3041
+12	\$	1969	3690
BALANCE POINT 27 DEG.F.			
70,000			
+03	\$	592	1060
+04	\$	789	1416
+05	\$	987	1771
+06	\$	1184	2127
+07	\$	1376	2482
+08	\$	1574	2838
+09	\$	1771	3193
+10	\$	1969	3549
+12	\$	2364	4260
BALANCE POINT 31 DEG.F.			
80,000			
+03	\$	705	1213
+04	\$	942	1619
+05	\$	1173	2025
+06	\$	1410	2431
+07	\$	1647	2838
+08	\$	1884	3244
+09	\$	2119	3650
+10	\$	2352	4057
+12	\$	2821	4869
BALANCE POINT 34 DEG.F.			

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
\$	117	156	195	234	273	312	351	390	468	←--ELECTRIC RATE \$/KWH
										←--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 36HPD3 INDOOR 212Q/M12Q1
 441 RATED COOLING CAP.: BTUH 147 1-36000 SEER 7.2
 ART RATED HEATING CAP.: BTUH 147 1-36000 COP 147 1-2.82, HSPF 6.50 MIN. DHR REG IV
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY .85

HEAT LOSS BTUH	ELEC. COST \$/KWH	.35	.40	.45	NATURAL GAS COST - \$/THERM	.60	.65	.70	.75	.80	.90	1.00			
40,000		\$ 372	423	479	530	581	637	688	744	795	852	909	1060	<--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$.03	315	321	327	332	338	344	349	355	361	366	378	389	THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR	
+04	\$.04	406	411	417	423	428	434	440	445	451	457	468	479		
+05	\$.05	495	502	507	513	519	524	530	536	541	547	558	569		
+06	\$.06	580	592	598	603	609	615	620	626	631	637	648	660		
+07	\$.07	671	682	688	694	699	705	710	716	722	727	739	750		
+08	\$.08	767	773	778	784	789	795	801	806	812	818	829	840		
+09	\$.09	857	863	868	874	880	885	891	897	902	908	919	931		
+10	\$.10	947	953	959	964	970	976	981	987	993	998	1010	1021		
+12	\$.12	1128	1134	1139	1145	1151	1156	1162	1168	1173	1179	1190	1201		
50,000		\$ 462	530	598	665	727	795	863	931	998	1060	1196	1331		<--THEORETICAL HEATING COST - FURNACE ONLY
+03	\$.03	400	417	434	457	473	490	513	530	547	569	609	643		THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR
+04	\$.04	490	507	524	547	564	581	603	620	637	660	699	733		
+05	\$.05	575	592	609	631	648	665	688	705	722	744	784	818		
+06	\$.06	664	682	699	722	739	756	778	795	812	835	874	908		
+07	\$.07	750	767	784	806	823	840	863	880	897	919	959	993		
+08	\$.08	840	857	874	897	914	931	953	970	987	1010	1049	1083		
+09	\$.09	931	947	964	987	1004	1021	1043	1060	1077	1100	1139	1173		
+10	\$.10	1015	1032	1049	1072	1089	1105	1128	1145	1152	1184	1224	1258		
+12	\$.12	1195	1213	1230	1252	1269	1286	1309	1326	1342	1365	1405	1438		
