



An inventor

An inventor claims to have invented a heat pump that requires 25 MW of power and that can transport 40 MW of heat. Do you believe this claim?

The coefficient of performance can be higher than 1, thus the second law of thermodynamics is not violated. Some heat is extracted from the low temperature environment, for this heat pump that could be 15 MW and thus the first law is not violated. We should believe this inventor because the COP can be higher than 1. That heat transfer and work are not the same does not give a sound argument on why to believe this inventor. So the right answer is:

“Yes, because the COP can be higher than 1.”