# Matrix Analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name / price | Wattage | Image | Materials | Dimensions | Weight | Link |
| Renogy 100 Watt Solar Panel  £79.99 | 100 | A picture containing appliance  Description automatically generated | Monocrystalline Silicon | ‎106.2 x 53 x 3.5 cm; | 7.61 Kilograms | https://uk.renogy.com/renogy-100-watt-12-volt-monocrystalline-solar-panel-compact-design/ |
| DOKIO Solar Panel 100w 12v Kit  £82.77 | 100 | A picture containing text, black, outdoor object, tiled  Description automatically generated | Polycrystalline Silicon | ‎108 x 54 x 2.5 cm | 5 kg | https://www.amazon.co.uk/DOKIO-Polycrystalline-Controller-Waterproof-Motorhome/dp/B07YKKZTXH/ref=sr\_1\_2\_sspa?crid=384SH5CLNHQBW&keywords=100w+solar+panel&qid=1658160593&sprefix=100w+solar+panel%2Caps%2C201&sr=8-2-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUExSlpEVlFVR0YyM1cxJmVuY3J5cHRlZElkPUEwMTAxNzM5M0hGMjhZUTZITUc4NyZlbmNyeXB0ZWRBZElkPUEwODM4MDczMUFBMENPTkxNMDBJTCZ3aWRnZXROYW1lPXNwX2F0ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU= |
| ECO-WORTHY 120 Watts Monocrystalline Solar Panel  £95.99 | 120 | A picture containing text, indoor  Description automatically generated | Monocrystalline Silicon | ‎101 x 73.5 x 6 cm | 7.6kg | https://www.amazon.co.uk/ECO-WORTHY-120Walts-Aluminimum-Efficiency-Monocrystalline/dp/B08KXMQ83P/ref=sr\_1\_2\_sspa?crid=384SH5CLNHQBW&keywords=100w%2Bsolar%2Bpanel&qid=1658160809&sprefix=100w%2Bsolar%2Bpanel%2Caps%2C201&sr=8-2-spons&smid=A1X24PMZYWVYTH&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEyTU5SOE82VDJWQTVFJmVuY3J5cHRlZElkPUEwMzk4NzAxM1ZaT0I0UDZOTURIQiZlbmNyeXB0ZWRBZElkPUExMDM0NjYzMlFPN0NNR1JJUEhHUSZ3aWRnZXROYW1lPXNwX2F0ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU&th=1 |

# Understanding Solar Panel Materials

‘Monocrystalline solar panels (or mono panels) are made from monocrystalline solar cells. Each cell is a slice of a single crystal of silicon that is grown expressly for the purpose of creating solar panels.

In the lab, the crystal is grown into a cylindrical log shape called an ingot and is then sliced into thin discs. Each disc is cut along the edges to form octagons.

When the solar cells are placed on the solar panel, the octagonal shapes help the solar panels fit a maximum number of solar cells into the array. It’s much like cookies on a baking sheet. Even tightly spaced round cookies always have spaces between them, but octagonal cookies can be placed tightly together with little wasted space.

Distinctive for their black color, monocrystalline solar panels typically have an efficiency range of between 15% to 20%, with some newer experimental models even reaching close to 50%.’ (<https://www.forbes.com/advisor/home-improvement/monocrystalline-vs-polycrystalline-solar-panels/>)

‘Polycrystalline solar panels (or poly panels) are made of individual polycrystalline solar cells.

Just like monocrystalline solar cells, polycrystalline solar cells are made from silicon crystals. The difference is that, instead of being extruded as a single pure ingot, the silicon crystal cools and fragments on its own. These fragments are melted in an oven and formed into cubes which are cut into thin wafers. So, many different crystals form this amalgam, rather than the single crystal of the monocrystalline solar cell type. It’s a less exacting production process than with monocrystalline cells, so it allows for more solar cells to be produced faster and less expensively.

The blue-colored square polycrystalline cells fit neatly side by side, eliminating any empty space between the cells. Polycrystalline solar panels operate less efficiently than monocrystalline panels because the melted fragments of silicon afford less room for the electrons to move around.

Polycrystalline panels generally have an efficiency rating of between 13% and 16%. While only a few percentage points less than monocrystalline panels, it’s a difference that can count for a lot when compounded across many solar panels.’ (<https://www.forbes.com/advisor/home-improvement/monocrystalline-vs-polycrystalline-solar-panels/>)

Understanding this project, it is imperative that efficiency is maximized as it is unknown the type of weather and where the placement of the solar panels will occur. Other solar panel characteristics will not be weighted in this discussion, such as dimensions, as this is secondary in terms of the efficiency and subsequent power generation of said solar panel. Therefore, from the above paragraphs it is seen that the monocrystalline solar panels are preferrable over polycrystalline panels.

# Recommendations:

Using a matrix analysis, the below findings can be found when determining the ideal solar panel to work with.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Design | Price | Wattage | Material | Weight | Total |
| 1 | 3 | 2 | 3 | 2 | 10 |
| 2 | 2 | 2 | 1 | 3 | 8 |
| 3 | 1 | 3 | 3 | 2 | 9 |

It is found from this analysis that the Renology 100W monocrystalline solar panel is the most ideal solar panel to work with. These findings can also be backed up by the website footprinthero.com (a website dedicated to sustainable solutions). Out of 5 of the markets top sold solar panels, the website came to the same conclusion as I did. Thereby concluding that the analysis worked and the work will proceed with that solar panel in particular.