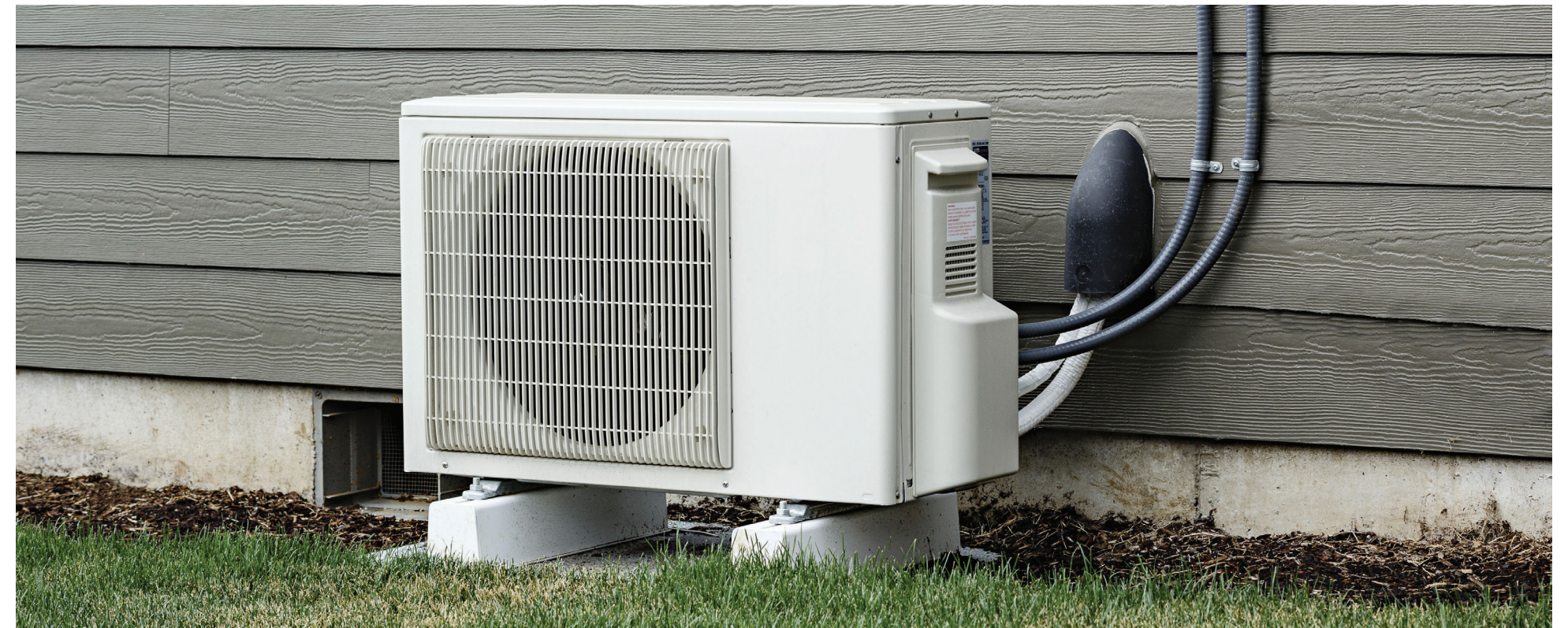


Why Heat Pumps?

Heat pumps are a very efficient way to heat and cool our homes.

Advantages:

