



DUAL FUEL

Your Boone Electric guide to Dual Fuel Systems

For more information about Dual Fuel Systems, call the Member Services Department at 573-449-4181 or visit our website at BooneElectric.coop.



Boone Electric Cooperative

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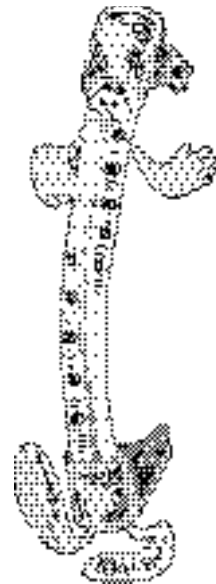
What is a Heat Pump?

A heat pump is an electrical driven unit which takes heat from outside air and moves it indoors to heat. It also effectively cools your home in the summer.

Why Dual Fuel?

A heat pump on Boone Electric Cooperative's Dual Fuel program allows Boone Electric to sell energy at off-peak times, which results in lower demand charges and more stable rates.

With Dual Fuel, an electric heat pump will economically heat your home down to 15°F. At this point, an outdoor thermostat calls for the gas furnace to operate.



Boone Electric Cooperative will provide:

- \$300 rebate on each Dual Fuel system installed. An additional rebate of \$150 per ton, limited time offer, if the system (heat pump and gas furnace combined) has a SEER rating of 17.0 as determined by the American Refrigeration Institute. The heat pump also needs to be a 3 SEER improvement and meet all other requirements.
- a follow-up inspection after the unit has been installed to make sure all necessary work has been performed.
- a load control switch to cycle the heat pump unit off in the summer when the unit is operating in air conditioning mode.

*** Rebates will not be granted until all preliminary upgrades are performed and all criteria have been met.*

AND...

***Electricity at a
REDUCED RATE
during heating season!***

Because Boone Electric is selling this electricity at off-peak times, it will provide the member with power at a reduced rate per kilowatt-hour to operate the heat pump. This rate would be effective for the period beginning with the first billing cycle in November through the May billing of each year. Your electric heat pump will be sub-metered to record the kilowatt-hours used.

In order to qualify for the discounted rate in the winter, the member must agree to allow Boone Electric to control the unit in the summer during air conditioning at peak times. The unit will not be off continuously, but rather will be cycled to prevent any discomfort to the member. No discount will be applied in the summer since the unit still contributes to a summer peak.

\$300 Rebate

- Any member installing an initial Dual Fuel system, who meets Boone Electric's installation requirements, will be granted a \$300 rebate (minimum Seasonal Energy Efficiency Ratio 13). An additional rebate of \$150 per ton, limited time offer, is available if the system (air-to-air heat pump and gas furnace combined) is rated as determined by ARI and has a SEER rating of at least 17.0. ARI reference number is required. A final invoice must be supplied to the cooperative along with all required paperwork before any rebates will be issued. A \$150 per ton rebate is also applicable to a homeowner with an existing Dual Fuel system who upgrades to a 17.0 SEER-rated system.
- This rebate will be issued directly to the member upon completion of the system.
- In addition to these rebates, some dealers may offer rebates through their manufacturers.
- There may also be federal and state tax credits available. For details check with your tax consultant or www.energystar.gov.
- All rebates are subject to federal and state tax.

The co-op member will:

- provide upgrades to higher insulation levels, and other energy efficiency measures that improve the minimum Energy Efficiency Standards for the home. These must be made prior to payment of rebates.
- maintain the equipment to keep it in good running order and agree to remove electric resistance heat, and not use electric resistance heat in the future. Maintenance is the responsibility of the member.
- agree not to tamper with the load control switch or 15°F temperature disconnect setting on the heat pump system.
- no rebates will be forwarded to the member until all required paperwork/calculations are provided to Boone Electric and all minimum standards are met with regard to building infiltration and insulation.
- a Home Performance with Energy Star (BPI) audit to assess the energy efficiency of your structure prior to the unit being installed (if required). This also provides an opportunity for a Boone Electric employee to explain other aspects of the program.

