We present ONETEP\textsuperscript{1} (Order-$N$ Electronic Total Energy Package), a density functional method, based on plane-waves, whose computational cost scales only linearly with the number of atoms.

Although at first sight the extended nature of plane-waves makes them appear unsuitable for representing the localised orbitals used in linear scaling methods – which is why localised basis sets such as Gaussians, numerical atomic orbitals, spherical waves and B-splines have been used commonly instead – we have developed a linear scaling method based on plane-waves which overcomes this difficulty and which can achieve the same accuracy and convergence rate as traditional plane-wave calculations\textsuperscript{2}.

We describe the main features of our method which result in its success, and present recent developments and results for realistic applications.
