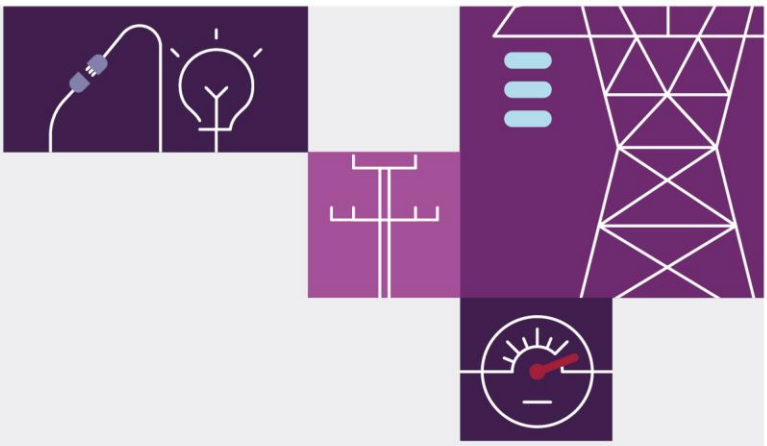
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Participant Forecasting FAQ

August 2023

Frequently asked questions regarding dispatch self-forecasts



Important notice

Purpose

AEMO has prepared this document to provide information about dispatch self-forecasts.

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Version control Version	Release date	Changes
1.0	23/09/2019	Initial release
1.1	25/01/2022	Reduced dispatch SF gate-closure time to 15 seconds (was 70 seconds). Reduced minimum DI threshold required for SF assessment to 60% (was 80%). Updated with additional detail and clarifications
1.2	29/03/2023	Reduced dispatch SF gate-closure time to 10 seconds (was 15 seconds).
1.3	07/08/2023	Included semi-dispatch cap details resulting from bid Max Avail submitted by semi-scheduled generators. Added details regarding self-forecasting assessment for generating units under aggregate dispatch conformance (ADC) arrangements.

AEMO acknowledges the Traditional Owners of country throughout Australia and recognises their continuing connection to land, waters and culture. We pay respect to Elders past and present.

Background

AEMO must prepare a forecast of available capacity for wind and solar generating units (unconstrained intermittent generation forecast (UIGF)) in accordance with NER 3.7B for the purposes of the dispatch, pre-dispatch and projected assessment of system adequacy processes (that is, forecasts for the period 5 minutes to 2 years ahead). When preparing a UIGF, AEMO must consider a number of matters as set out in clause 3.7B(c). AEMO currently uses the Australian Wind Energy Forecasting System (AWEFS) and Australian Solar Energy Forecasting System (ASEFS) as part of this process.

In 2018, a Market Participant Self-Forecasting trial was initiated as a collaboration between AEMO, the Australian Renewable Energy Agency (ARENA) and industry (forecasting service providers, existing and new wind/solar generators) to explore the benefits of self-forecasting unconstrained wind and solar generation. The initial focus of the trial is to determine the relative benefits of using the participant's 5-minute ahead dispatch self-forecast (SF) in dispatch, in preference to the equivalent forecast from AWEFS or ASEFS.

AEMO conducts performance assessments of the dispatch self-forecast according to the Semi-Scheduled Generation Dispatch Self-Forecast - Assessment Procedure.

This document details frequently asked questions regarding the dispatch self-forecast.

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1 FAQs

1.1 General Questions

1.1.1 What is a self-forecast?

- The participant's dispatch self-forecast (SF) is the Semi-Scheduled Generator's forecast, in megawatts, of unconstrained intermittent generation from a semi-scheduled generating unit at the end of the next dispatch interval, subject only to technical factors affecting operation of its generation and connection assets (aka local limits).
- The SF must be referenced to the same location as the agreed dispatch point, which corresponds to the location of the semi-scheduled generating unit's SCADA active power signal used in AWEFS and ASEFS and defined in the relevant ECM.
- The SF must be calculated assuming limits managed by AEMO through the central dispatch process (including applicable distribution or transmission network limits) do not apply at the end of the next dispatch interval.
- The SF must not reflect the Generator's market intentions, with the bidding of price bands used for this purpose.

1.1.2 What self-forecast data is available?

- Self-forecast data is available privately to the relevant participant after each dispatch run via the Data Interchange.
- A subset of that data, for all semi-scheduled generating units, is made available publicly the next day.
- Private data is available in real-time via the DISPATCHIS file, in the MMS Data Model tables: INTERMITTENT_DS_RUN, INTERMITTENT_DS_PRED, INTERMITTENT_FORECAST_TRK.
- These same tables are publicly available the next day in the NEXT_DAY_INTERMITTENT_DS file here, with the MODEL, AUTHORISEDBY and COMMENTS fields omitted. Therefore, it is not possible to identify the forecasts from a specific MODEL, only from a specific participant.

1.1.3 Can participants submit self-forecasts for timeframes other than dispatch?

- No, currently AEMO only accepts dispatch self-forecasts.
- Forecasts for other timeframes such as 5-minute Pre-dispatch (5MPD) will be rejected by the web API.