*** The member is responsible for all costs incurred in the Dual Fuel system installation.*

The structure must be energy efficient.

Minimum Insulation Levels:

Ceiling: R-38
Walls: R-13
Floors or crawl space walls: R-11

Recommended Insulation Levels:

Ceiling: R-50
Walls: R-19
Floors: R-19
Basement Walls: R-11

Recommended & Minimum Insulation Levels

Ductwork: All ductwork that runs through an unconditioned space must be insulated (R-13). All ductwork must be properly sealed to prevent air leakage.

Doors:

Urethane core: R-13.5
Polystyrene core: R-7.5
Solid Wood w/storm: R-3.5

Attic Ventilation:

Ratio of total net free area to area of ceiling shall not be less than 1/150, except ratio may be 1/300 provided:

- A vapor barrier having a transmission rate not exceeding one perm is installed on the warm side of the ceiling; or
- At least 50% of the required ventilating area is provided by ventilation located in the upper portion of the space to be provided by eaves or cornice vents.

Windows:

Double pane insulated: R-2 or R-3
Single pane with storm windows: R-1.9

The dealer assures:

- that the heat pump installed has a Seasonal Energy Efficiency Ratio (SEER) of 13.0 or higher to qualify for the \$300 Boone Electric rebate. An additional \$150 per ton rebate is available (for a limited time) if the SEER rating is 17.0. The dealer must verify and sign a form that assures that the system (both gas furnace and heat pump) is rated as recognized by ARI with a minimum seer of 17.0. A final invoice must be provided to the Cooperative before any rebates will be paid.
- that the heat pump installed does not have electric resistance back-up heat. Any existing strip heat must be removed.
- that all criteria of a Dual Fuel installation has been met if customer wishes to receive discount, rate and rebates of the Dual Fuel program.
- that the heating duct work has a minimum cubic feet per minute (CFM) of 400 per ton.
- that the installation has an outside thermostat, or an indoor thermostat with an external temperature sensor, set to disengage the heat pump at 15°F. Boone Electric must be provided with a procedure to verify and reset control centers.
- insulate duct work that passes through unconditioned space.
- the dealer will provide the interface kit, required by the manufacturer, to install a heat pump with a gas furnace as part of the installation. On Wi-Fi Dual Fuel systems, an onsite exterior temperature sensor is required. **Verification may be required.**
- Boone Electric recommends that all homes wishing to apply for the Dual Fuel Program have the following insulating factors: Ceiling R-50, Walls R-19, Floors R-19, and Basement Walls R-11.
- all homes must have minimum insulating factors as follows to be eligible for the Dual Fuel Program: Ceiling R-38, Walls R-13, and Floors R-11.
- if, after any inspection by a Boone Electric representative, there is found to be any tampering of off-peak equipment, including by not limited to changing control temperature settings, the off-peak rate will be discontinued permanently.
- if applicable, the dealer must verify the system as to a 17.0 SEER rating and supply the ARI reference number on rebate form.

Take Control & Save[®]

Dual Fuel Requirements

Prior to the final inspection and payment of rebates by Boone Electric, the following things must be completed:

1. System(s) must be operational.
 - Meter base installed (lugs “jumped” - no meter)
 - Thermostat controls installed and set to operate gas furnace and heat pump together; set to 15°F. Gas furnace installed and operational.
2. Make sure the home meets the minimum energy efficiency standards as outlined in the Dual Fuel handbook (member’s responsibility).
3. Have a copy of a paid receipt from the HVAC dealer showing the total number of systems installed.
4. Dealer to provide a copy of the ARI Certification showing the effective SEER rating of the member’s installed gas furnace and heat pump combination.
 - If a replacement heat pump(s) with an existing Dual Fuel system will only qualify for a Take Control & Save rebate and only if the SEER is at or above a prescribed minimum.
 - If a system(s) is a new install (not a previous Dual Fuel), it may qualify for up to two (2) - \$300 rebates if the SEER meets minimum federal efficiency standards.
 - The system may qualify for the Take Control & Save additional rebates (\$150/ton) if SEER is at or above a prescribed minimum.
5. If applicable, a Take Control & Save form must be completed by both the member and dealer.

