

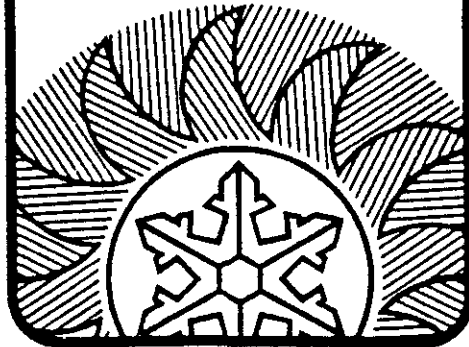
MANUAL 2100-072 B

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

REGION 4

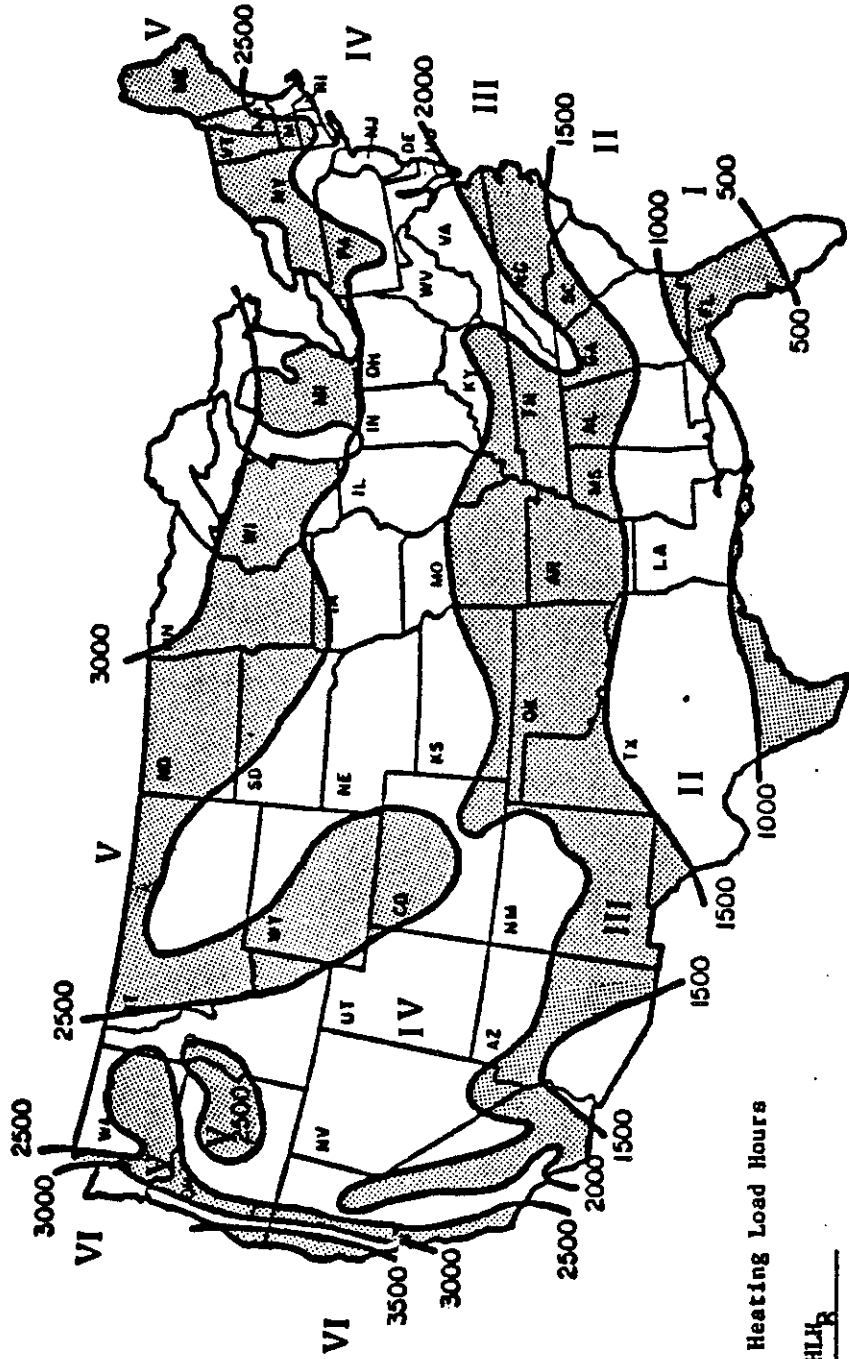
Bard[®]

**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.

TABLE OF CONTENTS

General Description

i

How To Use

ii

Heat Pump Outdoor Model	Heat Pump Indoor Model	Furnace Fuel	Furnace AFUE Efficiency Rating	Page
WQS30/WQSD30	H3AQ1	Electric	100%	1
		Natural Gas	65%	2
		Oil	65%	3
		Propane	65%	4
WQS36/WQSD36	H3AQ1	Electric	100%	5
		Natural Gas	65%	6
		Oil	65%	7
		Propane	65%	8
WQS50/WQSD50	H4AQ1	Electric	100%	9
		Natural Gas	65%	10
		Oil	65%	11
		Propane	65%	12
24HPQ4	H24QS1	Electric	100%	13
		Natural Gas	65%	14
		Oil	65%	15
		Propane	65%	16
30HPQ5	H3AQ1	Electric	100%	17
		Natural Gas	65%	18
		Oil	65%	19
		Propane	65%	20
36HPQ5	H3AQ1	Electric	100%	21
		Natural Gas	65%	22
		Oil	65%	23
		Propane	65%	24
36HPQ6	H3AQ1	Electric	100%	25
		Natural Gas	65%	26
		Oil	65%	27
		Propane	65%	28
42HPQ2	H4AQ1	Electric	100%	29
		Natural Gas	65%	30
		Oil	65%	31
		Propane	65%	32
48HPQ5	H4AQ1	Electric	100%	33
		Natural Gas	65%	34
		Oil	65%	35
		Propane	65%	36
60HPQ5	H5AQ1	Electric	100%	37
		Natural Gas	65%	38
		Oil	65%	39
		Propane	65%	40

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: 36HPQ5 w/H3AQ1 Indoor Coil

BARD MANUFACTURING COMPANY	
DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS	
REGION <u>4</u>	36HPQ5/H3AQ1
HEAT PUMP MODEL: <u>CUTDOOR 36HPQ5</u>	<u>INDOOR H3AQ1</u>
ARI RATED COOLING CAP.: BTUH (95) <u>36000</u> , SEER <u>7.50</u>	
ARI RATED HEATING CAP.: BTUH (47) <u>40500</u> , COP(47) <u>2.66</u>	
	BTUH (17) <u>24500</u> , COP(17) <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 36HPQ5 Bard heat pump with the oil furnace would be \$1139 for an annual savings of \$741 (\$1878 minus \$1139).

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 36HPQ5 heat pump has a balance point of 30 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

70,000	\$ 1342	1478	1613	1743	1878	2014	2149	2285	2420	2665	2956	3227	←←THEORETICAL HEATING COST • FURNACE ONLY
-03	\$ 648	671	694	722	744	773	795	823	846	877	907	938	THEORETICAL HEATING COST • FURN. • HEAT PUMP
-04	\$ 784	806	829	857	880	908	931	959	981	1032	1083	1134	\$ PER YEAR
-05	\$ 914	936	959	987	1010	1038	1060	1089	1111	1162	1213	1263	
-06	\$ 1043	1066	1087	1117	1139	1168	1190	1218	1241	1292	1342	1393	
-07	\$ 1179	1201	1224	1252	1275	1303	1326	1354	1376	1427	1478	1529	
-08	\$ 1309	1331	1354	1382	1405	1433	1455	1484	1506	1557	1607	1658	
-09	\$ 1438	1461	1484	1512	1534	1563	1585	1613	1636	1687	1737	1788	
-10	\$ 1574	1596	1617	1647	1677	1707	1729	1759	1771	1822	1873	1924	
-12	\$ 1839	1862	1884	1912	1935	1963	1985	2014	2036	2087	2138	2189	

BALANCE POINT 30 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 \$230.00 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	
\$	115	153	192	230	268	307	345	384	460	←←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.

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 BTUH	ELEC. COST \$/KWH	HEATING OIL COST - 1/2 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	1226	1303	1382	1534	1687	1839	←--THEORETICAL HEATING COST & FURNACE ONLY	
.03	\$ 327	332	332	338	344	349	349	355	361	366	372	383	THEORETICAL HEATING COST & FURN. + HEAT PUMP		
.04	\$ 417	423	423	428	434	440	440	445	451	457	462	473	\$ PER YEAR		
.05	\$ 513	519	519	524	530	536	536	541	547	552	558	569			
.06	\$ 609	615	615	620	626	631	631	637	643	648	654	665			
.07	\$ 705	710	710	716	722	727	727	733	739	744	750	761			
.08	\$ 801	806	806	812	818	823	823	829	835	840	846	857			
.09	\$ 897	902	902	908	914	919	919	925	931	936	942	953			
.10	\$ 987	991	993	998	1004	1010	1010	1015	1021	1026	1032	1043	BALANCE POINT 16 DEG.F.		
.12	\$ 1179	1184	1194	1199	1206	1201	1201	1207	1213	1218	1224	1235			
50,000		\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←--THEORETICAL HEATING COST & FURNACE ONLY	
.03	\$ 417	428	440	445	457	462	473	479	490	507	524	541	THEORETICAL HEATING COST & FURN. + HEAT PUMP		
.04	\$ 524	536	547	552	564	569	581	588	595	615	631	648	\$ PER YEAR		
.05	\$ 637	648	660	665	677	682	694	699	710	727	744	761			
.06	\$ 744	756	767	773	784	789	801	806	818	835	852	868			
.07	\$ 857	868	880	885	897	902	914	919	931	947	964	981			
.08	\$ 964	976	987	993	1004	1010	1021	1026	1038	1055	1072	1089			
.09	\$ 1077	1089	1100	1105	1117	1122	1134	1139	1151	1168	1184	1201			
.10	\$ 1190	1201	1213	1218	1230	1235	1247	1252	1263	1280	1297	1314	BALANCE POINT 22 DEG.F.		
.12	\$ 1410	1421	1433	1438	1450	1455	1467	1472	1484	1500	1517	1534			
60,000		\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←--THEORETICAL HEATING COST & FURNACE ONLY	
.03	\$ 519	536	552	569	581	598	615	626	643	677	705	739	THEORETICAL HEATING COST & FURN. + HEAT PUMP		
.04	\$ 643	660	677	694	705	722	739	750	767	801	829	863	\$ PER YEAR		
.05	\$ 767	784	801	818	829	846	863	874	891	925	953	987			
.06	\$ 891	908	925	942	953	970	987	998	1015	1049	1077	1111			
.07	\$ 1010	1026	1043	1060	1072	1089	1105	1117	1134	1169	1196	1230			
.08	\$ 1134	1151	1168	1184	1196	1213	1230	1241	1258	1292	1320	1354			
.09	\$ 1258	1275	1292	1309	1320	1337	1354	1375	1387	1418	1444	1478			
.10	\$ 1382	1399	1416	1433	1444	1461	1478	1499	1506	1540	1568	1602	BALANCE POINT 26 DEG.F.		
.12	\$ 1625	1642	1658	1675	1687	1704	1721	1732	1749	1783	1811	1845			
70,000		\$ 1342	1478	1613	1743	1878	2014	2149	2285	2420	2685	2956	3227	←--THEORETICAL HEATING COST & FURNACE ONLY	
.03	\$ 648	671	694	722	744	773	795	823	846	897	947	998	THEORETICAL HEATING COST & FURN. + HEAT PUMP		
.04	\$ 784	806	829	857	880	908	931	959	981	1032	1083	1134	\$ PER YEAR		
.05	\$ 914	936	959	987	1010	1038	1060	1089	1111	1162	1213	1263			
.06	\$ 1043	1065	1087	1115	1138	1166	1190	1218	1241	1292	1342	1393			
.07	\$ 1179	1201	1224	1252	1275	1303	1326	1354	1376	1427	1478	1529			
.08	\$ 1309	1331	1354	1382	1405	1433	1455	1484	1506	1557	1608	1658			
.09	\$ 1438	1461	1484	1512	1534	1563	1585	1613	1636	1687	1737	1788			
.10	\$ 1574	1596	1619	1647	1670	1698	1721	1749	1771	1822	1873	1924			
.12	\$ 1839	1862	1884	1912	1935	1963	1986	2014	2036	2087	2138	2199	BALANCE POINT 30 DEG.F.		
80,000		\$ 1534	1687	1839	1997	2149	2302	2454	2612	2764	3069	3374	3644	←--THEORETICAL HEATING COST & FURNACE ONLY	
.03	\$ 744	823	857	897	931	970	1004	1043	1077	1151	1224	1297	THEORETICAL HEATING COST & FURN. + HEAT PUMP		
.04	\$ 925	964	998	1038	1072	1111	1145	1184	1218	1292	1365	1438	\$ PER YEAR		
.05	\$ 1060	1109	1174	1173	1207	1247	1280	1320	1354	1427	1500	1574			
.06	\$ 1201	1241	1275	1314	1344	1388	1421	1461	1495	1568	1642	1715			
.07	\$ 1337	1376	1410	1450	1484	1523	1557	1596	1630	1704	1777	1850			
.08	\$ 1478	1517	1551	1591	1625	1664	1698	1737	1771	1845	1918	1991			
.09	\$ 1619	1658	1692	1732	1766	1805	1839	1878	1912	1986	2059	2132			
.10	\$ 1754	1794	1828	1867	1901	1941	1974	2014	2048	2121	2194	2268			
.12	\$ 2036	2076	2110	2149	2183	2223	2257	2296	2330	2403	2477	2550	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	←--ELECTRIC RATE \$/KWH				
		\$ 115	153	192	230	268	307	345	384	460	←--THEORETICAL AIR CONDITIONING COST				

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Figure 1.

REGION 4
 HEAT PUMP MODEL: COMPRESSOR SECTION 40530/40530 INDOOR HEAD
 COOLING CAPACITY AT 53 DEG.F. ENTERING WATER TEMP.: 12000 BTUH, 11.97 SEER
 HEATING CAPACITY AT 53 DEG.F. ENTERING WATER TEMP.: 25000 BTUH, 3.06 COP
 FURNACE TYPE ELECTRIC EFFICIENCY 100.00% AFUE

HEAT LOSS BTUH
 ELEC. COST \$/KWH

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST	
		HEAT PUMP WITH ELECTRIC HEAT	HEATING COST ONLY
30,000	.03	163	451
	.04	214	603
	.05	276	756
	.06	332	906
	.07	383	1060
	.08	440	1213
	.09	490	1365
	.10	547	1517
	.12	654	1822

BALANCE POINT 10- DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST	
		HEAT PUMP WITH ELECTRIC HEAT	HEATING COST ONLY
35,000	.03	186	530
	.04	253	705
	.05	315	885
	.06	378	1060
	.07	440	1241
	.08	502	1416
	.09	564	1596
	.10	631	1771
	.12	761	2127

BALANCE POINT 0 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST	
		HEAT PUMP WITH ELECTRIC HEAT	HEATING COST ONLY
40,000	.03	214	603
	.04	293	806
	.05	361	1010
	.06	434	1213
	.07	507	1416
	.08	575	1619
	.09	648	1822
	.10	722	2025
	.12	868	2431

BALANCE POINT 8 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST	
		HEAT PUMP WITH ELECTRIC HEAT	HEATING COST ONLY
50,000	.03	282	756
	.04	378	1010
	.05	473	1263
	.06	564	1517
	.07	660	1771
	.08	756	2025
	.09	852	2279
	.10	942	2533
	.12	1134	3041

BALANCE POINT 19 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL ANNUAL HEATING COST	
		HEAT PUMP WITH ELECTRIC HEAT	HEATING COST ONLY
60,000	.03	372	906
	.04	490	1213
	.05	615	1517
	.06	733	1822
	.07	863	2127
	.08	981	2431
	.09	1105	2736
	.10	1224	3041
	.12	1472	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
 \$.09 .92 115 136 161 185 209 231 277
 ← 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: COMPRESSOR SECTION 40S30/AD3D30 INDOOR DIA 41
 COOLING CAPACITY AT 33 DEG.F. ENTERING WATER TEMP.: 12000 BTUH, 11.07 SEER
 HEATING CAPACITY AT 33 DEG.F. ENTERING WATER TEMP.: 20000 BTUH, 3.06 COP
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% - 1.00%
 FURNACE TYPE NATURAL GAS

ELEC. COST \$/KWH .35 .40 .45 .50 .55 .60 .65 .70 .75 .80 .90 1.00
 NATURAL GAS COST - \$/THERM

HEAT LOSS BTUH	30,000	35,000	40,000	50,000	60,000
03	\$ 276	\$ 315	\$ 355	\$ 394	\$ 434
04	\$ 163	\$ 163	\$ 163	\$ 163	\$ 163
05	\$ 214	\$ 214	\$ 214	\$ 214	\$ 214
06	\$ 270	\$ 270	\$ 270	\$ 270	\$ 270
07	\$ 327	\$ 327	\$ 327	\$ 327	\$ 327
08	\$ 378	\$ 378	\$ 378	\$ 378	\$ 378
09	\$ 434	\$ 434	\$ 434	\$ 434	\$ 434
10	\$ 485	\$ 485	\$ 485	\$ 485	\$ 485
11	\$ 541	\$ 541	\$ 541	\$ 541	\$ 541
12	\$ 648	\$ 648	\$ 648	\$ 648	\$ 648

THEORETICAL HEATING COST \$ FURNACE ONLY	716	795	835	852	852
THEORETICAL HEATING COST \$ FURN. + HEAT PUMP \$ PER YEAR	169	163	191	191	191
BALANCE POINT 10- DEG.F.	654	648	648	648	648

HEAT LOSS BTUH	35,000	40,000	50,000	60,000
03	\$ 321	\$ 372	\$ 417	\$ 462
04	\$ 186	\$ 186	\$ 186	\$ 186
05	\$ 248	\$ 248	\$ 248	\$ 248
06	\$ 310	\$ 310	\$ 310	\$ 310
07	\$ 372	\$ 372	\$ 372	\$ 372
08	\$ 434	\$ 434	\$ 434	\$ 434
09	\$ 496	\$ 496	\$ 496	\$ 496
10	\$ 558	\$ 558	\$ 558	\$ 558
11	\$ 620	\$ 620	\$ 620	\$ 620
12	\$ 750	\$ 750	\$ 750	\$ 750

THEORETICAL HEATING COST \$ FURNACE ONLY	744	835	852	852
THEORETICAL HEATING COST \$ FURN. + HEAT PUMP \$ PER YEAR	191	191	191	191
BALANCE POINT 0 DEG.F.	756	756	756	756

HEAT LOSS BTUH	40,000	50,000	60,000
03	\$ 423	\$ 479	\$ 530
04	\$ 214	\$ 214	\$ 214
05	\$ 287	\$ 287	\$ 287
06	\$ 355	\$ 355	\$ 355
07	\$ 428	\$ 428	\$ 428
08	\$ 496	\$ 496	\$ 496
09	\$ 564	\$ 564	\$ 564
10	\$ 637	\$ 637	\$ 637
11	\$ 705	\$ 705	\$ 705
12	\$ 846	\$ 846	\$ 846

THEORETICAL HEATING COST \$ FURNACE ONLY	852	959	1060
THEORETICAL HEATING COST \$ FURN. + HEAT PUMP \$ PER YEAR	220	220	220
BALANCE POINT 8 DEG.F.	852	852	852

HEAT LOSS BTUH	50,000	60,000
03	\$ 530	\$ 598
04	\$ 270	\$ 270
05	\$ 355	\$ 355
06	\$ 440	\$ 440
07	\$ 519	\$ 519
08	\$ 603	\$ 603
09	\$ 688	\$ 688
10	\$ 773	\$ 773
11	\$ 852	\$ 852
12	\$ 1021	\$ 1021

THEORETICAL HEATING COST \$ FURNACE ONLY	1331	1596
THEORETICAL HEATING COST \$ FURN. + HEAT PUMP \$ PER YEAR	304	304
BALANCE POINT 19 DEG.F.	1043	1043

HEAT LOSS BTUH	60,000
03	\$ 716
04	\$ 349
05	\$ 440
06	\$ 524
07	\$ 609
08	\$ 694
09	\$ 778
10	\$ 852
11	\$ 937
12	\$ 1179

THEORETICAL HEATING COST \$ FURNACE ONLY	1596
THEORETICAL HEATING COST \$ FURN. + HEAT PUMP \$ PER YEAR	434
BALANCE POINT 27 DEG.F.	1269

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
 \$.69 .92 .115 .138 .161 .185 .208 .231 .277
 ---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.