1.1.4 Can participants submit self-forecasts for non-scheduled generating units?

- No, currently AEMO only accepts dispatch self-forecasts for semi-scheduled generating units.

1.2 Self-Forecast Registration

1.2.1 How do I register to submit SF?

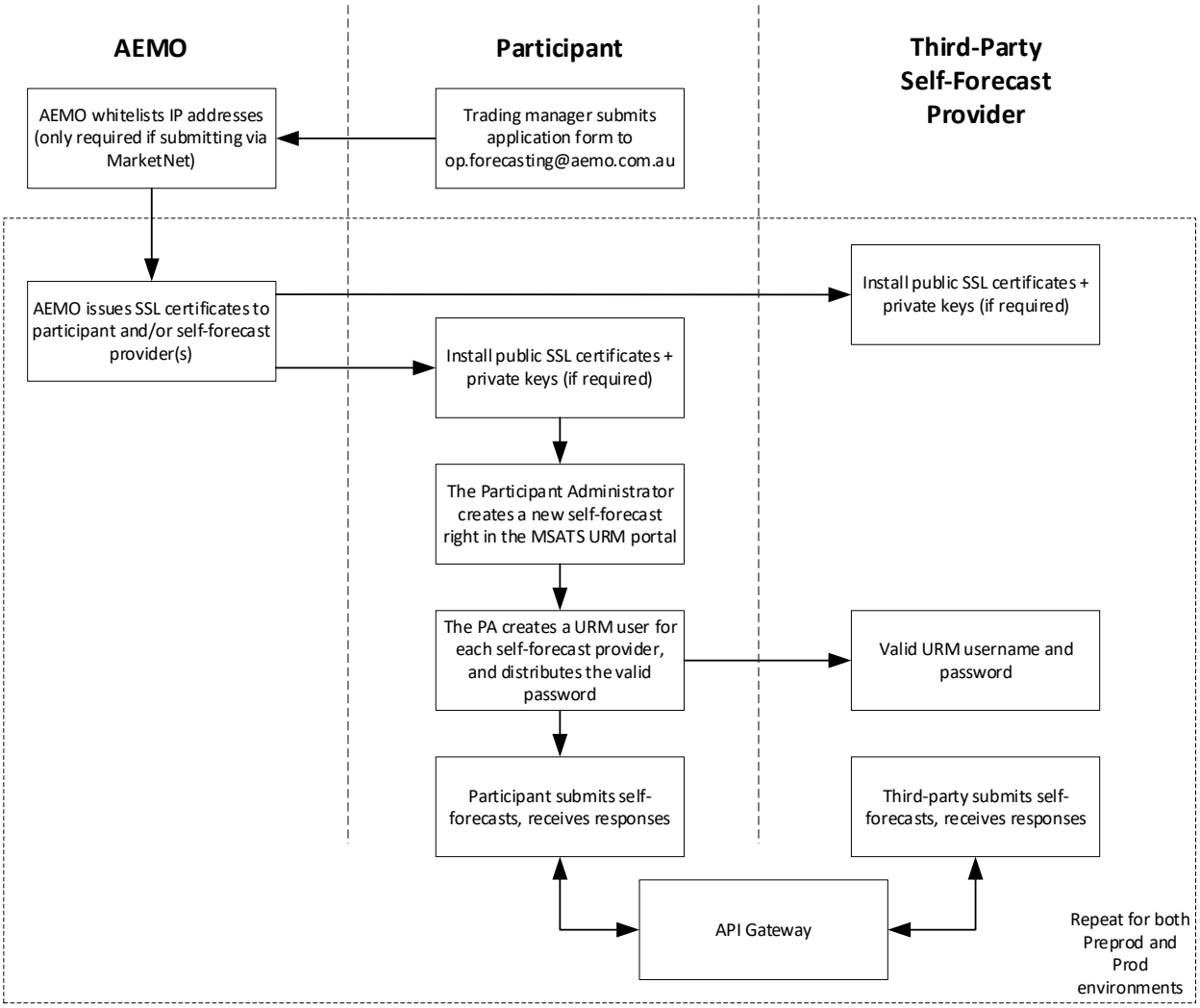
- All requests to register to submit SFs for one or more semi-scheduled generating units belonging to a Participant ID must be made to AEMO using this application form, and sent from the relevant trading manager for that Participant ID via email to: op.forecasting@aemo.com.au.

- Subsequent changes to the registration details (including changes to self-forecast providers, forecasting models, participant contact details) must be made by re-submitting the application to AEMO showing the relevant changes.
- AEMO will approve the application by return email once all the required information is provided, and advise the unique Model for each unit and forecasting model combination to be included in all self-forecast submissions.