60,000		\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596	<--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$.03	485	519	552	586	620	654	688	722	756	789	857	925	THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR	
+04	\$.04	569	603	637	671	705	739	773	806	840	874	942	1010		
+05	\$.05	654	688	722	756	789	823	857	891	925	959	1026	1094		
+06	\$.06	733	767	801	835	868	902	936	970	1004	1038	1105	1173		
+07	\$.07	818	852	885	919	953	987	1021	1055	1089	1122	1190	1258		
+08	\$.08	902	936	970	1004	1038	1072	1105	1139	1173	1207	1275	1342		
+09	\$.09	981	1015	1049	1083	1117	1151	1184	1218	1252	1286	1354	1421		
+10	\$.10	1066	1100	1134	1168	1201	1234	1269	1303	1337	1371	1438	1506		
+12	\$.12	1235	1269	1303	1337	1371	1405	1438	1472	1506	1540	1608	1675		
70,000		\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1852		<--THEORETICAL HEATING COST - FURNACE ONLY
+03	\$.03	558	598	637	677	716	756	795	835	874	914	993	1072		THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR
+04	\$.04	654	694	733	773	812	852	891	931	970	1010	1089	1168		
+05	\$.05	750	789	829	868	908	947	987	1026	1066	1105	1184	1263		
+06	\$.06	840	880	919	959	998	1038	1077	1117	1156	1196	1275	1354		
+07	\$.07	931	970	1015	1055	1094	1134	1173	1213	1252	1292	1371	1450		
+08	\$.08	1032	1072	1111	1154	1190	1230	1269	1309	1348	1388	1467	1546		
+09	\$.09	1128	1168	1207	1247	1286	1326	1365	1405	1444	1484	1563	1642		
+10	\$.10	1218	1258	1297	1337	1376	1416	1455	1495	1534	1574	1653	1732		
+12	\$.12	1410	1450	1489	1529	1568	1608	1647	1687	1726	1766	1845	1924		
80,000		\$ 744	852	959	1060	1168	1275	1382	1489	1596	1704	1918	2127	<--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$.03	665	721	789	857	919	981	1049	1111	1173	1235	1365	1489	THEORETICAL HEATING COST - FURN. + HEAT PUMP \$ PER YEAR	
+04	\$.04	770	801	863	931	993	1055	1122	1184	1247	1309	1438	1563		
+05	\$.05	878	880	942	1010	1072	1134	1201	1263	1326	1388	1517	1642		
+06	\$.06	891	923	1015	1083	1145	1207	1275	1337	1399	1461	1591	1715		
+07	\$.07	964	1026	1089	1156	1218	1280	1348	1410	1472	1534	1664	1788		
+08	\$.08	1038	1100	1162	1230	1292	1354	1421	1484	1546	1608	1737	1862		
+09	\$.09	1111	1173	1235	1303	1365	1427	1495	1557	1619	1681	1811	1935		
+10	\$.10	1184	1247	1309	1376	1438	1500	1568	1630	1692	1754	1884	2008		
+12	\$.12	1331	1393	1455	1523	1585	1647	1714	1777	1839	1901	2031	2155		

