

Subject S03: Solar Design

Hand-out - Select inverter or panels first?

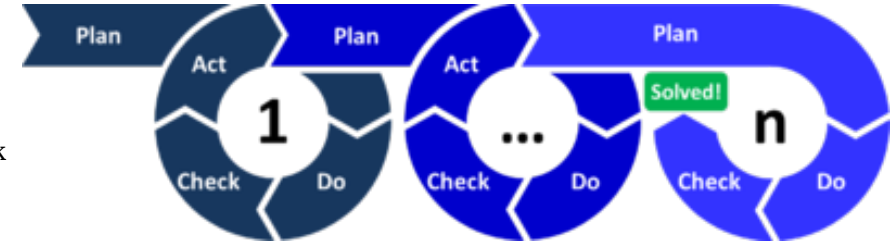
System design considerations

Panel notes:

- Polycrystalline - Slightly lower price per Watt, a little better in shade.
- Monocrystalline - Higher efficiency in full sun and less derating overtime.

Design notes:

- System design is an iterative process. Design the system, check the constraints such as inverter maximum and minimum voltage windows, if it doesn't work change a part and check the constraints again.
- Some designers prefer to select the inverter first where others prefer to select the panels first. This could be due to meeting customer specifications, personal preference or the complexity of some jobs such as roof size, angles and shaded areas.
- Cheap panels and an expensive inverter may be a more reliable system than expensive panels and a cheap inverter.



Ref: <https://en.wikipedia.org/wiki/PDCA>

| Select inverter first | | | Select panels first | |
|---|---|--|---|---|
| For straight runs with minimal shading such as good roofs or solar farms | | | For difficult roofs where space, shading or different roof angles is an issue | |
| When: <ul style="list-style-type: none"> • Roof space/land and shading is not an issue Or when: <ul style="list-style-type: none"> • The maximum size is being installed due to retailer or distributor limits • A specific energy yield is required • A specific package is being marketed Notes: <ul style="list-style-type: none"> • Inverter is the most expensive system item and a good price on a quality inverter is desirable | | | When: <ul style="list-style-type: none"> • All suitable roof space is likely to be taken up by panels • Complicated designs such as partially shaded areas or roofs with many different angles Notes: <ul style="list-style-type: none"> • Consider larger or smaller sized panels to best utilise the available space • Consider Monocrystalline (higher output per m²) | |
| | | | Optimisers | |
| | | | For partially shaded or a roof that has many angles, avoid the roof or use optimisers. Optimisers are likely: <ul style="list-style-type: none"> • The least expensive option (\$ per Watt) for a less than ideal roof • The most expensive option (\$ per Watt) for an ideal roof Optimisers can be purchased as connectible items or already built into the panels. However both require a special inverter. | |
| Single MPP tracker | Dual MPP tracker | Central inverter | Dual MPP tracker | Micro inverters |
| For small systems with panels facing the same direction and without shade. Small size inverter. | For medium systems with two strings on the same or different orientated roofs and without shade. 4kW and over inverter. | For large commercial or solar farm installations. Consider single axis tracking systems. | The system can be designed so that occasionally shaded areas are on their own string and own MPP tracker. | Are less common than optimisers in new installations, likely due to cost and reliability. |