

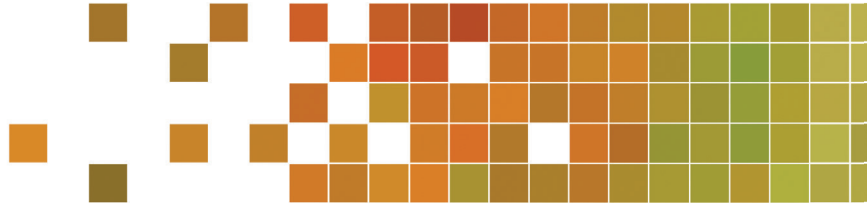
Minnesota Power

Dual Fuel/Controlled Access Guide



Table of Contents

Electric Heat	2
Dual Fuel	3
Dual Fuel Electric Heating	4
Individual Room Heating	4
Central Heating	6
Dual Fuel FAQs	7
Controlled Access	10
Storage Heating Rate	10
Electric Storage Heating Equipment	11
Storage Water Heating	12
Controlled Access FAQs	13
Space Heating Comparisons	14
Dual Fuel/Controlled Access Cost Worksheet	15
Meter Requirements	16
Metering Installation Examples	17
Dual Fuel/Controlled Access Application	18



Electric Heat

Electric heat offers many benefits

- There's no flame, which means less fire hazard and no combustion by-products that could present an indoor air quality concern.
- Eliminates sooting, back-drafting or fuel handling.
- Individual room units provide precise room-by-room temperature control to fit your lifestyle, save energy and allow for individual comfort. Electrical heat lets you put the right amount of heat exactly where you need it.
- In most cases, there are no, or a limited number, of moving parts.
- Installation and maintenance costs are low, and competitive Dual Fuel and Controlled Access storage rates make electric heat economical.
- Electric heating is very versatile and can offer many heating options to meet your needs, such as:
 - **Radiant heat**, e.g., cover heaters, ceiling panels, radiant slab heating
 - **Conventional heat**, e.g., baseboards and boilers
 - **Fan forced heat**, e.g., electric furnaces, plenum heaters, wall heaters, kickspace heaters, floor heaters, air source heat pumps and ground source heat pumps
- Electric heating offers a high degree of reliability with time-tested, proven heating technology. Electric heating is considered to be one of the most reliable systems available today.

Dual Fuel

The Dual Fuel interruptible service rate is designed for electric heating. To qualify for this rate, you must have a nonelectric backup heating system. The Dual Fuel system consists of an electric service entrance and panel connected only to your electric heating equipment. This separate electric service for heat has its own meter and switch that is controlled by Minnesota Power. During times when demand on Minnesota Power's electric system is high or to perform necessary interruption tests, we can interrupt your Dual Fuel service. When this happens, your nonelectric backup heating system must be capable of meeting your heating needs. Your backup heating system must be capable of providing all of your heating needs up to 30% of any annual period. Electric service for your other appliances is not affected.

Conditions

Backup heating systems can be fueled by oil, wood, propane or natural gas. The backup system must be capable of continuous automatic operation to meet your total space or water heating needs.

The owner will receive a Dual Fuel Interruptible agreement and tax exempt card after the meter is installed. (All heating fuels in the State of Minnesota are tax exempt).

How to participate:

Call Minnesota Power at 218-720-2644 for more information on the Dual Fuel program.



Dual Fuel Electric Heating

Individual room heating

Baseboard

Designed for quiet operation, in some cases easy and economical installation, minimal maintenance and no moving parts. Hydronic units are also available.



Cove heaters

Radiant heat is energy efficient. The energy emitted from the overhead electric cove heater is a long wave electromagnetic infrared energy that warms people, objects and the floor in the room directly. The objects in a room maintain a constant warmth and even temperature. This type of heating allows people the comfort of warm floors and furniture, while also saving energy costs.