QUESTIONS MOST OFTEN ASKED ABOUT DUAL FUEL

Q: WHEN DOES THE ELECTRIC HEAT PUMP OPERATE?

A: The heat pump shuts off at 15°F and comes on again at 18°F.

Q: WHEN DOES THE GAS FURNACE OPERATE?

A: When the temperature is below 15°F, or when the indoor thermostat switch is moved to emergency heat. When there is more than 1° difference between actual temperature and thermostat setting or when the unit goes into the defrost cycle.

Q: WHAT IS THE LIFE OF THE COMPRESSOR OF A HEAT PUMP?

A: Studies show a heat pump compressor outlasts air conditioner compressors because the heat pump compressor operates year-round, keeping the unit internally lubricated. The internal components of a heat pump compressor are built to more rigid specifications.

Q: CAN I USE MY EXISTING HEAT PUMP AND ADD A GAS FURNACE TO QUALIFY FOR THE DUAL FUEL PROGRAM?

A: Yes, this is an option. Boone Electric Cooperative will work with the customer to determine the effectiveness of doing so. To qualify as an Energy Star unit, most heat pumps must be coupled with a gas furnace that has a variable speed blower. Check with the dealer for details.

Q: WHAT IS THE TEMPERATURE OF THE AIR COMING FROM THE REGISTER OF THE HEAT PUMP?

A: The air's temperature ranges from 20° - 25° warmer than the return air, with the heat pump much the same (if not higher) than today's high-efficiency gas furnaces.

Q: CAN MY EXISTING DUCT WORK BE USED WITH THE DUAL FUEL SYSTEM?

A: The duct work should be able to allow 400-450 CFM per ton of heat pump capacity. Boone Electric Cooperative will recommend insulated duct work within the conditioned part of the house to provide maximum comfort in rooms located furthest from the heating unit. Duct work in attics or crawl spaces must have additional insulation to work properly.

Q: MUST A HOME BE ENERGY-EFFICIENT TO QUALIFY FOR THE DUAL FUEL PROGRAM?

A: Of all the money one can spend to save money on energy, insulation is the best investment for the dollar spent. Boone Electric Cooperative requires that minimum insulation standards be met to qualify for the program.

Q: ARE THERE MINIMUM EFFICIENCIES ON A HEAT PUMP?

A: Yes. The air-to-air heat pump should have a Seasonal Energy Efficiency Ratio (SEER) of 13.0 or higher. For more detailed information on efficiency ratings, contact Boone Electric Cooperative. Energy Star units consider both the heat pump and gas furnace together. See www.ceedirectory.org for more details.

Q: CAN A WI-FI THERMOSTAT BE USED?

A: Yes, if it is set up to receive temperature from an on-site sensor.

Q: WHY DOES BOONE ELECTRIC OFFER A DISCOUNTED RATE TO OPERATE THE HEAT PUMP IN THE WINTER ONLY?

A: Boone Electric's peak is actually an average of the total demand exhibited for both summer and winter. Since the heat pump is only cycled in the air conditioning mode, for comfort, it still contributes to the peak, thus adding to the total demand. Only in the winter is it totally shut off.

Q: HOW DO I GET THE MOST ECONOMICAL OPERATION OUT OF MY DUAL FUEL SYSTEM?

A: Care should be taken in constantly changing the temperature on the inside thermostat. Anytime the setting is raised more than 1°F, the emergency (or gas) heat will come on. This results in a more expensive operation.

