Organic solar cells exhibit unique properties such as light-weight, flexibility and solution processability. A major disadvantage in comparison with inorganic solar cells is the low power conversion efficiency (PCE) due to low exciton diffusion lengths and high recombination losses. Bulk-heterojunction (BHJ) solar cells have been utilized to maximize the excitonic yield using an optimized morphology with the cost of a large interface area. This complex morphology causes a high charge recombination and strong local variations in the morphology. In this work, we investigate the impact of phosphorescent sensizers on the PCE for organic solar cells. Phosphorescent sensizers convert short-lifetime singlet into long-lifetime triplet excitons and have been shown to enhance the effective lifetime and diffusion length. We study the impact of the sensitizer concentration on bilayer solar cells as an alternative method to tailoring efficiency with a minimum donor-acceptor interface.