Monocrystalline or Polycrystallline Solar Panels?
Important Considerations When Choosing

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For those embarking on the installation of a solar panel system one decision, whether to install monocrystalline or polycrystalline panels, can be somewhat perplexing. A basic understanding of the main differences can be helpful.

Crystal Manufacture

The basic element of both types of solar panel is the photovoltaic (PV) cell. The differences between mono and poly crystals are largely explained by considering the process of their manufacture. The main ingredient of a solar cell is pure silicon. A common method of extraction, carbothermic reduction, heats silica (sand) and carbon to around 1700 degrees Celsius. As the silicon cools it forms into crystals.

The speed of cooling determines the resulting crystal size - the slower the cooling, the larger the crystal that is formed. However, the slower cooling process is more difficult, which means that the larger crystals are more expensive to produce than smaller ones. Polycrystalline cells are made from many smaller crystals of silicon whereas monocrystalline cells are made from a single larger crystal.

Characteristics Compared

A monocrystalline cell has a very smooth surface compared to the irregular imperfections of a poly crystal. It is slightly more efficient at absorbing solar energy, and so produces a little more electricity per unit area, than a poly cell. Both types of cell lose efficiency as ambient temperature increases. It has been that the performance of mono panels could be as much as 10% better than poly at high ambient temperatures. Monocrystalline cells are more expensive to produce than poly cells.

When the energy efficiency and the production costs are balanced the cost of monocrystalline and polycrystalline panels ends up much the same, as measured in cost per watt of output power. There is a size difference, however. For the same power output a polycrystalline panel will be slightly larger than the mono equivalent. This wouldn't normally cause a problem but it could be an issue on roofs where space is limited (or where a very large installation is planned).

When viewed from close up monocrystalline cells have a much more uniform appearance than polycrystalline cells. From a distance it would be difficult to notice any discernible difference.

The energy payback time (EPBT) of different types of solar panel is the amount of time it takes for a panel to generate the equivalent of the energy used in the manufacture, transportation and end-of-life recycling of that panel. The European Photovoltaic Industry Association (EPIA) has published data on EPBT in northern Europe, up to 3.2 years for polycrystalline panels and 3.6 years for monocrystalline, and the sunnier southern Europe, 1.9 years and 2.2 years respectively.

There are anecdotal claims that polycrystalline panels are better than mono ones in cloudy or diffused light conditions. The assertion is that the irregular surface of a poly cell can capture a greater proportion of this diffuse light than a mono cell. This is a good theory but not one that has been tested rigorously.

The Choice - Monocrystalline or Polycrystalline?

If space is an issue then monocrystalline panels would be the better choice. Otherwise, the best choice will depend on factors other than whether the panels are mono or polycrystalline. It is essential to get panels made with the

highest grade of silicon. This will ensure optimum efficiency and longest possible lifetime of microgeneration. Manufacturers who have been in the business for a long time, and have a good reputation, are more likely to deliver these good quality cells. They are also more likely to be around throughout the warranty period of the panels.

In a nutshell, quality and efficiency are the most important factors when choosing what type of solar PV panel to install. You are most likely to achieve this with a reputable manufacturer of long standing. Don't be tempted by cheaper alternatives.