Why we use MPPT Charger Controller

- Consider solar panel Kyocera KC 130. It is rated at 7.39 *Amps* at 17.6 It's power output is 130 Watts .
- Panel puts out 7.39 *Amps* & battery charges under 12V
- 7.39 *Amps* * 12V =88.8 Watts
- We lost over 41 Watts. But we paid for 130 Watts.
- To overcome this loss, we use MPPT Charger Controller.

Working of MPPT Charger Controller

- Controller compares voltages of PV panel & Battery
- Figure out best voltage to charge Battery
- Example: Controller takes 17.6 Volts at 7.4 *Amps* & gives output to 10.8 *Amps* at 12Volts .

10.8 *Amps* * 12Volts = 129.6 Watts

- Now we still have almost 130 Watts.

- Batteries

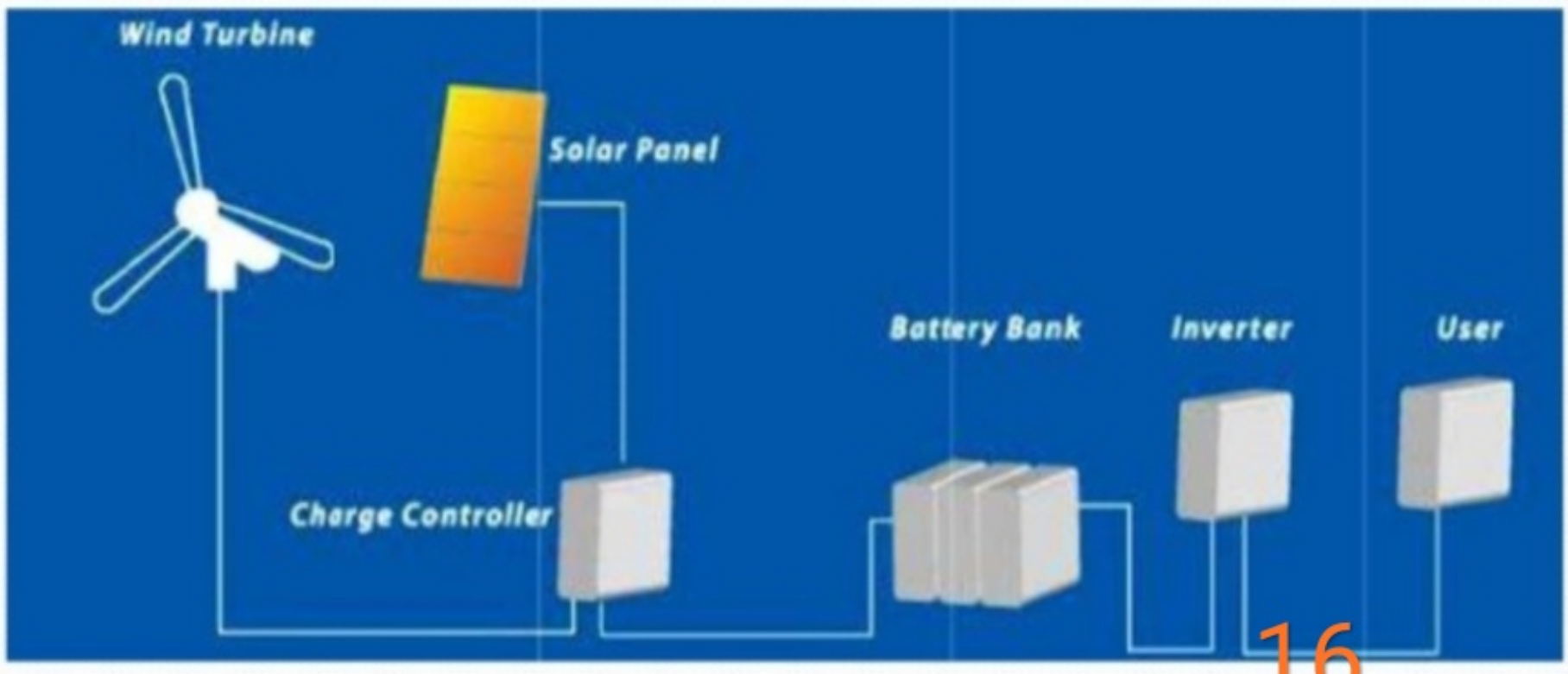
Stored the energy

- Inverter

Converts stored DC power to AC

WORKING

- Solar & Wind turbine produced DC power
- Inverter convert DC to AC
- Controller monitors the system



CHOICE OF COMPONENT

- **Choice of components For 1000 Watt Load**

Solar Panel:

• Total load = 1000W

•Period of operation or duration = 12 Hours

•Then, Total Watt-Hour = 1000×12= 12000W-hr

•The period of the solar panel exposed to the sun = 8 Hours (Averagely between 9am and 3pm)

•Therefore solar panel wattage = $12000Wh/8h$=1,500W.

•Hence solar panel of 1,500W will be needed for this design.

•If solar panel of 150W is to be use the number of panels to arrange in parallel to achieve 1,500 Watt will be:

No of panel =1500W/150W=10

This shows 10 of 150 Watt solar panel will be required for this design

Charging Controllers:

- For this design of 1000W solar power supply P=IV

Where

- I is the expected charging current and
- V is the voltage of the battery and V= 12 V
- P is the power supply rating= 1000W
- *Hence* I =*P*/*v*=1000/12=83*Amps*.
- Since the value 83.3 A Charging controllers is not readily available in the market then 1000A charging controller will be used.

Battery capacity:

- Given that the total load P= 1000W and
- Operational period = 12 Hours
- Watt-hour capacity = 12,000 W-hr
- To make the chosen battery to last long it is assumed that only a quarter (¼) of the battery capacity will be made used of so that it will not be over discharged therefore hence the required batter capacity will be
- 12, 000 × 4 = 48,000 W-hr
- Now the choice of battery hour depends on A-H rating of the storage battery.
- For example 1500AH, 12V batteries the number of batteries that will be needed is 48000/1500 = 32 batteries. Hence, for this design , 1500AH 12V battery should be used, Therefore the total number of storage battery required for 1000W solar power supply system = 32

Inverter

- Since the total load is 1000W it is advisable to size the required inverter to be 1500W as designed for solar panel ratings. Hence 1500W pure sign wave inverter is recommended in other to prolong the lifespan of the inverter.

APPLICATION

- Hotels
- Business (Institutions and Government)
- Large Estate Houses
- Factories and manufacturing facilities
- Commercial Power generation
- Street lighting

DISADVANTAGES

- Large number of harmonics is produced.
- Initial investment is more.
- Large space is required for larger generations
- Wind energy systems are noisy in operation; a large unit can be heard many kilometers away.
- Efficiency is less than conventional power plants.

CONCLUSION

- By this project many villages can be lighted. For villages which are much away from the construction site of large power generating stations such as hydro and nuclear can be provided power.
- Also to satisfied the increasing demand of electricity with clean hybrid power station by solar –wind can be used.