we consider a two-tier heterogeneous small cell network.In this network,a macrocell base station(MBS) is located in the center of it's service area while N self-powered SBS are deployed randomly.The SBSs can offload traffic from the MBS in consideration of energy efficiency and QoE.

as shown in Fig.1,the MBS is powered by the traditional power grid while the SBSs rely exclusively on energy harvesting sources,e.g, solar energy or use wireless power transfer from MBS trasmissions.We consider solar energy as SBSs' power source in this paper.To be specific,the energy storage systems(ESSs) are used to manager the rondomness of the solar energy coming so that the solar energy will be stored in the ESSs and consumed in SBSs' service times.

A: Energy consumption

For the MBS’s energy consumption, we adopt the linear model,