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	.03	.04	.05	.06	.07	.08	.10	.12	
\$	117	156	195	234	273	312	351	390	428
									<--ELECTRIC RATE \$/KWH
									<--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 8
 HEAT PUMP MODEL: OUTDOOR 36MBP3 INDOOR M3A2/M3A2L
 ARI RATED COOLING CAP.: BTUH 147 SEER 14.0 COP 4.1 2.65 MSPF 0.440 MIN.DHR REG TV
 ARI RATED HEATING CAP.: BTUH 117 COP 11.7
 FURNACE TYPE EUEL-DIL FURNACE EFFICIENCY .85, .903, .85WE

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON													
		1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.20	2.40		
40,000		\$ 767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839	←--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 332	338	338	344	349	355	355	361	366	372	378	389	THEORETICAL HEATING COST - FURN. + HEAT PUMP		
+04	\$ 428	434	434	440	445	451	451	457	462	468	473	485	% PER YEAR		
+05	\$ 524	530	530	536	541	547	547	552	558	564	569	581			
+06	\$ 620	631	631	637	643	648	648	654	660	665	671	682			
+07	\$ 722	727	727	733	739	744	744	750	756	762	767	778			
+08	\$ 818	823	823	829	835	840	840	846	852	857	863	874			
+09	\$ 919	924	924	931	936	942	942	947	953	959	964	976			
+10	\$ 1015	1021	1021	1026	1032	1038	1038	1043	1049	1055	1060	1072	BALANCE POINT 16 DEG.F.		
+12	\$ 1207	1213	1213	1218	1224	1230	1230	1235	1241	1247	1252	1263			
50,000		\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 428	440	445	457	462	473	485	490	502	519	536	542	THEORETICAL HEATING COST - FURN. + HEAT PUMP		
+04	\$ 541	552	558	569	575	586	598	603	618	631	648	665	% PER YEAR		
+05	\$ 654	665	671	682	688	699	710	716	727	744	761	778			
+06	\$ 767	778	784	795	801	812	823	829	840	857	874	891			
+07	\$ 880	891	897	908	914	925	936	942	953	970	987	1004			
+08	\$ 993	1004	1010	1021	1026	1038	1049	1055	1066	1083	1100	1117			
+09	\$ 1105	1117	1122	1134	1139	1151	1162	1168	1179	1196	1213	1230			
+10	\$ 1210	1230	1235	1247	1252	1263	1275	1280	1292	1309	1326	1342	BALANCE POINT 23 DEG.F.		
+12	\$ 1444	1455	1461	1472	1478	1489	1500	1506	1517	1534	1551	1568			
60,000		\$ 1151	1263	1387	1495	1613	1726	1839	1957	2070	2302	2533	2764	←--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 541	558	575	592	609	626	643	660	677	705	739	773	THEORETICAL HEATING COST - FURN. + HEAT PUMP		
+04	\$ 655	682	699	716	733	750	767	784	801	829	863	897	% PER YEAR		
+05	\$ 769	806	823	840	857	874	891	908	925	953	987	1021			
+06	\$ 914	931	947	964	981	998	1015	1032	1049	1077	1111	1145			
+07	\$ 1038	1055	1072	1089	1105	1122	1139	1156	1173	1201	1235	1269			
+08	\$ 1162	1179	1196	1213	1230	1247	1263	1280	1297	1326	1359	1393			
+09	\$ 1292	1309	1326	1342	1359	1376	1393	1410	1427	1455	1489	1523			
+10	\$ 1416	1433	1450	1467	1484	1500	1517	1534	1551	1579	1613	1647			
+12	\$ 1664	1681	1698	1715	1732	1749	1766	1783	1800	1828	1862	1895	BALANCE POINT 27 DEG.F.		
70,000		\$ 1342	1478	1613	1743	1878	2014	2149	2285	2420	2685	2956	3227	←--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 660	688	716	739	767	795	818	846	869	925	976	1026	THEORETICAL HEATING COST - FURN. + HEAT PUMP		
+04	\$ 795	823	852	874	902	931	953	981	1004	1060	1111	1162	% PER YEAR		
+05	\$ 931	959	987	1010	1038	1066	1089	1117	1139	1196	1247	1297			
+06	\$ 1066	1094	1122	1145	1173	1201	1224	1252	1275	1331	1382	1433			
+07	\$ 1201	1230	1258	1280	1309	1337	1359	1388	1417	1467	1517	1568			
+08	\$ 1337	1365	1393	1416	1444	1472	1495	1523	1546	1602	1653	1704			
+09	\$ 1467	1495	1523	1546	1574	1602	1625	1653	1676	1732	1783	1834			
+10	\$ 1602	1630	1658	1681	1709	1737	1760	1788	1811	1867	1918	1969			
+12	\$ 1873	1901	1929	1952	1980	2008	2031	2059	2082	2138	2189	2240	BALANCE POINT 31 DEG.F.		
80,000		\$ 1534	1687	1839	1997	2149	2302	2454	2612	2764	3069	3379	3684	←--THEORETICAL HEATING COST - FURNACE ONLY	
+03	\$ 812	852	891	931	970	1010	1049	1089	1128	1207	1286	1365	THEORETICAL HEATING COST - FURN. + HEAT PUMP		
+04	\$ 953	993	1032	1072	1111	1151	1190	1230	1269	1348	1427	1506	% PER YEAR		
+05	\$ 1094	1134	1173	1213	1252	1292	1331	1371	1410	1489	1568	1647			
+06	\$ 1235	1275	1314	1354	1393	1433	1472	1512	1551	1630	1709	1788			
+07	\$ 1376	1416	1455	1495	1534	1574	1613	1653	1692	1771	1850	1929			
+08	\$ 1517	1557	1596	1636	1675	1715	1754	1794	1833	1912	1991	2070			
+09	\$ 1653	1692	1732	1771	1811	1850	1890	1929	1969	2048	2127	2206			
+10	\$ 1794	1833	1873	1912	1952	1991	2031	2070	2110	2189	2268	2347			
+12	\$ 2076	2115	2155	2194	2234	2273	2313	2352	2392	2471	2550	2629	BALANCE POINT 34 DEG.F.		

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	
	\$ 117	156	195	234	273	312	351	390	468	←--ELECTRIC RATE \$/KWH
										←--THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERNS.