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

REGION 4		HEAT PUMP MODEL: COMPRESSOR SECTION 40533/405D30 INDOOR H3A01											
HEAT LOSS BTU/H		COOLING CAPACITY AT 53 DEG.F. ENTERING WATER TEMP.: 12000 BTU/H, 11.07 SEER											
HEAT LOSS BTU/H		HEATING CAPACITY AT 31 DEG.F. ENTERING WATER TEMP.: 20000 BTU/H, 3.06 COP											
HEAT LOSS BTU/H		FURNACE EFFICIENCY 65.10% AFUE											
HEAT LOSS BTU/H		FURNACE TYPE FUEL OIL											
HEAT LOSS BTU/H		HEATING OIL COST - \$/GALLON											
HEAT LOSS BTU/H		1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 2.00 2.20 2.40											
03	\$ 575	631	688	744	806	863	919	976	1032	1151	1263	1382	←---THEORETICAL HEATING COST @ FURNACE ONLY
04	\$ 163	163	169	169	169	169	169	169	169	169	169	169	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
05	\$ 214	214	220	220	220	220	220	220	220	220	220	220	\$ PER YEAR
06	\$ 270	270	276	276	276	276	276	276	276	276	276	276	
07	\$ 327	327	332	332	332	332	332	332	332	332	332	332	
08	\$ 378	378	383	383	383	383	383	383	383	383	383	383	
09	\$ 434	434	440	440	440	440	440	440	440	440	440	440	
10	\$ 485	485	490	490	490	490	490	490	490	490	490	490	
11	\$ 541	541	547	547	547	547	547	547	547	547	547	547	BALANCE POINT 10- DEG.F.
12	\$ 648	648	654	654	654	654	654	654	654	654	654	654	
03	\$ 671	739	806	868	936	1004	1072	1139	1207	1342	1478	1613	←---THEORETICAL HEATING COST @ FURNACE ONLY
04	\$ 191	191	191	191	191	191	191	191	191	191	191	191	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
05	\$ 253	253	253	253	253	253	253	253	253	253	253	253	\$ PER YEAR
06	\$ 315	315	315	315	315	315	315	315	315	315	315	315	
07	\$ 378	378	378	378	378	378	378	378	378	378	378	378	
08	\$ 440	440	440	440	440	440	440	440	440	440	440	440	
09	\$ 502	502	502	502	502	502	502	502	502	502	502	502	
10	\$ 564	564	564	564	564	564	564	564	564	564	564	564	BALANCE POINT 0 DEG.F.
11	\$ 626	626	626	626	626	626	626	626	626	626	626	626	
12	\$ 756	756	756	756	756	756	756	756	756	756	756	756	
03	\$ 767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839	←---THEORETICAL HEATING COST @ FURNACE ONLY
04	\$ 214	220	220	220	220	220	220	220	220	220	220	220	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
05	\$ 267	293	293	293	293	293	293	293	293	293	293	293	\$ PER YEAR
06	\$ 355	361	361	361	361	361	361	361	361	361	361	361	
07	\$ 428	434	434	434	434	434	434	434	434	434	434	434	
08	\$ 496	502	502	502	502	502	502	502	502	502	502	502	
09	\$ 564	569	569	569	569	569	569	569	569	569	569	569	
10	\$ 637	643	643	643	643	643	643	643	643	643	643	643	BALANCE POINT 8 DEG.F.
11	\$ 705	710	710	710	710	710	710	710	710	710	710	710	
12	\$ 846	852	852	852	852	852	852	852	852	852	852	852	
03	\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←---THEORETICAL HEATING COST @ FURNACE ONLY
04	\$ 293	293	304	304	310	315	321	327	332	344	344	344	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
05	\$ 378	378	383	383	394	394	400	406	411	417	428	434	\$ PER YEAR
06	\$ 462	462	469	473	479	485	490	496	502	513	519	519	
07	\$ 541	541	547	552	558	564	569	575	581	592	598	598	
08	\$ 626	626	631	637	643	649	654	660	665	677	682	682	
09	\$ 710	710	716	722	727	733	739	744	750	761	767	767	
10	\$ 795	795	801	806	812	818	823	829	835	846	852	852	BALANCE POINT 19 DEG.F.
11	\$ 874	874	880	885	891	897	902	908	914	925	931	931	
12	\$ 1043	1043	1049	1055	1060	1066	1072	1077	1083	1094	1100	1100	
03	\$ 1151	1263	1342	1495	1613	1726	1839	1957	2070	2302	2533	2764	←---THEORETICAL HEATING COST @ FURNACE ONLY
04	\$ 394	406	417	428	440	451	462	473	485	502	524	547	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
05	\$ 485	496	507	519	530	541	552	564	575	592	615	637	\$ PER YEAR
06	\$ 581	592	603	615	626	637	648	660	671	688	710	733	
07	\$ 671	682	694	705	716	727	739	750	761	778	801	823	
08	\$ 767	778	789	801	812	823	835	846	857	874	897	919	
09	\$ 857	868	880	891	902	914	925	936	947	964	987	1010	
10	\$ 953	964	976	987	999	1010	1021	1032	1043	1060	1083	1105	BALANCE POINT 27 DEG.F.
11	\$ 1043	1055	1066	1077	1089	1100	1111	1122	1134	1151	1173	1196	
12	\$ 1230	1241	1252	1263	1275	1286	1297	1309	1320	1337	1359	1382	

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

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROANE GAS COST - 1/4 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	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.03	\$ 163	163	169	169	169	169	169	169	169	169	169	169	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.04	\$ 214	214	220	220	220	220	220	220	220	220	220	220	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.05	\$ 270	270	276	276	276	276	276	276	276	276	276	276	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.06	\$ 327	327	332	332	332	332	332	332	332	332	332	332	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.07	\$ 378	378	383	383	383	383	383	383	383	383	383	383	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.08	\$ 434	434	440	440	440	440	440	440	440	440	440	440	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.09	\$ 485	485	490	490	490	490	490	490	490	490	490	490	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.10	\$ 541	541	547	547	547	547	547	547	547	547	547	547	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.12	\$ 648	648	654	654	654	654	654	654	654	654	654	654	←---THEORETICAL HEATING COST @ FURNACE ONLY
35,000		\$ 615	665	716	767	818	868	919	970	1021	1122	1230	1230	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.03	\$ 191	191	191	191	191	191	191	191	191	191	191	191	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.04	\$ 253	253	253	253	253	253	253	253	253	253	253	253	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.05	\$ 315	315	315	315	315	315	315	315	315	315	315	315	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.06	\$ 378	378	378	378	378	378	378	378	378	378	378	378	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.07	\$ 440	440	440	440	440	440	440	440	440	440	440	440	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.08	\$ 502	502	502	502	502	502	502	502	502	502	502	502	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.09	\$ 564	564	564	564	564	564	564	564	564	564	564	564	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.10	\$ 626	626	626	626	626	626	626	626	626	626	626	626	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.12	\$ 756	756	756	756	756	756	756	756	756	756	756	756	←---THEORETICAL HEATING COST @ FURNACE ONLY
40,000		\$ 699	756	818	874	936	993	1049	1111	1168	1286	1405	1405	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.03	\$ 214	214	220	220	220	220	220	220	220	220	220	220	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.04	\$ 287	287	293	293	293	293	293	293	293	293	293	293	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.05	\$ 355	355	361	361	361	361	361	361	361	361	361	361	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.06	\$ 428	428	434	434	434	434	434	434	434	434	434	434	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.07	\$ 496	496	502	502	502	502	502	502	502	502	502	502	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.08	\$ 564	564	569	569	569	569	569	569	569	569	569	569	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.09	\$ 637	637	643	643	643	643	643	643	643	643	643	643	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.10	\$ 705	705	710	710	710	710	710	710	710	710	710	710	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.12	\$ 846	846	852	852	852	852	852	852	852	852	852	852	←---THEORETICAL HEATING COST @ FURNACE ONLY
50,000		\$ 874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.03	\$ 287	287	293	299	299	304	304	310	310	321	327	327	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.04	\$ 372	372	378	383	383	389	389	394	394	406	411	411	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.05	\$ 457	457	462	468	468	473	473	479	479	490	496	496	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.06	\$ 536	536	541	547	547	552	552	558	558	569	575	575	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.07	\$ 620	620	626	631	631	637	637	643	643	654	660	660	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.08	\$ 705	705	710	716	716	722	722	727	727	739	744	744	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.09	\$ 789	789	795	801	801	806	806	812	812	823	829	829	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.10	\$ 868	868	874	880	880	885	885	891	891	902	908	908	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.12	\$ 1038	1038	1043	1049	1049	1055	1055	1060	1060	1072	1077	1077	←---THEORETICAL HEATING COST @ FURNACE ONLY
60,000		\$ 1049	1139	1230	1314	1405	1489	1579	1664	1754	1929	2104	2104	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.03	\$ 383	394	400	411	417	428	434	445	451	468	485	485	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.04	\$ 473	485	490	502	507	519	524	530	541	558	575	575	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.05	\$ 569	581	586	598	603	615	620	631	637	654	671	671	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.06	\$ 660	671	677	688	694	705	710	722	727	744	761	761	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.07	\$ 756	767	773	784	789	801	806	818	823	840	857	857	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.08	\$ 846	857	863	874	880	891	897	908	914	931	947	947	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.09	\$ 942	953	959	970	976	987	993	1004	1010	1026	1043	1043	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.10	\$ 1032	1043	1049	1060	1066	1077	1083	1094	1100	1117	1134	1134	←---THEORETICAL HEATING COST @ FURNACE ONLY
	.12	\$ 1218	1230	1235	1247	1252	1263	1269	1280	1286	1303	1320	1320	←---THEORETICAL HEATING COST @ FURNACE ONLY

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

←---ELECTRIC RATE \$/KWH
←---THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE IN 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 ENCK JUST SAVINGS

REGION 4
 HEAT PUMP MODEL: COMPRESSOR SECTION 405316/405034 INDOOR DIAG 1
 COOLING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP.: 12000 BTUH, 10.21 SEER
 HEATING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP.: 3500 BTUH, 2.90 COP
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100% 00% AEVE

HEAT LOSS BTUH
 ELEC. COST \$/KWH

35,000

	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ELECTRIC HEAT ONLY
.03	\$ 197	530		
.04	\$ 265	705		
.05	\$ 332	885		
.06	\$ 400	1060		
.07	\$ 462	1241		
.08	\$ 530	1416		
.09	\$ 592	1596		
.10	\$ 660	1771		
.12	\$ 795	2127		

BALANCE POINT 14- DEG.F.

40,000

	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ELECTRIC HEAT ONLY
.03	\$ 220	603		
.04	\$ 304	806		
.05	\$ 378	1010		
.06	\$ 451	1213		
.07	\$ 524	1416		
.08	\$ 598	1619		
.09	\$ 671	1822		
.10	\$ 750	2025		
.12	\$ 902	2431		

BALANCE POINT 4- DEG.F.

50,000

	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ELECTRIC HEAT ONLY
.03	\$ 282	756		
.04	\$ 372	1010		
.05	\$ 468	1263		
.06	\$ 558	1517		
.07	\$ 654	1771		
.08	\$ 744	2025		
.09	\$ 840	2279		
.10	\$ 931	2533		
.12	\$ 1117	3041		

BALANCE POINT 9 DEG.F.

60,000

	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ELECTRIC HEAT ONLY
.03	\$ 344	908		
.04	\$ 462	1213		
.05	\$ 581	1517		
.06	\$ 700	1822		
.07	\$ 812	2127		
.08	\$ 925	2431		
.09	\$ 1033	2736		
.10	\$ 1156	3041		
.12	\$ 1388	3650		

BALANCE POINT 18 DEG.F.

70,000

	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ELECTRIC HEAT ONLY
.03	\$ 428	1060		
.04	\$ 569	1416		
.05	\$ 716	1771		
.06	\$ 857	2127		
.07	\$ 998	2482		
.08	\$ 1145	2836		
.09	\$ 1292	3193		
.10	\$ 1438	3549		
.12	\$ 1721	4260		

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
 \$ 86 115 144 173 202 231 260 289 347
 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.

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

REGION 4		HEAT PUMP MODEL - COMPRESSOR SECTION				INDOOR HEATING CAPACITY AT 37 DEG.F. ENTERING WATER TEMP. - 1000 BTUH, 10.21 SEER			
		MODEL # 319/4090/36				MODEL # 421/5211/36			
HEATING CAPACITY AT 37 DEG.F. ENTERING WATER TEMP. - 1000 BTUH, 10.21 SEER		FURNACE EFFICIENCY .65				FURNACE EFFICIENCY .65			
FURNACE TYPE NATURAL GAS		NATURAL GAS COST - \$/THERM							
ELEC. COST \$/KWH		.35 .40 .45 .50 .55 .60 .65 .70 .75 .80 .90 1.00							

HEAT LOSS BTUH	35,000	40,000	50,000	60,000	70,000
.03	\$ 321	\$ 423	\$ 479	\$ 530	\$ 581
.04	\$ 197	\$ 197	\$ 197	\$ 197	\$ 197
.05	\$ 259	\$ 259	\$ 259	\$ 259	\$ 259
.06	\$ 327	\$ 327	\$ 327	\$ 327	\$ 327
.07	\$ 394	\$ 394	\$ 394	\$ 394	\$ 394
.08	\$ 457	\$ 457	\$ 457	\$ 457	\$ 457
.09	\$ 524	\$ 524	\$ 524	\$ 524	\$ 524
.10	\$ 586	\$ 586	\$ 586	\$ 586	\$ 586
.12	\$ 784	\$ 784	\$ 784	\$ 784	\$ 784

HEATING COST \$	197	372	417	462	507	558	603	648	694	744	835	931
THEORETICAL HEATING COST \$ PER YEAR	203	203	203	203	203	203	203	203	203	203	203	203
THEORETICAL HEATING COST \$ PER YEAR	265	265	265	265	265	265	265	265	265	265	265	265
BALANCE POINT 14 - DEG.F.	400	400	400	400	400	400	400	400	400	400	400	400
BALANCE POINT 14 - DEG.F.	462	462	462	462	462	462	462	462	462	462	462	462
BALANCE POINT 14 - DEG.F.	524	524	524	524	524	524	524	524	524	524	524	524
BALANCE POINT 14 - DEG.F.	586	586	586	586	586	586	586	586	586	586	586	586
BALANCE POINT 14 - DEG.F.	660	660	660	660	660	660	660	660	660	660	660	660
BALANCE POINT 14 - DEG.F.	789	789	789	789	789	789	789	789	789	789	789	789

HEATING COST \$	220	220	220	220	220	225	225	225	225	225	225	225
THEORETICAL HEATING COST \$ PER YEAR	304	304	304	304	304	304	304	304	304	304	304	304
THEORETICAL HEATING COST \$ PER YEAR	378	378	378	378	378	378	378	378	378	378	378	378
BALANCE POINT 4 - DEG.F.	451	451	451	451	451	451	451	451	451	451	451	451
BALANCE POINT 4 - DEG.F.	524	524	524	524	524	524	524	524	524	524	524	524
BALANCE POINT 4 - DEG.F.	598	598	598	598	598	598	598	598	598	598	598	598
BALANCE POINT 4 - DEG.F.	671	671	671	671	671	671	671	671	671	671	671	671
BALANCE POINT 4 - DEG.F.	744	744	744	744	744	744	744	744	744	744	744	744
BALANCE POINT 4 - DEG.F.	897	897	897	897	897	897	897	897	897	897	897	897

HEATING COST \$	462	530	598	665	727	795	863	931	998	1060	1196	1331
THEORETICAL HEATING COST \$ PER YEAR	282	282	282	282	282	282	282	282	282	282	282	282
THEORETICAL HEATING COST \$ PER YEAR	372	372	372	372	372	372	372	372	372	372	372	372
BALANCE POINT 0 DEG.F.	462	462	462	462	462	462	462	462	462	462	462	462
BALANCE POINT 0 DEG.F.	524	524	524	524	524	524	524	524	524	524	524	524
BALANCE POINT 0 DEG.F.	598	598	598	598	598	598	598	598	598	598	598	598
BALANCE POINT 0 DEG.F.	671	671	671	671	671	671	671	671	671	671	671	671
BALANCE POINT 0 DEG.F.	744	744	744	744	744	744	744	744	744	744	744	744
BALANCE POINT 0 DEG.F.	919	919	919	919	919	919	919	919	919	919	919	919
BALANCE POINT 0 DEG.F.	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100

HEATING COST \$	538	637	716	795	874	959	1038	1117	1196	1275	1438	1596
THEORETICAL HEATING COST \$ PER YEAR	344	344	344	344	344	344	344	344	344	344	344	344
THEORETICAL HEATING COST \$ PER YEAR	462	462	462	462	462	462	462	462	462	462	462	462
BALANCE POINT 0 DEG.F.	538	538	538	538	538	538	538	538	538	538	538	538
BALANCE POINT 0 DEG.F.	600	600	600	600	600	600	600	600	600	600	600	600
BALANCE POINT 0 DEG.F.	671	671	671	671	671	671	671	671	671	671	671	671
BALANCE POINT 0 DEG.F.	744	744	744	744	744	744	744	744	744	744	744	744
BALANCE POINT 0 DEG.F.	919	919	919	919	919	919	919	919	919	919	919	919
BALANCE POINT 0 DEG.F.	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100

HEATING COST \$	648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862
THEORETICAL HEATING COST \$ PER YEAR	440	440	440	440	440	440	440	440	440	440	440	440
THEORETICAL HEATING COST \$ PER YEAR	575	575	575	575	575	575	575	575	575	575	575	575
BALANCE POINT 25 DEG.F.	648	648	648	648	648	648	648	648	648	648	648	648
BALANCE POINT 25 DEG.F.	710	710	710	710	710	710	710	710	710	710	710	710
BALANCE POINT 25 DEG.F.	784	784	784	784	784	784	784	784	784	784	784	784
BALANCE POINT 25 DEG.F.	908	908	908	908	908	908	908	908	908	908	908	908
BALANCE POINT 25 DEG.F.	1072	1072	1072	1072	1072	1072	1072	1072	1072	1072	1072	1072
BALANCE POINT 25 DEG.F.	1269	1269	1269	1269	1269	1269	1269	1269	1269	1269	1269	1269
BALANCE POINT 25 DEG.F.	1529	1529	1529	1529	1529	1529	1529	1529	1529	1529	1529	1529

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

HEATING COST \$.03	.04	.05	.06	.07	.08	.09	.10	.12
HEATING COST \$	115	134	173	202	231	260	289	347	

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMPARISON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERNS. ---ELECTRIC RATE \$/KWH ---THEORETICAL AIR CONDITIONING COST

BARD MANUFACTURING COMPA.

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

REGION 4
 HEAT PUMP MODEL: COMPRESSOR SECTION 40530/405036
 COOLING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP. = 170.00 BTU/H. 10.21 SEER
 HEATING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP. = 130.00 BTU/H. 10.21 COP
 FURNACE TYPE FUEL OIL
 INDOOR HEAT LOSS
 FURNACE EFFICIENCY 82.10%
 FURNACE TYPE OIL

HEAT LOSS RTU/H	HEATING OIL COST - \$/GALLON												
	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.40		
35,000	\$ 671	739	806	868	936	1004	1072	1139	1207	1342	1478	1613	←---THEORETICAL HEATING COST ± FURNACE ONLY
.03	\$ 203	203	203	203	203	203	203	203	203	203	203	203	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP \$ PER YEAR
.04	\$ 265	265	265	265	265	265	265	265	265	265	265	265	
.05	\$ 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	
.07	\$ 462	462	462	462	462	462	462	462	462	462	462	462	
.08	\$ 530	530	530	530	530	530	530	530	530	530	530	530	
.09	\$ 592	592	592	592	592	592	592	592	592	592	592	592	
.10	\$ 660	660	660	660	660	660	660	660	660	660	660	660	
.12	\$ 789	789	789	789	789	789	789	789	789	789	789	789	
40,000	\$ 767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839	←---THEORETICAL HEATING COST ± FURNACE ONLY
.03	\$ 225	225	225	225	225	225	225	225	225	225	225	225	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP \$ PER YEAR
.04	\$ 304	304	304	304	304	304	304	304	304	304	304	304	
.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	\$ 524	524	524	524	524	524	524	524	524	524	524	524	
.08	\$ 598	598	598	598	598	598	598	598	598	598	598	598	
.09	\$ 671	671	671	671	671	671	671	671	671	671	671	671	
.10	\$ 744	744	744	744	744	744	744	744	744	744	744	744	
.12	\$ 897	897	897	897	897	897	897	897	897	897	897	897	
50,000	\$ 959	1050	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←---THEORETICAL HEATING COST ± FURNACE ONLY
.03	\$ 282	282	282	282	282	282	282	282	282	282	282	282	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP \$ PER YEAR
.04	\$ 372	372	372	372	372	372	372	372	372	372	372	372	
.05	\$ 462	462	462	462	462	462	462	462	462	462	462	462	
.06	\$ 552	552	552	552	552	552	552	552	552	552	552	552	
.07	\$ 643	643	643	643	643	643	643	643	643	643	643	643	
.08	\$ 733	733	733	733	733	733	733	733	733	733	733	733	
.09	\$ 823	823	823	823	823	823	823	823	823	823	823	823	
.10	\$ 914	914	914	914	914	914	914	914	914	914	914	914	
.12	\$ 1094	1094	1094	1094	1094	1094	1094	1094	1094	1094	1094	1094	
60,000	\$ 1151	1263	1382	1495	1613	1726	1838	1957	2070	2302	2533	2764	←---THEORETICAL HEATING COST ± FURNACE ONLY
.03	\$ 355	361	366	372	378	383	389	394	399	400	411	417	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP \$ PER YEAR
.04	\$ 462	460	473	479	485	490	496	501	507	519	524	524	
.05	\$ 564	569	575	581	586	592	598	604	609	620	626	626	
.06	\$ 671	677	682	687	692	697	702	707	712	727	733	733	
.07	\$ 773	778	784	789	795	801	806	811	816	829	835	835	
.08	\$ 874	880	885	891	897	902	908	913	919	931	936	936	
.09	\$ 981	987	993	999	1004	1010	1015	1021	1026	1038	1043	1043	
.10	\$ 1083	1089	1094	1099	1105	1111	1117	1123	1128	1139	1145	1145	
.12	\$ 1292	1297	1303	1309	1314	1320	1326	1332	1337	1348	1354	1354	
70,000	\$ 1342	1478	1613	1743	1878	2014	2149	2285	2420	2685	2956	3227	←---THEORETICAL HEATING COST ± FURNACE ONLY
.03	\$ 451	462	473	485	495	507	519	530	536	558	581	603	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP \$ PER YEAR
.04	\$ 564	575	586	598	609	620	631	643	649	671	694	716	
.05	\$ 682	694	705	716	727	737	748	759	767	789	812	835	
.06	\$ 795	806	818	829	840	851	862	873	880	902	925	947	
.07	\$ 908	919	931	942	953	964	975	986	993	1015	1038	1060	
.08	\$ 1026	1038	1049	1060	1072	1083	1094	1105	1117	1139	1169	1194	
.09	\$ 1139	1151	1162	1173	1184	1196	1207	1218	1224	1247	1269	1292	
.10	\$ 1258	1269	1280	1292	1303	1314	1326	1337	1342	1365	1388	1410	
.12	\$ 1484	1495	1506	1517	1529	1540	1551	1563	1568	1591	1613	1636	

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
\$.86	115	144	173	202	231	260	289	347

←---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: COMPRESSOR SECTION 40536 W/SD 36
 COOLING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP. 31000 BTU/H. 10.21 SEER
 HEATING CAPACITY AT 31 DEG.F. ENTERING WATER TEMP. 33500 BTU/H. 2.36 COP
 FURNACE TYPE PROPANE 213 FURNACE EFFICIENCY 83.00% AFUE

HEAT LOSS BTU/H	ELEC. COST \$/KWH	PROPANE GAS COST - \$/GALLON	INDOOR BTU/H. 11.49	SEER 10.21	COP 2.36	EFFICIENCY 83.00%	AFUE
35,000	.60	.75	.80	.90	.95	1.00	1.10 1.20 1.20
	\$ 615	665	716	767	818	868	919 970 1021 1122 1230 1230 203 203 203
.03	\$ 197	203	203	203	203	203	203 203 203 203 203 203 203
.04	\$ 259	265	265	265	265	265	265 265 265 265 265 265 265
.05	\$ 327	332	332	332	332	332	332 332 332 332 332 332 332
.06	\$ 394	400	400	400	400	400	400 400 400 400 400 400 400
.07	\$ 457	462	462	462	462	462	462 462 462 462 462 462 462
.08	\$ 524	530	530	530	530	530	530 530 530 530 530 530 530
.09	\$ 586	592	592	592	592	592	592 592 592 592 592 592 592
.10	\$ 654	660	660	660	660	660	660 660 660 660 660 660 660
.12	\$ 784	789	789	789	789	789	789 789 789 789 789 789 789
40,000	\$ 699	756	818	874	936	993	1049 1111 1168 1286 1405 1405 1405
.03	\$ 225	225	225	225	225	225	225 225 225 225 225 225 225
.04	\$ 304	304	304	304	304	304	304 304 304 304 304 304 304
.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	\$ 524	524	524	524	524	524	524 524 524 524 524 524 524
.08	\$ 598	598	598	598	598	598	598 598 598 598 598 598 598
.09	\$ 671	671	671	671	671	671	671 671 671 671 671 671 671
.10	\$ 744	744	744	744	744	744	744 744 744 744 744 744 744
.12	\$ 897	897	897	897	897	897	897 897 897 897 897 897 897
50,000	\$ 974	947	1021	1094	1168	1241	1314 1388 1461 1608 1754 1754 1754
.03	\$ 282	282	282	282	282	282	282 282 282 282 282 282 282
.04	\$ 372	372	372	372	372	372	372 372 372 372 372 372 372
.05	\$ 462	462	462	462	462	462	462 462 462 462 462 462 462
.06	\$ 552	552	552	552	552	552	552 552 552 552 552 552 552
.07	\$ 643	643	643	643	643	643	643 643 643 643 643 643 643
.08	\$ 733	733	733	733	733	733	733 733 733 733 733 733 733
.09	\$ 823	823	823	823	823	823	823 823 823 823 823 823 823
.10	\$ 914	914	914	914	914	914	914 914 914 914 914 914 914
.12	\$ 1094	1094	1094	1094	1094	1094	1094 1094 1094 1094 1094 1094 1094
60,000	\$ 1049	1139	1210	1314	1405	1499	1579 1664 1754 1929 2104 2104 2104
.03	\$ 349	359	361	366	366	366	366 366 366 366 366 366 366
.04	\$ 457	462	468	473	473	473	473 473 473 473 473 473 473
.05	\$ 558	564	569	575	575	575	575 575 575 575 575 575 575
.06	\$ 665	671	677	682	682	682	682 682 682 682 682 682 682
.07	\$ 767	771	778	784	784	784	784 784 784 784 784 784 784
.08	\$ 868	874	880	885	885	885	885 885 885 885 885 885 885
.09	\$ 976	981	987	993	993	993	993 993 993 993 993 993 993
.10	\$ 1077	1083	1089	1094	1094	1094	1094 1094 1094 1094 1094 1094 1094
.12	\$ 1286	1292	1297	1303	1303	1303	1303 1303 1303 1303 1303 1303 1303
70,000	\$ 1230	1331	1433	1534	1636	1737	1845 1946 2048 2251 2460 2460 2460
.03	\$ 445	451	457	460	473	485	490 504 504 504 504 504 504
.04	\$ 558	564	569	575	575	575	575 575 575 575 575 575 575
.05	\$ 677	682	689	695	695	695	695 695 695 695 695 695 695
.06	\$ 789	795	801	812	818	825	825 825 825 825 825 825 825
.07	\$ 902	908	914	925	931	942	942 942 942 942 942 942 942
.08	\$ 1021	1026	1032	1043	1049	1060	1066 1077 1083 1100 1117 1117 1117
.09	\$ 1134	1139	1145	1156	1162	1173	1179 1190 1196 1213 1230 1230 1230
.10	\$ 1252	1258	1263	1275	1280	1292	1297 1309 1314 1318 1348 1348 1348
.12	\$ 1478	1484	1491	1500	1506	1517	1523 1534 1540 1557 1574 1574 1574

