Uneven load allocations and random load behaviors are two major causes for three-phase power imbalance. The former mainly cause systematic imbalance, which can be addressed by low-cost phase swapping; the latter contribute to random imbalance, which requires relatively costly demand-side managements. To reveal the maximum potential of phase swapping and the minimum need for demand-side managements, this paper first proposes a novel a priori judgment to classify any set of three-phase power series into one of four scenarios, depending on whether there is a definite maximum phase, a definite minimum phase, or both. Then, this paper proposes a new method to decompose three-phase power series into a systematic imbalance component and a random imbalance component as the closed-form solutions of quadratic optimization models that minimize random imbalance. A degree of power imbalance is calculated based on the systematic imbalance component to guide phase swapping. Case studies demonstrate that 72.8% of 782 low voltage substations have systematic imbalance components. The degree of power imbalance results reveal the maximum need for phase swapping and the random imbalance components reveal the minimum need for demand side management, if the three phases are to be fully rebalanced.