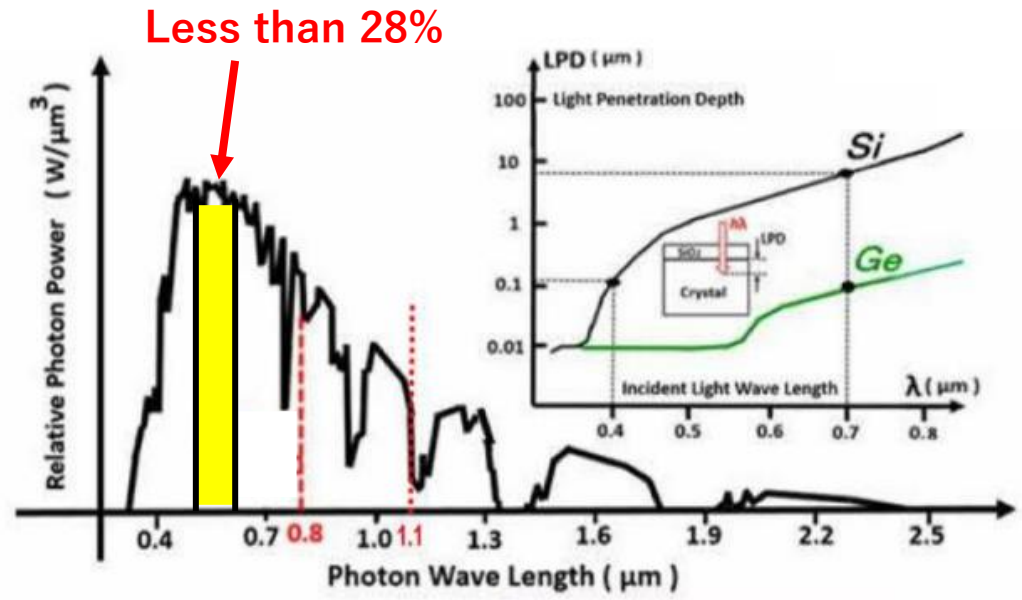
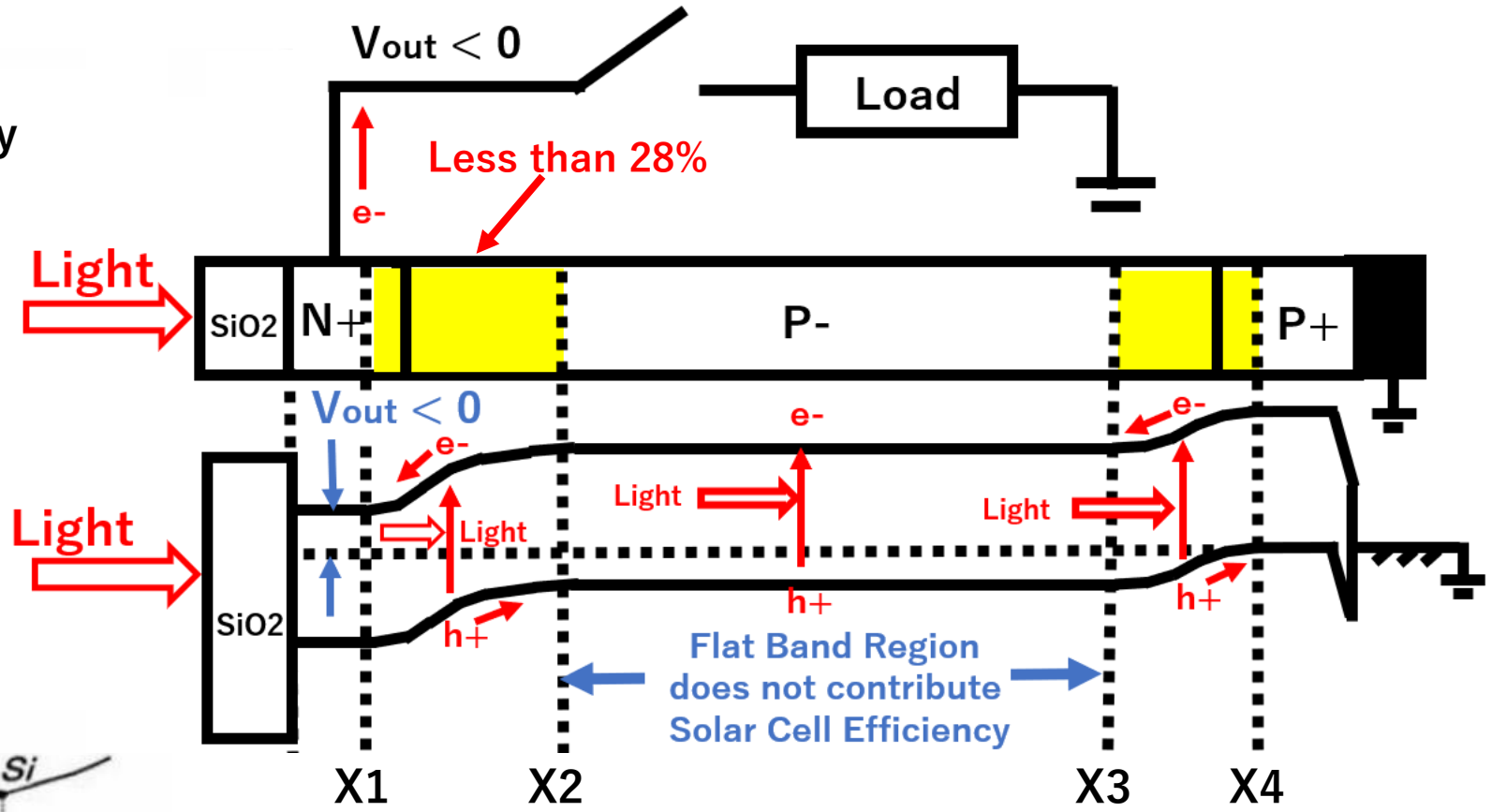
Single Junction type Solar Cell has a very low efficiency of less than 28%.

Since the band gap of silicon crystal is 1.1 eV, any photon with the energy greater than 1.1 eV can generate the photo electron and hole pairs.

However, without any Barrier Electric field, the generated pairs would recombine themselves and The photo pairs do not contribute to the Solar Cell Efficiency.





The N+P junction depletion width is given as (X2 − X1) . Take X1 ~ 1 μm and X2 ~ 6 μm. The photon wave length of Y1 = 0.5 μm has the silicon crystal penetration depth of about X1 = 1 μm while the photon wave length of Y2 = 0.6 μm has the silicon crystal penetration depth of about X2 = 6 μm. Only the photon wave length between Y1 = 0.5 μm and Y2 = 0.6 μm can reach the N+P junction depletion region (X2 – X1) and contribute to the solar cell efficiency, which is very small < 28% at most.