

Harvesting solar energy: the Aylesford Solar Farm 18th October 2018.

by Rodney Buckland

23 members of *How Things Work* visited a local solar farm near Aylesford village on 18th October.

Small by the standard of today's new solar farms, the Aylesford facility, operational since December 2011, has a maximum power output of 5 MW, enough to power 1,500 homes based on an average annual consumption of 3,300 kWh of electricity per home.

The serried ranks of solar panels are firmly fixed to the concrete foundations of a 25 acre former Aylesford paper mill site. The panels are of the PV (photovoltaic) type, converting solar energy - largely in the visible part of the spectrum - directly into direct current electrical power, which is then passed through inverters to feed into the National Grid.

As explained by our guide, Julian Elsworth of the Foresight Group, the panels are pointed in a fixed, but optimum, direction – there is no attempt to change their inclination and azimuth as the Sun moves across the sky every day and above and below the celestial equator over a year. When the Aylesford site was developed, the expected return on investment (ROI) of using solar-pointing arrays was not competitive compared to fixed ones, although nowadays innovation in pointing systems has encouraged the use of one- and two- axis systems in some special situations.

The ROI calculations done during technical feasibility and financial viability studies of new solar farm projects are often based on a nominal lifetime of 25 years, reflecting the expected ~ 1% per year reduction in efficiency by which solar flux is converted into electrical power. As experience in solar farm investment and operation builds up, there is a growing awareness of the 'residual value' of many sites to continue generating renewable energy at a profit beyond 25 years lifetime.

The Foresight Group, through their Solar and Infrastructure VCT (Venture Capital Trust) provided much of the capital investment needed to build the Aylesford farm. But having sold the site to a Korean investment firm in 2015 to free up capital for investments in other solar farms, the Group is now acting as asset manager, offering a SCADA (Supervisory Control And Data Acquisition) facility in High Wycombe that provides real-time essential performance data to Foresight's HQ on the top floor of the Shard.

We were saddened, but not entirely surprised, to learn that theft of panels, cabling and other valuables from solar farms by highly-organised gangs is a significant concern, although it was comforting to note that site security is improving – the author was detected on the Monday morning before our visit, when there were no maintenance staff on site, negotiating the highly-cratered track to the Aylesford site on reconnaissance for our visit.

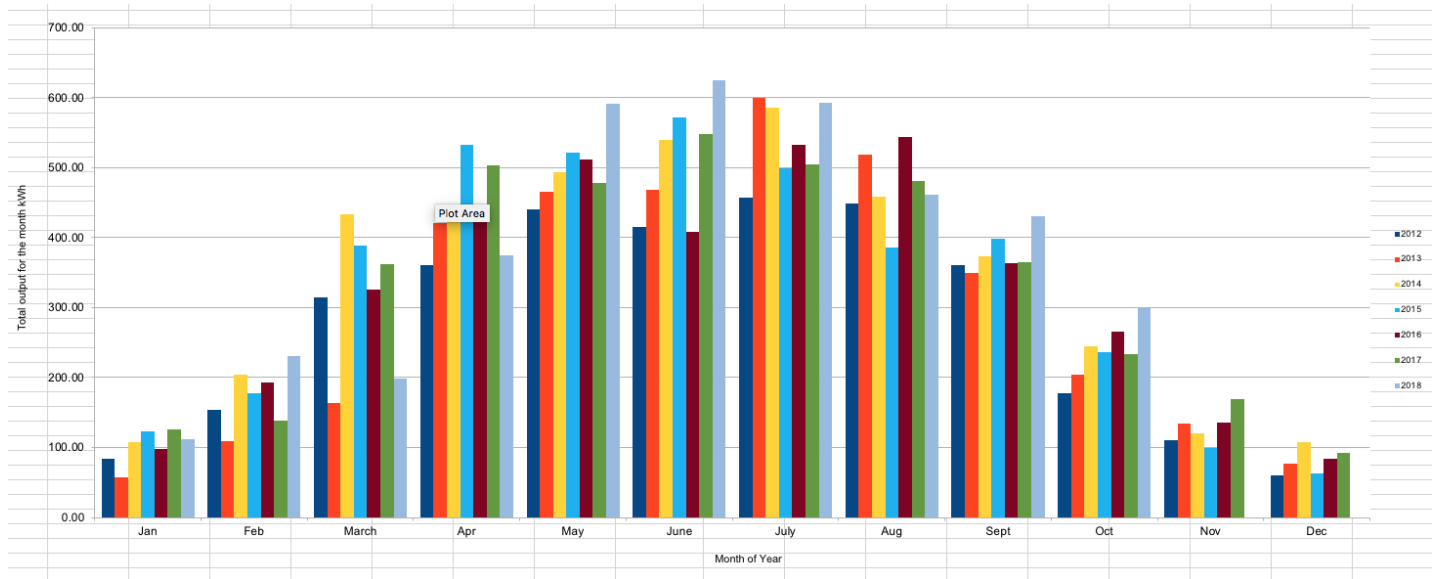
How is the Aylesford solar farm performing this year? As an indicator, the author's solar PV microgeneration site – on the roof of his house in nearby Culverstone - offers some clues.

The different-coloured sequences of vertical bars measure the amount of energy generated by a 4 KW peak PV system each month over the last seven years. October 2018 (up to the 28th) is the light-blue bar in the October collection.

It can be seen that February, May, June, July (almost), September and October 2018 have all been record months over the last seven years for insolation in this area of Kent (although March and April this year were pretty awful.)

With just over two months to go before the end of the year, it can safely be predicted that 2018 will be a record year for solar energy generation from my rooftop over the last seven years, even though there is a ~1% reduction in efficiency each year.

Climate change anyone?



How Things Work Group



Control Cabin



Solar Array



Distribution Box