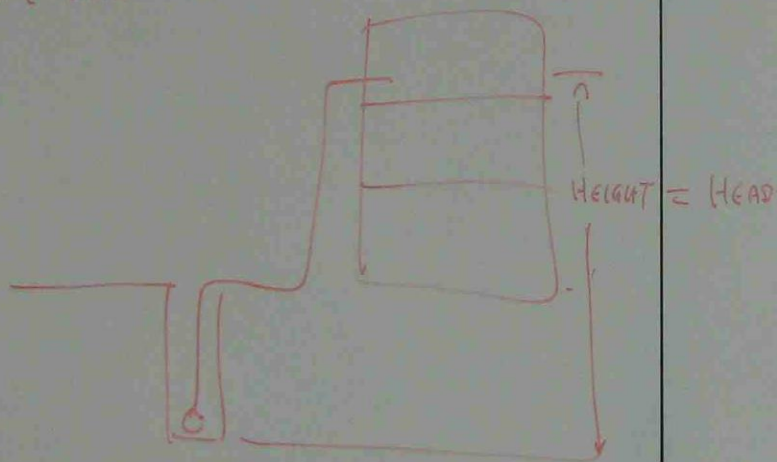


## P.V WATER PUMPING SYSTEM DESIGN

- DETERMINE THE VOLUME OF WATER TO BE PUMPED EACH DAY
- AT WHAT HEAD



- PUMPING RATE
- NUMBER OF SUN LIGHT HOURS.
- SELECT PUMP TYPE

- TORQUE SPEED CHARACTERISTICS OF PUMP
- SELECT APPROPRIATE SOLAR PANEL

## SOLAR WATER PUMPING CALCULATION

### HYDRAULIC (ENERGY & FLUID FLOW)

$H$  = PHYSICAL HEIGHT (HEAD) (POTENTIAL ENERGY)

$\frac{V^2}{2g}$  = VELOCITY HEAD (KINETIC ENERGY)

$\frac{P}{\rho g}$  = PRESSURE HEAD (PRESSURE ENERGY)

$V$  = VELOCITY (m/s)

$P$  = PRESSURE

$\rho$  = SPECIFIC GRAVITY

$g = 9.81$

— TORQUE SPEED CHARACTERISTICS OF PUMP

— SELECT APPROPRIATE SOLAR PANEL

### SOLAR WATER PUMPING CALCULATION

#### HYDRAULIC (ENERGY & FLUID FLOW)

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$P$  = PRESSURE

$\rho$  = SPECIFIC GRAVITY

$g = 9.81$

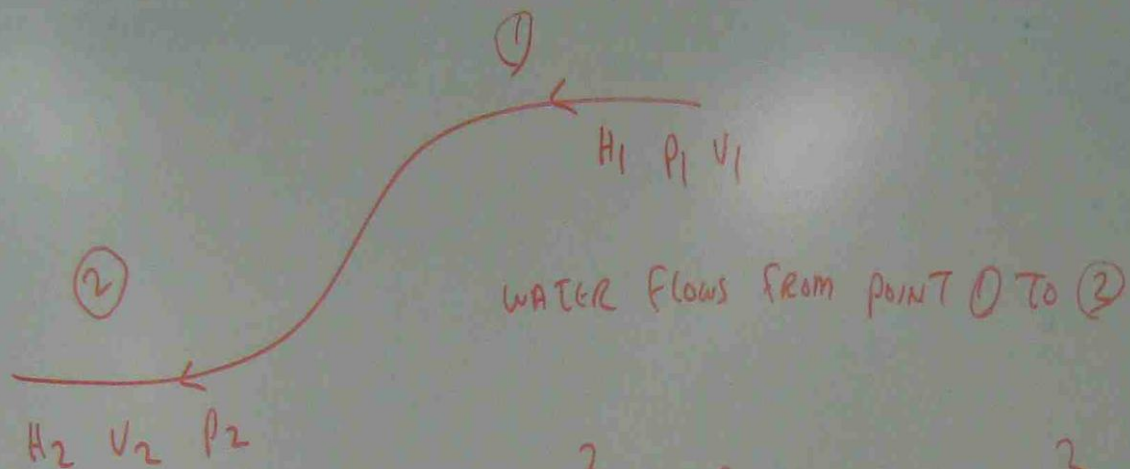
$$\text{TOTAL HEAD} = H + \frac{V^2}{2g} + \frac{P}{\rho g} = \text{CONSTANT}$$

