

Westmill Solar Park Facts and Figures



Location: 51°36'49" North, 1°38'56" West, Elevation: 0 m a.s.l.

Panels:

Poly-crystalline silicon

21,620 panels

Mounted in racks four above the other

In 32 rows,

At 30 degrees to the horizontal

All facing South.

Each panel has an area of 1.67 m²

a maximum output voltage of 37 V d.c.

a maximum output power of 225 W at an insolation level of 1 kW/ m².

The energy conversion efficiency is 13–15%.

The maximum power output for the total solar array is 4.9 MW.

Panels manufactured in Taiwan

Installed by the German company, Abakus

They are warranted to provide up to 90% output for 10 years
and up to 80% for 20 years.

The total area of solar panels is 3.6 hectares (8.9 acres)

Site area of 12 hectares (32 acres).

The 7m wide corridors between the panels could be used to crop or graze or for bio-diversity. Current intention is to seed with wild flowers to make a nature reserve. Sheep during winter of 2012/13

Connections:

Panels are connected in strings of 23 in series

To give a maximum voltage of 850 V per string

Groups of strings are paralleled in Combiner Boxes.

Conversion:

The outputs from the Combiner Boxes go to 7 Inverters where the variable voltage d.c. is converted to a 3-phase, 50 Hz a.c supply at 315 V.

This is then transformed to 33 kV for eventual connection to the grid.

The inverters operate at a PWM switching frequency of 3 kHz which produces a loud 'whistle' in their vicinity.

Inverter equipment is provided by the German company, SMA

Transformers are provided by a UK company.

Losses:

Estimated losses due to temperature: 7.6% (using local ambient temperature)

Estimated loss due to angular reflectance effects: 3.1%

Other losses (cables, inverter etc.): 13.0%

Combined PV system losses: 22.1% (note this does not tally with figures above)

Distribution:

The outputs from the transformers are carried by underground high voltage cables to the on-site Distribution Centre where they are combined and connected to the Switching Centre for connection to the grid.

Switchgear is provided by the German company ABB.

Grid Connection:

Power is supplied to the grid through the same cable and connection as is used for the Wind Farm, with arrangements made so that either system can be shut down independent of the other.

Monitoring and Control:

The whole system is monitored and controlled via the Internet and can be accessed anywhere in the world.

Civil Engineering:

Groundwork and rack installation was carried out by the UK Company, Jackson.

Electrical carried out by German contractors.

Whole project was completed in 2 months in order to meet the deadline for the abrupt change in feed-in tariffs announced by the Government in respect of large scale PV plants in 2011.

Cost:

The total cost of the installation was around £13M and it is privately owned at present. However, it is intended that it will eventually become a new Westmill Co-Operative Solar scheme with shares offered to the public, hopefully in early 2012. The hope is to get substantial local ownership and for the scheme to become a model for locally owned medium scale power generation plant

Economics:

Energy production per annum was predicted to be 4.8 GWh, but in 2014 was 5.4 GWh. The 2014 production represents enough energy to supply 1,630 typical houses and avoid 2,260 tonnes of CO₂ (there are 1,658 shareholders).

In 2014 the price paid for the electricity generated was £270,000 and the Feed-in-tariff and other renewable energy payments added a further £1,870,000 in income.

The energy used to produce the system was recovered in 2 years. It is predicted that the payback period for the investment will be 8 – 10 years.

The hope is to offer around a 10% return on investment in the share offer with the money invested for 25 years.

Customer:

Generated electrical energy is sold to Good Energy

Local Disturbance: Includes

Visual impact of some 3,6 hectares of solar cells on angled frames

In practice, there are no glare or glint issues

Site is not very visible locally due to the topography and screening by high hedges.

It is visible from far away elevation – e.g. White Horse Hill - but only about a third of the panels can be seen as it is not prominent and could be a water feature.

Noise

'Whistle' from the inverters

Some low level 50Hz 'hum' from the transformers

Neither noise is audible beyond the perimeter fence.

Download 60

Planning Issues:

No objections on file at planning

Scheme was unanimously approved at Council meeting (thanks probably to the wind farm success and reality).

The local CPRE did not object

Ron Colyer Version 3 Nov 2014