Fan-forced wall heaters

Fan-forced heat for bathrooms, bedrooms, family and rec rooms, utility room, entry-ways and small areas in homes, apartments and offices. Various sizes and styles provide great design versatility.



Fan-forced ceiling heaters

Fan-forced ceiling heaters are designed for use almost anywhere in areas where wall space is not available. Can be recessed or surface mounted. Room temperature is controlled by a remote wall thermostat.



Kickspace/toe heaters

Fan-forced heater commonly used in kitchens and bathrooms recessed at floor level in kick space, toe space counter or soffit. Room temperature is controlled by a remote wall thermostat.



Drop-in floor heaters

A versatile fan-forced heater used as a draft barrier for large window areas, sliding glass doors or open stairwells. Recessed into the floor between floor joists.



Unit heaters

A large fan-forced heater commonly used in areas such as garages, shops, warehouses and storage rooms where rapid temperature rises are required. Unit heaters can be either wall or ceiling mounted and are available in a variety of heating outputs for added versatility.



Radiant ceiling heating

Infrared type heating that provides heating comfort in much the same way as the sun. Radiant heating heats objects in the room rather than air, providing ideal comfort at lower temperatures, resulting in reduced heating cost. Radiant ceiling heat comes in a variety of designs.



Radiant slab/floor heating

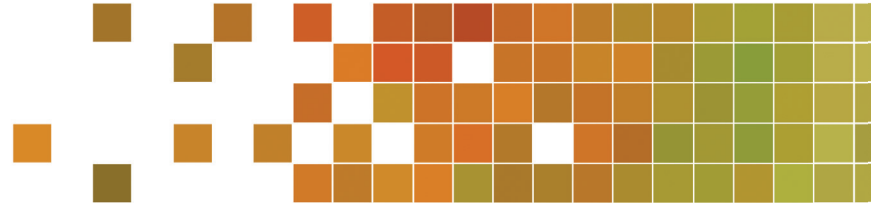
Radiant slab systems are designed for sub-floor or under-slab installation and can be used on any electric rate. Heating is provided by either an electric resistance heating cable or by plastic tubing used in conjunction with a hot water boiler. Radiant floor heating does not interfere with furniture placement or room design.



Floor warming systems

Eliminate cold ceramic tile or linoleum floors with the use of a supplemental electric floor warming system. Floor warming systems are suitable for both new construction and remodeling. This solves the problem with cold, uncomfortable floors and is used in addition to your primary heating system.





Dual Fuel Electric Heating

Central heating

Electric furnace

A 100 percent efficient central forced air heating system to be used with a conventional ductwork system.



Plenum heater

A common retrofit application for installing an electric heater into the plenum ductwork of an existing central forced air furnace.



Electric boiler

A 100 percent efficient central hot water heating system used for zoned hot water heat distribution. Boilers can be used with a variety of distribution systems including fin tube baseboards and slab heating.



Ground source heat pump

The ground source heat pump can provide 100 percent of a building's heating and air-conditioning needs. It operates by utilizing heat present in the earth to heat your home or business and also transfers heat back in to the earth when cooling is desired. Ground source heat pumps can also provide a percentage of your home or business hot water needs.



Air source heat pump

The air source heat pump operates similar to a ground source heat pump system, only it exchanges heat between the outside and inside air. When the outside temperature drops below 30 degrees, an alternate fuel source will be needed to supplement the heating of the home or business.



Dual Fuel FAQs

Q. What is the cost of installing Dual Fuel?

A. The costs can vary greatly depending on the individual installation. A mechanical heating contractor is normally hired to install your plenum heater, boiler, electric furnace, etc. An electrician will need to install a second service panel—one panel will have circuits for general household/business use; the second panel will have only the electric heating circuits. This means two separate meters are required. For services 200 amps and less, a radio receiver and socket interrupter or integral meter contactor will be installed by Minnesota Power. For services over 200 amps, an electrician needs to work with Minnesota Power's metering personnel to install a proper interruptible control system. The cost to upgrade Minnesota Power's distribution system facilities to accommodate your additional electric heating load can consist of but may not be limited to a transformer, wire, and meter disconnects in applicable installations, and a radio receiver and socket interrupter or integral meter contactor to control the heating service.

