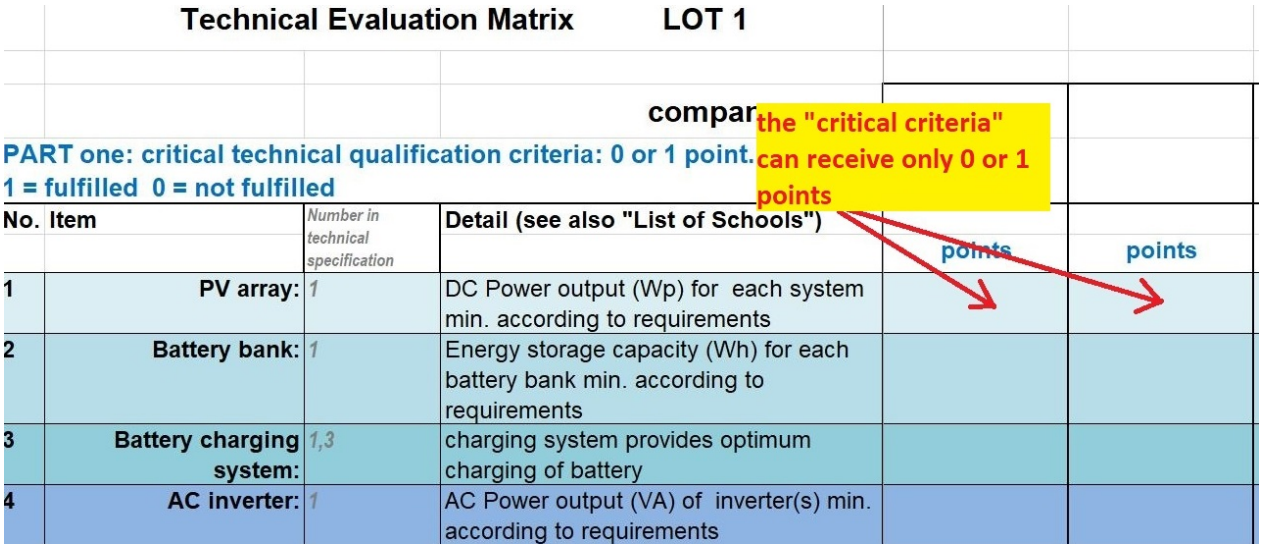
Guideline for use of bid evaluation matrix

PART one: critical technical qualification criteria



Technical Evaluation Matrix LOT 1

compar

the "critical criteria" can receive only 0 or 1 points

PART one: critical technical qualification criteria: 0 or 1 point.
1 = fulfilled 0 = not fulfilled

No.	Item	Number in technical specification	Detail (see also "List of Schools")	points	points
1	PV array:	1	DC Power output (Wp) for each system min. according to requirements		
2	Battery bank:	1	Energy storage capacity (Wh) for each battery bank min. according to requirements		
3	Battery charging system:	1,3	charging system provides optimum charging of battery		
4	AC inverter:	1	AC Power output (VA) of inverter(s) min. according to requirements		

For each of the 4 critical criteria there is only compliant (”1”) or non-compliant (“0”). Non-compliant in only one of the four criteria disqualifies the bidder, even if he reaches compliance in all other 3 critical criteria and in all other evaluations (technical, administrative).

1. PV array

Example: If a PV array for a certain school has a required DC power of 20000 Wp and the bidder offers a system with 20000 Wp **or more** then he scores 1 point. If he offers a system of less than 20000Wp then he scores 0 points.