BARD MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
HEAT PUMP MODEL: OUTDOOR 42HPD INDOOR H220
A/R RATED COOLING CAP.: BTUH 195 7-27000 SEER 9.00
A/R RATED HEATING CAP.: BTUH 147 3-21200 COP 2.70 45PF 0.25 MIN. DHR REG IV
FURNACE TYPE ELECTRIC --- FURNACE EFFICIENCY 100.00% AFUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST WITH ELECTRIC HEAT	ANNUAL HEATING COST ELECTRIC HEAT ONLY	
40,000				
+03	\$	332	603	
+04	\$	440	806	
+05	\$	547	1010	
+06	\$	656	1213	
+07	\$	773	1416	
+08	\$	885	1619	
+09	\$	993	1822	
+10	\$	1105	2025	BALANCE POINT 17 DEG.F.
+12	\$	1320	2431	

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST WITH ELECTRIC HEAT	ANNUAL HEATING COST ELECTRIC HEAT ONLY	
50,000				
+03	\$	417	756	
+04	\$	552	1010	
+05	\$	688	1263	
+06	\$	827	1517	
+07	\$	964	1771	
+08	\$	1105	2025	
+09	\$	1241	2279	
+10	\$	1382	2533	BALANCE POINT 23 DEG.F.
+12	\$	1658	3041	

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST WITH ELECTRIC HEAT	ANNUAL HEATING COST ELECTRIC HEAT ONLY	
60,000				
+03	\$	502	908	
+04	\$	671	1213	
+05	\$	840	1517	
+06	\$	1004	1822	
+07	\$	1173	2127	
+08	\$	1342	2431	
+09	\$	1512	2735	
+10	\$	1681	3041	BALANCE POINT 27 DEG.F.
+12	\$	2014	3650	

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST WITH ELECTRIC HEAT	ANNUAL HEATING COST ELECTRIC HEAT ONLY	
70,000				
+03	\$	598	1060	
+04	\$	806	1416	
+05	\$	1004	1771	
+06	\$	1207	2127	
+07	\$	1405	2482	
+08	\$	1602	2838	
+09	\$	1805	3193	
+10	\$	2008	3549	BALANCE POINT 31 DEG.F.
+12	\$	2409	4260	

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST WITH ELECTRIC HEAT	ANNUAL HEATING COST ELECTRIC HEAT ONLY	
80,000				
+03	\$	710	1213	
+04	\$	953	1619	
+05	\$	1190	2025	
+06	\$	1427	2431	
+07	\$	1664	2838	
+08	\$	1901	3244	
+09	\$	2138	3650	
+10	\$	2375	4057	BALANCE POINT 34 DEG.F.
+12	\$	2849	4869	