Q. How does the Dual Fuel rate compare with other fuels?

A. Please refer to the [Fuel Comparison Calculator](#).

Q. How often are the Dual Fuel interruptions? How long are the interruptions?

A. We cannot anticipate in advance the frequency or duration of interruptions. During times when demand on Minnesota Power's electric system is high, for emergencies, testing, or when the cost of supplying power is greater than the return from the rate we can interrupt your Dual Fuel service. The maximum interruption is not to exceed 30 percent of your Dual Fuel requirements of any annual period. There is no maximum interruption length per day defined in the rate. This is why it is extremely important that your non-electric backup system is capable of continuous operation and is adequately sized to meet 100 percent of your heating needs.

Q. Is a fireplace okay as a backup system?

A. The non-electric backup system must be externally vented and capable of continuous operation to meet your total space heating needs. It is the homeowner's responsibility to ensure that the backup heating system is adequate for comfort and protection from freezing of pipes, etc.

Q. Does Minnesota Power permit wood to be used as a backup heat source?

A. Wood can be the backup heating system for Dual Fuel, however, wood requires that someone is home to manage the backup system. Careful consideration is needed to determine if this is appropriate for your backup heating system.

Q. Can I put my water heater on the Dual Fuel system?

A. Yes, you can have a water heater connected to your Dual Fuel system, provided you have a non-electric, externally vented backup water heating system installed, e.g., natural gas, propane, or oil. The customer is responsible for the operation and maintenance of all backup systems.



Dual Fuel FAQs

Q. Can I put my air conditioner on the Dual Fuel Rate?

A. Air conditioning cannot be placed on Dual Fuel Rate.

Q. Can I Put a Heat Pump on the Dual Fuel Rate?

A. For the billing months of June through September all service through the Dual Fuel meter is billed as firm electric service under a separate application of the applicable standard rate schedule (i.e., Residential or General Service if a commercial customer). The service shall not be subject to interruption during this period. For the billing months of October through May all service through the Dual Fuel meter shall be subject to interruption and billed under the applicable Dual Fuel Interruptible Electric Service Schedule.

Q. If I go on vacation or go south for a month, can I go off Dual Fuel for that period of time?

A. No. When you go off a rate, you stay off that rate for a minimum 12 months.

Q. I am looking at buying a business or home that has Dual Fuel. What happens when a new owner moves into an existing building that already has Dual Fuel?

A. The new owner will be connected to Dual Fuel. With your first bill you will receive a form to sign and return. This form is to make you aware that you will be subject to interruptions and to qualify you for sales tax exemptions for your electric heat for the billing months of November 1 through April 30.

Q. Why is Minnesota Power changing its policies/practices?

A. The rate has not changed since the inception of the Dual Fuel rate in the 1980s. Although the rate has not changed, technology has advanced. With these technological advances, we have been able to upgrade the old time and temperature equipment that often failed when it was extremely cold. The new equipment, which uses a radio signal, also enables us to more closely match interruptions to the needs on our system.

Q. Will I be notified if there is a Dual Fuel interruption?

A. No. You can call our Interactive Voice Response at 1-800-307-6937 (Minnesota only) or 1-218-722-2625 or you may go to our website at www.mnpower.com and click on the Dual Fuel Interruption Notification Link. When an interruption is scheduled or in process, a message will be posted.

Dual Fuel FAQs

Q. How do I qualify for Dual Fuel?

- A. To qualify, you must have an electric heating system and a non-electric fueled, externally vented, backup heating system. A backup heating system can be fueled by oil, wood, propane or natural gas, and it must be capable of continuous operation to meet your total space-heating needs. You cannot use electric heaters connected to your household panel to back up your Dual Fuel electric heat.