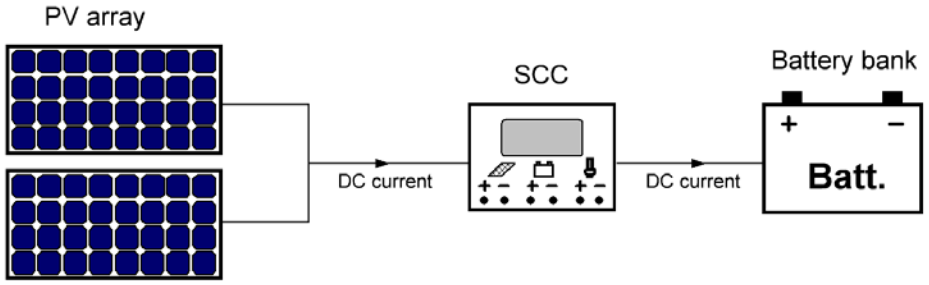
2. Battery Bank

Example: If a battery bank with a capacity of 48000Wh is required than that can be realized e.g. with a 48V battery of minimum 1000Ah, or a 96V battery with minimum 500A, or any other configuration where the product of Voltage and capacity is minimum 48000Wh.

3. Battery charging system

The battery charging system cannot be evaluated with a single specific (e.g. power) rating. The battery charging system "*must provide optimal charging of the battery under considering the load-generation profile".* To realize that there are several technologies and types of components possible, in each bid the offered system and components must be analyzed an understood to see if the offer is compliant or not.

Example A: PV array direct connected to solar charge controller (SCC) which is direct connected to the battery. DC power only.



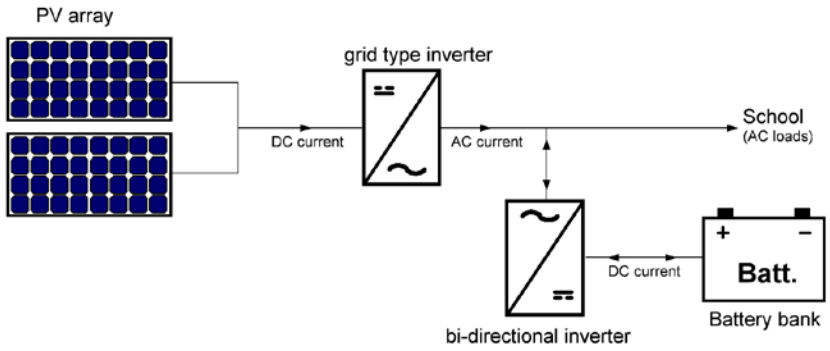
In this case the charge controller (or several combined) must have the power rating of the PV array + 20% safety margin.

Calculation: PV DC power = 20000Wp, + 20%. The Solar charge controller must have a power rating of 24000W.

As most charge controllers are rated in Ampere then the charging current depending of the battery voltage must be calculated.

Calculation: Battery voltage = 48V, PV power = 20000Wp + 20% safety margin. Ampere rating = 24000W / 48V = 500 Ampere. (can be realized by several controllers combined)

Example B: PV array connected to a grid type inverter (DC to AC conversion) which connects to a bi-directional inverter (AC to DC conversion) which charges the battery (e.g. SMA system)



In this case the bi-directional inverter is the charge controller. It is connected to the AC output of the grid type inverter (230V/60Hz) and must provide a charging current according to the battery.

Calculation: *Lead acid battery 48V/1000Ah. Minimum charging current should be around 12% of the battery capacity: 1000Ah x 12% = 120 Ampere. The minimum charging power would then be 48V x 120A = 5760W.*

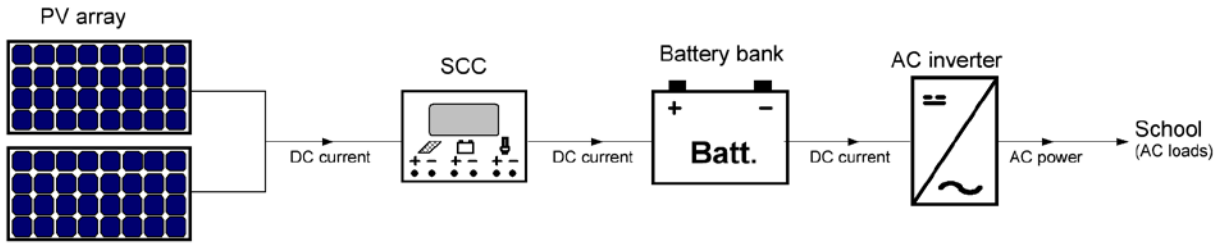
The grid type inverter must have the power rating according to the connected PV array +15% safety margin.