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

←--ELECTRIC RATE \$/KWH
 ←--THEORETICAL AIR CONDITIONING COST

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

REGION 4
 HEAT PUMP MODEL: COMPRESSOR SECTION 40559/403050 INDOOR HA AQ1
 COOLING CAPACITY AT 31 DEG.F. ENTERING WATER TEMP. 50000 BTUH, 11.3 SEER
 HEATING CAPACITY AT 31 DEG.F. ENTERING WATER TEMP. 50100 BTUH, 3.0 COP
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AEUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY
50,000	-.03	\$ 276	908	
	-.04	\$ 366	1213	
	-.05	\$ 457	1517	
	-.06	\$ 547	1822	
	-.07	\$ 631	2127	
	-.08	\$ 727	2431	
	-.09	\$ 818	2736	
	-.10	\$ 908	3041	
	-.12	\$ 1089	3650	

BALANCE POINT 7- DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY
60,000	-.03	\$ 321	908	
	-.04	\$ 434	1213	
	-.05	\$ 541	1517	
	-.06	\$ 648	1822	
	-.07	\$ 756	2127	
	-.08	\$ 863	2431	
	-.09	\$ 970	2736	
	-.10	\$ 1083	3041	
	-.12	\$ 1297	3650	

BALANCE POINT 5 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY
70,000	-.03	\$ 383	1060	
	-.04	\$ 507	1416	
	-.05	\$ 637	1771	
	-.06	\$ 767	2127	
	-.07	\$ 897	2482	
	-.08	\$ 1021	2838	
	-.09	\$ 1151	3193	
	-.10	\$ 1280	3549	
	-.12	\$ 1529	4260	

BALANCE POINT 13 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY
80,000	-.03	\$ 457	1213	
	-.04	\$ 603	1619	
	-.05	\$ 750	2025	
	-.06	\$ 908	2431	
	-.07	\$ 1060	2838	
	-.08	\$ 1207	3244	
	-.09	\$ 1359	3650	
	-.10	\$ 1517	4057	
	-.12	\$ 1816	4869	

BALANCE POINT 20 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY
90,000	-.03	\$ 536	1365	
	-.04	\$ 716	1822	
	-.05	\$ 897	2279	
	-.06	\$ 1072	2736	
	-.07	\$ 1252	3193	
	-.08	\$ 1433	3650	
	-.09	\$ 1613	4107	
	-.10	\$ 1788	4564	
	-.12	\$ 2149	5478	

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
 \$ 105 140 175 210 245 290 316 351 421
 <---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: COMPRESSOR SECTION 493550/803050 INDOOR MA01
 COOLING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP.: 5,000 BTUH, 11.9 SEER
 HEATING CAPACITY AT 51 DEG.F. ENTERING WATER TEMP.: 40,100 BTUH, 11.9 COP
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 85.0% SEUE

HEAT LOSS BTUH \$/KWH
 ELEC. COST \$/THERM
 NATURAL GAS COST - \$/THERM
 .35 .40 .45 .50 .55 .60 .65 .70 .75 .80 .90 1.00

50,000	\$ 462	530	598	665	727	795	863	931	998	1066	1136	1331	←---THEORETICAL HEATING COST @ FURNACE ONLY
.03	\$ 270	270	270	276	276	276	276	276	276	276	276	276	THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR
.04	\$ 361	361	361	366	366	366	366	366	366	366	366	366	
.05	\$ 451	451	451	457	457	457	457	457	457	457	457	457	
.06	\$ 541	541	541	547	547	547	547	547	547	547	547	547	
.07	\$ 626	626	626	631	631	631	631	631	631	631	631	631	
.08	\$ 716	716	716	722	722	722	722	722	722	722	722	722	
.09	\$ 806	806	806	812	812	812	812	812	812	812	812	812	
.10	\$ 897	897	897	902	902	902	902	902	902	902	902	902	
.12	\$ 1077	1077	1077	1083	1083	1083	1083	1083	1083	1083	1083	1083	BALANCE POINT 7- DEG.F.

60,000	\$ 558	637	716	795	874	959	1038	1117	1196	1275	1356	1596	←---THEORETICAL HEATING COST @ FURNACE ONLY
.03	\$ 321	321	321	321	321	321	321	321	321	321	321	321	THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR
.04	\$ 428	428	428	428	428	428	428	428	428	428	428	428	
.05	\$ 536	536	536	536	536	536	536	536	536	536	536	536	
.06	\$ 643	643	643	643	643	643	643	643	643	643	643	643	
.07	\$ 744	744	744	744	744	744	744	744	744	744	744	744	
.08	\$ 852	852	852	852	852	852	852	852	852	852	852	852	
.09	\$ 959	959	959	959	959	959	959	959	959	959	959	959	
.10	\$ 1066	1066	1066	1066	1066	1066	1066	1066	1066	1066	1066	1066	
.12	\$ 1275	1275	1275	1275	1275	1275	1275	1275	1275	1275	1275	1275	BALANCE POINT 5 DEG.F.

70,000	\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862	←---THEORETICAL HEATING COST @ FURNACE ONLY
.03	\$ 372	378	378	383	383	389	389	389	389	389	394	400	THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR
.04	\$ 490	496	496	502	502	507	507	507	507	507	513	519	
.05	\$ 615	620	620	626	626	631	631	631	631	631	637	643	
.06	\$ 733	739	739	744	744	750	750	750	750	750	756	761	
.07	\$ 857	863	863	868	868	874	874	874	874	874	880	885	
.08	\$ 976	981	981	987	987	993	993	993	993	993	998	1004	
.09	\$ 1094	1100	1100	1105	1105	1111	1111	1111	1111	1111	1117	1122	
.10	\$ 1219	1224	1224	1224	1230	1230	1235	1235	1235	1241	1247	1252	
.12	\$ 1455	1461	1461	1467	1467	1472	1472	1472	1472	1478	1484	1489	BALANCE POINT 13 DEG.F.

80,000	\$ 744	852	959	1060	1168	1275	1382	1489	1596	1704	1918	2127	←---THEORETICAL HEATING COST @ FURNACE ONLY
.03	\$ 434	440	445	451	451	457	462	468	473	479	485	496	THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR
.04	\$ 569	575	581	581	581	586	592	598	603	609	615	626	
.05	\$ 699	705	710	716	716	722	727	733	739	744	750	761	
.06	\$ 829	835	840	846	846	852	857	863	868	874	880	891	
.07	\$ 964	970	976	981	981	987	993	998	1004	1010	1015	1026	
.08	\$ 1094	1100	1105	1111	1111	1117	1122	1128	1134	1139	1145	1156	
.09	\$ 1230	1235	1241	1247	1247	1252	1258	1263	1269	1275	1280	1292	
.10	\$ 1365	1371	1376	1382	1382	1388	1393	1399	1405	1410	1416	1427	
.12	\$ 1630	1636	1642	1647	1647	1653	1658	1664	1670	1675	1681	1692	BALANCE POINT 20 DEG.F.

90,000	\$ 835	959	1077	1196	1314	1438	1557	1675	1794	1918	2155	2398	←---THEORETICAL HEATING COST @ FURNACE ONLY
.03	\$ 496	502	513	524	530	541	552	558	569	581	598	615	THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR
.04	\$ 643	648	660	671	677	688	699	705	716	727	744	761	
.05	\$ 789	799	801	818	825	840	857	868	874	885	902	920	
.06	\$ 925	931	942	953	959	970	981	987	998	1010	1026	1043	
.07	\$ 1072	1077	1089	1100	1105	1117	1128	1134	1145	1156	1173	1190	
.08	\$ 1218	1218	1230	1241	1247	1258	1267	1275	1286	1297	1314	1331	
.09	\$ 1359	1365	1376	1388	1393	1405	1416	1421	1433	1444	1478	1495	
.10	\$ 1500	1506	1517	1529	1534	1546	1557	1563	1574	1585	1602	1619	
.12	\$ 1788	1794	1805	1816	1822	1833	1845	1850	1862	1873	1890	1907	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
 \$ 105 140 175 210 245 280 316 351 421
 ←---ELECTRIC RATE \$/KWH
 ←---THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS 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.

BARO MANUFACTURING COMF

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

REGION 4		HEAT PUMP MODEL: COMPRESSOR SECTION W0550/W0350		INDOOR HEAT										
HEATING CAPACITY AT 33 DEG.F. ENTERING WATER TEMP.: 50.000 BTUH, 11.33 SEER		HEATING CAPACITY AT 33 DEG.F. ENTERING WATER TEMP.: 46.100 BTUH, 11.06 COP		BALANCE POINT 7- DEG.F.										
FURNACE TYPE FUEL OIL		FURNACE EFFICIENCY 55.00% AFUE		BALANCE POINT 13 DEG.F.										
HEATING OIL COST - \$/GALLON				BALANCE POINT 20 DEG.F.										
HEAT LOSS BTUH	ELEC. COST \$/KWH	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.20	2.40	
50,000	-03	\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←---THEORETICAL HEATING COST & FURNACE ONLY
	-04	\$ 276	366	366	276	276	276	276	276	276	276	282	282	THEORETICAL HEATING COST & FURN. → HEAT PUMP
	-05	\$ 457	457	457	457	457	457	457	457	457	457	462	462	\$ PER YEAR
	-06	\$ 547	547	547	547	547	547	547	547	547	547	552	552	
	-07	\$ 631	631	631	631	631	631	631	631	631	631	637	637	
	-08	\$ 722	722	722	722	722	722	722	722	722	722	727	727	
	-09	\$ 812	812	812	812	812	812	812	812	812	812	818	818	
	-10	\$ 902	902	902	902	902	902	902	902	902	902	908	908	
	-12	\$ 1083	1083	1083	1083	1083	1083	1083	1083	1083	1083	1089	1089	
60,000	-03	\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←---THEORETICAL HEATING COST & FURNACE ONLY
	-04	\$ 321	327	327	327	327	327	327	327	327	332	332	332	THEORETICAL HEATING COST & FURN. → HEAT PUMP
	-05	\$ 428	434	434	434	434	434	434	434	434	440	440	440	\$ PER YEAR
	-06	\$ 536	541	541	541	541	541	541	541	541	547	547	547	
	-07	\$ 643	648	648	648	648	648	648	648	648	654	654	654	
	-08	\$ 744	750	750	750	750	750	750	750	750	756	756	756	
	-09	\$ 852	857	857	857	857	857	857	857	857	863	863	863	
	-10	\$ 959	964	964	964	964	964	964	964	964	970	970	970	
	-12	\$ 1066	1072	1072	1072	1072	1072	1072	1072	1072	1077	1077	1077	
	-12	\$ 1275	1280	1280	1280	1280	1280	1280	1280	1280	1286	1286	1286	
70,000	-03	\$ 1342	1478	1613	1743	1978	2014	2149	2285	2420	2685	2956	3227	←---THEORETICAL HEATING COST & FURNACE ONLY
	-04	\$ 389	389	394	394	400	400	406	406	411	417	423	428	THEORETICAL HEATING COST & FURN. → HEAT PUMP
	-05	\$ 507	507	513	513	519	524	524	530	536	541	547	547	\$ PER YEAR
	-06	\$ 631	631	637	637	643	643	649	649	654	660	665	671	
	-07	\$ 750	750	756	756	761	761	767	767	773	778	784	789	
	-08	\$ 874	874	880	880	885	885	891	891	897	902	908	914	
	-09	\$ 993	993	998	998	1004	1004	1010	1010	1015	1021	1026	1032	
	-10	\$ 1111	1111	1117	1117	1122	1122	1128	1128	1134	1139	1145	1151	
	-12	\$ 1235	1235	1241	1241	1247	1247	1252	1252	1258	1263	1269	1275	
	-12	\$ 1472	1472	1478	1478	1484	1484	1489	1489	1495	1500	1506	1512	
80,000	-03	\$ 1534	1687	1839	1997	2149	2302	2454	2612	2764	3069	3379	3684	←---THEORETICAL HEATING COST & FURNACE ONLY
	-04	\$ 468	479	485	490	496	507	513	519	524	541	552	569	THEORETICAL HEATING COST & FURN. → HEAT PUMP
	-05	\$ 598	609	615	620	626	637	643	649	654	671	682	699	\$ PER YEAR
	-06	\$ 733	744	750	756	761	773	778	784	789	806	818	835	
	-07	\$ 863	874	880	885	891	902	908	914	919	936	947	964	
	-08	\$ 998	1010	1015	1021	1026	1032	1043	1049	1055	1072	1083	1100	
	-09	\$ 1128	1139	1145	1151	1156	1162	1173	1179	1184	1201	1213	1230	
	-10	\$ 1263	1275	1280	1286	1292	1303	1309	1314	1320	1337	1348	1365	
	-12	\$ 1399	1410	1416	1421	1427	1438	1444	1450	1455	1472	1484	1500	
	-12	\$ 1654	1675	1681	1687	1692	1704	1709	1715	1721	1737	1749	1766	
90,000	-03	\$ 1726	1901	2070	2245	2420	2599	2764	2939	3109	3456	3803	4147	←---THEORETICAL HEATING COST & FURNACE ONLY
	-04	\$ 564	575	592	603	615	631	643	660	671	699	727	750	THEORETICAL HEATING COST & FURN. → HEAT PUMP
	-05	\$ 710	722	739	750	761	778	789	806	818	846	874	897	\$ PER YEAR
	-06	\$ 852	863	880	891	902	919	931	947	959	987	1015	1038	
	-07	\$ 993	1004	1021	1032	1043	1060	1072	1089	1100	1124	1156	1179	
	-08	\$ 1139	1151	1168	1179	1190	1207	1218	1235	1247	1275	1303	1326	
	-09	\$ 1280	1292	1309	1320	1331	1348	1359	1376	1384	1416	1444	1467	
	-10	\$ 1427	1438	1455	1467	1478	1495	1506	1523	1534	1563	1591	1613	
	-12	\$ 1568	1579	1596	1608	1619	1636	1647	1664	1675	1704	1732	1754	
	-12	\$ 1856	1867	1884	1895	1907	1924	1935	1952	1963	1991	2020	2042	

ANNUAL A/C CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP

←---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: COMPRESSOR SECTION W0559/W0559
 HEATING CAPACITY AT 32 DEG.F. ENTERING WATER TEMP.: 50,000 BTUH, 11.39 SEER
 HEATING CAPACITY AT 32 DEG.F. ENTERING WATER TEMP.: 40,000 BTUH, 13.06 COP
 FURNACE TYPE: PROPRANE GAS FURNACE EFFICIENCY: 81.00% AFUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPRANE GAS COST - \$/GALLON	HEATING COST \$ PER YEAR	THEORETICAL HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR
50,000	-.60	-.75	-.80	-.85	-.90	-.95	1.00 1.10 1.20 1.20
-.03	\$ 674	947	1021	1094	1168	1241	1314 1388 1461 1608 1754 1754
-.04	\$ 276	276	276	276	276	276	276 276 276 276 276 276
-.05	\$ 366	366	366	366	366	366	366 366 366 366 366 366
-.06	\$ 457	457	457	457	457	457	457 457 457 457 457 457
-.07	\$ 547	547	547	547	547	547	547 547 547 547 547 547
-.08	\$ 631	631	631	631	631	631	631 631 631 631 631 631
-.09	\$ 722	722	722	722	722	722	722 722 722 722 722 722
-.10	\$ 812	812	812	812	812	812	812 812 812 812 812 812
-.12	\$ 1083	1083	1083	1083	1083	1083	1083 1083 1083 1083 1083 1083

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPRANE GAS COST - \$/GALLON	HEATING COST \$ PER YEAR	THEORETICAL HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR
60,000	-.60	-.75	-.80	-.85	-.90	-.95	1.00 1.10 1.20 1.20
-.03	\$ 1049	1139	1230	1314	1405	1489	1579 1664 1754 1929 2104 2104
-.04	\$ 321	327	327	327	327	327	327 327 327 327 327 327
-.05	\$ 426	428	434	434	434	434	434 434 434 434 434 434
-.06	\$ 536	536	541	541	541	541	541 541 541 541 541 541
-.07	\$ 643	643	648	648	648	648	648 648 648 648 648 648
-.08	\$ 744	744	750	750	750	750	750 750 750 750 750 750
-.09	\$ 852	852	857	857	857	857	857 857 857 857 857 857
-.10	\$ 959	959	964	964	964	964	964 964 964 964 964 964
-.12	\$ 1275	1275	1280	1280	1280	1280	1280 1280 1280 1280 1280 1280

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPRANE GAS COST - \$/GALLON	HEATING COST \$ PER YEAR	THEORETICAL HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR
70,000	-.60	-.75	-.80	-.85	-.90	-.95	1.00 1.10 1.20 1.20
-.03	\$ 1230	1331	1433	1534	1636	1737	1845 1946 2048 2251 2460 2460
-.04	\$ 383	389	394	394	394	394	394 394 394 394 394 394
-.05	\$ 502	507	513	513	513	513	513 513 513 513 513 513
-.06	\$ 626	631	637	637	637	637	637 637 637 637 637 637
-.07	\$ 744	750	756	756	756	756	756 756 756 756 756 756
-.08	\$ 868	874	880	880	880	880	880 880 880 880 880 880
-.09	\$ 987	993	998	998	998	998	998 998 998 998 998 998
-.10	\$ 1105	1111	1117	1117	1117	1117	1117 1117 1117 1117 1117 1117
-.12	\$ 1467	1472	1478	1478	1478	1478	1478 1478 1478 1478 1478 1478

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPRANE GAS COST - \$/GALLON	HEATING COST \$ PER YEAR	THEORETICAL HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR
80,000	-.60	-.75	-.80	-.85	-.90	-.95	1.00 1.10 1.20 1.20
-.03	\$ 1405	1517	1636	1754	1873	1986	2104 2223 2341 2573 2810 2810
-.04	\$ 462	468	473	479	485	490	496 502 507 519 530 530
-.05	\$ 592	598	603	609	615	620	626 631 637 643 648 648
-.06	\$ 727	733	739	744	750	756	761 767 773 778 784 784
-.07	\$ 857	863	869	874	880	885	891 897 902 908 914 914
-.08	\$ 993	999	1004	1010	1015	1021	1026 1032 1038 1049 1060 1060
-.09	\$ 1122	1128	1134	1139	1145	1151	1156 1162 1169 1179 1190 1190
-.10	\$ 1258	1263	1269	1275	1280	1286	1292 1297 1303 1314 1326 1326
-.12	\$ 1658	1664	1670	1675	1681	1687	1692 1698 1704 1715 1726 1726

HEAT LOSS BTUH	ELEC. COST \$/KWH	PROPRANE GAS COST - \$/GALLON	HEATING COST \$ PER YEAR	THEORETICAL HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR	HEATING COST \$ PER YEAR
90,000	-.60	-.75	-.80	-.85	-.90	-.95	1.00 1.10 1.20 1.20
-.03	\$ 1579	1709	1845	1974	2104	2240	2369 2499 2635 2894 3159 3159
-.04	\$ 552	564	575	581	592	603	615 620 631 631 654 677
-.05	\$ 699	710	722	727	739	750	761 773 778 784 801 823
-.06	\$ 840	852	863	868	880	891	902 914 919 926 942 964
-.07	\$ 981	993	1004	1010	1021	1032	1045 1055 1060 1063 1105 1105
-.08	\$ 1128	1139	1151	1156	1168	1179	1190 1201 1207 1230 1252 1252
-.09	\$ 1269	1280	1292	1297	1309	1320	1331 1342 1348 1371 1393 1393
-.10	\$ 1416	1427	1436	1444	1455	1467	1478 1489 1495 1517 1540 1540
-.12	\$ 1857	1866	1873	1884	1895	1907	1918 1924 1946 1969 1969 1969

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

← ELECTRIC RATE \$/KWH
 ← THEORETICAL AIR CONDITIONING COST

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

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 24H200
 HEAT RATED COOLING CAP.: BTUH(95) 23,000 SEER 7.50 INDOOR H2405L
 HEAT RATED HEATING CAP.: BTUH(17) 25,000 COP(17) 2.70 MSPF 0.135 MIN. OHR REG IV
 FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AEUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST
25,000	.03	\$ 203	378	378	378	378	378
	.04	\$ 270	502	502	502	502	502
	.05	\$ 338	631	631	631	631	631
	.06	\$ 400	756	756	756	756	756
	.07	\$ 473	885	885	885	885	885
	.08	\$ 536	1010	1010	1010	1010	1010
	.09	\$ 603	1139	1139	1139	1139	1139
	.10	\$ 671	1263	1263	1263	1263	1263
	.12	\$ 812	1517	1517	1517	1517	1517

BALANCE POINT 19 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST
30,000	.03	\$ 242	451	451	451	451	451
	.04	\$ 327	603	603	603	603	603
	.05	\$ 406	756	756	756	756	756
	.06	\$ 490	908	908	908	908	908
	.07	\$ 575	1060	1060	1060	1060	1060
	.08	\$ 648	1213	1213	1213	1213	1213
	.09	\$ 733	1365	1365	1365	1365	1365
	.10	\$ 818	1517	1517	1517	1517	1517
	.12	\$ 981	1822	1822	1822	1822	1822