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

\$	+03	+04	+05	+06	+07	+08	+09	+10	+12	
	127	170	212	255	297	340	382	425	510	
										←-ELECTRIC RATE \$/KWH
										←-THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4 HEAT PUMP MODEL: OUTDOOR 2HP2 (INDOOR MS20)
 AIR RATED COOLING CAP.: BTUH 750 SEER 8.400
 AIR RATED HEATING CAP.: BTUH 147 COP 1.7 MSOP 6.225 MIN. DMR REG. TV
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY .85 QRS AEUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	NATURAL GAS COST - \$/THERM														
		.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00			
60,000		\$ 372	423	479	530	581	637	688	744	795	852	909	1060	---THEORETICAL HEATING COST = FURNACE ONLY		
+03	\$	321	332	344	355	361	372	383	394	400	411	434	451	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR		
+04	\$	400	411	423	434	440	451	462	473	479	490	513	530			
+05	\$	485	496	507	519	524	536	547	558	564	575	598	615			
+06	\$	565	581	592	603	609	620	631	643	648	660	682	699			
+07	\$	654	665	677	688	694	705	716	727	733	744	767	784			
+08	\$	739	750	761	773	778	789	801	812	818	829	852	868			
+09	\$	823	835	846	857	863	874	885	897	902	914	936	953			
+10	\$	908	919	931	942	947	959	970	981	987	998	1021	1038			
+12	\$	1072	1083	1094	1105	1111	1122	1134	1145	1151	1162	1184	1201		BALANCE POINT 17 DEG.F.	
50,000		\$ 462	530	598	665	727	795	863	931	999	1060	1196	1331		---THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$	400	417	434	457	473	490	513	530	547	569	609	643		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$	490	507	524	547	564	581	603	620	637	660	699	733			
+05	\$	581	598	615	637	654	671	694	710	727	750	789	823			
+06	\$	665	682	699	722	739	756	778	795	812	835	874	908			
+07	\$	756	773	789	812	829	846	868	885	902	925	964	998			
+08	\$	846	863	880	902	919	936	959	976	993	1015	1054	1088			
+09	\$	931	947	964	987	1004	1021	1043	1060	1077	1100	1139	1173			
+10	\$	1021	1038	1055	1077	1094	1113	1134	1151	1168	1190	1230	1263			
+12	\$	1196	1213	1230	1242	1269	1286	1309	1326	1342	1365	1405	1438	BALANCE POINT 23 DEG.F.		
40,000		\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596	---THEORETICAL HEATING COST = FURNACE ONLY		
+03	\$	485	519	552	586	620	654	688	722	756	789	857	925	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR		
+04	\$	569	603	637	671	705	739	773	806	840	874	942	1010			
+05	\$	648	682	716	750	784	818	852	885	919	953	1021	1089			
+06	\$	733	767	801	835	868	902	936	970	1004	1038	1106	1173			
+07	\$	818	852	886	919	953	987	1021	1055	1089	1122	1190	1258			
+08	\$	897	931	964	998	1032	1066	1100	1134	1168	1201	1269	1337			
+09	\$	981	1015	1049	1083	1117	1151	1184	1218	1252	1286	1354	1421			
+10	\$	1066	1100	1134	1168	1201	1235	1269	1303	1337	1371	1438	1506			
+12	\$	1230	1263	1297	1331	1365	1399	1433	1467	1500	1534	1602	1670		BALANCE POINT 27 DEG.F.	
30,000		\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862		---THEORETICAL HEATING COST = FURNACE ONLY	
+03	\$	558	598	637	677	716	756	795	837	874	914	993	1072		THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR	
+04	\$	654	694	733	773	812	852	891	931	970	1010	1089	1168			
+05	\$	744	784	823	863	902	942	981	1021	1060	1100	1179	1258			
+06	\$	843	880	919	959	998	1038	1077	1117	1156	1196	1275	1354			
+07	\$	936	976	1015	1055	1094	1134	1173	1213	1252	1292	1371	1450			
+08	\$	1032	1072	1111	1151	1190	1230	1269	1309	1348	1388	1467	1546			
+09	\$	1122	1162	1201	1241	1280	1320	1359	1399	1438	1478	1557	1636			
+10	\$	1218	1258	1297	1337	1376	1416	1455	1495	1534	1574	1653	1732			
+12	\$	1405	1444	1484	1523	1563	1602	1642	1681	1721	1760	1839	1918	BALANCE POINT 31 DEG.F.		
20,000		\$ 744	852	959	1060	1168	1275	1382	1489	1596	1704	1918	2127	---THEORETICAL HEATING COST = FURNACE ONLY		
+03	\$	665	727	789	857	919	981	1049	1111	1173	1235	1365	1489	THEORETICAL HEATING COST = FURN. + HEAT PUMP \$ PER YEAR		
+04	\$	739	801	863	931	993	1055	1122	1184	1247	1309	1438	1563			
+05	\$	812	874	936	1004	1066	1128	1196	1258	1320	1382	1512	1636			
+06	\$	885	947	1010	1077	1139	1201	1269	1331	1393	1455	1585	1709			
+07	\$	959	1021	1083	1151	1213	1275	1342	1405	1467	1529	1658	1783			
+08	\$	1032	1094	1156	1224	1286	1348	1416	1478	1540	1602	1732	1856			
+09	\$	1100	1162	1224	1292	1354	1416	1484	1546	1608	1670	1800	1924			
+10	\$	1173	1235	1297	1365	1427	1489	1557	1619	1681	1743	1873	1997			
+12	\$	1320	1382	1444	1512	1574	1636	1704	1766	1829	1890	2020	2144		BALANCE POINT 34 DEG.F.	

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12	---ELECTRIC RATE \$/KWH	
	\$ 127	170	212	255	297	340	382	425	510	---THEORETICAL AIR CONDITIONING COST	

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR_52HPD INDOOR_M54D
 ARI RATED COOLING CAP: BTUH (17) 52500 SEER 8.00
 ARI RATED HEATING CAP: BTUH (47) 51500 COP (47) 2.10 MSPR_R422S MIN_OHR REG IV
 BTUH (17) 24000 COP (17) 1.80
 FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY .650008.8EVE

