In organic electronics, charge carrier mobility is a key performance parameter. Due to the complex manufacturing processes of e.g. organic field effect transistors (OFETs) measured mobilities are often heavily affected by the device preparation. This masks the intrinsic materials properties and therewith hampers the decision whether further device optimization for a given organic molecule is worthwhile or not. Within hopping models based e.g. on Marcus theory the intrinsic mobility can be reliably calculated from first principles. We developed a fast and efficient protocol with a descriptor based on Marcus theory to assess the expected performance of organic materials for application in organic electronic devices. We obtain good correlations to fully calculated mobilities, as well as to experimental data. Applying this protocol to experimental structures of organic crystals obtained from the Cambridge Structural Database (CSD), we screened about 40000 structures employing only first principle methods. While it is not surprising that the better part of these structures show only negligible performance, we were able to identify a number of promising candidates for more in-depth theoretical and experimental studies.