



## Claim of a Resistance Heater

An inventor claims to have developed a resistance heater that supplies 1.2 kWh of energy to a room for each kWh of electricity it consumes. Is this a reasonable claim and why?

Answer: No, this device creates energy and thus it is a perpetual motion machine of the first kind.

Explanation: In an electric heater 100% of the input energy is converted into heat. Thus 1.0 kWh input would result in 1.0 kWh energy in the form of heat. The inventor claims the output energy is 1.2 kWh output. This is not possible, his device created energy and is called a perpetual motion machine of the first kind. A heat pump can supply 1.2 kWh of energy to a room for each kWh of electricity it consumes, when its COP is larger than 1 (it should be 1.2 as  $COP = \text{heat released} / \text{energy consumed}$ ), however this device is not a heat pump.