Grid connection modelling and inverter characteristics

Knowledge type: Network connections

Technology: Solar photovoltaic

Key learning

The performance characteristics of the plant inverters are a key input to grid connection modelling conducted for a solar plant. The grid connection model, which forms the basis of the Connection Study and the Connection Agreement, needs to be based on a particular inverter make and model.

Implications for future projects

It is advisable to definitively select an inverter model before conducting grid connection studies. Otherwise, the technical modelling for the connection studies may need to be redone and the project will incur additional time and cost.

Knowledge gap

It could be useful to establish links between Network Service Providers (NSPs) and major inverter manufacturers so that inverter performance models can be made readily available in the correct software format. This would facilitate preparation of grid connection studies and discussions between project developers and NSPs.

Background

Objectives or project requirements

As project proponent, AGL conducted technical modelling to support preparation of connection studies for the Nyngan and Broken Hill projects. The modelling used proprietary software, which requires specification of inverter settings and network characteristics to determine the expected impacts of a generation facility on the network. The results of the modelling were incorporated into connection studies, which were used to negotiate the commercial and technical arrangements between the project proponent and the NSP.

Process undertaken

As the engineering, procurement and construction contractor for the projects, First Solar was responsible for selecting the inverter make and model to be used in the solar plants. Unfortunately, First Solar elected to use a different inverter than the one that AGL had used in the earlier connection studies. Because the performance characteristics of the two inverters were slightly different, AGL was required to redo the technical modelling to define plant performance. AGL engaged a technical consultant to conduct the grid modelling, and this additional modelling incurred extra cost as well as a delay in finalising project connection arrangements.