

Dual fuel heat pumps

TECHNOLOGY OVERVIEW



WHAT IS A DUAL FUEL HEAT PUMP?

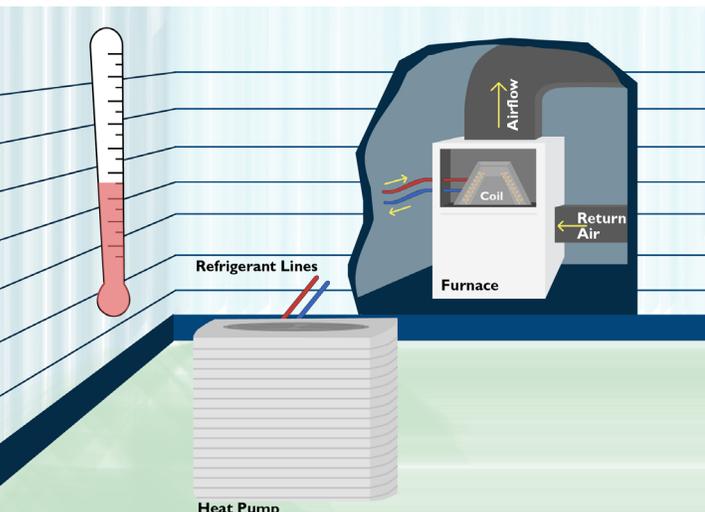
A heating and cooling system that combines an electric heat pump for air conditioning with a natural gas furnace to provide heat during the coldest days of the year.

The system has four main components:

- An outside electric **heat pump**
- An inside **natural gas furnace**
- A **coil** installed above the natural gas furnace
- **Refrigerant lines** connecting the heat pump to the coil

A dual fuel heat pump replaces a traditional air conditioning system and integrates a natural gas furnace to provide both heating and cooling.

A dual fuel heat pump system alternates between the heat pump and natural gas furnace, based on outside air temperature and the thermostat setting to maximize comfort and efficiency.



HOW DO THEY WORK?

A dual fuel heat pump transfers heat from one location to another and utilizes a natural gas furnace to assist when temperatures are too cold to transfer a sufficient amount of heat. Heat pumps run consistently at a lower air temperature to circulate air more efficiently and gradually change the indoor air temperature.

The heat pump process

- For heating, the heat pump refrigerant takes heat from outside air and compresses it to make it hotter.
- This heated refrigerant is transferred to the inside coil.
- Air from the natural gas furnace blower passes over the hot coil.
- Heat is extracted as air passes over the coil to the duct system.
- Cooler refrigerant is left in the coil and returned to outside heat pump unit.
- The cycle is repeated.
- For cooling, the cycle is reversed, taking warm air from the house through the coil via the refrigerant and evaporating with the heat pump, sending cooler refrigerant back to the natural gas furnace blower.
- The cooling process also dehumidifies by extracting moisture from the warm air as it passes over the coil and is cooled by the refrigerant.
- Hot or cold air is constantly and evenly distributed through the heat pump, heating or cooling your home efficiently.

The switch to back-up heat

- The outside temperature drops to heat pump's balance point.
- The natural gas furnace takes over.
- The furnace burns natural gas in combustion chamber.
- Heat is transferred to the natural gas furnace heat exchanger.
- Air passes over the heat exchanger and is distributed through the duct system.

HOW EFFICIENT ARE DUAL FUEL HEAT PUMP SYSTEMS?

 150%
to
300%
EFFICIENT

Input

 1.0
Unit of
Energy Used

you get

Output

  1.5
to
   3.0 times

ENERGY RETURNED
(in the form of heating and cooling)

General breakdown of system usage

- Heat pump is used between 70% and 95% of the year depending on outside air temperatures and thermostat settings.
- Natural gas furnace is used between 5% and 30% of the year (for heating only) during the coldest temperatures.

CIRCUMSTANCE	DFHP RESPONSE
Thermostat calls for cooling	Functions like a high-efficient central air conditioner
Home needs moderate heating	Reverses refrigerant flow, providing warm air to the home
Home heating demand exceeds capacity of heat pump (due to outside air temperatures)	Natural gas furnace takes over to reach desired indoor thermostat setting

What are the best geographical areas for dual fuel heat pump systems?

In the Mountain West, all geographic areas represent good applications for dual fuel heat pumps, provided electricity and natural gas are available to the home, helping Rocky Mountain Power keep electricity prices for all customers among the lowest in the nation.



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