BALANCE POINT 23 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST
35,000	.03	\$ 287	530	530	530	530	530
	.04	\$ 389	705	705	705	705	705
	.05	\$ 485	885	885	885	885	885
	.06	\$ 581	1060	1060	1060	1060	1060
	.07	\$ 677	1241	1241	1241	1241	1241
	.08	\$ 773	1416	1416	1416	1416	1416
	.09	\$ 874	1596	1596	1596	1596	1596
	.10	\$ 970	1771	1771	1771	1771	1771
	.12	\$ 1162	2127	2127	2127	2127	2127

BALANCE POINT 27 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST
40,000	.03	\$ 344	603	603	603	603	603
	.04	\$ 457	806	806	806	806	806
	.05	\$ 569	1010	1010	1010	1010	1010
	.06	\$ 682	1213	1213	1213	1213	1213
	.07	\$ 801	1416	1416	1416	1416	1416
	.08	\$ 914	1619	1619	1619	1619	1619
	.09	\$ 1026	1822	1822	1822	1822	1822
	.10	\$ 1145	2025	2025	2025	2025	2025
	.12	\$ 1371	2431	2431	2431	2431	2431

BALANCE POINT 30 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST	HEATING COST	ANNUAL HEATING COST
50,000	.03	\$ 457	756	756	756	756	756
	.04	\$ 609	1010	1010	1010	1010	1010
	.05	\$ 767	1263	1263	1263	1263	1263
	.06	\$ 914	1517	1517	1517	1517	1517
	.07	\$ 1066	1771	1771	1771	1771	1771
	.08	\$ 1224	2025	2025	2025	2025	2025
	.09	\$ 1376	2279	2279	2279	2279	2279
	.10	\$ 1529	2533	2533	2533	2533	2533
	.12	\$ 1833	3041	3041	3041	3041	3041

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
 \$ 72 96 120 144 168 192 216 240 288
 C---ELECTRIC RATE \$/KWH
 C---THEORETICAL AIR CONDITIONING COST

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BARD MANUFACTURING CO
 DUAL FUEL ADD-ON HEAT PUMP GUIDE TO RGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 24HP04 INDOOR H240E1
 HEAT RATED COOLING CAP.: BTU/HRS 21000 SEER 7.80
 ARI RATED HEATING CAP.: BTU/H (47) COP (47) 21000 COP (47) 21000
 FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 85.00 % A/EVE

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
25,000	.03		\$ 479	524	575	620	671	716	767	812	863	959	1055	1151
	.04		\$ 208	214	220	225	225	225	231	236	242	248	253	253
	.05		\$ 270	270	276	282	282	287	287	293	293	304	310	315
	.06		\$ 327	327	332	338	338	344	344	349	355	361	366	372
	.07		\$ 383	383	389	394	394	400	400	406	411	417	423	428
	.08		\$ 445	445	451	457	457	462	462	468	473	479	485	490
	.09		\$ 502	502	507	513	513	519	519	524	530	536	541	547
	.10		\$ 558	558	564	569	569	575	575	581	586	592	598	603
	.12		\$ 620	620	626	631	631	637	637	643	648	654	660	665
			\$ 739	739	744	750	750	756	756	761	767	773	778	784
30,000	.03		\$ 575	631	688	744	806	863	919	976	1032	1151	1263	1382
	.04		\$ 259	265	270	276	282	287	293	299	304	315	327	338
	.05		\$ 327	332	338	344	349	355	361	366	372	383	394	406
	.06		\$ 389	394	400	406	411	417	422	428	434	445	457	468
	.07		\$ 457	462	468	473	479	485	490	496	502	513	524	536
	.08		\$ 524	530	536	541	547	552	558	564	569	581	592	603
	.09		\$ 586	592	598	603	609	615	620	626	631	643	654	665
	.10		\$ 654	660	665	671	677	682	688	694	699	710	722	733
	.12		\$ 722	727	733	739	744	750	756	761	767	778	789	801
			\$ 852	857	863	868	874	880	885	891	897	908	919	931
35,000	.03		\$ 671	739	806	868	936	1004	1072	1139	1207	1342	1478	1613
	.04		\$ 310	315	327	338	344	355	366	372	383	400	423	440
	.05		\$ 383	389	400	411	417	428	445	457	473	496	513	530
	.06		\$ 457	462	473	485	490	502	513	519	530	547	569	586
	.07		\$ 530	536	547	558	564	575	586	592	603	620	643	660
	.08		\$ 598	603	615	626	631	643	654	660	671	688	710	727
	.09		\$ 671	677	688	699	705	716	727	733	744	761	784	801
	.10		\$ 744	750	761	773	778	789	801	806	818	835	857	874
	.12		\$ 818	823	835	846	852	863	874	880	891	908	931	947
			\$ 959	964	976	987	993	1004	1015	1021	1032	1049	1072	1089
40,000	.03		\$ 767	840	919	996	1072	1151	1224	1303	1382	1514	1687	1839
	.04		\$ 372	389	400	417	428	445	457	473	490	514	547	575
	.05		\$ 445	462	473	490	502	519	530	547	564	592	620	648
	.06		\$ 524	541	552	569	581	598	609	626	643	671	699	727
	.07		\$ 598	615	626	643	654	671	682	699	716	744	773	801
	.08		\$ 677	694	705	722	733	750	761	778	795	823	852	880
	.09		\$ 756	773	784	801	812	824	840	857	874	902	931	959
	.10		\$ 829	846	857	874	885	902	914	927	947	976	1004	1032
	.12		\$ 908	925	936	953	964	981	993	1010	1026	1055	1083	1111
			\$ 1060	1077	1089	1105	1117	1134	1145	1162	1179	1207	1235	1263
50,000	.03		\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302
	.04		\$ 513	536	564	592	615	643	671	694	722	778	829	880
	.05		\$ 598	620	648	677	699	727	756	778	806	863	914	964
	.06		\$ 682	705	733	761	784	812	840	863	891	947	998	1049
	.07		\$ 761	784	812	840	863	891	919	942	970	1026	1077	1128
	.08		\$ 846	868	897	925	947	976	1004	1026	1055	1111	1162	1213
	.09		\$ 931	953	981	1010	1032	1060	1089	1111	1139	1196	1247	1297
	.10		\$ 1015	1038	1066	1094	1117	1145	1173	1196	1224	1281	1331	1382
	.12		\$ 1094	1117	1145	1173	1196	1224	1252	1275	1303	1359	1410	1461
			\$ 1263	1286	1314	1342	1365	1393	1421	1444	1472	1529	1579	1630

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
 \$ 72 96 120 144 168 192 216 240 288

<---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 MODEL: OUTDOOR_24HP04 INDOOR H240S1
 HEAT PUMP CAP.: BTUH195 SEER 7.80
 ART RATED HEATING CAP.: BTUH (47) COP17 2.10 COP17 2.10 MSPF 6.33 MIN. OHR REG IV
 BTUH (17) COP17 1.90 FURNACE EFFICIENCY 55.00 % AEUE

HEAT LOSS BTUH 25,000 PROPANE GAS COST - \$/GALLON .75 .80 .85 .90 .95 1.00 1.10 1.20 1.20 1.20
 ELEC. COST \$/KWH .60 .65 .70 .75 .80 .85 .90 .95 1.00 1.10 1.20 1.20 1.20

		\$ 434	473	507	547	581	620	654	694	727	801	874	874	<---THEORETICAL HEATING COST @ FURNACE ONLY
+03	\$ 203	208	214	220	226	232	238	244	250	256	262	268	274	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
+04	\$ 265	270	276	282	288	294	300	306	312	318	324	330	336	\$ PER YEAR
+05	\$ 321	327	332	338	344	350	356	362	368	374	380	386	392	
+06	\$ 378	383	388	393	398	404	409	414	419	424	429	434	439	
+07	\$ 440	445	451	456	461	467	472	477	482	487	492	497	502	
+08	\$ 496	502	507	512	517	522	527	532	537	542	547	552	557	
+09	\$ 552	558	564	569	574	579	584	589	594	599	604	609	614	
+10	\$ 615	620	626	631	637	642	648	653	659	664	669	674	679	
+12	\$ 733	739	744	750	755	761	766	771	777	782	787	792	797	

		\$ 524	569	615	654	699	744	789	829	874	964	1049	1049	<---THEORETICAL HEATING COST @ FURNACE ONLY
+03	\$ 253	259	265	270	276	282	287	292	297	303	309	314	319	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
+04	\$ 321	327	332	338	344	349	355	360	366	372	377	382	387	\$ PER YEAR
+05	\$ 383	389	394	400	406	411	417	422	428	434	439	444	449	
+06	\$ 451	457	462	468	473	479	485	490	496	502	507	512	517	
+07	\$ 519	524	529	535	540	546	551	557	562	567	573	578	583	
+08	\$ 581	586	591	597	602	607	613	618	623	628	634	639	644	
+09	\$ 648	654	659	665	670	676	681	686	691	697	702	707	712	
+10	\$ 716	722	727	733	739	744	750	755	761	766	771	777	782	
+12	\$ 846	852	857	863	868	874	879	884	889	894	899	904	909	

		\$ 615	665	716	767	818	868	919	970	1021	1122	1230	1230	<---THEORETICAL HEATING COST @ FURNACE ONLY
+03	\$ 299	310	315	321	327	333	339	344	349	355	361	366	372	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
+04	\$ 372	383	389	394	400	406	411	417	423	428	434	439	444	\$ PER YEAR
+05	\$ 445	457	462	468	473	479	485	490	496	502	507	512	517	
+06	\$ 519	530	536	541	547	553	558	564	569	575	580	586	591	
+07	\$ 586	598	603	609	615	621	626	631	637	643	648	653	659	
+08	\$ 660	671	677	682	688	693	699	705	710	716	721	726	731	
+09	\$ 733	744	750	756	761	767	773	778	784	789	795	800	805	
+10	\$ 806	818	823	829	835	840	846	852	857	863	868	874	879	
+12	\$ 947	959	964	970	976	981	987	993	998	1004	1010	1016	1022	

		\$ 699	756	818	874	936	993	1049	1111	1168	1280	1405	1405	<---THEORETICAL HEATING COST @ FURNACE ONLY
+03	\$ 361	372	383	394	406	417	428	440	451	462	473	484	494	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
+04	\$ 434	445	457	468	479	490	502	513	524	535	546	557	568	\$ PER YEAR
+05	\$ 513	524	536	547	558	569	581	592	603	614	625	636	647	
+06	\$ 586	598	609	620	631	643	654	665	676	687	698	709	720	
+07	\$ 665	677	688	699	710	721	732	743	754	765	776	787	798	
+08	\$ 744	756	767	778	789	801	812	823	834	845	856	867	878	
+09	\$ 818	829	840	851	862	873	884	895	906	917	928	939	949	
+10	\$ 897	908	919	931	942	953	964	975	986	997	1008	1019	1029	
+12	\$ 1049	1060	1072	1083	1094	1105	1117	1128	1139	1150	1161	1172	1183	

		\$ 874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754	<---THEORETICAL HEATING COST @ FURNACE ONLY
+03	\$ 490	507	530	547	569	592	609	631	648	668	688	733	733	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
+04	\$ 575	592	615	631	654	677	694	710	733	756	773	818	818	\$ PER YEAR
+05	\$ 660	677	699	716	739	761	778	801	818	837	857	902	902	
+06	\$ 739	756	778	795	818	840	857	880	897	916	931	981	981	
+07	\$ 823	840	863	880	902	925	942	964	981	1021	1066	1066	1066	
+08	\$ 908	925	947	964	987	1010	1028	1049	1066	1066	1105	1151	1151	
+09	\$ 993	1010	1032	1049	1072	1094	1111	1134	1151	1190	1230	1235	1235	
+10	\$ 1072	1089	1111	1128	1151	1173	1190	1213	1230	1269	1314	1314	1314	
+12	\$ 1241	1258	1280	1297	1320	1342	1359	1382	1399	1438	1484	1484	1484	

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
 \$.72 .96 1.20 1.44 1.68 1.92 2.16 2.40 2.88
 <---ELECTRIC RATE \$/KWH
 <---THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS
 BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING & COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON
 ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 30HP05
 HEAT RATED COOLING CAP.: BTUHS 11,400 SEER 8.40 INDOOR H1A01
 HEAT RATED HEATING CAP.: BTUH (47) 120,000 COP(47) 2.26 MSPP 6.50 MIN. OHR REG IV
 FURNACE TYPE ELECTRIC
 FURNACE EFFICIENCY 100.00 % AEUJ

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
30,000	.03	\$ 225	451		
	.04	\$ 310	603		
	.05	\$ 383	756		
	.06	\$ 462	908		
	.07	\$ 536	1060		
	.08	\$ 615	1213		
	.09	\$ 688	1365		
	.10	\$ 767	1517		
	.12	\$ 925	1822		

BALANCE POINT 14 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
35,000	.03	\$ 270	530		
	.04	\$ 361	705		
	.05	\$ 445	885		
	.06	\$ 536	1060		
	.07	\$ 626	1241		
	.08	\$ 716	1416		
	.09	\$ 809	1596		
	.10	\$ 897	1771		
	.12	\$ 1077	2127		

BALANCE POINT 18 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
40,000	.03	\$ 310	603		
	.04	\$ 411	806		
	.05	\$ 513	1010		
	.06	\$ 615	1213		
	.07	\$ 716	1416		
	.08	\$ 818	1619		
	.09	\$ 925	1822		
	.10	\$ 1026	2025		
	.12	\$ 1235	2431		

BALANCE POINT 21 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
50,000	.03	\$ 394	756		
	.04	\$ 530	1010		
	.05	\$ 660	1263		
	.06	\$ 795	1517		
	.07	\$ 925	1771		
	.08	\$ 1052	2025		
	.09	\$ 1184	2279		
	.10	\$ 1320	2533		
	.12	\$ 1585	3041		

BALANCE POINT 27 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEAT PUMP WITH ELECTRIC HEAT	ELECTRIC HEAT ONLY
60,000	.03	\$ 496	908		
	.04	\$ 665	1213		
	.05	\$ 829	1517		
	.06	\$ 998	1822		
	.07	\$ 1162	2127		
	.08	\$ 1326	2431		
	.09	\$ 1495	2736		
	.10	\$ 1664	3041		
	.12	\$ 1991	3650		

BALANCE POINT 31 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
\$ 84	112	140	168	196	224	252	280	336

---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 18HP05
 RATED COOLING CAP.: BTU/HR 17,100 SEER 8.40 INDOOR H1A01
 RATED HEATING CAP.: BTU/H 147,000 COP17 2.16, HSPF 6.59 MIN.OHR REG IV
 RATED HEATING CAP.: BTU/H 171,000 COP17 1.70 FURNACE EFFICIENCY 55.00 %
 FURNACE TYPE NATURAL GAS

HEAT LOSS BTU/HR	ELEC. COST \$/KWH	NATURAL GAS COST - \$/THERM	35	40	45	50	55	60	65	70	75	80	90	1.00
30,000	-03	\$ 276	315	355	394	434	474	519	558	598	637	716	795	874
	-04	\$ 225	231	242	248	248	253	259	265	270	276	282	288	294
	-05	\$ 287	287	293	304	310	310	315	321	327	333	339	344	350
	-06	\$ 355	355	366	372	378	383	389	394	400	406	411	417	423
	-07	\$ 417	417	423	428	434	440	445	451	457	462	468	473	479
	-08	\$ 479	479	485	490	496	502	507	513	519	524	529	536	541
	-09	\$ 541	541	547	552	558	564	569	575	581	586	591	598	604
	-10	\$ 609	609	615	620	626	631	637	643	648	654	659	665	671
	-12	\$ 671	671	677	682	688	694	699	705	710	716	722	727	733
		\$ 801	801	806	812	818	823	829	835	840	846	852	857	863
		\$ 321	372	417	462	507	558	603	648	694	744	835	931	1031
35,000	-03	\$ 259	265	276	282	293	299	310	321	327	338	355	372	390
	-04	\$ 327	332	344	349	361	366	378	389	394	406	423	440	457
	-05	\$ 394	400	411	417	428	434	445	457	462	473	490	507	524
	-06	\$ 457	462	473	479	490	496	507	519	524	536	552	569	586
	-07	\$ 524	530	541	547	558	564	575	586	592	603	620	637	654
	-08	\$ 592	598	609	615	626	631	643	654	660	671	688	705	722
	-09	\$ 660	665	677	682	694	699	710	722	727	739	756	773	790
	-10	\$ 722	727	739	744	756	761	773	784	789	801	818	835	852
	-12	\$ 857	863	874	880	891	897	908	919	925	936	953	970	987
		\$ 372	423	479	530	581	637	688	744	795	852	959	1050	1150
40,000	-03	\$ 287	299	310	321	327	338	349	361	366	378	400	417	434
	-04	\$ 366	378	389	400	406	417	428	440	445	457	479	496	513
	-05	\$ 445	451	462	473	479	490	502	513	519	530	552	569	586
	-06	\$ 513	524	536	547	552	564	575	586	592	603	620	637	654
	-07	\$ 586	598	609	620	626	637	648	659	665	677	694	711	728
	-08	\$ 660	671	682	694	699	710	722	733	739	750	773	789	806
	-09	\$ 733	744	756	767	773	784	795	806	812	823	846	863	880
	-10	\$ 806	818	829	840	846	857	868	880	885	897	919	936	953
	-12	\$ 959	970	981	993	998	1010	1021	1032	1039	1049	1072	1089	1106
		\$ 462	530	598	665	727	795	863	931	998	1066	1196	1331	1471
50,000	-03	\$ 383	411	440	468	496	524	552	581	609	637	694	750	806
	-04	\$ 445	473	502	530	559	586	615	643	671	699	756	812	868
	-05	\$ 507	536	564	592	620	648	677	705	733	761	818	874	930
	-06	\$ 569	598	626	654	682	710	739	767	795	823	880	936	992
	-07	\$ 631	660	688	716	744	773	801	829	857	885	942	998	1054
	-08	\$ 694	722	750	778	806	835	863	891	919	947	1004	1060	1116
	-09	\$ 756	784	812	840	868	897	925	953	981	1010	1066	1122	1178
	-10	\$ 818	846	874	902	931	959	987	1015	1043	1072	1128	1184	1240
	-12	\$ 947	976	1004	1032	1060	1089	1117	1145	1173	1201	1258	1314	1370
		\$ 462	530	598	665	727	795	863	931	998	1066	1196	1331	1471
60,000	-03	\$ 457	490	524	558	592	626	660	694	727	761	829	897	965
	-04	\$ 524	558	592	626	660	694	727	761	795	829	907	975	1043
	-05	\$ 598	631	665	699	733	767	801	835	869	903	971	1039	1107
	-06	\$ 671	705	739	773	806	840	874	908	942	976	1043	1111	1179
	-07	\$ 744	778	812	846	880	914	948	982	1016	1050	1117	1184	1251
	-08	\$ 818	852	885	919	953	987	1021	1055	1089	1123	1190	1258	1326
	-09	\$ 891	925	959	993	1027	1060	1094	1128	1162	1196	1263	1331	1400
	-10	\$ 964	998	1032	1066	1100	1134	1168	1201	1235	1269	1337	1405	1473
	-12	\$ 1105	1139	1173	1207	1241	1275	1309	1342	1376	1410	1478	1546	1614
		\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596	1754

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
 \$.64 112 140 168 196 224 252 280 336
 ---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 30HPQ5 INDOOR H12A01
 HEAT RATED COOLING CAP.: BTUH195 SEER 8.40
 HEAT RATED HEATING CAP.: BTUH (47) COP17.1 2.26, NSFP -61.50 MIN. OHR REG IV
 FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00 % AFUE

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
30,000			\$ 575	631	688	744	806	863	919	976	1032	1151	1263	1362
			\$ 231	236	242	242	242	242	248	248	253	259	259	265
			\$ 304	310	315	315	321	321	321	327	332	332	338	338
			\$ 372	378	383	383	389	389	389	394	400	400	406	406
			\$ 445	451	457	457	462	462	462	468	473	473	479	479
			\$ 513	519	524	524	530	530	530	536	541	541	547	547
			\$ 586	592	598	598	603	603	603	609	615	615	620	620
			\$ 654	660	666	666	671	671	671	677	682	682	688	688
			\$ 727	733	739	739	744	744	744	750	756	756	761	761
			\$ 808	814	820	820	826	826	832	838	844	850	856	862
			\$ 871	877	883	883	889	889	895	901	907	913	919	925
35,000			\$ 671	739	806	868	936	1004	1072	1139	1207	1342	1478	1613
			\$ 282	287	293	299	299	304	310	315	321	321	332	338
			\$ 361	366	372	378	383	389	394	400	411	417	417	417
			\$ 434	434	440	445	451	457	462	468	473	485	490	490
			\$ 513	513	519	524	530	536	541	547	552	564	569	569
			\$ 592	592	598	603	609	615	620	626	631	643	648	648
			\$ 671	671	677	682	688	694	699	705	710	722	727	727
			\$ 750	750	756	761	767	773	778	784	789	801	806	806
			\$ 829	829	835	840	846	852	857	863	868	880	885	885
			\$ 987	987	993	998	1004	1004	1010	1015	1021	1026	1038	1043
40,000			\$ 767	840	919	998	1072	1151	1224	1303	1382	1534	1687	1839
			\$ 327	332	338	344	349	355	361	372	378	389	400	417
			\$ 411	417	423	428	434	440	445	457	462	473	485	502
			\$ 496	502	507	513	519	524	530	541	547	558	569	596
			\$ 581	586	592	598	603	609	615	626	631	643	654	671
			\$ 665	671	677	682	688	694	699	710	716	727	739	756
			\$ 750	756	761	767	773	778	784	795	801	812	823	840
			\$ 840	846	852	857	863	868	874	885	891	902	914	931
			\$ 925	931	936	942	947	953	959	970	976	987	998	1015
			\$ 1094	1100	1105	1111	1117	1122	1128	1139	1145	1156	1168	1184
50,000			\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302
			\$ 423	440	451	462	479	490	502	519	530	552	581	609
			\$ 519	536	547	558	575	586	598	615	626	648	677	705
			\$ 615	631	643	654	671	682	694	710	722	744	773	801
			\$ 716	733	744	756	773	784	795	812	823	846	874	902
			\$ 812	829	840	852	868	880	891	908	919	942	970	998
			\$ 908	925	936	947	964	976	987	1004	1015	1038	1066	1094
			\$ 1004	1021	1032	1043	1060	1072	1083	1100	1111	1134	1162	1190
			\$ 1105	1122	1134	1145	1162	1173	1184	1201	1211	1235	1263	1292
			\$ 1297	1314	1326	1337	1354	1365	1376	1393	1405	1427	1455	1484
60,000			\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764
			\$ 541	564	586	615	637	660	682	705	727	773	818	863
			\$ 648	671	694	722	744	767	789	812	835	880	925	970
			\$ 756	778	801	829	852	874	897	919	942	987	1032	1077
			\$ 863	885	908	936	959	981	1004	1026	1049	1094	1139	1184
			\$ 964	987	1010	1038	1060	1083	1105	1128	1151	1196	1241	1286
			\$ 1072	1094	1117	1145	1168	1190	1213	1235	1258	1303	1348	1393
			\$ 1176	1201	1224	1252	1275	1297	1320	1342	1365	1410	1455	1500
			\$ 1286	1309	1331	1359	1382	1405	1427	1450	1472	1519	1563	1608
			\$ 1495	1517	1540	1568	1591	1613	1636	1658	1681	1726	1771	1816

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP
 ←--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 AOO-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 10HP95 INDOOR HEAD1
 ARI RATED COOLING CAP.: BTUH195 1-2000 SEER 8.40
 ARI RATED HEATING CAP.: BTUH 147 1-1200 COP(47) 2.76, MSPF 8.50 MIN. OHR REG IV
 BTUH (17 1-20200 COP(17))
 FURNACE EFFICIENCY 85.00 % A/EVE

HEAT LOSS BTUH \$ 524 569 615 654 699 744 789 829 874 964 1049 1049
 ELEC. COST \$/KWH .60 .65 .70 .75 .80 .85 .90 .95 1.00 1.10 1.20 1.20
 PROPANE GAS COST - \$/GALLON .75 .80 .85 .90 .95 1.00 1.10 1.20 1.20

30,000	-.03	\$ 231	231	236	236	242	242	242	248	248	253	253	←---THEORETICAL HEATING COST ± FURNACE ONLY
	-.04	\$ 304	304	310	310	315	315	315	321	321	327	327	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
	-.05	\$ 372	372	379	378	383	383	383	389	389	394	394	\$ PER YEAR
	-.06	\$ 445	445	451	451	457	457	457	462	462	468	468	
	-.07	\$ 513	513	519	519	524	524	524	524	524	530	530	
	-.08	\$ 586	586	592	592	598	598	598	603	603	609	609	
	-.09	\$ 654	654	660	660	665	665	665	671	671	677	677	
	-.10	\$ 727	727	733	733	739	739	739	744	744	750	750	
	-.12	\$ 868	868	874	874	880	880	880	885	885	891	891	BALANCE POINT 14 DEG.F.