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPANE GAS COST - \$/GALLON													
		.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10	1.20			
40,000	\$	699	756	818	874	936	993	1049	1111	1168	1266	1405	1405	---THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$	338	364	349	349	345	361	361	366	366	378	383	383	THEORETICAL HEATING COST * FURN. + HEAT PUMP	
+04	\$	434	440	445	445	451	457	457	462	462	473	479	479	\$ PER YEAR	
+05	\$	536	541	547	547	552	556	556	564	564	579	581	581		
+06	\$	631	637	643	643	648	654	654	660	660	671	671	671		
+07	\$	733	739	746	746	750	756	756	761	761	773	778	778		
+08	\$	835	840	846	846	852	857	857	863	863	874	880	880		
+09	\$	931	936	942	942	947	953	953	959	959	970	976	976		
+10	\$	1037	1038	1043	1043	1049	1055	1055	1060	1060	1072	1077	1077	BALANCE POINT 17 DEG.F.	
+12	\$	1230	1235	1241	1241	1247	1252	1252	1258	1258	1269	1275	1275		
50,000	\$	874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754	---THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$	434	460	445	457	462	469	479	485	490	507	519	519	THEORETICAL HEATING COST * FURN. + HEAT PUMP	
+04	\$	547	552	558	569	575	581	581	586	603	620	631	631	\$ PER YEAR	
+05	\$	660	665	671	682	688	694	705	710	716	733	744	744		
+06	\$	778	784	789	801	806	812	823	829	835	852	863	863		
+07	\$	891	897	902	914	919	925	936	942	947	964	976	976		
+08	\$	1004	1010	1015	1026	1032	1038	1049	1055	1060	1077	1089	1089		
+09	\$	1122	1128	1134	1145	1151	1156	1168	1173	1179	1196	1207	1207		
+10	\$	1235	1241	1247	1258	1263	1269	1280	1286	1292	1309	1320	1320	BALANCE POINT 23 DEG.F.	
+12	\$	1467	1472	1478	1489	1495	1500	1512	1517	1523	1540	1551	1551		
60,000	\$	1049	1139	1230	1314	1405	1489	1579	1664	1754	1929	2104	2104	---THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$	530	547	558	569	566	598	609	620	637	660	688	688	THEORETICAL HEATING COST * FURN. + HEAT PUMP	
+04	\$	640	677	688	699	716	727	739	750	767	789	818	818	\$ PER YEAR	
+05	\$	764	801	812	823	840	852	863	874	891	914	942	942		
+06	\$	914	931	942	953	970	981	993	1004	1021	1043	1072	1072		
+07	\$	1038	1055	1066	1077	1094	1105	1117	1128	1145	1168	1196	1196		
+08	\$	1168	1184	1195	1207	1224	1235	1247	1258	1275	1299	1326	1326		
+09	\$	1292	1309	1320	1331	1348	1359	1371	1382	1399	1421	1450	1450		
+10	\$	1421	1438	1450	1461	1478	1489	1500	1512	1523	1540	1551	1551	BALANCE POINT 27 DEG.F.	
+12	\$	1675	1692	1704	1715	1732	1743	1754	1766	1783	1804	1833	1833		
70,000	\$	1230	1331	1433	1534	1636	1737	1849	1946	2048	2251	2460	2460	---THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$	648	671	688	710	727	750	773	789	812	852	891	891	THEORETICAL HEATING COST * FURN. + HEAT PUMP	
+04	\$	789	812	829	852	868	891	914	931	953	993	1032	1032	\$ PER YEAR	
+05	\$	925	947	964	987	1004	1026	1049	1066	1089	1128	1168	1168		
+06	\$	1060	1083	1100	1122	1159	1199	1247	1293	1337	1399	1453	1453		
+07	\$	1196	1218	1235	1258	1299	1347	1392	1437	1483	1552	1621	1621		
+08	\$	1331	1354	1371	1393	1430	1472	1517	1563	1609	1694	1774	1774		
+09	\$	1467	1489	1506	1529	1566	1608	1653	1700	1743	1845	1929	1929		
+10	\$	1602	1625	1642	1664	1681	1704	1726	1743	1766	1805	1845	1845	BALANCE POINT 31 DEG.F.	
+12	\$	1878	1901	1918	1941	1957	1980	2003	2020	2042	2082	2121	2121		
80,000	\$	1405	1517	1636	1754	1873	1986	2104	2223	2341	2573	2810	2810	---THEORETICAL HEATING COST * FURNACE ONLY	
+03	\$	784	812	845	874	902	931	964	993	1021	1083	1139	1139	THEORETICAL HEATING COST * FURN. + HEAT PUMP	
+04	\$	925	953	987	1015	1043	1072	1108	1134	1162	1224	1280	1280	\$ PER YEAR	
+05	\$	1066	1094	1128	1156	1184	1213	1247	1275	1303	1365	1421	1421		
+06	\$	1213	1241	1275	1303	1331	1359	1393	1421	1450	1512	1568	1568		
+07	\$	1345	1373	1416	1444	1472	1500	1534	1563	1591	1653	1709	1709		
+08	\$	1495	1523	1567	1605	1633	1662	1695	1724	1752	1815	1850	1850		
+09	\$	1636	1664	1698	1726	1754	1783	1816	1845	1873	1935	1991	1991		
+10	\$	1783	1811	1845	1873	1901	1929	1963	1991	2020	2082	2138	2138	BALANCE POINT 34 DEG.F.	
+12	\$	2065	2093	2127	2155	2183	2211	2245	2273	2302	2364	2420	2420		

