Using methods of spectral analysis and modular theory of operator algebras, we study the energy transfers between a small system $S$ and a reservoir $R$ in the process of return to equilibrium. More precisely, we consider a microscopic Hamiltonian model describing a finite level quantum system $S$ coupled to an infinitely extended thermal reservoir $R$ at inverse temperature $\beta$, where the coupling strength depend on a constant $\lambda$. We consider the measures $P_{S,\lambda,t}$ and $P_{R,\lambda,t}$ obtained through a two measurement protocol at times $0$ and $t$, for fixed $\lambda$. Assuming that the coupled system is mixing, we can show that in a suitable limit regime for $\lambda$ and $t$, the limiting measures coincide. This result strengthens the first law of thermodynamics for open quantum systems, which is a statement concerning only the averages of $P_{S,\lambda,t}$ and $P_{R,\lambda,t}$ (joint work with V. Jaksic, J. Panangaden, C-A. Pillet).