35,000	-.03	\$ 615	665	716	767	818	868	919	970	1021	1122	1230	←---THEORETICAL HEATING COST ± FURNACE ONLY
	-.04	\$ 276	282	287	287	293	293	293	304	310	315	315	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
	-.05	\$ 355	355	361	366	372	372	378	383	389	394	394	\$ PER YEAR
	-.06	\$ 428	428	434	440	445	445	451	457	462	468	468	
	-.07	\$ 507	507	513	519	524	524	530	536	541	547	547	
	-.08	\$ 586	586	592	598	603	603	609	615	620	626	626	
	-.09	\$ 665	665	671	677	682	682	688	694	699	705	705	
	-.10	\$ 744	744	750	756	761	761	767	773	778	784	784	
	-.12	\$ 981	981	987	993	998	998	1004	1010	1015	1021	1021	BALANCE POINT 18 DEG.F.

40,000	-.03	\$ 699	756	818	874	936	993	1049	1111	1168	1280	1405	←---THEORETICAL HEATING COST ± FURNACE ONLY
	-.04	\$ 321	321	327	332	338	344	349	355	361	366	378	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
	-.05	\$ 406	406	411	417	423	428	434	440	445	451	462	\$ PER YEAR
	-.06	\$ 490	490	496	502	507	513	519	524	530	536	547	
	-.07	\$ 575	575	581	586	592	598	603	609	615	620	631	
	-.08	\$ 660	660	665	671	677	682	688	694	699	705	716	
	-.09	\$ 744	744	749	755	761	767	773	778	784	789	801	
	-.10	\$ 835	835	840	846	852	857	863	868	874	880	891	
	-.12	\$ 1089	1089	1094	1100	1105	1111	1117	1122	1128	1134	1145	BALANCE POINT 21 DEG.F.

50,000	-.03	\$ 874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	←---THEORETICAL HEATING COST ± FURNACE ONLY
	-.04	\$ 411	423	434	445	451	462	473	485	490	513	536	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
	-.05	\$ 507	519	530	541	547	558	569	581	586	609	631	\$ PER YEAR
	-.06	\$ 603	615	624	637	643	654	665	677	682	705	727	
	-.07	\$ 705	716	727	739	744	756	767	778	784	806	829	
	-.08	\$ 801	812	823	835	840	852	863	874	880	902	925	
	-.09	\$ 897	908	919	931	936	947	959	970	976	998	1021	
	-.10	\$ 993	1004	1015	1026	1032	1043	1055	1066	1072	1094	1117	
	-.12	\$ 1286	1297	1309	1320	1326	1337	1348	1359	1365	1388	1410	BALANCE POINT 27 DEG.F.

60,000	-.03	\$ 1049	1139	1230	1314	1405	1485	1579	1664	1754	1929	2104	←---THEORETICAL HEATING COST ± FURNACE ONLY
	-.04	\$ 524	541	558	575	592	609	626	648	665	699	733	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
	-.05	\$ 631	648	665	682	699	716	733	756	773	806	840	\$ PER YEAR
	-.06	\$ 739	756	773	785	806	823	840	863	880	914	947	
	-.07	\$ 846	863	880	897	914	931	947	970	987	1021	1055	
	-.08	\$ 947	964	981	998	1015	1032	1049	1072	1089	1122	1156	
	-.09	\$ 1055	1072	1089	1105	1122	1139	1156	1179	1196	1230	1263	
	-.10	\$ 1162	1179	1196	1213	1230	1247	1263	1286	1303	1337	1371	
	-.12	\$ 1478	1495	1512	1529	1546	1563	1579	1602	1619	1653	1687	BALANCE POINT 31 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
 \$ 84 112 140 168 196 224 252 280 336

←---ELECTRIC RATE \$/KWH
 ←---THEORETICAL AIR CONDITIONING COST

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

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

REGION 4
 HEAT PUMP MODEL: OUTDOOR 34HP95 INDOOR HEAVY
 HEAT RATED COOLING CAP.: BTUH(95) 136600 SEER 7.50
 ARI RATED HEATING CAP.: BTUH (47) 140500 COP(47) 2.66 HSPF 92.10 MIN.OMR REG IV
 BTUH (17) 24000 COP(17) 1.72 FURNACE EFFICIENCY 100.00% ACUE

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING WITH ELECTRIC HEAT ONLY	DEG.F.
40,000	.03	\$ 321	603		
	.04	\$ 417	806		
	.05	\$ 524	1010		
	.06	\$ 631	1213		
	.07	\$ 739	1416		
	.08	\$ 846	1619		
	.09	\$ 953	1822		
	.10	\$ 1055	2025		
	.12	\$ 1263	2431		

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING WITH ELECTRIC HEAT ONLY	DEG.F.
50,000	.03	\$ 400	756		
	.04	\$ 530	1010		
	.05	\$ 665	1263		
	.06	\$ 795	1517		
	.07	\$ 936	1771		
	.08	\$ 1066	2025		
	.09	\$ 1201	2279		
	.10	\$ 1337	2533		
	.12	\$ 1602	3041		

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING WITH ELECTRIC HEAT ONLY	DEG.F.
60,000	.03	\$ 490	908		
	.04	\$ 654	1213		
	.05	\$ 818	1517		
	.06	\$ 981	1822		
	.07	\$ 1145	2127		
	.08	\$ 1309	2431		
	.09	\$ 1472	2736		
	.10	\$ 1636	3041		
	.12	\$ 1963	3650		

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING WITH ELECTRIC HEAT ONLY	DEG.F.
70,000	.03	\$ 592	1060		
	.04	\$ 795	1416		
	.05	\$ 993	1771		
	.06	\$ 1190	2127		
	.07	\$ 1388	2482		
	.08	\$ 1585	2837		
	.09	\$ 1783	3193		
	.10	\$ 1980	3549		
	.12	\$ 2381	4260		

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING WITH ELECTRIC HEAT ONLY	DEG.F.
80,000	.03	\$ 710	1213		
	.04	\$ 947	1619		
	.05	\$ 1179	2025		
	.06	\$ 1416	2431		
	.07	\$ 1647	2837		
	.08	\$ 1890	3244		
	.09	\$ 2127	3650		
	.10	\$ 2358	4057		
	.12	\$ 2832	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
\$ 117	\$ 156	\$ 195	\$ 234	\$ 273	\$ 312	\$ 351	\$ 390	\$ 468

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

HEAT LOSS BTUH	ELEC. COST \$/KWH	NATURAL GAS COST - \$/THERM	INDOOR HJ/HR		THEORETICAL HEATING COST @ FURNACE ONLY		THEORETICAL HEATING COST @ FURNACE ONLY					
			ARI RATED HEATING CAP. BTUH (47)	ARI RATED HEATING CAP. BTUH (47)	ARI RATED HEATING COST @ FURN. \$ PER YEAR	ARI RATED HEATING COST @ FURN. \$ PER YEAR	ARI RATED HEATING COST @ FURN. \$ PER YEAR	ARI RATED HEATING COST @ FURN. \$ PER YEAR				
40,000	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00
	\$ 372	423	479	530	581	637	688	744	795	852	959	1060
	\$ 310	315	321	327	332	338	344	349	355	361	372	383
	\$ 394	400	406	411	417	423	428	434	440	445	457	468
	\$ 485	490	496	502	507	513	519	524	530	536	547	558
	\$ 569	575	581	586	592	598	603	609	615	620	631	643
	\$ 750	756	761	767	773	778	784	789	795	801	812	823
	\$ 835	840	846	852	857	863	868	874	880	885	897	908
	\$ 925	931	936	942	947	953	959	964	970	976	987	998
	\$ 1100	1105	1111	1117	1122	1128	1134	1139	1145	1151	1162	1173
50,000	\$ 462	530	598	665	727	795	863	931	998	1060	1196	1331
	\$ 389	406	423	445	462	479	502	519	536	558	598	631
	\$ 473	490	507	530	547	564	586	603	620	643	682	716
	\$ 564	581	598	620	637	654	677	694	710	733	773	806
	\$ 648	665	682	705	722	739	761	778	795	818	857	891
	\$ 733	750	767	789	806	823	846	863	880	902	942	976
	\$ 818	835	852	874	891	908	931	947	964	987	1026	1060
	\$ 902	919	936	959	976	993	1015	1032	1049	1072	1111	1145
	\$ 987	1004	1021	1043	1060	1077	1100	1117	1134	1156	1196	1230
	\$ 1156	1173	1190	1213	1230	1247	1269	1286	1303	1326	1365	1399
60,000	\$ 558	637	716	795	874	954	1038	1117	1196	1275	1438	1596
	\$ 457	479	502	524	547	569	592	615	643	665	710	756
	\$ 552	575	598	620	643	665	688	710	730	761	806	852
	\$ 654	677	699	722	744	767	789	812	840	863	908	953
	\$ 756	778	801	823	846	868	891	914	942	964	1010	1055
	\$ 852	874	897	919	942	964	987	1010	1036	1060	1105	1151
	\$ 953	976	998	1021	1043	1066	1089	1111	1139	1162	1207	1252
	\$ 1055	1077	1100	1122	1145	1168	1190	1213	1241	1263	1309	1354
	\$ 1151	1173	1196	1218	1241	1263	1286	1309	1337	1359	1405	1450
	\$ 1348	1371	1393	1416	1438	1461	1484	1506	1534	1557	1602	1647
70,000	\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862
	\$ 552	592	631	671	710	750	789	829	868	908	987	1066
	\$ 643	682	722	761	801	840	880	919	959	998	1077	1156
	\$ 733	773	812	852	891	931	970	1010	1049	1089	1168	1247
	\$ 823	863	902	942	981	1021	1060	1100	1139	1179	1258	1337
	\$ 914	953	993	1032	1072	1111	1151	1190	1230	1269	1348	1427
	\$ 1004	1043	1083	1122	1162	1201	1241	1280	1320	1359	1438	1517
	\$ 1100	1139	1179	1218	1258	1297	1337	1376	1416	1455	1534	1613
	\$ 1190	1230	1269	1309	1348	1388	1427	1467	1506	1546	1625	1704
	\$ 1371	1410	1450	1489	1529	1568	1608	1647	1687	1726	1805	1884
80,000	\$ 744	852	959	1060	1166	1275	1382	1489	1596	1704	1918	2127
	\$ 660	722	784	852	914	976	1043	1105	1168	1230	1359	1484
	\$ 733	795	857	925	987	1049	1117	1179	1241	1303	1433	1557
	\$ 806	868	931	998	1066	1128	1190	1252	1314	1376	1506	1630
	\$ 874	936	998	1066	1128	1190	1258	1320	1382	1444	1574	1698
	\$ 947	1010	1072	1139	1201	1263	1325	1387	1450	1512	1642	1766
	\$ 1021	1083	1145	1213	1275	1337	1405	1472	1534	1596	1726	1850
	\$ 1089	1151	1213	1280	1342	1405	1472	1534	1596	1658	1788	1912
	\$ 1162	1224	1286	1354	1416	1478	1546	1608	1670	1732	1862	1986
	\$ 1303	1365	1427	1495	1557	1619	1687	1749	1811	1873	2003	2127

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

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 WEATHER CONDITIONS AND INDIVIDUAL USAGL PATTERN.

← ELECTRIC RATE \$/KWH
← THEORETICAL AIR CONDITIONING COST

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

REGION 4 MODEL: OUTDOOR 36HPQS INDOOR H1A9L
 HEAT PUMP HEAT RATED COOLING CAP.: BTUH195 SEER 7.50
 ART RATED HEATING CAP.: BTUH 147 COP 2.66 COP 2.66 HSPF 92.40 W IN.DHR REG IV
 BTUH 17 COP 17 FURNACE EFFICIENCY 82.00 % AFUE

HEAT LOSS BTUH	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
		\$ 327	332	332	338	344	349	349	355	361	366	372	363	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 417	423	423	428	434	440	445	451	457	462	473	473	\$ PER YEAR
		\$ 513	519	519	524	530	536	541	547	552	558	569	569	BALANCE POINT 16 DEG.F.
		\$ 609	615	615	620	626	631	637	643	648	654	665	665	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 801	806	806	812	818	823	829	835	840	846	857	857	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 987	993	993	998	1004	1010	1015	1021	1026	1032	1043	1043	\$ PER YEAR
		\$ 1179	1184	1184	1190	1196	1201	1207	1213	1218	1224	1235	1235	BALANCE POINT 22 DEG.F.
50,000		\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 417	428	440	445	457	462	472	479	490	507	524	541	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 524	536	547	552	564	569	581	586	598	615	631	648	\$ PER YEAR
		\$ 637	648	660	665	677	682	694	699	710	727	744	761	BALANCE POINT 26 DEG.F.
		\$ 744	756	767	773	784	789	801	806	818	835	852	868	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 857	868	880	885	897	902	914	919	931	947	964	981	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 964	976	987	993	1004	1010	1021	1026	1038	1055	1072	1089	\$ PER YEAR
		\$ 1077	1089	1100	1105	1117	1122	1134	1139	1151	1168	1184	1201	BALANCE POINT 22 DEG.F.
		\$ 1190	1201	1213	1218	1230	1235	1247	1252	1263	1280	1297	1314	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 1410	1421	1433	1438	1450	1455	1467	1472	1484	1500	1517	1534	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
60,000		\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 519	536	552	569	581	598	615	626	643	677	705	739	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 643	660	677	694	705	722	739	750	767	801	829	863	\$ PER YEAR
		\$ 767	784	801	818	829	846	863	874	891	925	953	987	BALANCE POINT 26 DEG.F.
		\$ 891	908	925	942	953	970	987	998	1015	1049	1077	1111	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 1010	1026	1043	1060	1072	1089	1105	1117	1134	1168	1196	1230	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 1134	1151	1168	1184	1196	1213	1230	1241	1259	1292	1320	1354	\$ PER YEAR
		\$ 1258	1275	1292	1309	1320	1337	1354	1365	1382	1416	1444	1478	BALANCE POINT 26 DEG.F.
		\$ 1382	1399	1416	1433	1444	1461	1478	1489	1506	1540	1568	1602	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 1625	1642	1658	1675	1687	1704	1721	1732	1749	1783	1811	1845	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
70,000		\$ 1342	1478	1613	1743	1978	2014	2149	2285	2420	2695	2956	3227	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 648	671	694	722	744	773	795	821	846	897	947	998	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 784	806	829	857	880	908	931	959	981	1032	1083	1134	\$ PER YEAR
		\$ 914	936	959	987	1010	1038	1060	1089	1111	1162	1213	1263	BALANCE POINT 30 DEG.F.
		\$ 1043	1066	1089	1117	1139	1168	1190	1216	1241	1292	1342	1393	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 1179	1201	1224	1252	1275	1303	1326	1354	1376	1427	1478	1529	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 1309	1331	1354	1382	1405	1433	1455	1484	1506	1557	1608	1658	\$ PER YEAR
		\$ 1438	1461	1484	1512	1534	1563	1585	1613	1636	1687	1737	1788	BALANCE POINT 30 DEG.F.
		\$ 1574	1596	1619	1647	1670	1692	1721	1749	1771	1822	1873	1924	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 1839	1862	1884	1912	1935	1963	1986	2014	2036	2087	2138	2189	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
80,000		\$ 1534	1687	1839	1997	2149	2302	2454	2612	2764	3069	3379	3684	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 784	823	857	897	931	970	1004	1043	1077	1151	1224	1297	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 925	964	998	1038	1072	1111	1145	1184	1218	1292	1365	1438	\$ PER YEAR
		\$ 1060	1100	1134	1173	1207	1247	1280	1320	1354	1427	1500	1574	BALANCE POINT 33 DEG.F.
		\$ 1201	1241	1275	1314	1348	1388	1421	1461	1495	1568	1642	1715	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 1337	1376	1410	1450	1484	1523	1557	1596	1630	1704	1777	1850	THEORETICAL HEATING COST @ FURN. + HEAT PUMP
		\$ 1478	1517	1551	1591	1625	1664	1698	1737	1771	1845	1918	1991	\$ PER YEAR
		\$ 1619	1658	1692	1732	1766	1805	1839	1876	1912	1986	2059	2132	BALANCE POINT 33 DEG.F.
		\$ 1754	1794	1828	1867	1901	1941	1974	2018	2048	2121	2194	2268	←---THEORETICAL HEATING COST @ FURNACE ONLY
		\$ 2036	2076	2110	2149	2183	2223	2257	2296	2330	2403	2477	2550	THEORETICAL HEATING COST @ FURN. + HEAT PUMP

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.

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

REGION 4
 HEAT PUMP MODEL: OUTDOOR 16HP06 INDOOR H1A01
 HEAT RATED COOLING CAP.: BTUH(35) 14000 STEER 8.00
 ARI RATED HEATING CAP.: BTUH (47) 14000 COP 1.72 2.99, MSPF 7.00 MIN.OMR REG IV
 BTUH (17) 21800, COP 1.72 2.99 FURNACE EFFICIENCY 100.00 3.4EVE

HEAT LOSS BTUH
 ELEC. COST \$/KWH

35,000

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST WITH ELECTRIC HEAT ONLY
.03		\$ 259		530
.04		\$ 349		705
.05		\$ 428		885
.06		\$ 519		1060
.07		\$ 603		1241
.08		\$ 688		1416
.09		\$ 778		1596
.10		\$ 863		1771
.12		\$ 1038		2127

BALANCE POINT 16 DEG.F.

40,000

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST WITH ELECTRIC HEAT ONLY
.03		\$ 299		603
.04		\$ 400		806
.05		\$ 496		1010
.06		\$ 598		1213
.07		\$ 699		1416
.08		\$ 789		1619
.09		\$ 891		1822
.10		\$ 993		2025
.12		\$ 1190		2431

BALANCE POINT 19 DEG.F.

50,000

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST WITH ELECTRIC HEAT ONLY
.03		\$ 378		756
.04		\$ 513		1010
.05		\$ 637		1263
.06		\$ 761		1517
.07		\$ 891		1771
.08		\$ 1015		2025
.09		\$ 1145		2279
.10		\$ 1269		2533
.12		\$ 1529		3041

BALANCE POINT 24 DEG.F.

60,000

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST WITH ELECTRIC HEAT ONLY
.03		\$ 479		908
.04		\$ 637		1213
.05		\$ 789		1517
.06		\$ 947		1822
.07		\$ 1105		2127
.08		\$ 1253		2431
.09		\$ 1427		2736
.10		\$ 1585		3041
.12		\$ 1901		3650

BALANCE POINT 28 DEG.F.