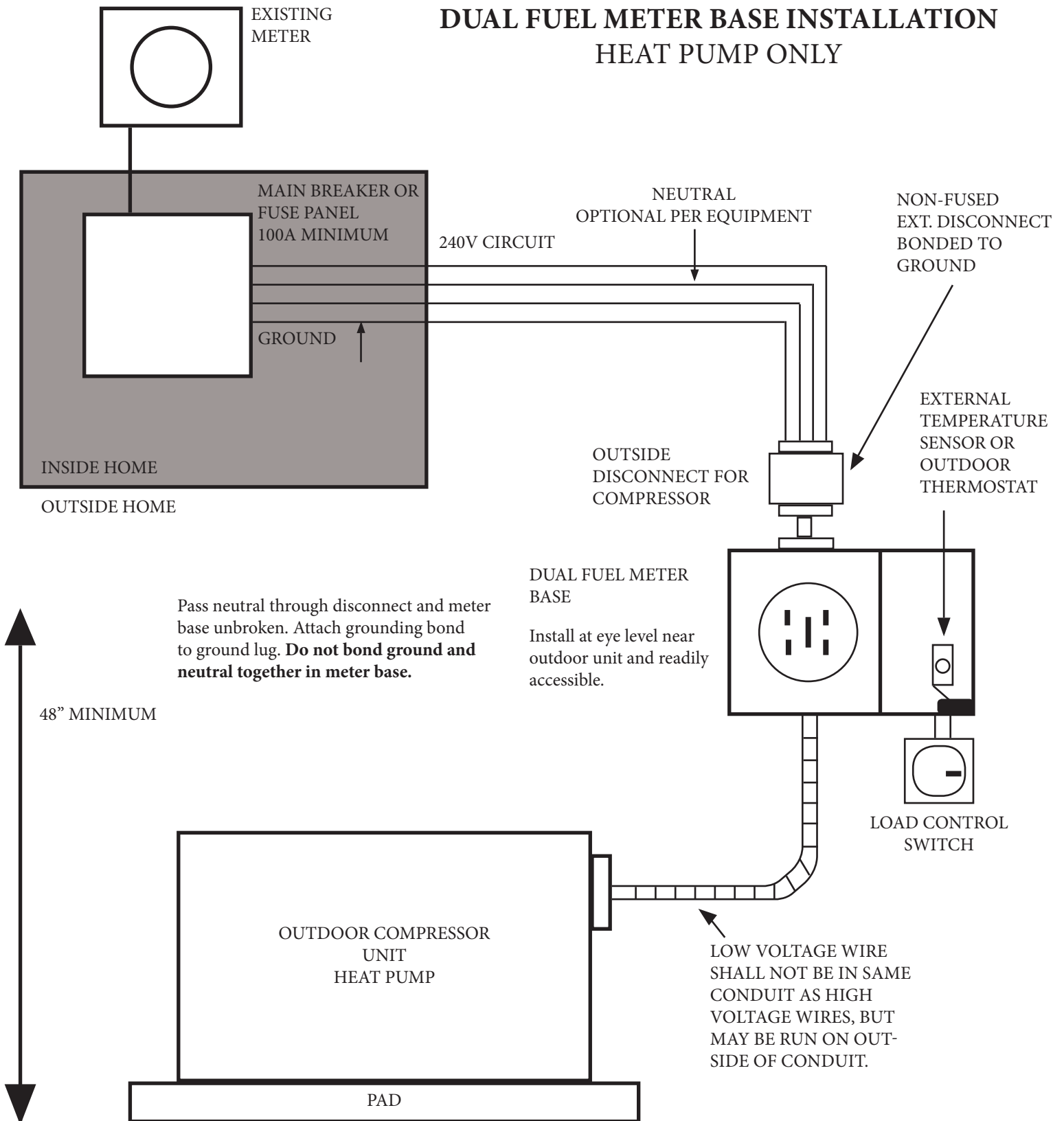
COST OF 1 MILLION BTU's OF HEAT FROM VARIOUS FUELS

TYPE OF ENERGY	UNIT	AVG. COST	AVG. FURNACE EFFICIENCY	ADJ. COST 1,000,000 BTU's
ELECTRICITY Dual Fuel Rate (Regular Rate)	KWH	\$0.07 Per KWH (\$0.10 Per KWH)	250% (COP2.5) SEER 13, 3 TON	\$7.14 (\$11.13)
GROUND SOURCE HEAT PUMP Regular Rate	KWH	\$0.10 Per KWH	350% (EER 12.0)	\$7.95
NATURAL GAS	Therm or CCF	\$1.00 Per CCF	65% 85%	\$14.65 \$11.20
NO. 2 FUEL OIL	Gallon	\$3.60 Per Gallon	62.5%	\$41.14
WOOD (STOVE) Dry Oak	Cord	\$125 Per Cord	50%	\$10.87
PROPANE	Gallon	\$1.50/\$2.00/\$2.50 Per Gallon	65% 85%	\$25.64/\$34.19/\$42.73 \$19.61/\$26.14/\$32.68
KEROSENE	Gallon	\$4.26 Gallon	80%	\$39.44
ELECTRICITY Regular Rate	KWH	\$0.10 Per KWH	100%	\$27.83
WOOD (FIRE PLACE) Dry Oak	Cord	\$125 Per Cord	5%	\$108.70

Formula:
$$\frac{1,000,000}{\text{Heating Value} \times \text{Efficiency of System}} \times \text{Cost of Fuel} = \text{Cost of Delivered Heat for 1,000,000 BTU's}$$

Heating Values of Various Fuels

Fuel	Unit	Heating Value
Natural Gas	Btu/ft ³	1,050
Propane	Btu/gallon	90,000
No. 2 Fuel Oil	Btu/gallon	140,000
Wood (white oak)	Cord	23,000,000 Btu
Kerosene	Btu/gallon	135,000
Electric	KWH	3,413



NOTES:

1. All wiring to meet applicable National Electric Code and all local and/or State Regulations.
2. Outside thermostat or external temperature sensor may be installed in Dual Fuel Meter
3. No ground rod is required on the Dual Fuel Meter Base. But the system ground must be run through the center bar of the base to ground the box.

Dual Fuel Dealers

AAA Service Co Heating & Cooling	Columbia.....	474-7447
Accurate Heating & Cooling	Columbia.....	442-7312
Air & Water Solutions	Columbia.....	445-1112
