abstract The finite temperature Casimir free energy, entropy, and internal energy are considered anew for a conventional parallel-plate configuration, in the light of current discussions in the literature. In the case of an “ideal” metal, characterized by a refractive index equal to infinity for all frequencies, we recover, via a somewhat unconventional method, conventional results for the temperature dependence, meaning that the zero-frequency transverse electric mode contributes the same as the transverse magnetic mode. For a real metal, however, approximately obeying the Drude dispersive model at low frequencies, we find that the zero-frequency transverse electric mode does not contribute at all. This would appear to lead to an observable temperature dependence and a violation of the third law of thermodynamics. It had been suggested that the source of the difficulty was the behaviour of the reflection coefficient for perpendicular polarization but we show that this is not the case. By introducing a simplified model for the Casimir interaction, consisting of two harmonic oscillators interacting via a third one, we illustrate the behavior of the transverse electric field. Numerical results are presented based on the refractive index for gold. A linear temperature correction to the Casimir force between parallel plates is indeed found which should be observable in room-temperature experiments, but this does not entail any thermodynamic inconsistency.