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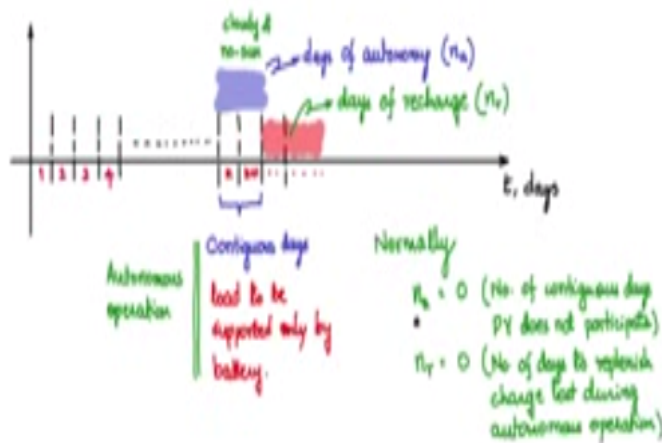
Design of Photovoltaic Systems

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We shall now find out the number of days of autonomy and the number of days of recharge of the battery to reclines the charge lost during autonomies operation let me consider this graph where the x axis is time in days not hours time in days and I want to split the time axis like this and each segment is one day like this 1, 2, 3, 4 then k^{th} day k+ 1 day and so on so they are the day numbers.

Now consider configures days if for example on two contiguous days there is no sun power meaning it is so cloudy it may be monsoons at that place at that particular latitude so you may not have sun power significant sun power at all on many contiguous days, so consider let us say for example in on these 2 days it is cloudy and there is sun power, so how do we take this into account.

We say that on these two days on these two days or the days where there is no cloud the entire load as to be supported by the battery so these are the contiguous days and the load as to be supported entirely by the battery there is no support from the Pv or the solar and these days of operation is called autonomous operation means it is operating by cell without the help from solar of the Pv.

So which means battery as to be rated to support the load for as many number of days for the particular place needs so this is called the days of autonomy and we will give a symbol na now after having gone through the period the days of autonomies operation the battery would at pretty low condition and it as to get recharged following on the following days on the sun is back again to normal the Pv as to recharge the battery and probably it may not be able to recharge in one single day.

But as then you will have to over rate the Pv panel very much and it can be costly you may have to recharge it in a number of days following the days of autonomy so let us say you have a number of days associated with recharge replicating the number of amount of charge that has been lost during autonomy operation.

We will call this in the days of recharge and then we will give it a symbol nr so normally na will be 0 meaning the 0 number of days of autonomy meaning on every day normally the Pv panel to the Pv source will be contributing to the load, so number of days contiguous days the Pv does not participate is what we will associate with autonomies operation so na will normally be 0 which means we assume that on everyday Pv does contribute to the load nr also will be normally 0 and it is the number of days replicates the charge lost during autonomies operation by autonomies operation we mean on those days when the Pv does not participate battery alone will be supply to the load so we need to define na and nr. So normally we take it as na as 0 nr as 0