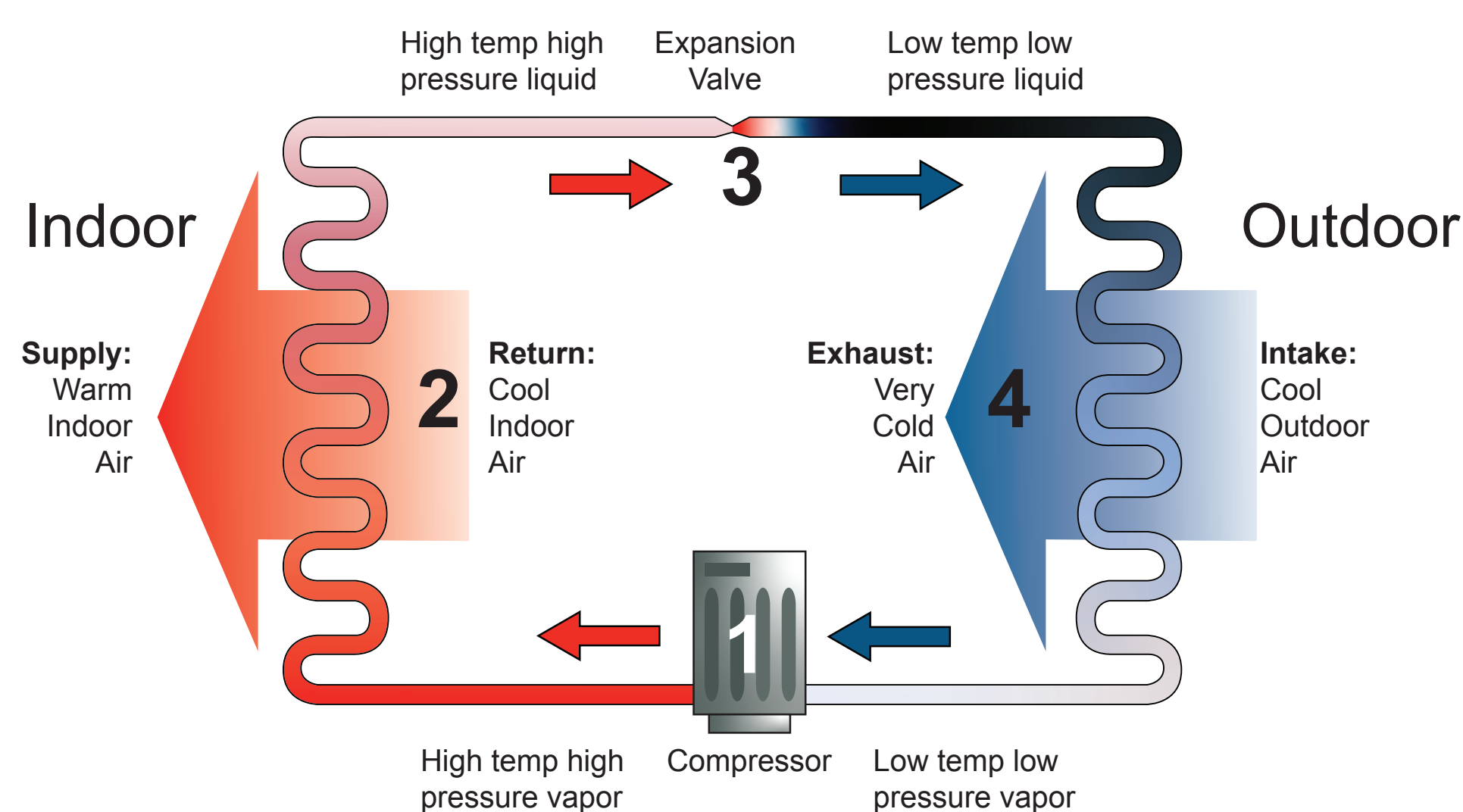
- Energy efficiency – Moving heat from one place to another is much more energy efficient than creating it. A heat pump moves two to five units of heat for every unit of energy input.
- Lower costs – You could see significant utility bill savings if you're currently heating with electric resistance, fuel oil, or propane.
- Lower carbon – As electricity gets cleaner, a heat pump's operational carbon is reduced.
- Improved safety – No chance of a gas leak or carbon monoxide poisoning.
- Simplification – Heating and air conditioning is provided with one piece of equipment.
- Solar – It pairs well with solar panels.