$$Q = \frac{\pi D^4}{4} \times V$$

↑  
FLOW RATE  
m<sup>3</sup>/s

$D$  = DIAMETER OF PIPE  
 $V$  = VELOCITY OF WATER

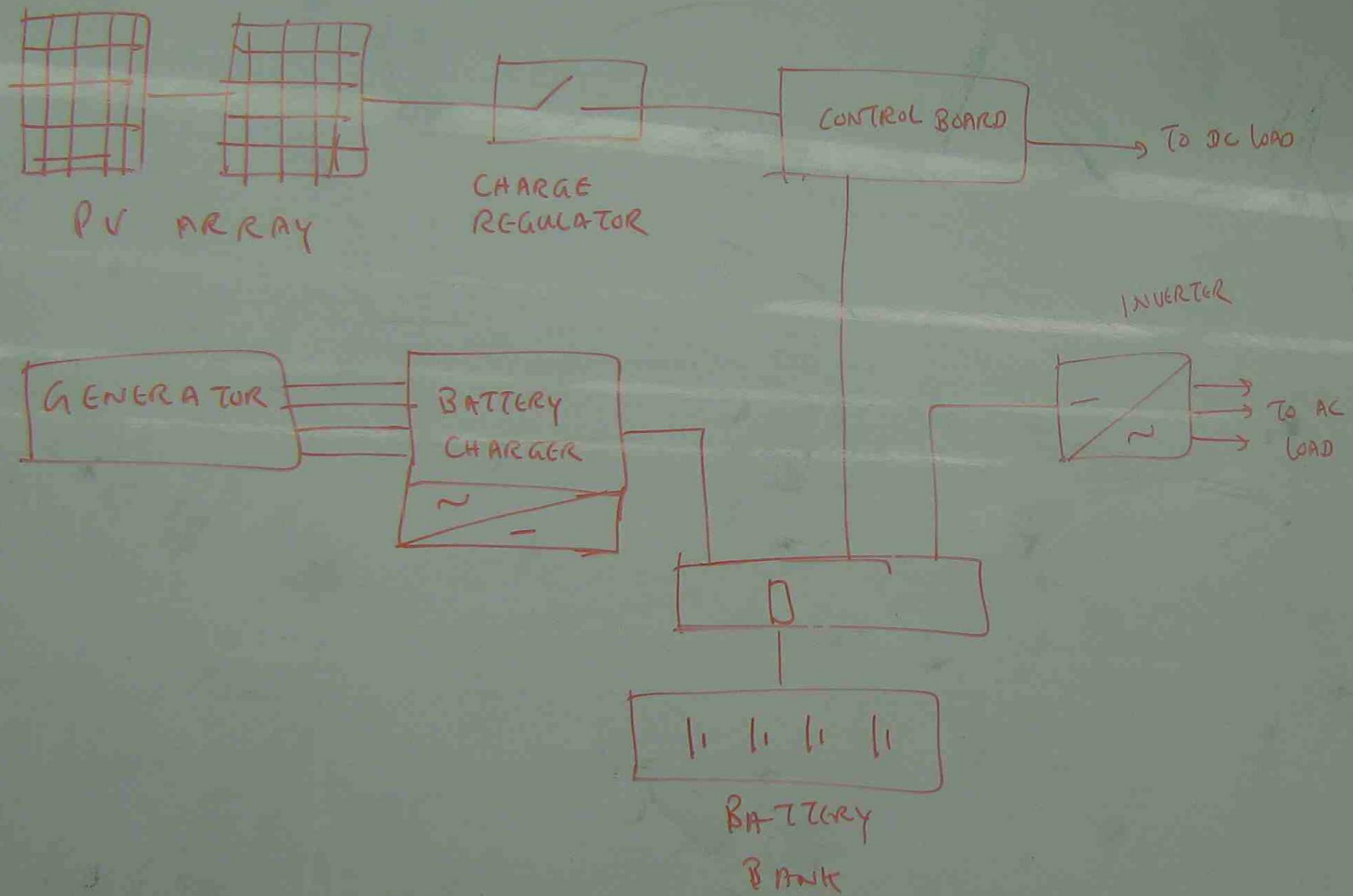




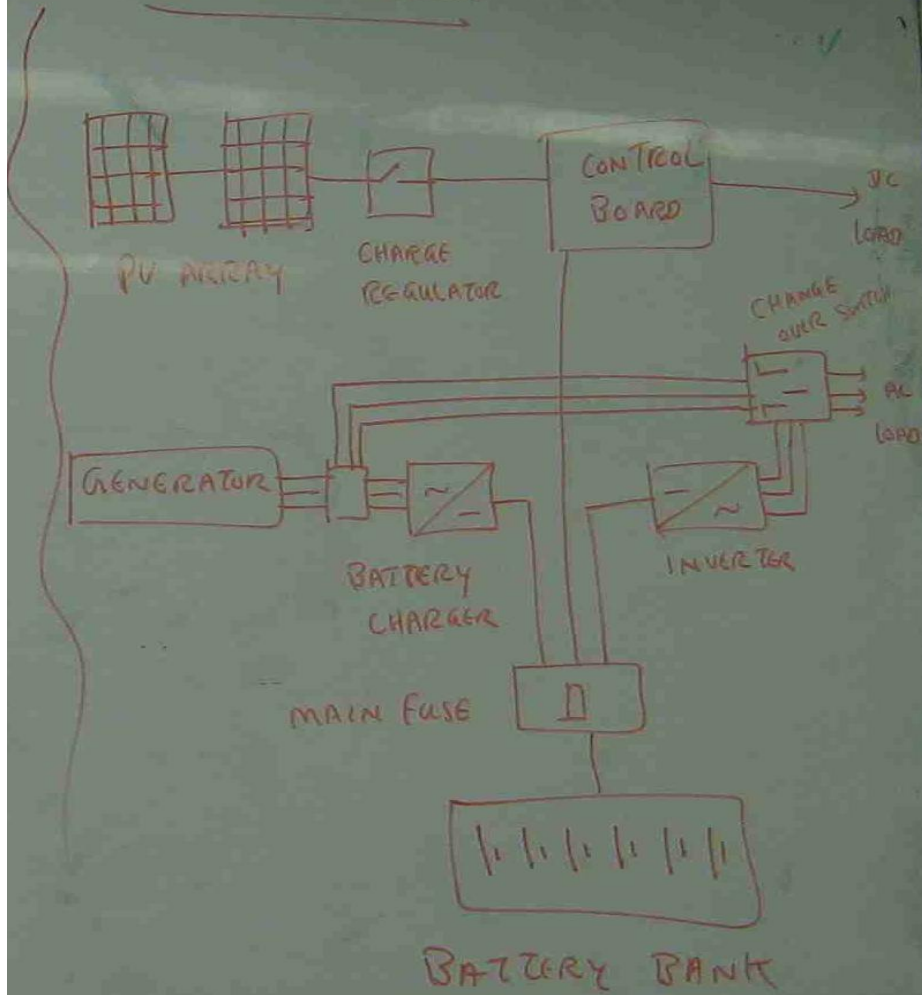
$$H_1 + \frac{V_1^2}{2g} + \frac{P_1}{\rho g} = H_2 + \frac{V_2^2}{2g} + \frac{P_2}{\rho g} \quad (\text{NO FRICTION LOSS})$$

$$H_1 + \frac{V_1^2}{2g} + \frac{P_1}{\rho g} = H_2 + \frac{V_2^2}{2g} + \frac{P_2}{\rho g} + \text{FRICTIONAL LOSS (HEAD)}$$

