Indian Institute of Science

Design of Photovoltaic Systems

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NPTEL Online Certification Course

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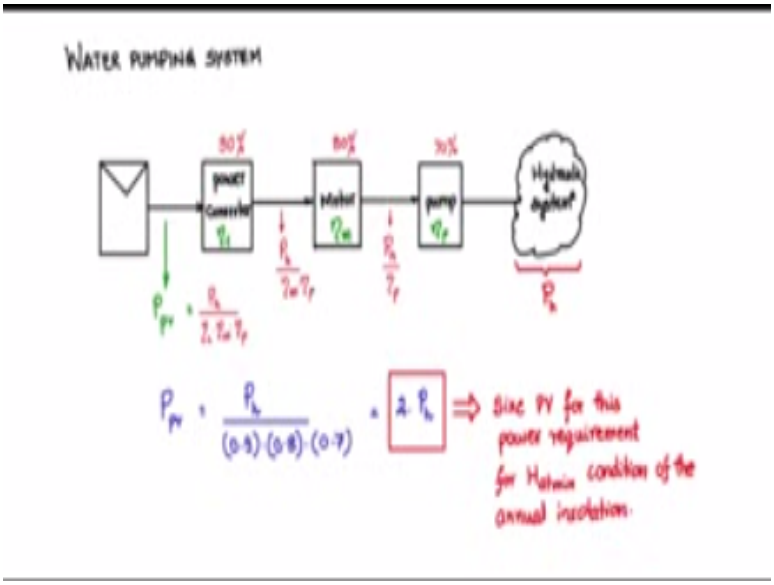

Consider now the generic water pumping system, now it is a casket of all the components starting from the PV source, PV source is output is connected to a power convertor the power converter maybe a DC converter BC to Dc converter or a DC to AC converter depending upon whether it is deriving a Dc motor or a AC motor. Than the output of the power converter is powering the motor and the motor is driving the shaft of the pump it could be centrifugal pump or a reciprocating pump.

And the pump is actually taking care of the hydraulic system, containing the section head delivery head friction loses and all those things we know how ton estimate the power fort the hydraulic system, we have done that all the long in few example and that tips ph which is the hydraulic power based on a particular amount of discharge within the specific discharge time diameter of the such and pipe delivery pipe with all those concentrations, we have seen how to calculate the hydraulic power.

Now the pump will have an efficiency NP motor will have efficiency NM convertor power convertor have an efficiency NV then the PV power PPV is what? So motor output should be capable of delivering PH / NP power convertor output should be capable of delivering PH/ NM and NP and the food hold tike panel or the module should be capable of delivering PH/ NC Nm NP all taken care, all the efficiency coming out to the picture.

Typical values of efficiency or the for the pump 70% for the motor 80% for the power convertor 90% you see the motor even 85% efficient motors are available 90% efficient motors are available but take a conservative value of 80% so that you do not feel that the later on like the PV panels size is not sufficient to handle the entire system once you change the motor or a motor as detrained with time all these factors.

The power convertor efficiency also you get for 98% but it is safe to take a 90% conservative value, so that you are on the safe side. Now P_{pv} will be PH / 0.9, 0.8, 0.7, and if you calculate all this it is two times PH, so whatever hydraulic power that you calculate here when your size the PV panel it should be polarize the hydraulic power that you calculated. So you have to rate the PV panel for this power requirement and also for the entire year you find out the HAT minimum, the minimum energy incident on a given day at a given place and though HAT minimum you have use for sizing the PV panel we have discuss this in week 3 and 4 go through that.

And if you do that than on any day in the year your system will be capable your PV panel will be capable of powering this hydraulic water pumping system for this particular hydraulic power requirement.