

# Report to BWCE Members

## Understanding Lower Project Performance 2017-18

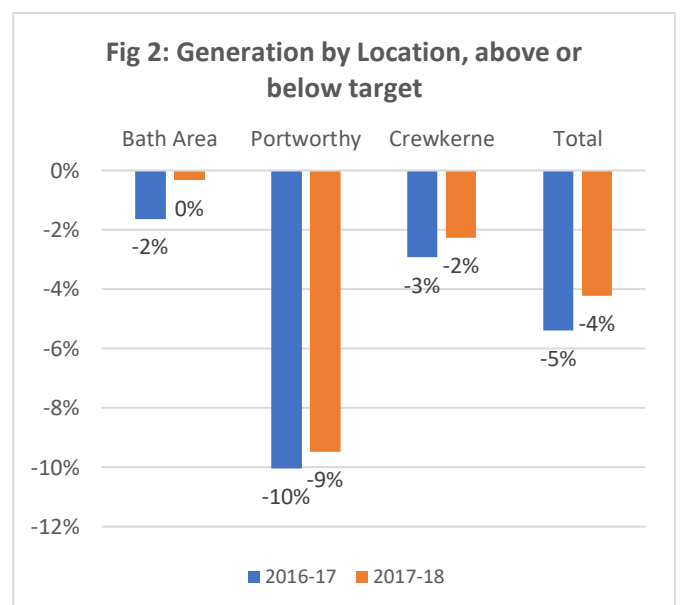
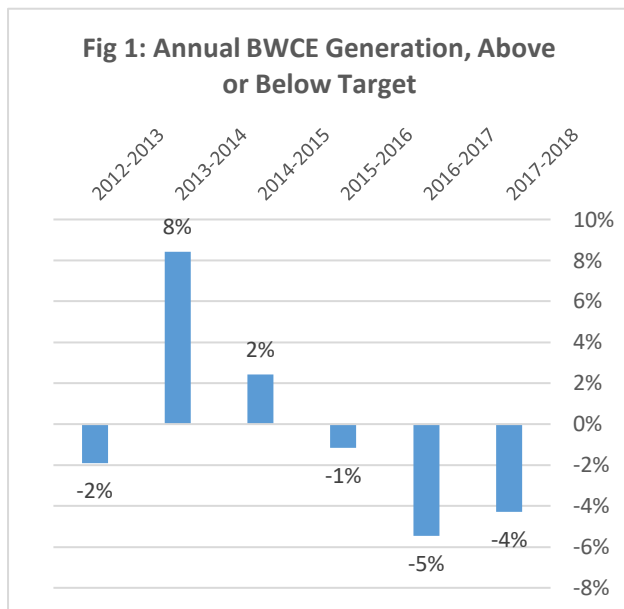
This paper is an update of the project performance paper circulated last year.

### 1. Headlines

- Overall our project portfolio performed 4% below target in the year April 2017 to March 2018, with the Portworthy project performing 9% below target.
- Whilst there have been some outages on the larger solar arrays, the most significant reason for the lower performance across the majority of our portfolio has been lower than average sunshine levels.
- Analysis suggests that sunshine levels during the last three years have been significantly below average at all our sites.
- Evidence suggests that longer term performance should return to predicted levels.
- These performance issues were flagged at last year’s AGM. At that time, we indicated that this year’s interest payment to members may be similar to the 6% we paid last year. This is indeed the proposal that we will be making to this year’s AGM.
- Given the abnormally low levels of sunshine over the last three years and lower inflation<sup>1</sup> over the past 5 years, we believe this would be a significant achievement.
- Our proposals for member interest and community fund payments are contained within a separate paper.

### 2. Performance against targets

Our targets are based on long term average solar radiation data. So, some years will be below target and other years above target. However, our total project portfolio performed 4% below target during the financial year to end March 2018 compared to 5% below target the previous year (Fig. 1). Fig. 2 breaks down performance for the last two years by location.



<sup>1</sup> Project income from the Feed in Tariff is adjusted annually in line with the Retail Price Index (RPI), hence the importance of inflation.

As you would expect the BWCE Board are concerned about the causes of the underperformance and any long-term implications, given the impact underperformance has on BWCE's income.

### 3. Operational performance

We have had some minor inverter and shading issues during the year on our smaller roof projects. These issues have not had a material impact on the overall performance of the portfolio.

The performance of the actual panels at all three larger sites, Wilmington, Crewkerne and Portworthy has been good. The performance ratio, or the efficiency with which the panels are converting solar irradiation into electricity, has been above target for all three projects. So, the panels are working well.