Q. What do I do if I want to discontinue Dual Fuel?

- A. If you want to discontinue Dual Fuel, you will not be allowed to return to the Dual Fuel rate for a minimum of 12 months. If you wish to discontinue this rate, you can request this rate change. Minnesota Power will disable the radio control. If the Dual Fuel meter can be removed (no electric equipment requiring power is wired into the Dual Fuel electrical panel), Minnesota Power will do so. If the meter is not removed, you will continue to be billed a monthly service charge. To avoid that charge, transfer all electric heating circuits to the general service panel. If you have had a lot line metering pedestal installed, and decide you no longer want Dual Fuel, the Dual Fuel pedestal may need to be removed at a cost to you. The cost to remove our facilities varies based on individual installations. You would need to contact the Dual Fuel Coordinator for these costs and sign an [interruptible service disconnect request](#).



Controlled Access

Storage Heating Rate

The Controlled Access rate is designed around the ability to store energy for space and water heating. During off-peak hours from 11 p.m. to 7 a.m., when the cost of electricity and system demand is less, storage heating equipment turns on and stores the energy needed for the balance of the day. A storage system can consist of thermal storage room units, a central storage furnace, a central hot water system or slab heat. Water heating on the storage rate generally requires a minimum of one 80-gallon electric water heater or two 52-gallon electric water heaters. Larger combinations may be necessary depending on hot water demand. Electricity to energize the heating equipment is on only between 11 p.m. and 7 a.m. This system is also known as controlled access or “ETS” (electric thermal storage).

Conditions:

To qualify for the Controlled Access rate, you must have sufficient storage capacity to meet your building’s space or water heating needs. The homeowner or business owner will receive a Controlled Access Agreement and the tax-exempt card after the meter is installed (all heating fuels in the state of Minnesota are tax-exempt).

How to participate:

Call Minnesota Power at 218-720-2644 or 1-800-307-6937, for more information on the Controlled Access program.

Electric Storage Heating Equipment

Room storage heater

Room storage heaters can easily be installed during new construction or remodeling projects and easily retrofitted into existing homes or businesses. A fan circulates stored heat into the room when the thermostat calls for heat. Each room storage heater is individually controlled so you can adjust the temperature in each room.



Electric storage furnace

Is a central forced air heating system that utilizes high density ceramic bricks to store heat during off peak hours. And is designed to meet 100% of your heating needs.



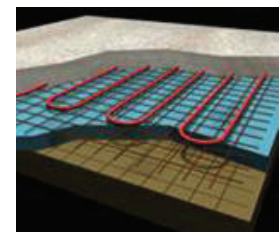
Electric storage boiler

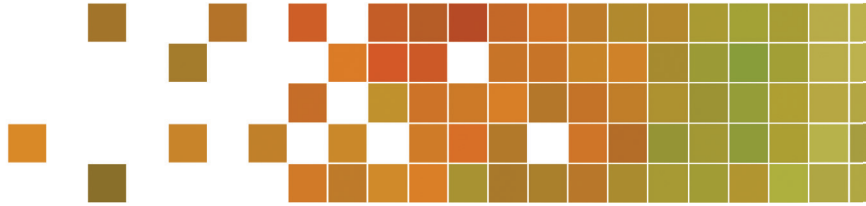
A central hot water system that stores heat during off- peak hours. And is designed to meet 100% of your heating needs.



Radiant slab heating

Radiant slab systems are designed for sub-floor or under-slab installation and can be used on any electric rate. Heating is provided by either a specially designed electrical resistance cable or by plastic tubing in conjunction with a hot water boiler. This option eliminates interference with furniture placement and design. If this installation is to be used with the Controlled Access rate it has to be properly designed by your heating contractor so that enough thermal mass and energy are stored during the 8 hour charge time (11 pm to 7 am) to deliver heat to your living space for the remainder of the day.





Storage Water Heating

A storage water heating system is one which has sufficient storage capacity to supply the residential or commercial customer with the hot water needed, while only heating between 11:00 p .m. to 7:00 a .m. The system is remotely controlled and the water heater elements will not operate at any other time. The water heater must have a minimum storage capacity of 80 gallons.