70,000

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING COST WITH ELECTRIC HEAT ONLY
.03		\$ 575		1060
.04		\$ 767		1416
.05		\$ 959		1771
.06		\$ 1151		2127
.07		\$ 1342		2482
.08		\$ 1534		2838
.09		\$ 1726		3193
.10		\$ 1918		3549
.12		\$ 2302		4260

BALANCE POINT 32 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
 \$ 102 136 170 204 238 272 306 340 408
 <---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

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEATING OIL COST - 1/4 GALLON										THEORETICAL HEATING COST & FURNACE ONLY \$ PER YEAR	THEORETICAL HEATING COST & FURN. & HEAT PUMP \$ PER YEAR	BALANCE POINT 16 DEG.F.			
		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	1275	1342	1478	1613	1749	1885	1000
	.03	265	270	270	276	282	282	287	293	293	299	310	310	315	315	315	
	.04	344	349	349	355	361	361	366	372	372	378	389	389	394	394	394	
	.05	417	423	423	428	434	434	440	446	446	451	462	462	468	468	468	
	.06	496	502	502	507	513	513	519	524	524	529	540	540	546	546	546	
	.07	575	581	581	586	592	592	598	603	603	609	620	620	626	626	626	
	.08	648	654	654	660	666	666	671	677	677	682	693	693	699	699	699	
	.09	727	733	733	739	744	744	750	756	756	761	772	772	778	778	778	
	.10	806	812	812	818	823	823	829	835	835	840	851	851	857	857	857	
	.12	959	964	964	970	976	976	981	987	987	993	1004	1004	1010	1010	1010	
40,000		767	840	919	998	1072	1151	1224	1303	1382	1454	1687	1839	1939	2032	2110	2302
	.03	310	315	321	327	332	338	344	349	355	366	378	389	389	389	389	
	.04	394	400	406	411	417	423	428	434	440	451	462	462	468	468	468	
	.05	470	476	482	487	493	493	498	504	504	509	520	520	526	526	526	
	.06	546	552	558	563	569	569	574	580	580	585	596	596	602	602	602	
	.07	622	628	634	639	645	645	650	656	656	661	672	672	678	678	678	
	.08	700	706	712	717	723	723	728	734	734	739	750	750	756	756	756	
	.09	777	783	789	794	800	800	805	811	811	816	827	827	833	833	833	
	.10	854	860	866	871	877	877	882	888	888	893	904	904	910	910	910	
	.12	1066	1072	1077	1083	1089	1094	1100	1105	1111	1122	1134	1134	1145	1145	1145	
50,000		959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	2531	2764	2956	3227
	.03	400	411	424	440	451	462	473	485	496	519	541	564	564	564	564	
	.04	502	513	530	541	552	564	575	586	598	620	643	667	667	667	667	
	.05	598	609	626	637	648	660	671	682	694	716	739	761	761	761	761	
	.06	694	705	722	733	744	756	767	778	789	812	835	857	857	857	857	
	.07	789	801	819	829	840	852	863	874	885	908	931	953	953	953	953	
	.08	885	897	914	925	936	947	959	970	981	1004	1026	1049	1049	1049	1049	
	.09	981	993	1010	1021	1032	1043	1055	1066	1077	1100	1122	1145	1145	1145	1145	
	.10	1077	1089	1105	1117	1128	1139	1151	1162	1173	1196	1218	1241	1241	1241	1241	
	.12	1275	1286	1303	1314	1324	1337	1349	1359	1371	1393	1416	1438	1438	1438	1438	
60,000		1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2531	2764	2956	3227	3419	3690
	.03	519	530	558	575	599	615	637	654	677	710	750	789	789	789	789	
	.04	626	643	665	682	705	722	744	761	784	823	857	897	897	897	897	
	.05	727	744	767	784	806	823	846	863	885	925	959	998	998	998	998	
	.06	835	852	874	891	914	931	953	970	993	1032	1066	1105	1105	1105	1105	
	.07	942	959	981	998	1021	1038	1060	1077	1100	1139	1173	1213	1213	1213	1213	
	.08	1049	1066	1089	1105	1128	1145	1168	1184	1207	1247	1280	1320	1320	1320	1320	
	.09	1156	1173	1196	1213	1235	1252	1275	1292	1314	1354	1388	1427	1427	1427	1427	
	.10	1263	1280	1303	1320	1342	1365	1382	1399	1421	1461	1495	1534	1534	1534	1534	
	.12	1478	1495	1517	1534	1557	1574	1596	1613	1636	1675	1709	1749	1749	1749	1749	
70,000		1342	1478	1613	1743	1978	2149	2285	2420	2645	2956	3227	3419	3690	3961	4232	4503
	.03	637	665	694	722	750	784	817	840	869	925	987	1043	1043	1043	1043	
	.04	750	778	806	835	863	897	925	953	981	1038	1100	1156	1156	1156	1156	
	.05	868	897	925	953	981	1015	1043	1072	1100	1156	1218	1275	1275	1275	1275	
	.06	981	1010	1038	1066	1094	1128	1156	1184	1213	1269	1331	1388	1388	1388	1388	
	.07	1094	1122	1151	1179	1207	1241	1269	1297	1326	1382	1444	1500	1500	1500	1500	
	.08	1213	1241	1269	1297	1326	1359	1388	1416	1444	1500	1563	1619	1619	1619	1619	
	.09	1326	1354	1382	1410	1439	1472	1500	1529	1557	1613	1675	1732	1732	1732	1732	
	.10	1438	1467	1495	1523	1551	1585	1613	1642	1670	1726	1788	1845	1845	1845	1845	
	.12	1670	1698	1726	1754	1783	1816	1845	1873	1901	1957	2020	2076	2076	2076	2076	

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

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

REGION 4
HEAT PUMP MODEL: OUTDOOR 36HE06
HEAT RATED COOLING CAP.: BTUH(95) 34000 SEER 8.00 INDOOR HEAT
ARI RATED HEATING CAP.: BTUH (47) 2000 COP(47) 2.20, MSPF -1.00 11IN.DHR REG IV
BTUH (17) 21800 COP(17) 2.10 FURNACE EFFICIENCY 65.00 % AENE

FURNACE TYPE PROPANE GAS
ELEC. COST \$/KWH
HEAT LOSS BTUH
PROPANE GAS COST - \$/GALLON

35,000	.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10	1.20	1.20
\$	615	665	716	767	818	868	919	970	1021	1122	1230	1230
-.03	265	270	276	276	276	276	276	282	282	287	293	293
-.04	344	349	349	355	355	355	355	361	361	366	372	372
-.05	417	423	423	428	428	428	428	434	434	440	445	445
-.06	496	502	502	507	507	507	507	513	513	519	524	524
-.07	575	581	581	586	586	586	586	592	592	598	603	603
-.08	648	654	654	660	660	660	660	665	665	671	677	677
-.09	727	733	733	739	739	739	739	744	744	750	756	756
-.10	806	812	812	818	818	818	818	823	823	829	835	835
-.12	959	964	964	970	970	970	970	976	976	981	987	987

40,000	.699	756	818	874	936	992	1049	1111	1168	1286	1405	1405
-.03	304	310	315	321	327	332	338	343	349	361	361	361
-.04	389	394	400	406	411	417	423	428	434	445	445	445
-.05	473	479	485	490	496	502	507	513	519	530	530	530
-.06	558	564	569	575	581	586	592	598	603	615	615	615
-.07	643	648	654	660	666	671	677	683	689	701	701	701
-.08	722	727	733	739	744	750	756	762	768	779	779	779
-.09	806	812	818	823	829	835	840	846	852	863	863	863
-.10	891	897	902	908	914	919	925	931	936	947	947	947
-.12	1060	1066	1072	1077	1083	1089	1094	1099	1105	1117	1117	1117

50,000	.874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754
-.03	394	400	411	417	423	434	445	457	468	479	496	496
-.04	496	502	513	519	526	536	547	558	564	581	598	598
-.05	592	598	609	615	622	631	643	654	660	677	694	694
-.06	688	694	705	710	722	727	739	750	756	773	790	790
-.07	784	789	801	806	818	823	835	846	852	868	885	885
-.08	880	885	897	902	914	919	931	942	947	964	981	981
-.09	976	981	993	998	1010	1015	1026	1038	1043	1060	1077	1077
-.10	1072	1077	1089	1094	1111	1122	1134	1149	1156	1173	1173	1173
-.12	1269	1275	1286	1292	1303	1309	1320	1331	1337	1354	1371	1371

60,000	1.049	1139	1230	1314	1405	1495	1579	1664	1754	1929	2104	2104
-.03	502	513	530	547	559	575	592	603	620	648	682	682
-.04	609	620	637	654	665	682	699	710	727	756	789	789
-.05	710	722	739	756	767	784	801	814	829	857	891	891
-.06	818	829	846	863	874	891	908	914	936	964	998	998
-.07	925	936	953	970	981	998	1015	1026	1043	1072	1105	1105
-.08	1032	1043	1060	1077	1089	1105	1122	1134	1151	1179	1213	1213
-.09	1139	1151	1168	1184	1196	1213	1230	1241	1254	1296	1320	1320
-.10	1247	1258	1275	1292	1303	1320	1320	1348	1365	1373	1427	1427
-.12	1461	1472	1489	1506	1517	1534	1551	1563	1579	1608	1642	1642

70,000	1.230	1331	1433	1534	1636	1737	1845	1946	2048	2251	2460	2460
-.03	609	631	654	677	699	722	744	767	789	835	880	880
-.04	722	744	767	789	812	835	857	880	902	947	993	993
-.05	840	863	885	908	931	953	976	998	1021	1066	1111	1111
-.06	953	976	998	1021	1043	1066	1089	1111	1134	1179	1224	1224
-.07	1066	1089	1111	1134	1156	1179	1201	1224	1247	1292	1337	1337
-.08	1184	1207	1230	1252	1275	1297	1320	1342	1365	1410	1455	1455
-.09	1297	1320	1342	1365	1388	1410	1433	1455	1478	1523	1568	1568
-.10	1410	1433	1455	1478	1500	1523	1546	1568	1591	1636	1681	1681
-.12	1642	1664	1687	1709	1732	1754	1777	1799	1822	1867	1912	1912

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
\$ 102 136 170 204 234 272 306 340 404

←---ELECTRIC RATE \$/KWH
←---THEORETICAL AIR CONDITIONING COST

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS
BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING
ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERNS

THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON
LOADING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON

REGION 4
 HEAT PUMP MODEL: OUTDOOR 2HEG2
 HEAT RATED COOLING CAP.: BTUH 951 41500 SEER 8.50
 ARI RATED HEATING CAP.: BTUH 147 41500 COP 4.7
 BTUH (17) 2200 COP 1.7
 FURNACE EFF IC IE MCY 100.00 X SEVE
 FURNACE TYPE ELECTRIC
 HEAT LOSS BTUH
 HEAT COST \$/KWH
 ELEC.
 FURNACE

40,000

HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING CAPACITY OF HEAT PUMP
\$ 327	\$ 603	19 DEG.F.
\$ 440	\$ 806	
\$ 552	\$ 1010	
\$ 665	\$ 1213	
\$ 767	\$ 1416	
\$ 880	\$ 1619	
\$ 993	\$ 1822	
\$ 1105	\$ 2025	
\$ 1320	\$ 2431	

50,000

HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING CAPACITY OF HEAT PUMP
\$ 417	\$ 756	23 DEG.F.
\$ 558	\$ 1010	
\$ 694	\$ 1263	
\$ 829	\$ 1517	
\$ 970	\$ 1771	
\$ 1111	\$ 2025	
\$ 1252	\$ 2279	
\$ 1383	\$ 2533	
\$ 1670	\$ 3041	

60,000

HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING CAPACITY OF HEAT PUMP
\$ 507	\$ 908	27 DEG.F.
\$ 677	\$ 1213	
\$ 846	\$ 1517	
\$ 1015	\$ 1822	
\$ 1184	\$ 2127	
\$ 1354	\$ 2431	
\$ 1523	\$ 2736	
\$ 1698	\$ 3041	
\$ 2031	\$ 3650	

70,000

HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING CAPACITY OF HEAT PUMP
\$ 615	\$ 1060	30 DEG.F.
\$ 812	\$ 1416	
\$ 1021	\$ 1771	
\$ 1224	\$ 2127	
\$ 1427	\$ 2482	
\$ 1630	\$ 2838	
\$ 1839	\$ 3193	
\$ 2030	\$ 3549	
\$ 2448	\$ 4260	

80,000

HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	HEATING CAPACITY OF HEAT PUMP
\$ 722	\$ 1213	32 DEG.F.
\$ 964	\$ 1619	
\$ 1201	\$ 2025	
\$ 1438	\$ 2431	
\$ 1681	\$ 2838	
\$ 1924	\$ 3244	
\$ 2161	\$ 3650	
\$ 2403	\$ 4057	
\$ 2883	\$ 4869	

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP
 \$ 117 156 195 234 273 312 351 390 469
 ---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.

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

REGION 4
 HEAT PUMP MODEL: OUTDOOR 42H902 42H902 IND DOOR H2AG1
 ART RATED COOLING CAP.: BTUH(95) 41500A SEEM BLSO
 ART RATED HEATING CAP.: BTUH (47) 11300 COP(47) 2.20, HSPF 6.30 MIN.DHR REG IV
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 55.00 X AFUE

HEAT LOSS BTUH	35	40	45	NATURAL GAS COST - \$/THERM		75	80	90	1.00
				.50	.55	.60	.65	.70	.75
40,000	\$ 372	423	479	530	581	637	688	744	795
	\$ 310	321	332	344	349	361	372	383	389
	\$ 394	406	417	428	434	445	457	468	473
	\$ 473	485	496	507	513	524	536	547	552
	\$ 558	569	581	592	598	609	620	631	637
	\$ 637	648	660	671	677	688	699	710	716
	\$ 716	727	739	750	756	767	778	789	795
	\$ 801	812	823	835	840	852	863	874	880
	\$ 880	891	902	914	919	931	942	953	959
	\$ 1043	1055	1066	1077	1083	1094	1105	1117	1122

←--THEORETICAL HEATING COST ± FURNACE ONLY
 THEORETICAL HEATING COST ± FURN. ← HEAT PUMP \$ PER YEAR
 BALANCE POINT 19 DEG.F.

50,000	\$ 462	530	598	665	727	795	863	931	998
	\$ 394	411	428	451	468	485	507	524	541
	\$ 479	496	513	536	552	569	592	609	626
	\$ 564	581	598	620	637	654	677	694	710
	\$ 648	665	682	705	722	739	761	778	795
	\$ 739	756	773	795	812	829	852	868	885
	\$ 823	840	857	880	897	914	936	953	970
	\$ 908	925	942	964	981	998	1021	1038	1055
	\$ 993	1010	1026	1049	1066	1083	1105	1122	1139
	\$ 1168	1184	1201	1224	1241	1258	1280	1297	1314

←--THEORETICAL HEATING COST ± FURNACE ONLY
 THEORETICAL HEATING COST ± FURN. ← HEAT PUMP \$ PER YEAR
 BALANCE POINT 23 DEG.F.

60,000	\$ 558	637	716	795	874	954	1038	1117	1196
	\$ 479	513	547	581	615	648	682	716	750
	\$ 558	592	626	660	694	727	761	795	829
	\$ 637	671	705	739	773	806	840	874	908
	\$ 722	756	789	823	857	891	925	959	993
	\$ 801	835	868	902	936	970	1004	1038	1072
	\$ 880	914	947	981	1015	1049	1083	1117	1151
	\$ 964	998	1032	1066	1100	1134	1168	1201	1235
	\$ 1043	1077	1111	1145	1179	1213	1247	1280	1314
	\$ 1201	1235	1269	1303	1337	1371	1405	1438	1472

←--THEORETICAL HEATING COST ± FURNACE ONLY
 THEORETICAL HEATING COST ± FURN. ← HEAT PUMP \$ PER YEAR
 BALANCE POINT 27 DEG.F.

70,000	\$ 648	744	835	931	1021	1117	1207	1303	1393
	\$ 552	592	631	671	710	750	789	829	869
	\$ 643	682	722	761	801	840	880	919	959
	\$ 733	773	812	852	891	931	970	1009	1049
	\$ 829	868	908	947	987	1026	1066	1105	1145
	\$ 919	959	998	1036	1077	1117	1156	1196	1235
	\$ 1010	1049	1089	1128	1168	1207	1247	1286	1326
	\$ 1100	1139	1179	1218	1258	1297	1337	1376	1416
	\$ 1196	1235	1275	1314	1354	1393	1433	1472	1512
	\$ 1376	1416	1455	1495	1534	1574	1613	1653	1692

←--THEORETICAL HEATING COST ± FURNACE ONLY
 THEORETICAL HEATING COST ± FURN. ← HEAT PUMP \$ PER YEAR
 BALANCE POINT 30 DEG.F.

80,000	\$ 744	852	959	1060	1168	1275	1382	1489	1596
	\$ 660	722	784	852	914	976	1043	1105	1168
	\$ 733	795	857	925	987	1049	1117	1179	1241
	\$ 801	863	925	993	1055	1117	1184	1247	1309
	\$ 874	936	998	1066	1128	1190	1258	1320	1382
	\$ 947	1009	1072	1139	1201	1263	1331	1393	1455
	\$ 1021	1083	1145	1213	1275	1337	1405	1467	1529
	\$ 1089	1151	1213	1280	1342	1405	1472	1534	1596
	\$ 1162	1224	1286	1354	1416	1478	1546	1608	1670
	\$ 1303	1365	1427	1495	1557	1619	1687	1749	1811

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP
 ←--ELECTRIC RATE \$/KWH
 ←--THEORETICAL AIR CONDITIONING COST

\$.03	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2
\$ 117	156	195	234	273	312	351	390	468

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 COY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO .GY COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR 42HPQ2 INDOOR H4A91
 HEAT RATED COOLING CAP.: BTUH(95) 1-215001 SEER 8.20
 ARI RATED HEATING CAP.: BTUH (47) 1-21500, COP(47) 2.20, MSPF 6.20 MIN. OHR REG IV
 FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00% AFUE

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	
	\$ 338	344	355	361	366	372	378	383	389	400	411	423	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 434	440	451	457	462	468	473	479	485	496	507	519	BALANCE POINT 19 DEG.F.	
	\$ 530	536	547	552	558	564	569	575	581	592	603	615	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 626	631	643	648	654	660	665	671	677	688	699	710	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 716	722	733	739	744	750	756	761	767	778	789	801	BALANCE POINT 19 DEG.F.	
	\$ 812	818	829	835	840	846	852	857	863	874	885	897	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 908	914	925	931	936	942	947	953	959	970	981	993	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1004	1010	1021	1026	1032	1038	1043	1049	1055	1066	1077	1089	BALANCE POINT 19 DEG.F.	
	\$ 1190	1196	1207	1213	1218	1224	1230	1235	1241	1252	1263	1275	←--THEORETICAL HEATING COST & FURNACE ONLY	

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
50,000	\$ 959	1055	1151	1247	1342	1438	1534	1630	1726	1918	2110	2302	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 440	451	462	473	485	496	507	519	530	547	569	592	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 552	564	575	586	598	609	620	631	642	660	682	705	BALANCE POINT 23 DEG.F.	
	\$ 660	671	682	694	705	716	727	739	750	767	789	812	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 767	778	789	801	812	823	835	846	857	874	897	919	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 880	891	902	914	925	936	947	959	970	987	1010	1032	BALANCE POINT 23 DEG.F.	
	\$ 987	998	1010	1021	1032	1043	1055	1066	1077	1094	1117	1139	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 1100	1111	1122	1134	1145	1156	1168	1179	1190	1207	1230	1252	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1207	1218	1230	1241	1252	1263	1275	1286	1297	1314	1337	1359	BALANCE POINT 23 DEG.F.	
	\$ 1427	1438	1450	1461	1472	1484	1495	1506	1517	1534	1557	1579	←--THEORETICAL HEATING COST & FURNACE ONLY	

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
60,000	\$ 1151	1263	1382	1495	1613	1726	1839	1957	2070	2302	2533	2764	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 547	564	581	598	615	631	654	671	688	722	761	795	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 671	688	705	722	739	756	774	795	812	846	885	919	BALANCE POINT 27 DEG.F.	
	\$ 789	806	823	840	857	874	891	908	931	964	1004	1038	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 914	931	947	964	981	998	1021	1038	1055	1089	1124	1162	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1038	1055	1072	1089	1105	1122	1145	1162	1179	1213	1252	1286	BALANCE POINT 27 DEG.F.	
	\$ 1156	1173	1190	1207	1224	1241	1258	1275	1291	1331	1371	1405	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 1280	1297	1314	1331	1348	1365	1382	1405	1421	1455	1495	1529	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1405	1421	1438	1455	1472	1489	1512	1529	1546	1579	1619	1653	BALANCE POINT 27 DEG.F.	
	\$ 1647	1664	1681	1698	1715	1732	1754	1771	1788	1822	1862	1895	←--THEORETICAL HEATING COST & FURNACE ONLY	

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
70,000	\$ 1342	1478	1613	1743	1878	2014	2149	2285	2420	2695	2956	3227	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 671	694	722	750	774	806	835	863	885	942	998	1055	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 801	823	852	880	908	936	964	993	1015	1072	1128	1184	BALANCE POINT 30 DEG.F.	
	\$ 936	959	987	1015	1043	1072	1100	1128	1151	1207	1263	1320	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 1066	1089	1117	1145	1171	1201	1230	1258	1280	1337	1393	1450	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1196	1218	1247	1275	1303	1331	1359	1388	1410	1467	1523	1579	BALANCE POINT 30 DEG.F.	
	\$ 1326	1348	1376	1405	1433	1461	1489	1517	1540	1596	1653	1709	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 1461	1484	1512	1540	1569	1596	1625	1653	1675	1732	1788	1845	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1591	1613	1642	1670	1698	1726	1754	1783	1805	1862	1918	1974	BALANCE POINT 30 DEG.F.	
	\$ 1856	1878	1907	1935	1963	1991	2020	2048	2070	2127	2183	2240	←--THEORETICAL HEATING COST & FURNACE ONLY	

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
80,000	\$ 1534	1687	1839	1997	2149	2302	2454	2612	2764	3069	3379	3684	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 801	840	874	914	953	993	1026	1066	1105	1184	1258	1337	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 942	981	1015	1055	1094	1134	1168	1207	1247	1326	1399	1478	BALANCE POINT 32 DEG.F.	
	\$ 1077	1117	1151	1190	1230	1269	1303	1342	1382	1461	1534	1613	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 1218	1258	1292	1331	1371	1410	1444	1484	1523	1602	1675	1754	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1359	1399	1433	1472	1512	1551	1585	1625	1664	1743	1816	1895	BALANCE POINT 32 DEG.F.	
	\$ 1500	1540	1574	1613	1653	1692	1726	1766	1805	1884	1957	2036	←--THEORETICAL HEATING COST & FURNACE ONLY	
	\$ 1636	1675	1709	1749	1788	1828	1862	1901	1941	2020	2093	2172	THEORETICAL HEATING COST & FURN. + HEAT PUMP \$ PER YEAR	
	\$ 1777	1816	1850	1890	1929	1965	2003	2042	2082	2161	2234	2313	BALANCE POINT 32 DEG.F.	
	\$ 2053	2093	2127	2166	2206	2245	2270	2314	2358	2437	2510	2589	←--THEORETICAL HEATING COST & FURNACE ONLY	

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP
 ←--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	HEAT PUMP MODEL	OUTDOOR A2HRQ2	INDOOR H1A91	SEER 8-50	ARI RATED HEATING CAP. BTU/H (47)	ARI RATED HEATING CAP. BTU/H (17)	FURNACE EFFICIENCY	PROANE GAS COST - \$/GALLON	ELEC. COST \$/KWH	HEAT LOSS BTU/H	THEORETICAL HEATING COST \$ PER YEAR	THEORETICAL HEATING COST \$ PER YEAR	HEAT PUMP	DEG.F.
40,000	.03	\$ 338	338	344	349	355	993	1049	1.11	1168	1286	1405	1405	19
	.04	\$ 434	434	445	451	457	.85	.90	1.00	1.10	1.20	1.20		
	.05	\$ 530	530	536	541	547								
	.06	\$ 626	626	631	637	643								
	.07	\$ 716	716	722	727	733								
	.08	\$ 812	812	815	823	825								
	.09	\$ 908	908	914	919	925								
	.10	\$ 1004	1004	1010	1015	1021								
	.12	\$ 1190	1190	1196	1201	1207								
50,000		\$ 874	947	1021	1094	1168	1241	1314	1388	1461	1608	1754	1754	23
	.03	\$ 428	440	445	457	462	473	479	490	496	513	530	530	
	.04	\$ 541	552	558	569	575	586	592	603	609	626	643	643	
	.05	\$ 648	660	665	677	682	694	699	710	716	733	750	750	
	.06	\$ 756	767	773	784	789	801	806	818	823	840	857	857	
	.07	\$ 868	880	885	897	902	914	919	931	936	953	970	970	
	.08	\$ 978	987	993	1004	1010	1021	1026	1038	1043	1060	1077	1077	
	.09	\$ 1089	1100	1105	1117	1122	1134	1139	1151	1156	1173	1190	1190	
	.10	\$ 1196	1207	1213	1224	1230	1241	1247	1258	1263	1280	1297	1297	
	.12	\$ 1416	1427	1433	1444	1450	1461	1467	1478	1484	1500	1517	1517	
60,000		\$ 1049	1139	1230	1314	1405	1489	1579	1664	1754	1929	2104	2104	27
	.03	\$ 530	541	558	569	586	598	609	628	637	665	694	694	
	.04	\$ 654	665	682	694	710	722	733	750	761	789	818	818	
	.05	\$ 773	784	801	812	829	840	852	868	880	908	936	936	
	.06	\$ 897	908	925	936	953	964	976	993	1004	1032	1060	1060	
	.07	\$ 1021	1032	1049	1060	1077	1089	1100	1117	1128	1156	1184	1184	
	.08	\$ 1139	1151	1168	1179	1196	1207	1218	1235	1247	1275	1303	1303	
	.09	\$ 1263	1275	1292	1303	1320	1331	1342	1359	1371	1399	1427	1427	
	.10	\$ 1388	1399	1416	1427	1444	1455	1467	1484	1495	1523	1551	1551	
	.12	\$ 1630	1642	1659	1670	1687	1698	1709	1726	1737	1766	1794	1794	
70,000		\$ 1230	1331	1433	1534	1636	1737	1845	1946	2048	2251	2460	2460	30
	.03	\$ 643	665	698	710	727	750	773	799	812	852	897	897	
	.04	\$ 773	795	818	840	857	880	902	928	942	981	1026	1026	
	.05	\$ 908	931	953	976	993	1015	1038	1055	1077	1117	1162	1162	
	.06	\$ 1038	1060	1083	1105	1122	1145	1168	1194	1207	1247	1292	1292	
	.07	\$ 1168	1190	1213	1235	1252	1275	1297	1314	1337	1376	1421	1421	
	.08	\$ 1297	1320	1342	1365	1382	1405	1427	1444	1467	1500	1551	1551	
	.09	\$ 1433	1455	1478	1500	1517	1540	1563	1579	1602	1642	1687	1687	
	.10	\$ 1563	1585	1608	1630	1647	1670	1692	1709	1732	1771	1816	1816	
	.12	\$ 1828	1850	1873	1895	1912	1935	1957	1974	1997	2036	2082	2082	
80,000		\$ 1405	1517	1636	1754	1873	1986	2104	2223	2341	2573	2810	2810	32
	.03	\$ 707	795	823	852	885	914	942	970	998	1060	1117	1117	
	.04	\$ 908	936	964	993	1026	1055	1083	1111	1130	1201	1258	1258	
	.05	\$ 1043	1072	1100	1128	1162	1190	1218	1247	1275	1337	1393	1393	
	.06	\$ 1184	1213	1241	1269	1303	1331	1359	1388	1416	1478	1534	1534	
	.07	\$ 1326	1354	1382	1410	1444	1472	1500	1529	1557	1619	1675	1675	
	.08	\$ 1467	1495	1523	1551	1585	1613	1642	1670	1698	1760	1816	1816	
	.09	\$ 1602	1630	1658	1687	1721	1749	1777	1805	1833	1895	1952	1952	
	.10	\$ 1743	1771	1799	1828	1862	1890	1918	1946	1974	2036	2093	2093	
	.12	\$ 2020	2048	2076	2104	2138	2166	2194	2223	2251	2313	2369	2369	