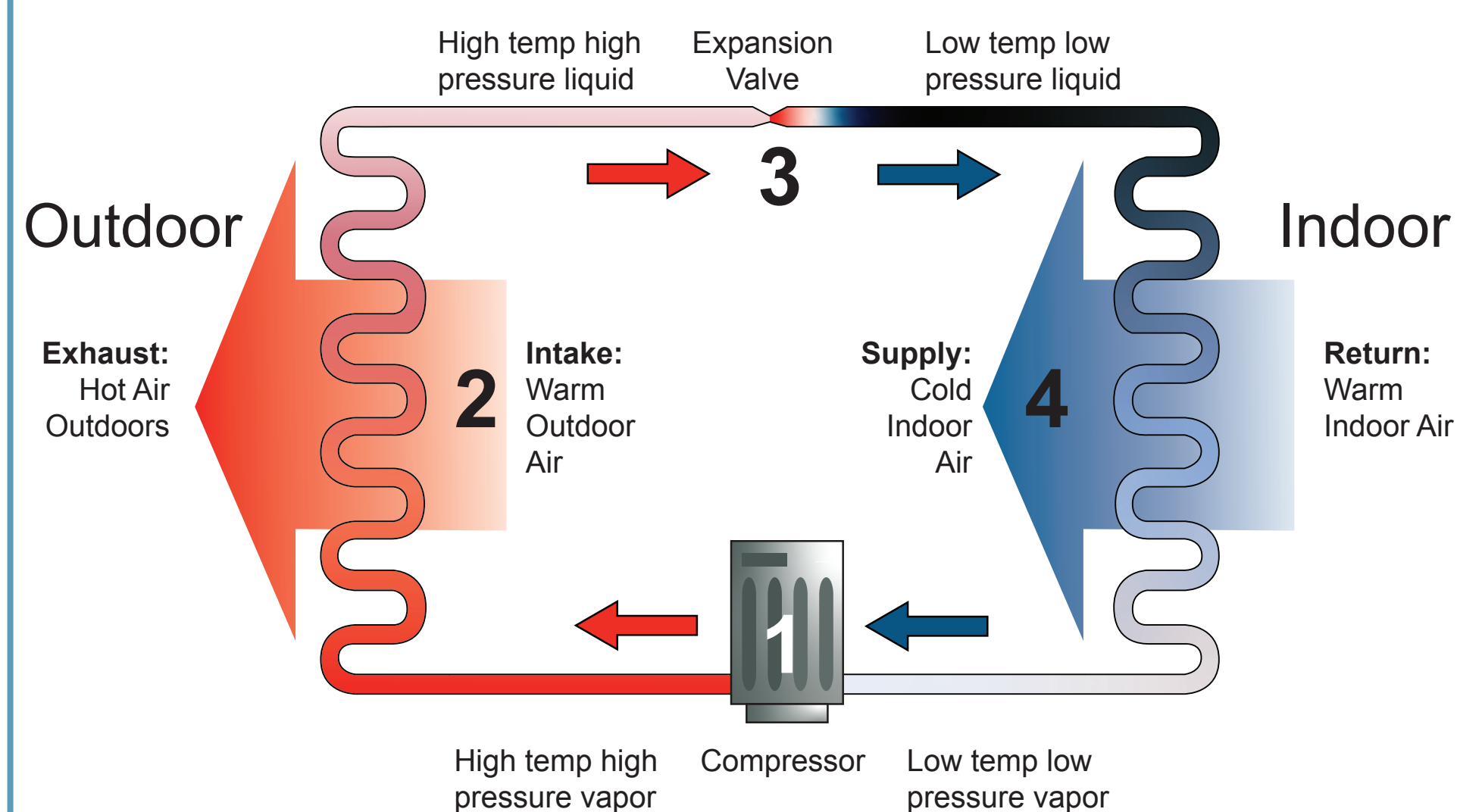
Disadvantages:

- Heating with natural gas might be cheaper than electricity in some areas even though heat pumps are more efficient.
- There may be reduced heat output when outdoor temperatures fall below ~5 °F.
- Locations with extreme cold (less than ~5 °F for long periods of time) may need supplemental heat.

Heating Mode



Cooling Mode



How Heat Pumps Work

1. An outdoor unit called a compressor compresses refrigerant which makes the refrigerant hotter.
2. The hot refrigerant releases its heat via a heat exchanger. In the summer, the heat is released outdoors; in the winter, the heat is released indoors. The release of heat causes the refrigerant to condense into a liquid that is still at high pressure.
3. An expansion valve allows the high-pressure liquid refrigerant to flow into a low-pressure environment. The pressure drop results in a large temperature decrease so now the refrigerant is a low-temperature liquid.
4. The low-temperature liquid refrigerant picks up heat via a heat exchanger and boils and evaporates into a low-temperature vapor. In the summer, heat is transferred from the indoor air into the liquid refrigerant via the indoor heat exchanger to cool the home. In the winter, heat is transferred from the outdoor air into the liquid refrigerant via the outdoor heat exchanger to heat the home.
5. A reversing valve allows the system to switch which heat exchanger is the evaporator and which is the condenser depending on the season.

