Extending the accuracy and improvability of correlated electronic structure in the solid state by using the many-electron wavefunction, whilst still reaching the necessary thermodynamic limit, has been seen by many over the years as an unrealistic task. However, through a combination of emerging approaches, realistic systems are now within reach. In this talk, some of these approaches will be discussed, and results presented for both lattice and realistic ab-initio systems without any empirical parameterization. Demonstrations of the new levels of accuracy achievable for relatively simple materials, including defect formation energies and static quantities will be discussed, as well as the prospects for spectral quantities and systems with stronger correlation effects.