PLANET Networking & Communication

Pioneer of IP Innovation

# How to choose PV & Battery for BSP-300?

## Base on optimal assumption!

www.planet.com.tw

# Outline

- Assumption of usage in optimal case
- Factors in the PV and Battery installation

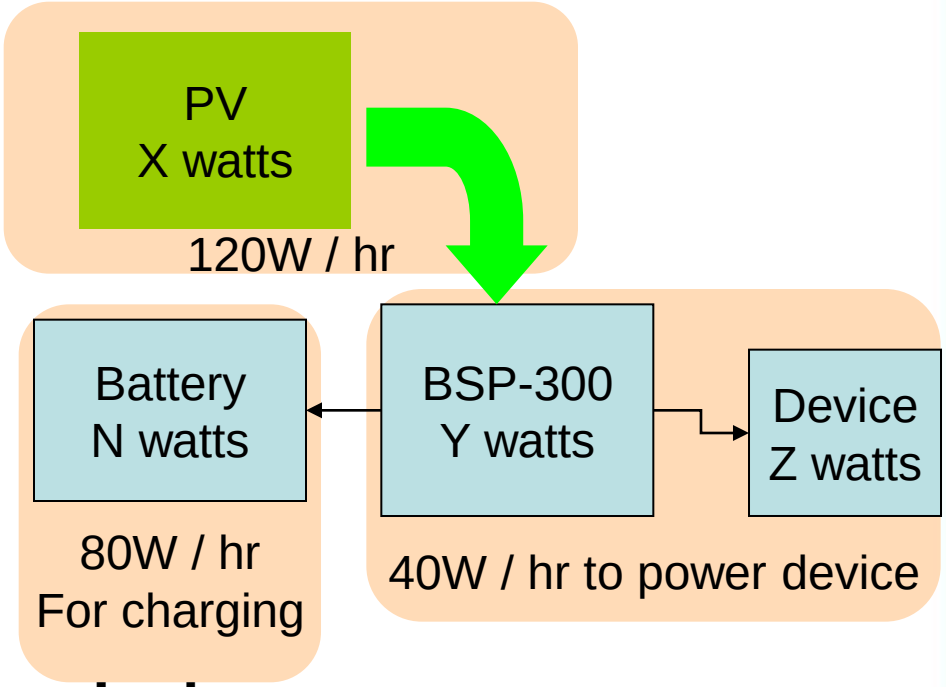
# Assumption

- **System Requirement & Assumption**
  - ✓ **BSP-300 system: 8 Watts**
  - ✓ **1 x 25W AT Camera: 25 Watts**
  - ✓ **1 x 802.11a/n AP: 7 Watts => Total: 40 Watt/hr**

- **Environment Factor (Optimal Case)**
  - ✓ **8hr sunshine at daytime**
  - ✓ **16hr power consuming from battery at nighttime**
    - We got 40w x 16hr (**640 Watts**) per night consumed
    - The minimal battery capacity required should be 640 watts
      - 640W/24V = 26Ah (i.e. 12VDC Battery 26Ah x 2 required)
    - Also, that is **80 watt/hr** (640w / 8hr) need to be reserved for charging

# Get the first PV required

- **How it calculated**
  - ✓ **PV power up the system & device**
  - ✓ **The rest power budget then be used for charging**