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	+03	+04	+05	+06	+07	+08	+09	+10	+12		
	\$	129	190	212	233	247	340	382	425	510	---ELECTRIC RATE \$/KWH
											---THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 48HPOZ INDOOR H550
 ARI RATED COOLING CAP.: BTUH 785 1-15500 SEER 8-10
 ARI RATED HEATING CAP.: BTUH 147 1-15000 COP 1.7-2.20 HSPF 6-15 MIN. OMR REG IV
 BTUH (17) 2600 COP 1.7-1.85
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100% 003-AEVE

HEAT LOSS
 BTUH
 ELEC.
 COST
 \$/KWH

40,000

--- THEORETICAL ANNUAL HEATING COST ---
 HEAT PUMP WITH ELECTRIC HEAT ELECTRIC HEAT ONLY

.03	\$	338	603
.04	\$	451	806
.05	\$	528	1010
.06	\$	671	1213
.07	\$	789	1416
.08	\$	897	1619
.09	\$	1010	1822
.10	\$	1122	2025
.12	\$	1348	2431

BALANCE POINT 15 DEG.F.

50,000

--- THEORETICAL ANNUAL HEATING COST ---
 HEAT PUMP WITH ELECTRIC HEAT ELECTRIC HEAT ONLY

.03	\$	417	756
.04	\$	558	1010
.05	\$	694	1263
.06	\$	835	1517
.07	\$	976	1771
.08	\$	1111	2025
.09	\$	1242	2279
.10	\$	1393	2533
.12	\$	1670	3041

BALANCE POINT 20 DEG.F.

60,000

--- THEORETICAL ANNUAL HEATING COST ---
 HEAT PUMP WITH ELECTRIC HEAT ELECTRIC HEAT ONLY

.03	\$	502	908
.04	\$	671	1213
.05	\$	840	1517
.06	\$	1010	1822
.07	\$	1179	2127
.08	\$	1354	2431
.09	\$	1517	2736
.10	\$	1687	3041
.12	\$	2075	3690

BALANCE POINT 25 DEG.F.

70,000

--- THEORETICAL ANNUAL HEATING COST ---
 HEAT PUMP WITH ELECTRIC HEAT ELECTRIC HEAT ONLY

.03	\$	603	1040
.04	\$	801	1416
.05	\$	1004	1771
.06	\$	1207	2127
.07	\$	1410	2482
.08	\$	1608	2838
.09	\$	1811	3193
.10	\$	2008	3549
.12	\$	2404	4260

BALANCE POINT 29 DEG.F.

80,000

--- THEORETICAL ANNUAL HEATING COST ---
 HEAT PUMP WITH ELECTRIC HEAT ELECTRIC HEAT ONLY

.03	\$	705	1213
.04	\$	942	1619
.05	\$	1179	2025
.06	\$	1416	2431
.07	\$	1653	2838
.08	\$	1884	3244
.09	\$	2121	3650
.10	\$	2358	4057
.12	\$	2826	4869

BALANCE POINT 32 DEG.F.

90,000

--- THEORETICAL ANNUAL HEATING COST ---
 HEAT PUMP WITH ELECTRIC HEAT ELECTRIC HEAT ONLY

.03	\$	818	1365
.04	\$	1100	1822
.05	\$	1371	2279
.06	\$	1642	2736
.07	\$	1918	3193
.08	\$	2189	3650
.09	\$	2465	4107
.10	\$	2742	4564
.12	\$	3289	5479

BALANCE POINT 35 DEG.F.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

	.03	.04	.05	.06	.07	.08	.09	.10	.12	
\$	137	183	229	275	321	367	413	459	551	
										←--ELECTRIC RATE \$/KWH
										←--THEORETICAL AIR CONDITIONING COST

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