4. AC inverter

The AC inverter must provide continuously the maximum AC power according to the load. 20% safety margin are already in-calculated in the inverter AC power requirements.

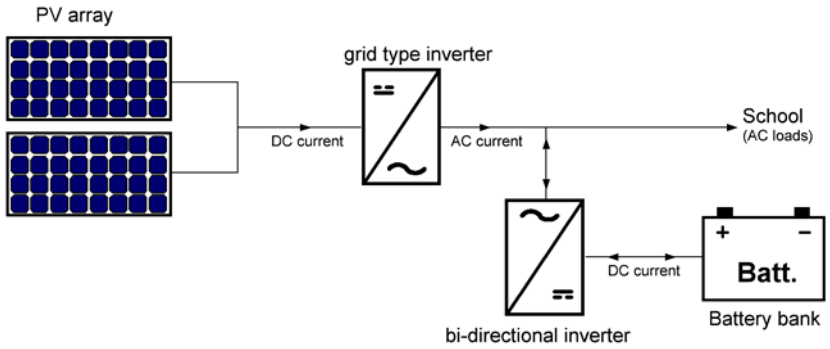
The AC power can be provided by different inverter types, depending on system technology.

Example A: AC inverter (battery inverter) is directly connected to the battery and provides the AC power as required.

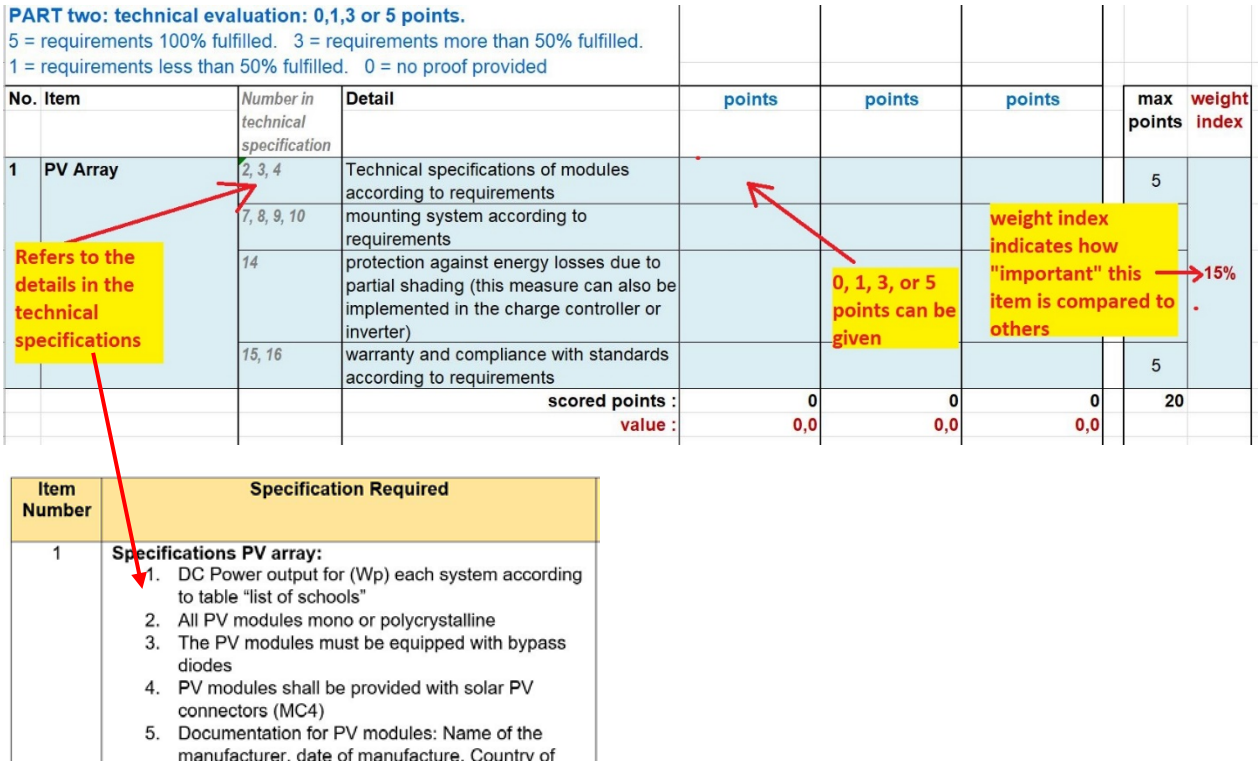


Example B: The AC power is provided by the grid type inverter **and** the bi-directional inverter (e.g. SMA system) which also charges the battery. As this system also must function when there is no power from the grid type inverter (at night) the bi-directional inverter must provide the full AC power as required.

The grid type inverter must have the power rating according to the connected PV array +15% safety margin.



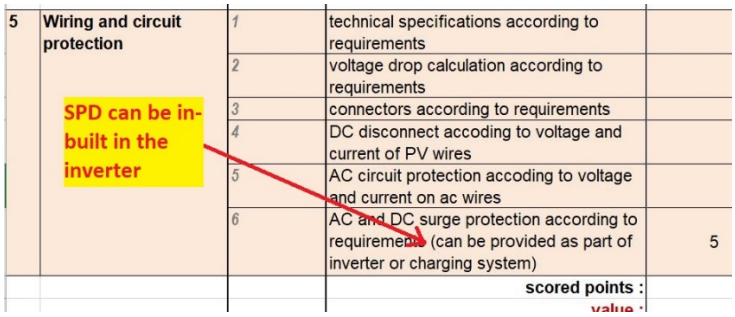
PART two: technical evaluation



Example: *"Technical specifications of modules according to requirements".* The requirements are no. 2, 3, and 4. If all requirements (mono or polycrystalline + bypass + MC4) are fulfilled then 5 points are awarded, for less requirements 3 or 1 point, if no requirement is fulfilled or no documentation provided which proves it then 0 points are awarded.

Sometimes a technical requirement can be fulfilled in another rubric than the one where it is written.

Example: AC or DC surge protection devices (SPD) can be inbuilt in the inverter (inverter technical specifications must be studied). Therefore 5 points can be awarded even the requirement is written under *"wiring and surge protection"*



Some items from the technical specifications cannot be evaluated at the time of bidding but are rather criteria for final inspection after completion of work:

Item Number	Specification Required	Specificatio
	11. The array should be installed with a 10° to 15° angle of tilt, enabling the maximum solar energy yield which is possible on the respective roof. The contractor shall determine the best angle when on site. 12. The solar modules should not protrude over the roof edges. 13. The solar modules must be installed in a way that they allow access for cleaning (e.g. spaces between modules on the roof to allow walking on roof) 14. The array must have efficient protection against	

The *"weight index"* describes how important the item is and influences the *"value"* of the points which are scored. E.g. scoring 10 points at the PV array has more value than scoring 10 points for end user training.

At the end of the table the *"technical evaluation result"* is the sum of all values. It is also multiplied with all *"critical technical qualification criteria"* points, meaning if one of the critical criteria has scored "0" then the overall result will be "0". The minimum score for a successful technical evaluation are 30 points or more.

scored points :	**0**	**0**
value :	**0,0**	**0,0**
technical evaluation result :	**0,0**	**0,0**