Solar Power Ensemble Forecaster

Lessons Learned Report 2

Contents

1. Introduction

The purpose of this document is to summarise the lessons learned during the second reporting period for the Skycam and Multi-Model Solar Forecasting Project. This includes work conducted between October 2019 and March 2020. Multiple forecast models have been commissioned and the ensemble forecast approach refined. Forecasts are being submitted to AEMO for four out of the five farms in the trial.

2. Key Lessons Learned

2.1 Lesson learnt No. 1: Time delays for forecasts submitted to AEMO server

Category: Technical

Objective: Demonstrate the ability to submit five-minute ahead self-forecasts via AEMO's web based MP5F API

Implications for future projects: Significant variability in the response time of the AEMO forecast server has been experienced. This has caused forecasts for several dispatch intervals to miss the gate closure. The challenge here is that when submitting 7 seconds prior to the gate closure, the response time from the AEMO server varied from near instantaneous to 12 seconds (where any response time over 6-7 seconds would cause the gate closure to be missed), but submitting 9 seconds prior to the gate closure, only 2 seconds earlier, the response time is always near instantaneous, and at most less than 1 second. Potentially, this is due to increased load of the AEMO servers near to the gate closure time. Ideally, the forecast submissions would be timestamped by the AEMO server as soon as they are received, rather than when they are processed in the queue. Unless changes are made at the AEMO server side this issue will become worse as more farms and forecast providers start submitting forecasts. The implication for future projects is that multiple submissions should be made, up to the gate closure to ensure that a valid forecast is received and available for use in dispatch.

2.2 Lesson learnt No.2: FCAS Causer Pays Calculation Process

Category: Commercial

Objective: Demonstrate the potential commercial benefits of wind and solar farms investing in short-term, self-forecasting solutions

Implications for future projects: There is a significant knowledge gap in the non-transparent process for calculating causer-pays fees. An extremely detailed AEMO document is available describing this process but is difficult to interpret and not all necessary data is publicly available to non-market participants. If this process were fully understood, and necessary data available, further causer-pays forecast improvements may be possible.

2.3 Lesson learnt No.3: Discrepancies between site data and AEMO data

Category: Technical / Logistical

Objective: Demonstrate the five-minute ahead self-forecasts are more accurate than the AWEFS and ASEFS

Implications for future projects: Large differences between on-site SCADA based export power measurements and AEMO's final published INITIALMW values remain. On some sites these differences are almost as high as the forecast error, suggesting that forecasts could be improved significantly if these disparities were fixed. We are still working to resolve these issues across several sites.

2.4 Lesson learnt No.4: Unknown AEMO server or user account errors preventing forecast submissions

Category: Technical

Objective: Demonstrate the ability to submit five-minute ahead self-forecasts via AEMO's web based MP5F API

Implications for future projects: There have been instances where errors have occurred submitting forecasts that appear to be related to the user account permission but have no known cause. In every case, these forecast submission errors have started and stopped with no intervention or changes on our system, nor were any changes made to our user account by the participants. In two notable cases of this error, the commencement of forecast submission was delayed significantly, and in another case, our self-forecasting assessment was significantly impacted due to many missed forecasts that were attributed to this error. There is no clear-cut resolution to the issue to date.

2.5 Lesson learnt No.5: Complications with submitting forecasts as a non-market participant

Category: Technical

Objective: Demonstrate the ability to submit five-minute ahead self-forecasts via AEMO's web based MP5F API

Implications for future projects: There are several problems arising from being a forecast provider that is not a market participant:

- Passwords for submission must be changed regularly. This is a manual process that needs to be carried out by the market participant and the information relayed to the forecast provider. This provides some logistical challenges and blurs the boundary lines for responsibility. An automated system for password changes is required.
- Gaining access to MarketNet data is an overly complex and expensive process for non-market participants. Not having access to this data could negatively impact forecast accuracy, while forcing every forecast provider to pay for a connection increases the costs of providing self-forecasts.