



SNS COLLEGE OF ENGINEERING

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AN AUTONOMOUS INSTITUTION

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

19EE711 SOLAR AND WIND ENERGY

UNIT III-SOLAR RESOURCE

Maximum Power Point

Let us consider, for the moment, a single PV module connected to a load as shown in the figure below. The load might be a dc motor driving a pump or it might be a battery, for example. Before the load is connected, the module sitting in the sun will produce an open-circuit voltage V_{OC} , but no current will flow. If the terminals of the module are shorted together (which doesn't damage the module at all, by the way), the short-circuit current I_{SC} will flow, but the output voltage will be zero. In both cases, since power is the product of current and voltage, no power is delivered by the module and no power is received by the load. When a load is connected, some combination of current and voltage will result and power will be delivered. To figure out how much power is delivered, we have to consider the **I-V** characteristic curve of the **module** as well as the **I-V** characteristic curve of the **load**.

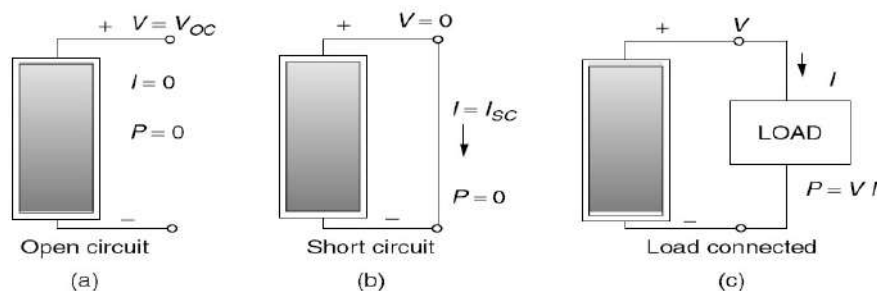


Figure-6: No power is delivered when the circuit is open (a) or shorted (b). When the load is connected (c), the same current flows through the load and module and the same voltage appears across them.

Figure-7 below shows a generic **I-V** curve for a PV module, identifying key parameters like open-circuit voltage V_{OC} and short-circuit current I_{SC} that we have explained. Also shown is the product of voltage and current, i.e., the power delivered by the module. At the two ends of the **I-V** curve, the

output power is zero since either current or voltage is zero at those points. The '**Maximum Power Point**' (MPP) is that spot near the knee of the **I-V** curve at which the product of current and voltage reaches its maximum. The voltage and current at the MPP are designated as V_m and I_m *in general* and as V_R and I_R (*rated voltage and rated current*) under idealized test conditions.