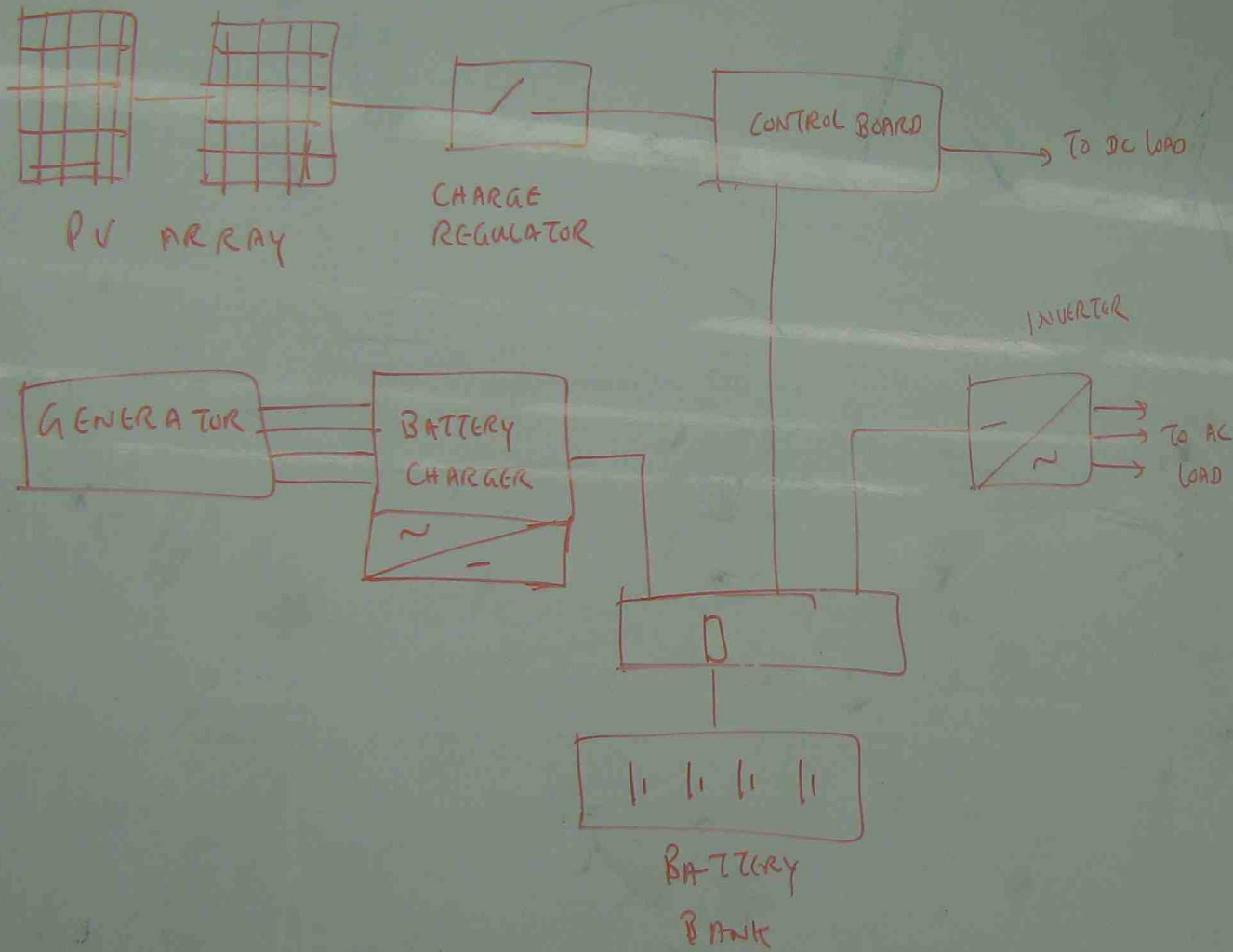
## SERIES SYSTEM



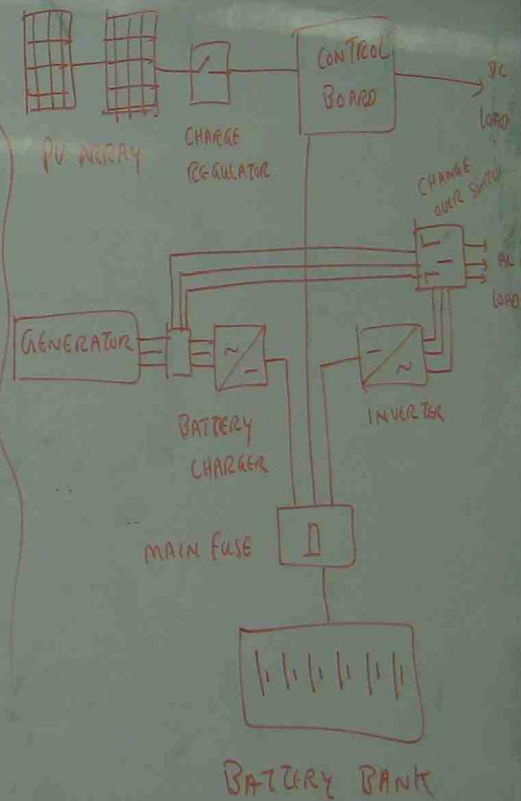
# SWITCHED SYSTEM



# SERIES SYSTEM



# SWITCHED SYSTEM







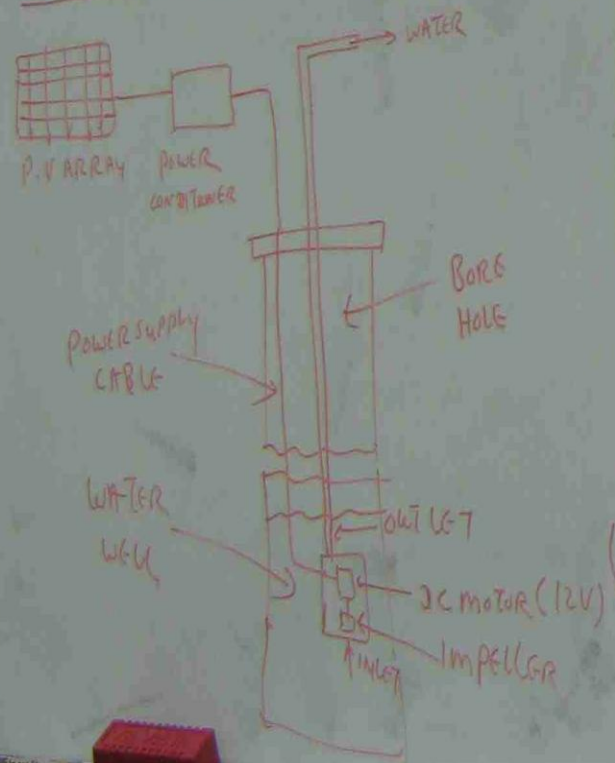
# P.V SYSTEM APPLICATIONS

SPS - STAND ALONE POWER SYSTEM

RAPS - REMOTE AREA POWER SUPPLY