A reduction in the efficiency of the solar panels themselves of 0.5% per year has been taken into account within the target figures. This also reflects our approach to long term financial forecasting for all our solar projects.

We have had grid outages at both Crewkerne and Portworthy. This is where the network operator shuts down the solar system to allow them to do work on the local grid. Outages have however been far less of an issue than last year. We would expect there to be continuing grid outages but we do not think they will be a major risk to future output.

We are however concerned about the continued lower performance at Portworthy, following two years of lower than expected performance. As a result we are commissioning a detailed technical review of the site.

### 4. Solar Irradiance

All project targets are based on assessments of long term average solar irradiance drawn from PVGIS, a respected European Commission database of solar radiation. At our larger sites, solar irradiance is remotely monitored in real time.

Where data is available, there is a close correlation between lower than average solar irradiance and lower than forecast generation.

However, a key question is, do we expect these low levels of sunshine to continue?

Whilst there are no widely available long-term annual records of solar irradiance for our specific sites, we have been reviewing our performance against publicly available data on sunshine levels, measured in sun hours<sup>2</sup>, to get a sense of how abnormal our experience might be.

The data in Figure 3 below, compares variation in sunshine levels against the 8 year average in Bath and at the Portworthy and Crewkerne sites. This is modelled data, that comes from [www.worldweatheronline.com](http://www.worldweatheronline.com).

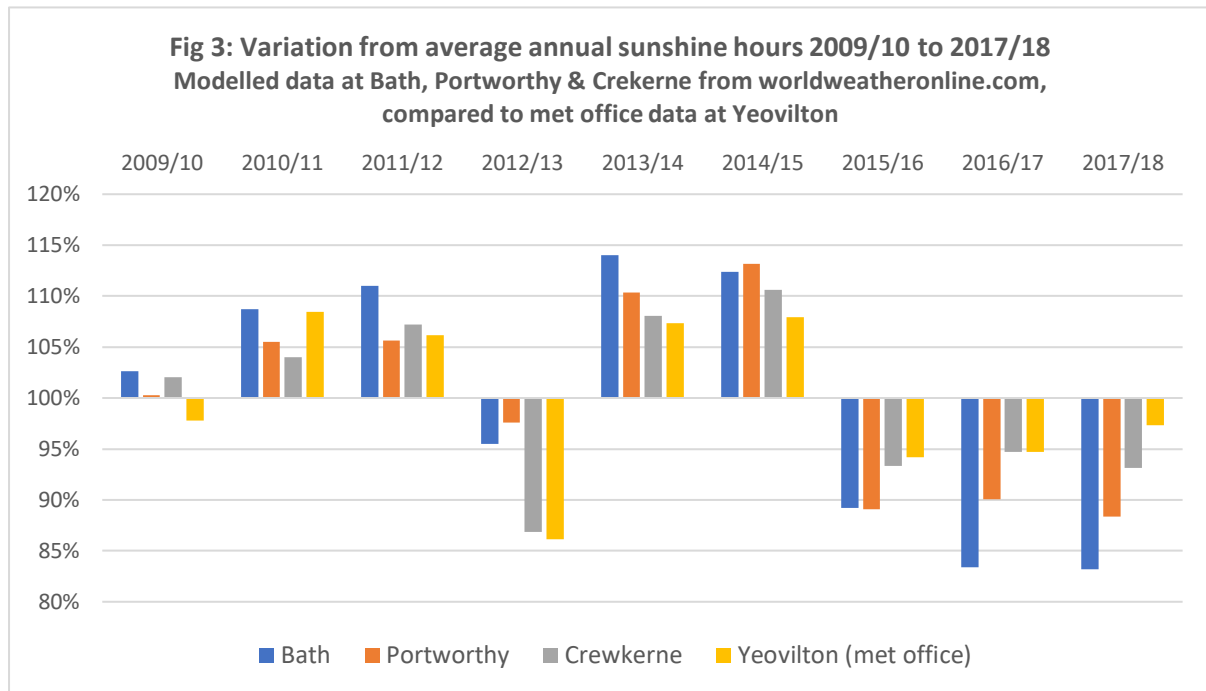
Because the publicly available data is modelled rather than actual observed data, we also wanted to check how accurate the modelled data might be compared to the real world. So, the graph also provides observed data from the Meteorological Office Station at Yeovilton, which is in the same

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<sup>2</sup> Sunshine hours are defined by the met office as the amount of time that direct solar radiation exceeds 120 w/m<sup>2</sup>. This is not as accurate as measuring actual solar irradiance, which is what we do at our larger sites. Sunshine hours do not take into account indirect solar radiation, of which we get a lot. However, it has not been possible to source historical irradiance data for comparison.

