Off Grid Solar Powered EV Charging Station

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EV Charging

Location-

- Azad Maidan(26.26’81’’N 80.32’28’’E)
- Elevation 120m

Specifications and Standards-

1. Charging Capacity of 50KWh/day

- Level 2 charging
- 50Kw During Day time
- 2 Chargers of 10 Kw
- 5 Charger of 3 Kw
- 3 Chargers of 7Kw

2. Bharat DC 001 (15Kw) Charger

- Max Output Voltage of 240 V for 4 wheeler
- Max Output Voltage of 48 for 3 Wheeler and 2 Wheeler
- Single Connector gun

3. Solar Module Configuration

- AEG Solar
- 325Wp Max power
- 1.50m^2 Area
- Detailed Specification sheet is attached
- at the end

4. Battery Specifications

- Li Ion Battery
- 25.6V Nominal Voltage
- C10 Capacity =100Ah
- DOD=95%
- 5 Years Battery Life

Load Requirement and Calculations

- This Charging station is designed to Handle 2400Kwh/day of charging in a whole day of which 50Kwh will be during the day time and 50Kwh During the night time.

1. Total consumption calculation

- Consumption = 100 KWh/day

2. Calculation of Solar Power plant according to MNRE:

- Total Consumption = 100 KWh/day
- Plant peak sunny hour operation = 4.5s (Normal consideration)
- Plant Performance = 70% = 0.7
- Solar Power plant capacity = $\frac{\text{Total consumption}}{\text{PSH X Plant Performance}}$
  $=\frac{100}{4.5*0.7}$ = 31.74 KW (Plant capacity to be installed)
- Plant Capacity = 32 KW
- Module Rating = 325 Wp

Total no of modules required = (32 x 1000)/325 = 99

3. Battery Sizing Calculation: (Li Ion Battery)

Battery will be required for night time only.

- Total consumption = 100 KWH
- Day of Autonomy = 2day (Means how many days it will carry the charge)

  Margin is 15% extra i.e. (100% + 15%) = 115% =1.15 Battery unit is in AH

- PCU Charge controller Voltage 20 KW to 30 KW = 96 V
- Depth of Discharge (DOD) =Assume depth of discharge as 95 % = 0.95
- Battery Efficiency = 100 % = 1
- AH =$\frac{\text{Night time consumption X Design Margin X Day of Autonomy}}{\text{Charge controller Voltage X Depth of discharge X Battery Efficiency}}$

  AH = $\frac{100000 \text{ X } 1 \text{ X } 1.15}{96 \text{ X } 0.95 \text{ X } 1}$= AH = 1260 AH So, we need 1260 AH Battery.

- Total storage of battery for 2 day = 2X96V X 1260

  AH = 241KWH