Recommendations for sizing:

Number in family	Single tank	Dual tanks	Dual tanks
1	80	52-52	
2	80	52-52	
3	120	52-52	
4	120	52-52	
5		52-82	52-66
6		52-82	66-82
7		52-120	82-82
8		52-120	82-82
9			82-120

200 gallons is the maximum amount of water that a 4 .5 kw element will heat in an eight-hour charge period. Storage heating is not recommended for families of 10 or more. Families may have to adjust their hot water usage with faucet aerators, water saver showerheads, mixing valves, cold or warm wash for clothes, etc.

Controlled Access FAQs

Q. What is the cost of installing Controlled Access System?

A. The costs can vary greatly depending on the individual installation. A mechanical heating contractor is normally hired to install your storage heating equipment. An electrician will need to install a second service panel - one panel will have circuits for general household/business use; the second panel will have only the electric heating circuits. This means two separate meters are required. For services 200 amps and less, a radio receiver and socket interrupter or integral meter contactor will be installed by Minnesota Power. For services over 200 amps, an electrician needs to work with Minnesota Power's metering personnel to install a proper interruptible control system. The cost to upgrade Minnesota Power's distribution system facilities to accommodate your additional electric heating load can consist of but may not be limited to a transformer, wire, and meter disconnects in applicable installations, and a radio receiver and socket interrupter or integral meter contactor to control the heating service.

Q. How do I qualify for Controlled Access?

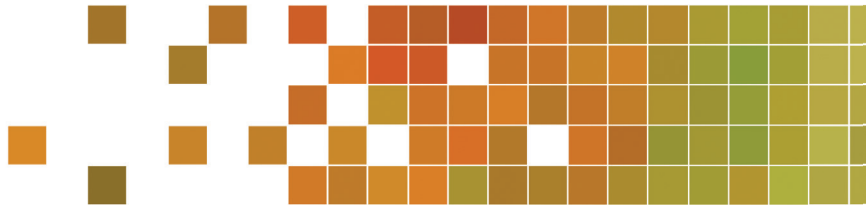
A. To qualify, you must have a means of storing sufficient heating energy to meet your building's needs.

Q. What do I do if I want to discontinue being on the Controlled Access rate?

A. If you want to discontinue Controlled Access, you will not be allowed to return to the Controlled Access rate for a minimum of 12 months. If you wish to discontinue this rate, you can request this rate change. Minnesota Power will disable the radio control. If the Controlled Access meter can be removed (no electric equipment requiring power is wired into the Controlled Access electrical panel), Minnesota Power will do so. If the meter is not removed, you will continue to be billed a monthly service charge. To avoid that charge, transfer all electric heating circuits to the general service panel. If you have had a lot line metering pedestal installed, and decide you no longer want Controlled Access, the Controlled Access pedestal may need to be removed at a cost to you. The cost to remove our facilities varies based on individual installations. You would need to contact the Controlled Access Coordinator for these costs and sign an [interruptible service disconnect request](#).

Q. What will I save by going on the Controlled Access rate?

A. Please refer to the Guide to Fuel Cost Comparisons if you wish to compare electric heating options with other fuels or you may use the [Fuel Comparison Calculator](#). If your home has electric heat and you add Controlled Access, the savings can range from 0-40 percent depending on your annual kwh usage.



Space Heating Comparisons

Type of heating appliance	Electricity	Gas/propane	Oil	Wood
Boiler	●	●	●	●
Forced air	●	●	●	●
Plenum	●			
Baseboard (non-hydronic)	●			
Radiant cove	●			
Slab	●	●	●	●
Slab storage	●			
Heat pump	●			
Convection heater	●	●	●	●

Operation/maintenance	Electricity	Gas/propane	Oil	Wood
Precise room-by-room control	●			
Moving parts	●	●	●	●
Fuel handling required		●	●	●
Regular maintenance required	●	●	●	●
Venting required		●	●	●

Dual Fuel/Controlled Access Costing Worksheet

The following worksheet is provided to assist you in estimating costs related to installing Dual Fuel or Controlled Access systems. It in no way is intended to answer all of your questions nor is it a representation of all costs you may encounter in such a project. It should be looked upon as a guide to lay out applicable cost and to aid in your decision making project.