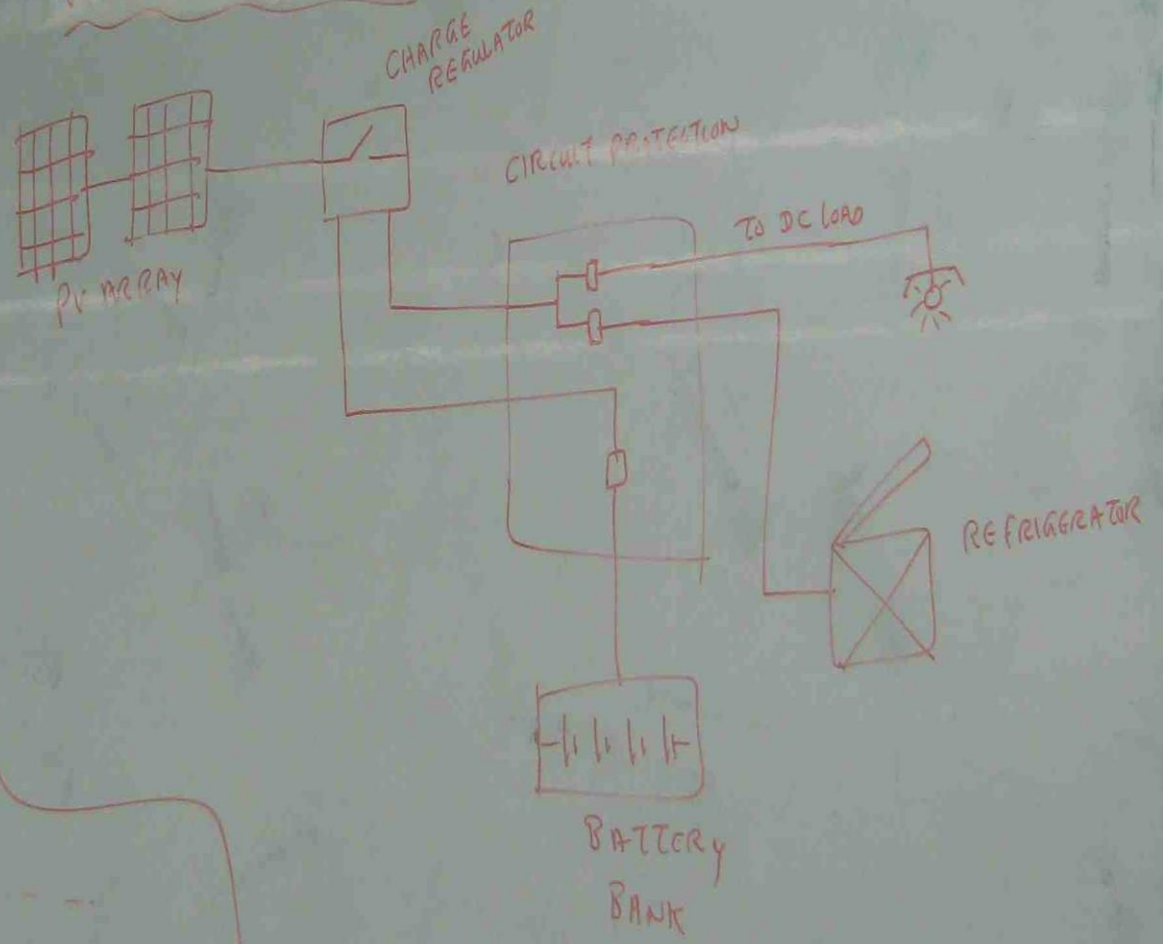
P.V WATER PUMPING SYSTEM.

## P.V WATER PUMP



SUBMERSIBLE PUMP/MOTOR UNIT.

## VACCINE STORAGE SYSTEM





## REQUIREMENT OF AS4509

THE CONNECTION DIAGRAM REFERRED TO AS 4509 SECTION (10).

IN THE CONTEXT OF RE (RENEWABLE ENERGY) INDUSTRY, THE DIAGRAM PROVIDES THE SIMILAR FUNCTION TO SCHEMATIC DIAGRAM.

BUT IT ALSO INCLUDES MECHANICAL POSITIONAL INFORMATION WHICH CAN BE UNDERSTOOD BY SYSTEM OWNERS WHO ARE NOT FAMILIAR WITH ELECTRICAL DRAWINGS AS WELL AS TECHNICAL PERSONNEL.

## P.V SYSTEM WIRING SUPPLYING AC / DC LOAD