**X – (Y+Z) = N**

**N then is the** budget **for Charging**

**So in optimal case:**

**X = Y+Z+N = 120W**

**That is base on the assumption 120W PV required.**

# Factors in the Battery Installation

## Environment Factors

### ✓ Duration of Sunshine

- How long for PV to  power the system and also charge the batteries

### ✓ Battery Efficiency

- There are discharge  efficiency that effect the capacity of battery

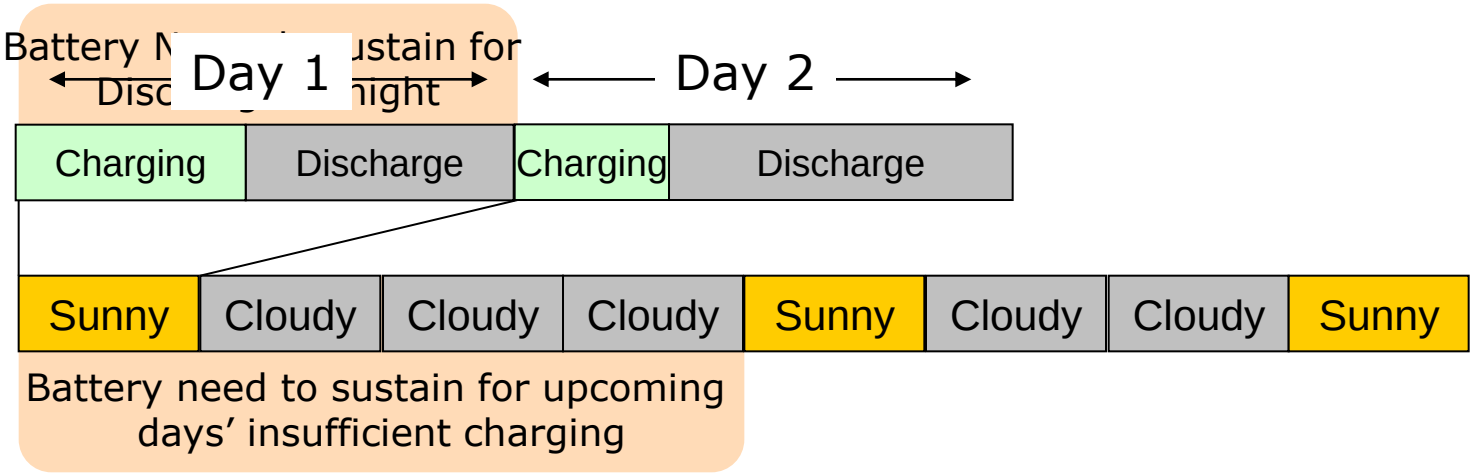
### ✓ Temperature

- Temperature will effect the efficiency of batteries for discharge and charge

# Factors in the Battery installation

## Duration of sunshine

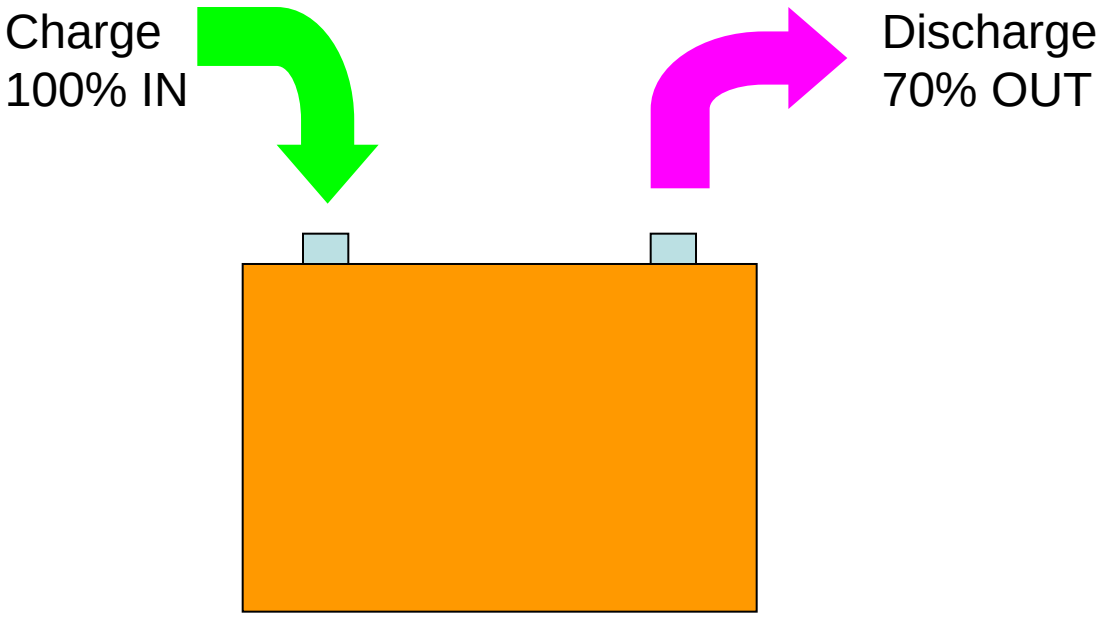
- ✓ **Need to check the Weather Bureau for average hours per day locally**
- ✓ **Need to check the cloudy day duration** **(say, the cloudy day will lasting for how many days)**



# Factors in the Battery installation

## Battery Efficiency

- **Different Battery will have different discharge efficiency**
  - Lead-acid, for example, 70% ~ 80%



# Battery Capacity Formula

- **Assuming the battery capacity formula**
  - ✓ C: **Capacity (Ah)**
  - ✓ W: **The system load (W)**
  - ✓ T: **Discharge hours (h)**
  - ✓ $B_f$: **Battery Discharge Efficiency**
  - ✓ $V_s$: **BSP-300 cut-off voltage (to protect battery over discharged)**
  - ✓ $D_c$: **Cloudy days of the area**

$$C = \frac{W \times T}{B_f \times V_s} \times (1 + D_c)$$

- **So previously, we have 26Ah Battery**
  - ✓ **C = 40W x 16h / 24V**
- **Then the one close to the real environment will be**
  - ✓ **C = [(40W x 16h) / (22V x 0.7) ] x (1+$D_c$) =42 Ah**
  - ✓ **We got 42Ah (assuming no cloudy days)**
  - ✓ **And if with 1 cloudy days**
  - ✓ **C= [(40W x 24h) / (22V x 0.7) ] x (1+1) ≈ 120Ah**

# Factors in PV

- **The PV is also with Efficiency**
  - ✓ **Say for example: 80%**
  - ✓ **So the new PV required will be:**
    - N = (640W $_{(sunny\ day1)}$ + 960 W $_{(cloudy\ day2)}$) / 8 = 200 Watt
    - PV = (200Watt + 40Watt) / 80% = 300 Watts
- **To apply to your system, please check the Excel work sheet below.**

Microsoft Office
Excel ¤u§@Ş¡

# Factor in Temperature

- **The Temperature also will effect the efficiency of battery the battery should installed in a shelter to provide stable and reliable power for BSP-300 system.**

PLANET
Networking & Communication

# Activating IP Power