Aire Serv Heating & Air Conditioning.....	Jefferson City	636-4490
.....	Columbia.....	256-4490
Albright Heating & Air Conditioning.....	Columbia.....	875-7888
All Seasons Heating & Cooling.....	Hallsville	474-4403
All Weather Heating & Cooling	Columbia.....	874-8076
Always Be Comfortable	Columbia.....	474-5558
American Geothermal.....	Columbia.....	825-3350
Bentlage Heating & Cooling	Hartsburg.....	657-8515
Burks Service Company	Columbia.....	874-1501
Chapman Heating & Air Conditioning.....	Columbia.....	445-4489
Clark Heating & Cooling.....	Clark.....	(660) 456-7080
Cockrum Service	Columbia.....	445-7098
Comfort Crew Heating & Cooling	Columbia.....	(573) 355-1494
Crossbreak Heating & Cooling.....	Columbia.....	999-1960
D & M Heating & Air, Inc.....	Rocheport.....	(660) 537-0461
Elements Home Energy Solutions	Ashland	(573) 239-8200
Hancock Refrigeration & Heating.....	Centralia.....	682-3805
Jira Heating & Cooling.....	Columbia.....	445-4187
Lasater Heating & Cooling.....	Ashland	808-0574
March Heating	Hallsville	696-1610
Master Tech	Columbia.....	777-7777
Peters Heating & A/C	Columbia.....	443-3660
Reed Heating & Air Conditioning.....	Columbia.....	445-4112
Smith Heating & Cooling.....	Columbia.....	814-0506
.....	Moberly.....	(660) 263-5944
Star Heating & Air Conditioning.....	Columbia.....	449-3784
Tiger Appliance Heating & Cooling.....	Columbia.....	442-1998
Timmerman Heating & Cooling.....	Columbia.....	443-3271
Vaughn Heating & Cooling.....	Columbia.....	239-3611
Wayne's Heating & Cooling.....	Moberly.....	(660) 263-5517

* There are other HVAC dealers who are qualified to install or service a Dual Fuel System but are not listed here. Please check with your contractor, dealer, or Boone Electric Cooperative if you have questions.