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP
 \$ 0.03 .04 .05 .06 .07 .08 .09 .10 .12
 \$ 1.17 1.56 1.95 2.34 2.73 3.12 3.51 3.90 4.68
 ←---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 FUEL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

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

REGION 4
 HEAT PUMP MODEL: OUTDOOR 48HE95
 HEAT RATED COOLING CAP.: BTU/H (47) 46500, COP 1.7
 HEAT RATED HEATING CAP.: BTU/H (17) 29000, COP 1.7
 FURNACE EFFICIENCY 100.00%
 INCL. 12201
 SEECH 8.09
 COP 1.7
 MSPP 8.50 MIN. DHR REG IV
 2.00

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	BALANCE POINT 18 DEG.F.
50,000	.03	\$ 389	756		
	.04	\$ 507	1010		
	.05	\$ 637	1263		
	.06	\$ 767	1517		
	.07	\$ 897	1771		
	.08	\$ 1026	2025		
	.09	\$ 1156	2279		
	.10	\$ 1275	2533		
	.12	\$ 1534	3041		

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	BALANCE POINT 23 DEG.F.
60,000	.03	\$ 468	908		
	.04	\$ 620	1213		
	.05	\$ 778	1517		
	.06	\$ 931	1824		
	.07	\$ 1089	2127		
	.08	\$ 1247	2431		
	.09	\$ 1399	2736		
	.10	\$ 1551	3041		
	.12	\$ 1867	3650		

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	BALANCE POINT 26 DEG.F.
70,000	.03	\$ 552	1060		
	.04	\$ 739	1416		
	.05	\$ 925	1771		
	.06	\$ 1111	2127		
	.07	\$ 1297	2482		
	.08	\$ 1478	2836		
	.09	\$ 1664	3193		
	.10	\$ 1850	3549		
	.12	\$ 2217	4260		

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	BALANCE POINT 30 DEG.F.
80,000	.03	\$ 660	1213		
	.04	\$ 880	1619		
	.05	\$ 1100	2025		
	.06	\$ 1314	2431		
	.07	\$ 1534	2836		
	.08	\$ 1754	3244		
	.09	\$ 1974	3650		
	.10	\$ 2194	4057		
	.12	\$ 2635	4869		

HEAT LOSS BTU/H	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT	THEORETICAL ANNUAL HEATING COST	ELECTRIC HEAT ONLY	BALANCE POINT 32 DEG.F.
90,000	.03	\$ 767	1365		
	.04	\$ 1015	1822		
	.05	\$ 1275	2279		
	.06	\$ 1524	2736		
	.07	\$ 1793	3193		
	.08	\$ 2036	3650		
	.09	\$ 2296	4107		
	.10	\$ 2550	4564		
	.12	\$ 3058	5478		

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
 \$ 127 162 211 254 296 338 381 423 509
 <---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 UNITS 48HPQ5
 RATED COOLING CAP.: BTU/H (95) 15000 SEER 9.69
 RATED HEATING CAP.: BTU/H (17) 15000 COP (47) 2.80 MSFP -6.50 MIN. DHR REG IV
 FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY .65 .00 X-AEVE

ELEC. COST \$/KWH .35 .40 .45 NATURAL GAS COST - \$/THERM .50 .55 .60 .65 .70 .75 .80 .90 1.00

50,000	\$ 462	530	598	665	727	795	863	931	998	1060	1196	1331	←--THEORETICAL HEATING COST ± FURNACE ONLY
-.03	\$ 372	389	400	411	423	434	451	462	473	485	513	536	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
-.04	\$ 468	485	496	519	530	547	558	569	581	609	631	609	\$ PER YEAR
-.05	\$ 564	581	592	603	615	626	643	654	665	677	705	727	
-.06	\$ 654	671	682	694	705	716	733	744	756	767	795	818	
-.07	\$ 750	767	778	789	801	812	829	840	852	863	891	914	
-.08	\$ 846	863	874	885	897	908	925	936	947	959	987	1010	
-.09	\$ 942	959	970	981	993	1004	1021	1032	1043	1055	1083	1105	
-.10	\$ 1038	1055	1066	1077	1088	1100	1117	1128	1139	1151	1179	1201	
-.12	\$ 1230	1247	1258	1269	1280	1292	1309	1320	1331	1342	1371	1393	BALANCE POINT 18 DEG.F.

60,000	\$ 558	637	716	795	874	959	1038	1117	1196	1275	1438	1596	←--THEORETICAL HEATING COST ± FURNACE ONLY
-.03	\$ 451	473	496	519	541	564	586	609	637	660	705	750	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
-.04	\$ 547	569	592	615	637	660	682	705	733	756	801	846	\$ PER YEAR
-.05	\$ 643	665	688	710	733	756	778	801	829	852	897	942	
-.06	\$ 744	767	789	812	835	857	880	902	931	953	998	1043	
-.07	\$ 840	863	885	908	931	953	976	998	1026	1049	1094	1139	
-.08	\$ 936	959	981	1004	1026	1049	1072	1094	1122	1145	1190	1235	
-.09	\$ 1032	1055	1077	1100	1122	1145	1168	1190	1218	1241	1286	1331	
-.10	\$ 1134	1156	1179	1201	1224	1247	1269	1292	1320	1342	1388	1433	
-.12	\$ 1326	1348	1371	1393	1416	1438	1461	1484	1512	1534	1579	1625	BALANCE POINT 23 DEG.F.

70,000	\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862	←--THEORETICAL HEATING COST ± FURNACE ONLY
-.03	\$ 519	547	569	598	626	648	677	705	733	756	812	863	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
-.04	\$ 611	640	662	682	710	739	761	789	818	846	897	942	\$ PER YEAR
-.05	\$ 739	767	789	818	846	883	897	925	953	976	1032	1083	
-.06	\$ 852	880	902	931	959	981	1010	1038	1066	1094	1145	1196	
-.07	\$ 964	993	1015	1043	1072	1094	1122	1151	1179	1201	1258	1309	
-.08	\$ 1072	1100	1122	1151	1179	1201	1230	1258	1286	1309	1365	1416	
-.09	\$ 1184	1213	1235	1263	1292	1314	1342	1371	1399	1421	1478	1529	
-.10	\$ 1292	1320	1342	1371	1399	1421	1450	1478	1506	1529	1585	1636	
-.12	\$ 1517	1546	1568	1596	1625	1647	1675	1704	1732	1754	1811	1862	BALANCE POINT 26 DEG.F.

80,000	\$ 744	852	959	1060	1168	1275	1382	1489	1596	1704	1918	2127	←--THEORETICAL HEATING COST ± FURNACE ONLY
-.03	\$ 615	660	705	750	795	840	885	931	976	1021	1111	1201	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
-.04	\$ 716	761	806	852	897	942	987	1032	1077	1122	1213	1303	\$ PER YEAR
-.05	\$ 812	857	902	947	993	1038	1083	1128	1173	1218	1309	1399	
-.06	\$ 914	959	1004	1049	1094	1139	1184	1230	1275	1320	1410	1500	
-.07	\$ 1015	1060	1105	1151	1196	1241	1286	1331	1376	1421	1512	1602	
-.08	\$ 1118	1156	1201	1247	1292	1337	1382	1427	1472	1517	1608	1698	
-.09	\$ 1213	1258	1303	1348	1393	1438	1484	1529	1574	1619	1709	1799	
-.10	\$ 1314	1354	1405	1450	1495	1540	1585	1630	1675	1721	1811	1901	
-.12	\$ 1512	1557	1602	1647	1692	1737	1783	1828	1873	1918	2008	2099	BALANCE POINT 30 DEG.F.

90,000	\$ 835	950	1077	1196	1314	1438	1557	1675	1794	1918	2155	2398	←--THEORETICAL HEATING COST ± FURNACE ONLY
-.03	\$ 733	801	874	947	1021	1084	1162	1235	1303	1376	1517	1664	THEORETICAL HEATING COST ± FURN. ± HEAT PUMP
-.04	\$ 812	880	953	1026	1100	1168	1241	1314	1388	1455	1596	1743	\$ PER YEAR
-.05	\$ 885	953	1026	1100	1173	1241	1314	1388	1455	1529	1670	1816	
-.06	\$ 964	1032	1105	1179	1252	1320	1393	1467	1538	1608	1749	1895	
-.07	\$ 1038	1105	1179	1252	1326	1393	1467	1540	1608	1681	1822	1969	
-.08	\$ 1117	1184	1258	1331	1405	1472	1546	1619	1687	1760	1901	2048	
-.09	\$ 1196	1263	1337	1410	1484	1551	1625	1698	1766	1839	1980	2127	
-.10	\$ 1269	1337	1410	1484	1557	1625	1698	1771	1839	1912	2053	2200	
-.12	\$ 1427	1495	1568	1642	1715	1783	1856	1929	1997	2070	2211	2358	BALANCE POINT 32 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
 \$ 127 169 211 254 296 338 381 423 508
 ←--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.

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

REGION 4
 HEAT PUMP MODEL: OUTDOOR 4HRP05
 SEER 8.69
 ARI RATED COOLING CAP.: BTUH(47) 46000, COP(47) 2.80, HSPF 6.50 MIN. OHR REG IV
 ARI RATED HEATING CAP.: BTUH(117) 20000, COP(17) 2.00 FURNACE EFF IC IF NCY 65.90 X AEVE
 FURNACE TYPE FUEL OIL

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEATING OIL COST - \$/GALLON	50,000	60,000	70,000	80,000	90,000
1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70
1.00	1.50	1.60	1.70	1.80	1.90	2.00	2.10
1.00	2.00	2.10	2.20	2.30	2.40	2.50	2.60
1.00	2.50	2.60	2.70	2.80	2.90	3.00	3.10
1.00	3.00	3.10	3.20	3.30	3.40	3.50	3.60
1.00	3.50	3.60	3.70	3.80	3.90	4.00	4.10
1.00	4.00	4.10	4.20	4.30	4.40	4.50	4.60
1.00	4.50	4.60	4.70	4.80	4.90	5.00	5.10
1.00	5.00	5.10	5.20	5.30	5.40	5.50	5.60
1.00	5.50	5.60	5.70	5.80	5.90	6.00	6.10
1.00	6.00	6.10	6.20	6.30	6.40	6.50	6.60
1.00	6.50	6.60	6.70	6.80	6.90	7.00	7.10
1.00	7.00	7.10	7.20	7.30	7.40	7.50	7.60
1.00	7.50	7.60	7.70	7.80	7.90	8.00	8.10
1.00	8.00	8.10	8.20	8.30	8.40	8.50	8.60
1.00	8.50	8.60	8.70	8.80	8.90	9.00	9.10
1.00	9.00	9.10	9.20	9.30	9.40	9.50	9.60
1.00	9.50	9.60	9.70	9.80	9.90	10.00	10.10
1.00	10.00	10.10	10.20	10.30	10.40	10.50	10.60
1.00	10.50	10.60	10.70	10.80	10.90	11.00	11.10
1.00	11.00	11.10	11.20	11.30	11.40	11.50	11.60
1.00	11.50	11.60	11.70	11.80	11.90	12.00	12.10
1.00	12.00	12.10	12.20	12.30	12.40	12.50	12.60
1.00	12.50	12.60	12.70	12.80	12.90	13.00	13.10
1.00	13.00	13.10	13.20	13.30	13.40	13.50	13.60
1.00	13.50	13.60	13.70	13.80	13.90	14.00	14.10
1.00	14.00	14.10	14.20	14.30	14.40	14.50	14.60
1.00	14.50	14.60	14.70	14.80	14.90	15.00	15.10
1.00	15.00	15.10	15.20	15.30	15.40	15.50	15.60
1.00	15.50	15.60	15.70	15.80	15.90	16.00	16.10
1.00	16.00	16.10	16.20	16.30	16.40	16.50	16.60
1.00	16.50	16.60	16.70	16.80	16.90	17.00	17.10
1.00	17.00	17.10	17.20	17.30	17.40	17.50	17.60
1.00	17.50	17.60	17.70	17.80	17.90	18.00	18.10
1.00	18.00	18.10	18.20	18.30	18.40	18.50	18.60
1.00	18.50	18.60	18.70	18.80	18.90	19.00	19.10
1.00	19.00	19.10	19.20	19.30	19.40	19.50	19.60
1.00	19.50	19.60	19.70	19.80	19.90	20.00	20.10
1.00	20.00	20.10	20.20	20.30	20.40	20.50	20.60
1.00	20.50	20.60	20.70	20.80	20.90	21.00	21.10
1.00	21.00	21.10	21.20	21.30	21.40	21.50	21.60
1.00	21.50	21.60	21.70	21.80	21.90	22.00	22.10
1.00	22.00	22.10	22.20	22.30	22.40	22.50	22.60
1.00	22.50	22.60	22.70	22.80	22.90	23.00	23.10
1.00	23.00	23.10	23.20	23.30	23.40	23.50	23.60
1.00	23.50	23.60	23.70	23.80	23.90	24.00	24.10
1.00	24.00	24.10	24.20	24.30	24.40	24.50	24.60
1.00	24.50	24.60	24.70	24.80	24.90	25.00	25.10
1.00	25.00	25.10	25.20	25.30	25.40	25.50	25.60
1.00	25.50	25.60	25.70	25.80	25.90	26.00	26.10
1.00	26.00	26.10	26.20	26.30	26.40	26.50	26.60
1.00	26.50	26.60	26.70	26.80	26.90	27.00	27.10
1.00	27.00	27.10	27.20	27.30	27.40	27.50	27.60
1.00	27.50	27.60	27.70	27.80	27.90	28.00	28.10
1.00	28.00	28.10	28.20	28.30	28.40	28.50	28.60
1.00	28.50	28.60	28.70	28.80	28.90	29.00	29.10
1.00	29.00	29.10	29.20	29.30	29.40	29.50	29.60
1.00	29.50	29.60	29.70	29.80	29.90	30.00	30.10
1.00	30.00	30.10	30.20	30.30	30.40	30.50	30.60
1.00	30.50	30.60	30.70	30.80	30.90	31.00	31.10
1.00	31.00	31.10	31.20	31.30	31.40	31.50	31.60
1.00	31.50	31.60	31.70	31.80	31.90	32.00	32.10
1.00	32.00	32.10	32.20	32.30	32.40	32.50	32.60
1.00	32.50	32.60	32.70	32.80	32.90	33.00	33.10
1.00	33.00	33.10	33.20	33.30	33.40	33.50	33.60
1.00	33.50	33.60	33.70	33.80	33.90	34.00	34.10
1.00	34.00	34.10	34.20	34.30	34.40	34.50	34.60
1.00	34.50	34.60	34.70	34.80	34.90	35.00	35.10
1.00	35.00	35.10	35.20	35.30	35.40	35.50	35.60
1.00	35.50	35.60	35.70	35.80	35.90	36.00	36.10
1.00	36.00	36.10	36.20	36.30	36.40	36.50	36.60
1.00	36.50	36.60	36.70	36.80	36.90	37.00	37.10
1.00	37.00	37.10	37.20	37.30	37.40	37.50	37.60
1.00	37.50	37.60	37.70	37.80	37.90	38.00	38.10
1.00	38.00	38.10	38.20	38.30	38.40	38.50	38.60
1.00	38.50	38.60	38.70	38.80	38.90	39.00	39.10
1.00	39.00	39.10	39.20	39.30	39.40	39.50	39.60
1.00	39.50	39.60	39.70	39.80	39.90	40.00	40.10
1.00	40.00	40.10	40.20	40.30	40.40	40.50	40.60
1.00	40.50	40.60	40.70	40.80	40.90	41.00	41.10
1.00	41.00	41.10	41.20	41.30	41.40	41.50	41.60
1.00	41.50	41.60	41.70	41.80	41.90	42.00	42.10
1.00	42.00	42.10	42.20	42.30	42.40	42.50	42.60
1.00	42.50	42.60	42.70	42.80	42.90	43.00	43.10
1.00	43.00	43.10	43.20	43.30	43.40	43.50	43.60
1.00	43.50	43.60	43.70	43.80	43.90	44.00	44.10
1.00	44.00	44.10	44.20	44.30	44.40	44.50	44.60
1.00	44.50	44.60	44.70	44.80	44.90	45.00	45.10
1.00	45.00	45.10	45.20	45.30	45.40	45.50	45.60
1.00	45.50	45.60	45.70	45.80	45.90	46.00	46.10
1.00	46.00	46.10	46.20	46.30	46.40	46.50	46.60
1.00	46.50	46.60	46.70	46.80	46.90	47.00	47.10
1.00	47.00	47.10	47.20	47.30	47.40	47.50	47.60
1.00	47.50	47.60	47.70	47.80	47.90	48.00	48.10
1.00	48.00	48.10	48.20	48.30	48.40	48.50	48.60
1.00	48.50	48.60	48.70	48.80	48.90	49.00	49.10
1.00	49.00	49.10	49.20	49.30	49.40	49.50	49.60
1.00	49.50	49.60	49.70	49.80	49.90	50.00	50.10
1.00	50.00	50.10	50.20	50.30	50.40	50.50	50.60
1.00	50.50	50.60	50.70	50.80	50.90	51.00	51.10
1.00	51.00	51.10	51.20	51.30	51.40	51.50	51.60
1.00	51.50	51.60	51.70	51.80	51.90	52.00	52.10
1.00	52.00	52.10	52.20	52.30	52.40	52.50	52.60
1.00	52.50	52.60	52.70	52.80	52.90	53.00	53.10
1.00	53.00	53.10	53.20	53.30	53.40	53.50	53.60
1.00	53.50	53.60	53.70	53.80	53.90	54.00	54.10
1.00	54.00	54.10	54.20	54.30	54.40	54.50	54.60
1.00	54.50	54.60	54.70	54.80	54.90	55.00	55.10
1.00	55.00	55.10	55.20	55.30	55.40	55.50	55.60
1.00	55.50	55.60	55.70	55.80	55.90	56.00	56.10
1.00	56.00	56.10	56.20	56.30	56.40	56.50	56.60
1.00	56.50	56.60	56.70	56.80	56.90	57.00	57.10
1.00	57.00	57.10	57.20	57.30	57.40	57.50	57.60
1.00	57.50	57.60	57.70	57.80	57.90	58.00	58.10
1.00	58.00	58.10	58.20	58.30	58.40	58.50	58.60
1.00	58.50	58.60	58.70	58.80	58.90	59.00	59.10
1.00	59.00	59.10	59.20	59.30	59.40	59.50	59.60
1.00	59.50	59.60	59.70	59.80	59.90	60.00	60.10
1.00	60.00	60.10	60.20	60.30	60.40	60.50	60.60
1.00	60.50	60.60	60.70	60.80	60.90	61.00	61.10
1.00	61.00	61.10	61.20	61.30	61.40	61.50	61.60
1.00	61.50	61.60	61.70	61.80	61.90	62.00	62.10
1.00	62.00	62.10	62.20	62.30	62.40	62.50	62.60
1.00	62.50	62.60	62.70	62.80	62.90	63.00	63.10
1.00	63.00	63.10	63.20	63.30	63.40	63.50	63.60
1.00	63.50	63.60	63.70	63.80	63.90	64.00	64.10
1.00	64.00	64.10	64.20	64.30	64.40	64.50	64.60
1.00	64.50	64.60	64.70	64.80	64.90	65.00	65.10
1.00	65.00	65.10	65.20				

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

REGION A
 HEAT PUMP MODEL: OUTDOOR 48HPQ5 INDOOR H14Q1
 ARI RATED COOLING CAP.: BTUH (95) 146000 SEER 8.69
 ARI RATED HEATING CAP.: BTUH (17) 146000 COP (47) 2.80 MSPF .650 MIN. DHR REG IV
 FURNACE TYPE: PROPANE GAS FURNACE EFFICIENCY .65 .90 % AFUE

HEAT LOSS BTUH
 ELEC. COST \$/KWH
 PROPANE GAS COST - \$/GALLON

50,000 \$ 874 947 1021 1094 1168 1241 1314 1388 1461 1608 1754 1754 1754
 ←---THEORETICAL HEATING COST & FURNACE ONLY

-.03 \$ 394 400 400 406 411 417 423 428 428 440 451 451 451
 -.04 \$ 502 507 507 513 519 524 530 536 542 547 558 558 558
 -.05 \$ 615 620 620 626 631 637 643 648 654 660 671 671 671
 -.06 \$ 727 733 733 739 744 750 756 761 767 773 784 784 784
 -.07 \$ 840 846 846 852 857 863 868 874 880 885 897 897 897
 -.08 \$ 953 959 959 964 970 976 981 987 993 998 1010 1010 1010
 -.09 \$ 1066 1072 1072 1077 1083 1089 1094 1100 1106 1111 1122 1122 1122
 -.10 \$ 1173 1179 1179 1184 1190 1196 1201 1207 1213 1218 1230 1230 1230
 -.12 \$ 1390 1405 1405 1410 1416 1421 1427 1433 1439 1444 1455 1455 1455

60,000 \$ 1049 1139 1230 1314 1405 1499 1579 1664 1754 1929 2104 2104 2104
 ←---THEORETICAL HEATING COST & FURNACE ONLY

-.03 \$ 479 490 496 507 513 524 530 541 547 564 581 581 581
 -.04 \$ 603 615 620 631 637 648 654 665 671 688 705 705 705
 -.05 \$ 733 744 750 761 767 778 784 795 801 818 835 835 835
 -.06 \$ 857 868 874 885 891 902 908 919 925 942 959 959 959
 -.07 \$ 981 993 998 1010 1015 1026 1032 1043 1049 1066 1083 1083 1083
 -.08 \$ 1111 1122 1128 1139 1145 1156 1162 1173 1179 1196 1213 1213 1213
 -.09 \$ 1235 1247 1252 1263 1269 1280 1286 1297 1303 1320 1337 1337 1337
 -.10 \$ 1359 1371 1376 1386 1393 1405 1411 1421 1427 1444 1461 1461 1461
 -.12 \$ 1613 1625 1630 1642 1647 1658 1664 1675 1681 1698 1715 1715 1715