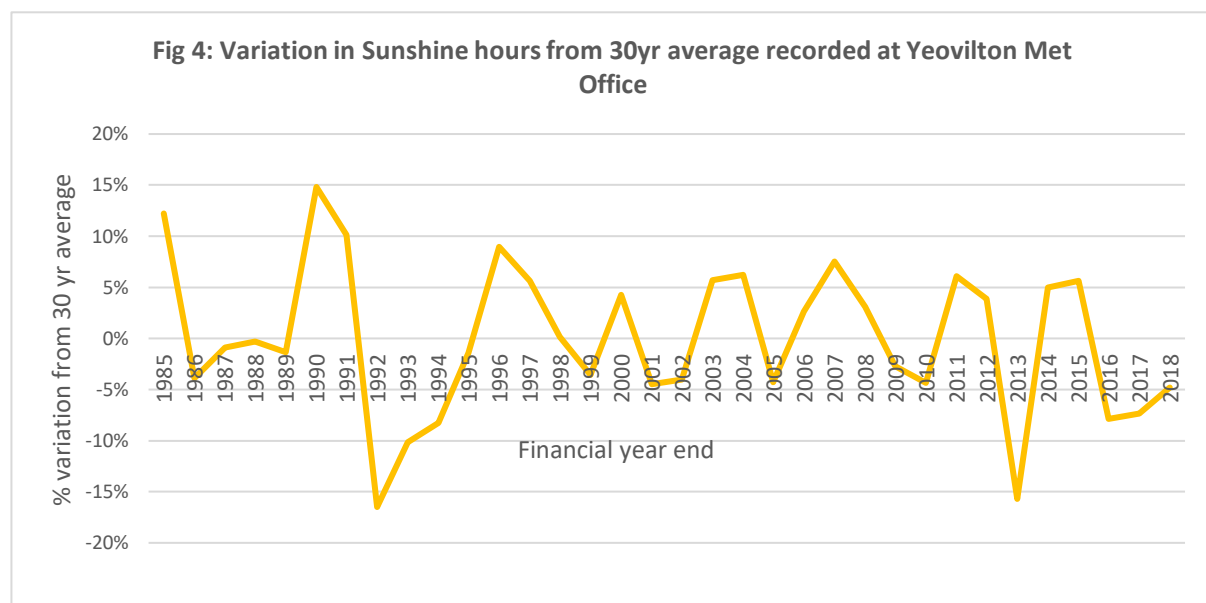
area as the Crewkerne site. It is also the only met office in the South West that has long term data records for sunshine hours.

The actual observed data at Yeovilton shows a strong correlation with the modelled data we are using at Crewkerne. The strong correlation between the observed and modelled data here, increases our confidence in the modelled data for our other sites as well.



The overall trends in the modelled data summarised in Fig. 3 show a good if not exact correlation with our project generation performance outlined in Fig. 1. Last year’s performance from our Bath area projects was up from the previous year, even though sunshine levels were lower. This was because we had fewer operational issues with our largest project, the Wilmington solar array.

The long-term observed data from Yeovilton, illustrated in Fig. 4 below, emphasises the unusual nature of the last few years. The data in Fig 4. illustrates both the normal range of variability that you might expect around a target based on average solar irradiance, as well as the degree to which sunshine levels in 3 of the last 5 years have been abnormally low. The last time there was this concentration of low sun years was in the early 90s.



The long-term average from actual observations at Yeovilton, is within a couple of percent of the 8 year average shown in Fig. 3.

Research<sup>3</sup> suggests that long term, climate change is likely to increase rather than decrease solar radiation in the South of England, with some increase in seasonal variability.

Overall, our conclusion is that the last three years have delivered significantly below average levels of sunshine at all three locations, but that in the long term we should see better performance.

## **5. Impact on BWCE income and member returns**

Members' return on their investment is dependent on the performance of our projects. As noted above, performance depends upon several factors – not all of which are within BWCE's control.

These performance issues were flagged at last year's AGM. At that time, we indicated that this year's interest payment to members may be similar to the 6% we paid last year. This is indeed the proposal that we will be making to this year's AGM. The proposals for this year's payments and their justification are provided in a separate paper.

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<sup>3</sup> Burnett, Barbour & Harrison: 2014, The UK Solar Energy Resource and the Impact of Climate Change, Institute for Energy Systems, School of Engineering, University of Edinburgh, United Kingdom.  
<http://www.sciencedirect.com/science/article/pii/S0960148114002857>