

# RESPONSE TO CONSULTATION ON ENERGY CONVERSION MODEL FOR SOLAR FORECASTING

VERSION: 1.0

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## 1 Introduction and background

On 12 April 2013, AEMO released an Energy Conversion Model (ECM) for solar generation plants. The ECM identifies the energy output that can be expected from a solar farm based on ambient conditions at the solar farm's location.

The ECM was released for consultation and the consultation period closed on 3 May 2013. The consultation sought input on the parameters that solar generators will need to provide to AEMO in order to develop accurate solar generation forecasts.

The ECM is a crucial element in the Australian Solar Energy Forecasting System (ASEFS) that is being designed to project expected generation from solar power generators in the short, medium, and long term based on measurements of ambient conditions and the configuration of solar plant.

The ASEFS will itself form a component of the existing Australian Wind Energy Forecasting System (AWEFS), sharing many of its administrative functions and interfaces.

As part of the delivery of ASEFS, Overspeed has been contracted as AEMO's service provider to develop the model and assist in its integration into AEMO's market systems.

This document summarises the consultation comments received and AEMO's response.

## 2 Consultation submissions

Consultation submissions were received from:

- AGL
- Belectric
- Hydro Tasmania/Entura
- GDF Suez
- Solar Thermal Group, Australian National University
- Independent party

In determining responses to the consultation comments, AEMO collaborated with Overspeed, CSIRO and the individual parties themselves where clarifications and discussions were needed.

### 3 Summary of Submissions Received

The following table contains a summary of the issues raised in the submissions and AEMO's response to those issues. For brevity, consultation comments have been grouped according to similar themes.

Item	Comment	Action	Comment source
1	<p>Many of the parameters such as atmospheric thickness and cloud albedo are difficult and/or expensive to measure.</p> <p>Questions were also raised as to how useful these parameters would be to the ECM.</p>	<p>After discussions and input from Overspeed, CSIRO and industry, a number of these parameters were removed.</p> <p>A complete list of the parameters that were removed is provided in Section 3.1.</p>	<p>Hydro Tasmania</p> <p>AGL</p> <p>Belectric</p>
2	<p>A parameter that quantifies the degradation due to ageing was suggested.</p>	<p>Overspeed has indicated that these degradations will be inherently captured by the system's ability to 'learn' from operational data. As such, any trends in degradation due to ageing would be captured in the system's forecasts.</p>	<p>GDF Suez</p>
3	<p>There was ambiguity in the terminology and the structure of the ECM</p>	<p>A glossary of terms and several relevant examples have been included in the ECM.</p>	<p>AGL</p> <p>Belectric</p>
4	<p>An independent party suggested that degradations of solar output due to soiling or dust should be included as a parameter.</p>	<p>While the parameter would be quite useful for the model, industry representatives, and in particular generators, voiced concern about the additional cost this would impose on their solar farms.</p> <p>This parameter has been made optional. However, if the facility is measuring this for its own internal use, AEMO would request that it be provided.</p>	<p>AGL</p> <p>Belectric</p> <p>Independent party</p> <p>Hydro Tasmania</p>
5	<p>Suggestion to include a parameter that handles concentrating solar power with storage.</p>	<p>Facilities with storage solutions are not considered in Phase 1. This will be considered in later stages.</p>	<p>Solar Thermal Group, Australian National University</p>
6	<p>It was unclear how multiple module types that are connected to one inverter would be specified.</p>	<p>After discussion with Overspeed and Belectric, the ECM structure has been modified to handle this scenario and an accompanying example has been added that describes how the ECM should be completed to accommodate this arrangement.</p>	<p>Belectric</p>

### 3.1 List of removed parameters

The following parameters were removed from the ECM:

Facility online	Cloud coverage
Slant water vapour density distribution	Cloud type
Slant water vapour abundance	Cloud albedo
Column water vapour abundance	Cloud velocity
Slant atmospheric density	Cloud scale
Aerosol optical thickness density	Cloud height
Slant aerosol optical thickness	Cloud optical thickness
Column aerosol optical thickness	Device online
Total ozone abundance	Device functioning
Site albedo distribution	Last device calibration date
Site albedo	Receivers online
Reactive power control set point	

Please note that AEMO may need to re-instate some of these parameters based on the results of the off-line testing, to be undertaken by November 2013.

AEMO will liaise with affected parties (particularly solar farm generation proponents) should this need arise.

## 4 Next Steps

Next steps for the solar generation ECM are:

- Available for off-line testing by November 2013.
- Operational by end May 2014.