Customer supported heat system/electrical costs:

Cost of heating system:

Cost of electric heating equipment	\$ _____
Cost of back-up heating system, if all electric	\$ _____
Cost of electrical contractor	\$ _____
Cost of mechanical or plumbing contractor	\$ _____

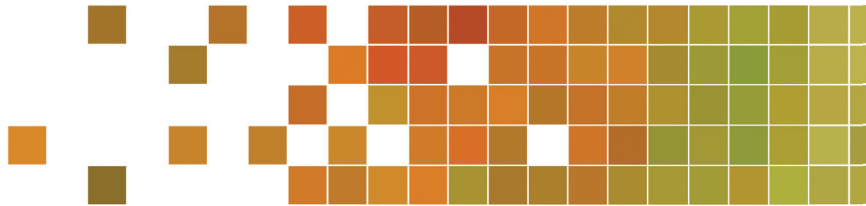
Cost of electrical wiring changes:

Cost of second electric entrance	\$ _____
Cost of existing service modification	\$ _____
Cost of electric wiring affidavit/inspection	\$ _____
Cost of exterior excavation/restoration	\$ _____

Minnesota Power's costs to customer:

Cost of socket interrupter or meter with an integral contactor (Control equipment for Dual Fuel or Controlled Access)	\$ _____
Cost of electric distribution system upgrades	\$ _____

Please remember that the Dual Fuel and Controlled Access programs require that both meters are located approximately at the same location and under no circumstances will subtractive metering be allowed. There is currently no rebate or financing programs available.



Meter Requirements

Bypass Metering Requirements If Lot Line Metering is Not Used



In order to minimize power interruptions during meter replacement or calibration, and to ensure safety of Minnesota Power employees, all residential, customer-owned, self-contained meter sockets must have a jaw-clamping, lever-type bypass. *Horn-type bypasses are not acceptable.*

Self-Contained Metering

200-Amp Single-Phase 3-Wire—4 or 5 terminal, 200-amp, jaw-clamping, lever-operated bypass, weatherproof, ringless, 5th jaw at nine o'clock position, hub opening for overhead, closure plate or plain top for underground.

320-Amp Single-Phase 3-Wire—4 terminal, 320-amp, jaw-clamping, lever-operated bypass, weatherproof, ringless, hub opening for overhead, closure plate or plain top for underground. Anti-inversion clips in the upper right jaw are not allowed.

200 Amp 2 Position Single Phase 3 Wire—4 terminal, weatherproof, 200-amp jaw-clamping, lever-operated bypass per position, ringless, hub opening for overhead, closure plate or plain top for underground.

200 Amp 3 Wire Network or 3 Phase 3 Wire—5 terminal, 200-amp jaw-clamping, lever-operated bypass, weatherproof, ringless, 5th jaw at nine o'clock position, hub opening for overhead, closure plate or plain top for underground.

Approved Meter Sockets—List of Manufacturers

Landis and Gyr, Milbank, T&B, Anchor, Durham, Siemens, Square D, Cutler Hammer and Midwest Electric are examples of UL approved metering equipment providers.

**Note: Metering services greater than 320A and in excess of 240V require instrument-rated metering equipment. [View requirements here.](#)*

Meter Location

Outdoor metering is required for all installations unless prior approval is given.

- For outdoor installations the center line of all meters shall be between four and six feet from the finished grade.
- A minimum three feet of unobstructed working space, as measured from the surface on which it is mounted, should be maintained in front of the meter, and a minimum of 12 inches of unobstructed space should be maintained on all sides of the meter cover. Ample space shall be provided for all meters, metering equipment and other apparatus so that they can be safely read, inspected and tested.