70,000 \$ 1230 1331 1433 1534 1636 1737 1845 1940 2049 2251 2460 2460 2460
 ←---THEORETICAL HEATING COST & FURNACE ONLY

-.03 \$ 575 586 603 615 631 643 654 671 682 710 739 739 739
 -.04 \$ 716 727 744 756 773 784 795 812 823 852 880 880 880
 -.05 \$ 852 863 880 891 908 919 931 947 959 987 1015 1015 1015
 -.06 \$ 993 1004 1021 1032 1049 1060 1072 1084 1100 1128 1156 1156 1156
 -.07 \$ 1128 1139 1156 1168 1184 1196 1207 1224 1235 1263 1292 1292 1292
 -.08 \$ 1263 1275 1292 1303 1320 1331 1342 1359 1371 1399 1427 1427 1427
 -.09 \$ 1405 1416 1433 1444 1461 1472 1482 1500 1512 1540 1568 1568 1568
 -.10 \$ 1540 1551 1568 1576 1596 1608 1619 1636 1647 1675 1704 1704 1704
 -.12 \$ 1816 1828 1845 1856 1873 1884 1895 1912 1924 1952 1980 1980 1980

80,000 \$ 1405 1517 1636 1754 1873 1986 2104 2223 2341 2573 2810 2810 2810
 ←---THEORETICAL HEATING COST & FURNACE ONLY

-.03 \$ 694 710 733 756 778 795 818 840 863 902 942 942 942
 -.04 \$ 840 857 880 902 925 947 964 987 1010 1049 1089 1089 1089
 -.05 \$ 987 1004 1026 1049 1072 1099 1111 1134 1156 1196 1235 1235 1235
 -.06 \$ 1134 1151 1173 1196 1218 1235 1258 1280 1303 1342 1382 1382 1382
 -.07 \$ 1280 1297 1320 1342 1365 1382 1405 1427 1450 1489 1528 1528 1528
 -.08 \$ 1427 1444 1467 1489 1512 1529 1551 1574 1596 1636 1675 1675 1675
 -.09 \$ 1574 1591 1613 1636 1658 1675 1698 1721 1743 1783 1822 1822 1822
 -.10 \$ 1721 1737 1760 1783 1805 1822 1845 1867 1890 1929 1969 1969 1969
 -.12 \$ 2014 2031 2053 2076 2099 2115 2138 2161 2183 2223 2262 2262 2262

90,000 \$ 1579 1709 1845 1974 2104 2240 2369 2499 2635 2894 3159 3159 3159
 ←---THEORETICAL HEATING COST & FURNACE ONLY

-.03 \$ 812 840 868 897 925 959 987 1015 1043 1100 1162 1162 1162
 -.04 \$ 964 993 1021 1049 1077 1111 1139 1168 1196 1252 1314 1314 1314
 -.05 \$ 1122 1151 1179 1207 1235 1269 1297 1326 1354 1410 1472 1472 1472
 -.06 \$ 1275 1303 1331 1359 1388 1421 1450 1478 1506 1563 1625 1625 1625
 -.07 \$ 1427 1455 1484 1512 1540 1574 1602 1630 1658 1715 1777 1777 1777
 -.08 \$ 1579 1608 1636 1664 1692 1726 1754 1783 1811 1867 1929 1929 1929
 -.09 \$ 1737 1766 1794 1822 1850 1884 1912 1941 1969 2025 2087 2087 2087
 -.10 \$ 1890 1918 1946 1974 2003 2036 2065 2093 2121 2178 2240 2240 2240
 -.12 \$ 2200 2228 2257 2285 2313 2347 2375 2403 2431 2468 2550 2550 2550

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

-.03 \$ 103 .04 .05 .06 .07 .08 .05 .10 .12
 \$ 127 169 211 254 296 338 381 423 504
 ←---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 LOCAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY
 DUAL FUEL ADD-ON HEAT PUMPS IDE TO FURNACE COST SAVINGS

REGION 4
 HEAT PUMP MODEL: OUTDOOR COILS
 AMI RATED COOLING CAP: BTUH (75) SEER 8.00 INDOOR HEAD
 AMI RATED HEATING CAP: BTUH (47) COP (4.7) 4.85, HSPF 82.60 MIN-DHR DEG F V
 FURNACE TYPE ELECTRIC (17) 12000, COP (17) 2.00 FURNACE EFFIC IFMCV 100.00 X SEVE

HEAT LOSS BTUH
 ELEC. COST \$/KWH

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT		THEORETICAL ANNUAL HEATING COST	
		HEAT	ELEC.	HEAT	ELEC.
60,000	.03	462	904	1213	
	.04	513	1017	1317	
	.05	573	1147	1422	
	.06	644	1297	1531	
	.07	727	1477	1642	
	.08	823	1687	1767	
	.09	933	1927	1907	
	.10	1057	2207	2062	
	.12	1350	2807	2450	

BALANCE POINT 19 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT		THEORETICAL ANNUAL HEATING COST	
		HEAT	ELEC.	HEAT	ELEC.
70,000	.03	541	1080	1416	
	.04	602	1217	1531	
	.05	673	1377	1657	
	.06	757	1567	1797	
	.07	857	1787	1952	
	.08	973	2037	2122	
	.09	1107	2317	2307	
	.10	1257	2627	2517	
	.12	1610	3407	3000	

BALANCE POINT 22 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT		THEORETICAL ANNUAL HEATING COST	
		HEAT	ELEC.	HEAT	ELEC.
80,000	.03	637	1274	1619	
	.04	707	1437	1757	
	.05	787	1627	1907	
	.06	877	1847	2072	
	.07	987	2097	2252	
	.08	1117	2377	2447	
	.09	1267	2687	2657	
	.10	1437	3027	2892	
	.12	1810	3807	3370	

BALANCE POINT 25 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT		THEORETICAL ANNUAL HEATING COST	
		HEAT	ELEC.	HEAT	ELEC.
90,000	.03	733	1466	1822	
	.04	807	1647	1977	
	.05	897	1857	2147	
	.06	1007	2097	2332	
	.07	1137	2367	2532	
	.08	1287	2667	2757	
	.09	1457	3007	2997	
	.10	1647	3387	3262	
	.12	2020	4167	3740	

BALANCE POINT 28 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT		THEORETICAL ANNUAL HEATING COST	
		HEAT	ELEC.	HEAT	ELEC.
100,000	.03	833	1666	2022	
	.04	917	1867	2197	
	.05	1017	2097	2387	
	.06	1137	2357	2592	
	.07	1277	2647	2812	
	.08	1437	2967	3057	
	.09	1617	3317	3322	
	.10	1817	3697	3602	
	.12	2200	4477	4080	

BALANCE POINT 31 DEG.F.

HEAT LOSS BTUH	ELEC. COST \$/KWH	HEAT PUMP WITH ELECTRIC HEAT		THEORETICAL ANNUAL HEATING COST	
		HEAT	ELEC.	HEAT	ELEC.
110,000	.03	947	1874	2222	
	.04	1037	2097	2427	
	.05	1147	2347	2647	
	.06	1277	2627	2882	
	.07	1427	2937	3132	
	.08	1597	3277	3407	
	.09	1787	3647	3702	
	.10	1997	4047	4022	
	.12	2380	4827	4500	

BALANCE POINT 33 DEG.F.

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

HEAT LOSS BTUH	ELEC. COST \$/KWH	THEORETICAL AIR CONDITIONING COST
60,000	.03	172
	.04	230
	.05	287
	.06	345
	.07	402
	.08	460
	.09	517
	.10	575
	.12	690

<---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 60HPQS HEAT RATED COOLING CAP.: BTUH (95) 57,500 SEER 8.00 INDOOR HEAD1 ARI RATED HEATING CAP.: BTUH (17) 57,500 COP (AT 7) 2.45 HSPF 65.00 MIN. OHR REC 1 V BTUH (17) 14,000 COP (17) 2.00 FURNACE EFFICIENCY 65.00 X A/EU		60HPQS		70,000		80,000		90,000		100,000		110,000	
HEAT LOSS BTUH	ELEC. COST \$/KWH	NATURAL GAS COST - \$/THERM	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY	THEORETICAL HEATING COST \$ FURNACE ONLY
0.03	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.90	1.00	
60,000	\$ 558	637	716	795	874	954	1038	1117	1196	1275	1438	1596	643
	\$ 445	462	479	490	507	524	536	552	569	581	609	643	
	\$ 558	575	592	603	620	637	648	665	682	694	722	756	
	\$ 671	688	705	716	733	750	761	778	795	806	835	868	
	\$ 868	891	914	931	949	976	996	1024	1053	1083	1121	1162	
	\$ 1015	1032	1049	1060	1077	1094	1105	1122	1139	1151	1179	1213	
	\$ 1128	1145	1162	1173	1190	1207	1218	1235	1252	1263	1292	1326	
	\$ 1241	1258	1275	1286	1303	1320	1331	1348	1365	1376	1405	1438	
	\$ 1472	1489	1506	1517	1534	1551	1563	1579	1596	1608	1636	1670	
70,000	\$ 648	744	835	931	1021	1117	1207	1303	1393	1489	1675	1862	643
	\$ 524	552	575	603	631	654	682	710	739	761	818	868	
	\$ 671	671	671	671	671	671	671	671	671	671	671	671	
	\$ 868	897	919	947	976	998	1024	1053	1083	1121	1162	1213	
	\$ 1015	1032	1049	1060	1077	1094	1105	1122	1139	1151	1179	1213	
	\$ 1128	1145	1162	1173	1190	1207	1218	1235	1252	1263	1292	1326	
	\$ 1241	1258	1275	1286	1303	1320	1331	1348	1365	1376	1405	1438	
	\$ 1472	1489	1506	1517	1534	1551	1563	1579	1596	1608	1636	1670	
80,000	\$ 744	852	959	1066	1168	1275	1382	1489	1596	1704	1919	2127	643
	\$ 598	626	654	688	716	750	778	806	840	868	931	993	
	\$ 722	750	778	812	840	874	902	931	964	993	1053	1117	
	\$ 976	1004	1032	1056	1079	1094	1124	1153	1182	1211	1249	1297	
	\$ 1105	1134	1162	1192	1224	1258	1296	1336	1378	1421	1468	1519	
	\$ 1230	1258	1286	1320	1358	1398	1441	1486	1534	1584	1636	1692	
	\$ 1359	1388	1416	1450	1478	1512	1551	1593	1639	1687	1737	1791	
	\$ 1489	1517	1546	1579	1608	1643	1682	1724	1769	1814	1862	1913	
	\$ 1743	1771	1799	1833	1862	1895	1924	1952	1986	2014	2076	2138	
90,000	\$ 835	959	1077	1196	1314	1438	1557	1675	1794	1918	2155	2398	643
	\$ 694	744	795	846	897	947	998	1049	1100	1151	1252	1354	
	\$ 806	857	908	959	1010	1060	1111	1162	1213	1263	1365	1467	
	\$ 919	970	1021	1072	1122	1173	1224	1275	1326	1377	1479	1581	
	\$ 1032	1083	1134	1184	1235	1286	1337	1388	1439	1490	1592	1694	
	\$ 1145	1196	1247	1297	1348	1399	1450	1501	1552	1603	1705	1807	
	\$ 1258	1309	1359	1410	1461	1512	1563	1614	1665	1716	1818	1920	
	\$ 1371	1421	1472	1523	1574	1625	1676	1727	1778	1829	1931	2033	
	\$ 1484	1534	1585	1636	1687	1737	1788	1839	1890	1941	2042	2144	
	\$ 1709	1760	1811	1862	1912	1963	2014	2065	2115	2166	2268	2369	
100,000	\$ 931	1060	1196	1331	1461	1596	1732	1862	1997	2127	2398	2663	643
	\$ 767	823	880	936	993	1049	1105	1162	1219	1275	1388	1500	
	\$ 885	942	998	1055	1111	1168	1224	1280	1337	1393	1506	1619	
	\$ 1010	1066	1122	1179	1235	1292	1348	1405	1461	1517	1630	1743	
	\$ 1134	1190	1247	1303	1359	1416	1472	1529	1585	1642	1754	1867	
	\$ 1258	1314	1371	1427	1484	1540	1596	1653	1709	1766	1878	1991	
	\$ 1382	1438	1495	1551	1608	1664	1721	1777	1833	1890	2002	2115	
	\$ 1506	1563	1619	1675	1732	1788	1845	1901	1957	2014	2127	2240	
	\$ 1630	1687	1743	1799	1856	1912	1969	2025	2082	2138	2251	2364	
	\$ 1873	1929	1986	2042	2099	2155	2211	2268	2324	2381	2494	2606	
110,000	\$ 1021	1168	1314	1461	1608	1754	1901	2048	2194	2341	2635	2928	643
	\$ 897	981	1072	1156	1247	1331	1421	1506	1596	1681	1856	2031	
	\$ 987	1072	1162	1247	1337	1421	1512	1596	1687	1771	1946	2121	
	\$ 1063	1168	1258	1342	1433	1517	1608	1692	1783	1867	2042	2217	
	\$ 1173	1258	1348	1433	1523	1608	1698	1783	1873	1957	2132	2307	
	\$ 1269	1354	1444	1529	1619	1704	1794	1878	1969	2053	2228	2403	
	\$ 1359	1444	1534	1619	1709	1794	1884	1969	2059	2144	2319	2494	
	\$ 1455	1540	1630	1715	1805	1890	1980	2065	2155	2240	2415	2589	
	\$ 1546	1630	1721	1805	1895	1980	2070	2154	2244	2330	2505	2680	
	\$ 1737	1818	1907	1991	2081	2166	2257	2341	2431	2516	2691	2866	

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

.03 172 .04 230 .05 287 .06 345 .07 402 .08 460 .09 517 .10 575 .12 590

←--ELECTRIC RATE \$/KWH
←--THEORETICAL AIR CONDITIONING CO

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

REGION 4
HEAT PUMP MODEL: OUTDOOR CONDENSING
HEAT RATED COOLING CAP.: BTUH @ 47 °F SEER 13.00 INDOOR H2591
HEAT RATED HEATING CAP.: BTUH @ 17 °F COP 17.1
BTUH @ 17 °F COP 17.1
FURNACE EFFICIENCY 85.00%
FURNACE TYPE FUEL OIL

HEAT LOSS BTUH	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.20	2.40
60,000	\$ 1151	\$ 1263	\$ 1382	\$ 1495	\$ 1613	\$ 1726	\$ 1839	\$ 1957	\$ 2070	\$ 2302	\$ 2533	\$ 2764
HEATING OIL COST - \$/GALLON	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
THEORETICAL HEATING COST @ FURNACE ONLY	541	559	575	592	608	625	642	659	676	727	778	829
THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR	671	684	697	710	723	736	749	762	775	826	877	928
BALANCE POINT 19 DEG.F.	1737	1754	1771	1788	1805	1822	1839	1856	1873	1924	1975	2026
70,000	\$ 1342	\$ 1478	\$ 1613	\$ 1743	\$ 1878	\$ 2014	\$ 2149	\$ 2285	\$ 2420	\$ 2655	\$ 2926	\$ 3227
HEATING OIL COST - \$/GALLON	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
THEORETICAL HEATING COST @ FURNACE ONLY	671	686	699	714	728	742	756	770	784	835	886	937
THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR	801	814	827	840	853	866	879	892	905	956	1007	1058
BALANCE POINT 22 DEG.F.	1977	2000	2023	2046	2069	2092	2115	2138	2161	2212	2263	2314
90,000	\$ 1534	\$ 1687	\$ 1839	\$ 1997	\$ 2149	\$ 2302	\$ 2454	\$ 2612	\$ 2764	\$ 3049	\$ 3379	\$ 3694
HEATING OIL COST - \$/GALLON	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
THEORETICAL HEATING COST @ FURNACE ONLY	801	816	831	846	861	876	891	906	921	972	1023	1074
THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR	931	944	957	970	983	996	1009	1022	1035	1086	1137	1188
BALANCE POINT 25 DEG.F.	2183	2214	2245	2276	2307	2338	2369	2400	2431	2482	2533	2584
100,000	\$ 1726	\$ 1901	\$ 2070	\$ 2245	\$ 2420	\$ 2599	\$ 2764	\$ 2939	\$ 3109	\$ 3450	\$ 3803	\$ 4187
HEATING OIL COST - \$/GALLON	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
THEORETICAL HEATING COST @ FURNACE ONLY	931	946	961	976	991	1006	1021	1036	1051	1102	1153	1204
THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR	1061	1074	1087	1100	1113	1126	1139	1152	1165	1216	1267	1318
BALANCE POINT 28 DEG.F.	2389	2420	2451	2482	2513	2544	2575	2606	2637	2688	2739	2790
100,000	\$ 1918	\$ 2110	\$ 2302	\$ 2494	\$ 2685	\$ 2877	\$ 3069	\$ 3261	\$ 3458	\$ 3842	\$ 4226	\$ 4610
HEATING OIL COST - \$/GALLON	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
THEORETICAL HEATING COST @ FURNACE ONLY	1061	1076	1091	1106	1121	1136	1151	1166	1181	1232	1283	1334
THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR	1191	1204	1217	1230	1243	1256	1269	1282	1295	1346	1397	1448
BALANCE POINT 31 DEG.F.	2595	2626	2657	2688	2719	2750	2781	2812	2843	2894	2945	2996
110,000	\$ 2110	\$ 2324	\$ 2533	\$ 2747	\$ 2956	\$ 3162	\$ 3379	\$ 3588	\$ 3803	\$ 4226	\$ 4649	\$ 5072
HEATING OIL COST - \$/GALLON	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
THEORETICAL HEATING COST @ FURNACE ONLY	1191	1206	1221	1236	1251	1266	1281	1296	1311	1362	1413	1464
THEORETICAL HEATING COST @ FURN. + HEAT PUMP \$ PER YEAR	1321	1334	1347	1360	1373	1386	1399	1412	1425	1476	1527	1578
BALANCE POINT 33 DEG.F.	2701	2732	2763	2794	2825	2856	2887	2918	2949	2990	3041	3092

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
\$	172	230	287	345	402	460	517	575	660

← 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 A HEAT PUMP MODEL: OUTDOOR UNITS HEAT RATED COOLING CAP. BTUH HEAT RATED HEATING CAP. BTUH		INDOOR HEAD SEE P. 10 SEER 14.0 COP 17.0 EFFICIENCY 85.00%		ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP	
HEAT LOSS BTUH	ELEC. COST \$/KWH	PROpane GAS COST \$/GALLON	PROpane GAS COST \$/GALLON	PROpane GAS COST \$/GALLON	PROpane GAS COST \$/GALLON
60,000	.03	.75	.80	.90	1.00 1.10 1.20 1.20
	.04	.75	.80	.90	1.00 1.10 1.20 1.20
	.05	.75	.80	.90	1.00 1.10 1.20 1.20
	.06	.75	.80	.90	1.00 1.10 1.20 1.20
	.07	.75	.80	.90	1.00 1.10 1.20 1.20
	.08	.75	.80	.90	1.00 1.10 1.20 1.20
	.09	.75	.80	.90	1.00 1.10 1.20 1.20
	.10	.75	.80	.90	1.00 1.10 1.20 1.20
	.11	.75	.80	.90	1.00 1.10 1.20 1.20
	.12	.75	.80	.90	1.00 1.10 1.20 1.20
70,000	.03	.75	.80	.90	1.00 1.10 1.20 1.20
	.04	.75	.80	.90	1.00 1.10 1.20 1.20
	.05	.75	.80	.90	1.00 1.10 1.20 1.20
	.06	.75	.80	.90	1.00 1.10 1.20 1.20
	.07	.75	.80	.90	1.00 1.10 1.20 1.20
	.08	.75	.80	.90	1.00 1.10 1.20 1.20
	.09	.75	.80	.90	1.00 1.10 1.20 1.20
	.10	.75	.80	.90	1.00 1.10 1.20 1.20
	.11	.75	.80	.90	1.00 1.10 1.20 1.20
	.12	.75	.80	.90	1.00 1.10 1.20 1.20
80,000	.03	.75	.80	.90	1.00 1.10 1.20 1.20
	.04	.75	.80	.90	1.00 1.10 1.20 1.20
	.05	.75	.80	.90	1.00 1.10 1.20 1.20
	.06	.75	.80	.90	1.00 1.10 1.20 1.20
	.07	.75	.80	.90	1.00 1.10 1.20 1.20
	.08	.75	.80	.90	1.00 1.10 1.20 1.20
	.09	.75	.80	.90	1.00 1.10 1.20 1.20
	.10	.75	.80	.90	1.00 1.10 1.20 1.20
	.11	.75	.80	.90	1.00 1.10 1.20 1.20
	.12	.75	.80	.90	1.00 1.10 1.20 1.20
90,000	.03	.75	.80	.90	1.00 1.10 1.20 1.20
	.04	.75	.80	.90	1.00 1.10 1.20 1.20
	.05	.75	.80	.90	1.00 1.10 1.20 1.20
	.06	.75	.80	.90	1.00 1.10 1.20 1.20
	.07	.75	.80	.90	1.00 1.10 1.20 1.20
	.08	.75	.80	.90	1.00 1.10 1.20 1.20
	.09	.75	.80	.90	1.00 1.10 1.20 1.20
	.10	.75	.80	.90	1.00 1.10 1.20 1.20
	.11	.75	.80	.90	1.00 1.10 1.20 1.20
	.12	.75	.80	.90	1.00 1.10 1.20 1.20
100,000	.03	.75	.80	.90	1.00 1.10 1.20 1.20
	.04	.75	.80	.90	1.00 1.10 1.20 1.20
	.05	.75	.80	.90	1.00 1.10 1.20 1.20
	.06	.75	.80	.90	1.00 1.10 1.20 1.20
	.07	.75	.80	.90	1.00 1.10 1.20 1.20
	.08	.75	.80	.90	1.00 1.10 1.20 1.20
	.09	.75	.80	.90	1.00 1.10 1.20 1.20
	.10	.75	.80	.90	1.00 1.10 1.20 1.20
	.11	.75	.80	.90	1.00 1.10 1.20 1.20
	.12	.75	.80	.90	1.00 1.10 1.20 1.20
110,000	.03	.75	.80	.90	1.00 1.10 1.20 1.20
	.04	.75	.80	.90	1.00 1.10 1.20 1.20
	.05	.75	.80	.90	1.00 1.10 1.20 1.20
	.06	.75	.80	.90	1.00 1.10 1.20 1.20
	.07	.75	.80	.90	1.00 1.10 1.20 1.20
	.08	.75	.80	.90	1.00 1.10 1.20 1.20
	.09	.75	.80	.90	1.00 1.10 1.20 1.20
	.10	.75	.80	.90	1.00 1.10 1.20 1.20
	.11	.75	.80	.90	1.00 1.10 1.20 1.20
	.12	.75	.80	.90	1.00 1.10 1.20 1.20

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.