This paper presents a dynamic droop load sharing scheme based on the available generation capacity of the distributed generation (DG) units. Since conventional droop schemes share loads proportional to units' ratings, they suffer from the inability to maintain an efficient operating point when their input renewable power varies, without imposing their new operating point on other connected DGs in the microgrid. This problem is mainly due to the insensitivity of the droop scheme to the varying nature of the renewable resources used, including wind and solar photovoltaic (PV). A control method is proposed for PV systems; however, it is applicable for all types of droop-controlled renewable DG. A stability analysis of the proposed scheme on DG units is also presented to identify theoretical and practical limits. The proposed scheme identifies the dc operating zone of the inverter-based source as irradiance level changes and conditions the droop parameters appropriately for an efficient load sharing based on available generation, while the rating of each unit is also taken into account. The proposed scheme provides energy saving, since energy demand from a local auxiliary generator is reduced. The proposed method is validated using MATLAB/SIMULINK simulations.