Please call Minnesota Power's Meter Department at 1-800-228-4966 or 218-355-2516 for questions regarding sockets.

**Note: Your local or state electrical code may have additional requirements.*

Meter Installation Examples

Overhead style parallel mast



Minnesota Power underground lot line
meter base installation



Underground or overhead style
2 position meter base



Minnesota Power overhead lot line
meter base installation



Dual Fuel/Controlled Access (Storage) Application

Please complete and return this form if you plan to install electric heat on the Dual Fuel or Controlled Access Rate.

Name _____ Daytime Phone _____
 Address _____ City _____
 Electrician's Name _____ Phone _____
 Name _____ Phone _____

In the state of Minnesota jurisdictional area, the electrician or homeowner must complete a "Request for Electrical Inspection" form and provide Minnesota Power with a copy of the state form.

Estimated ready date for Minnesota Power _____

PLEASE CHECK THOSE THAT APPLY:

<p><u>Program/Rate:</u> <input type="checkbox"/> Dual Fuel <input type="checkbox"/> Controlled Access/Storage <input type="checkbox"/> Controlled Access (Storage Water Heat only)</p> <p><u>Electric Heating Panel—Main Breaker Size:</u> 100, 125, 150, or 200Amps _____ Amps Over 200 Amps _____ Amps</p> <p><u>Electric heat load:</u> Total wattage ÷ 1000 = _____ kW</p>	<p><u>Building Structure:</u> <input type="checkbox"/> Home <input type="checkbox"/> New Construction <input type="checkbox"/> Business <input type="checkbox"/> Existing Home <input type="checkbox"/> Cabin <input type="checkbox"/> Addition <input type="checkbox"/> Garage <input type="checkbox"/> Extensive remodeling</p> <p><u>When Dual Fuel or Controlled Access is being added to your existing home/business, describe the new service:</u> <input type="checkbox"/> Parallel overhead service <input type="checkbox"/> 2-position meter base—overhead <input type="checkbox"/> 2-position meter base—underground <input type="checkbox"/> Lot line meter added by Minnesota Power</p>
<p><u>Electric Heating System:</u> <input type="checkbox"/> Ground source heat pump <input type="checkbox"/> Air source heat pump <input type="checkbox"/> Slab heat—electric cable <input type="checkbox"/> Slab heat—electric boiler <input type="checkbox"/> Electric boiler—hot water baseboard <input type="checkbox"/> Baseboard/wall heaters/cove heaters <input type="checkbox"/> Electric plenum <input type="checkbox"/> Thermal storage unit heaters <input type="checkbox"/> Centrally-ducted storage furnace <input type="checkbox"/> Central storage hot water system <input type="checkbox"/> Other _____</p>	<p><u>Non-Electric heating System(s):</u> <input type="checkbox"/> Boiler—slab heat <input type="checkbox"/> Boiler—hot water baseboard <input type="checkbox"/> Forced air furnace <input type="checkbox"/> Fireplace/stove <input type="checkbox"/> Other _____</p> <p><u>Non-Electric Fuel(s):</u> <input type="checkbox"/> Propane <input type="checkbox"/> Other _____ <input type="checkbox"/> Natural gas <input type="checkbox"/> None <input type="checkbox"/> Fuel oil <input type="checkbox"/> Wood</p>

The Dual Fuel Rate is an interruptible electric heating rate. You must have a non-electric (natural gas, LP, oil, or wood), externally-vented, backup heating system capable of continuous operation to meet your heating needs.

Customer Signature _____ Date _____

For Minnesota Power use: Account # _____ Rate _____ SP # _____

SIO # _____ Turn/On order # _____ Billing complete date _____

**Please return to: Minnesota Power—3215 W Arrowhead Road, Duluth, MN 55811
 Or fax to: 218-720-2795 Attn: Dual Fuel**