1.2.2 How long will IT setup take, and what steps are involved?

- Configuring access to the web API can take several weeks. To minimise the time it takes to provide API access, it is important that information requested in the application form is complete and correct.
- A valid TLS certificate is required to access any of the e-Hub APIs, and a single TLS certificate is issued for each company.
- The steps required are outlined in Figure 1 below, and include:
  - Participant (or nominated self-forecast provider) creates Certificate Signing Request (CSR) for both preproduction and production environments:
    - This action also creates a private key on their machine.
    - A separate CSR is required for each company (i.e. self-forecast provider)
  - Participant submits the CSR text(s) for both preproduction and production environments via the application form.
  - Participant requests specific IP addresses to be whitelisted (only required if submitting via MarketNet).
  - AEMO creates the public TLS certificates for preproduction and production environments and provides these to the participant or relevant self-forecasting provider, and confirms IP addresses have been whitelisted.
  - The Participant Administrator (PA) creates a new User Rights Management (URM) right in the MSATS portal, with access to entity 'MMS_MP5F'.
  - The PA creates specific SF API User accounts for self-forecast providers and grants those users access to that URM right. The PA does this in both preproduction and production environments.
  - The PA ensures that any self-forecast providers who do not have access to MarketNet VPN (and therefore do not have access to the MSATS portal), have been given a valid User password to use. Note these passwords expire every 90 days and must be refreshed.
  - SF API Users submit SF (over Internet or MarketNet) to the API gateway, using:
    - Correct public TLS certificate and associated Private Key for that company.
    - Valid MSATS username and password credentials.
    - Valid headers and payload in API submission.
- More information is available on the API documentation portal.

Figure 1 IT Setup Workflow



1.2.3 Do I need to register for access to the API documentation portal? (https://dev.aemo.com.au)

- No, the SF API documentation and Swagger files are available from this portal without needing to register and login.
- Registration is only required for other APIs, such as B2B which uses access tokens.

1.2.4 What should I do if I want to change third-party self-forecast providers or introduce new forecasting models?

- If a participant wishes to change self-forecast providers or introduce new forecasting models, their trading manager must resubmit the application form to AEMO, noting the changes.
  - The participant can revoke the access of a specific self-forecast provider to submit self-forecasts to the API at any time. To do this, the PA can remove the relevant URM right (which has access to entity 'MMS_MP5F') for the relevant user in the MSATS portal.

1.2.5 How early can I start self-forecasting for a new farm?

- A participant can apply to AEMO for API access as soon as the farm is registered in production, and can submit self-forecasts via the API once access is given.
- However, it is recommended the participant delay requesting AEMO to start the self-forecast initial assessment process until commissioning of the new farm is well advanced, or at least operating beyond the first hold point.

1.3 Self-Forecast Submissions

1.3.1 Is the SF a SCADA value?

- No, the self-forecast is a value submitted by the self-forecast provider via a web API.
- There is no quality flag associated with the self-forecast.

1.3.2 What do I do if my self-forecast is inaccurate?

- The self-forecast provider should actively monitor the reliability of their self-forecasting process and the accuracy of their self-forecasts.
- If a self-forecast provider does not believe their DUID self-forecasts are accurate, they may decide to selectively suppress self-forecasts for one or more or their forecasting models, by:
  - Submitting the self-forecasts, but flagging them as “suppressed”; or
  - Submitting the self-forecast as unsuppressed, but with a lower Priority Number than all other SFs
- AEMO prefers either of the above approaches over the complete cessation of all self-forecast submissions, to facilitate monitoring of self-forecasting systems reliability.
- Dispatch will not use a self-forecast that has been suppressed by the self-forecast provider, and AEMO does not assess the performance of suppressed self-forecasts.
- AEMO control room will not see any self-forecasts suppressed by the self-forecast provider.

1.3.3 How do I know if there is an API outage?

- Submissions are being rejected.
- AEMO Support Hub sends IT notification email to participants. Please contact AEMO Support Hub to request your organisation to be added to this IT bulletin distribution list.
- AEMO issues Market Notices under the category ‘Market Systems’, and anyone can subscribe to these notices here. Participants can also view service status for AWEFS, ASEFS and EMMS here.

1.3.4 What is the Model field in SF submission?

- When AEMO approves a new self-forecast registration, AEMO also assigns the Model ID to the participant for each unique DUID and forecasting model combination
- Model ID is purely generic, but AEMO internally tracks Model ID against the full Model Description provided as part of the self-forecast registration.
- The Model field is not checked for validity during the submission process. However, AEMO requires all submissions to include the assigned Model ID, to assist in comparing the relative performance of forecasting models.

1.3.5 Can I include multiple SF for same DUID, Dispatch Interval and Model in the same submission?

- Yes, but each SF must have a different Priority Number so AEMO can determine which one to use in dispatch and in assessments.
- The unsuppressed SF with the highest Priority Number will be used in dispatch and assessments ahead of unsuppressed SF with lower Priority Numbers
- When making several simultaneous submissions for a dispatch interval which contain the same DUID, ensure that a different Forecast Priority is used, otherwise submissions made in the same second will be rejected.

1.3.6 I am having issues connecting to the API and making a successful SF submission, what should I do?

- If you cannot make a successful SF submission, please contact the AEMO Support Hub with details on the header and payload you attempted to submit, and error message received.
- Please do not contact AEMO control room regarding IT connection issues.

1.3.7 When does my URM user password expire?

- URM user passwords expire 90 days after last update, after which the account locks and submissions will fail. To improve the reliability of the submissions process, AEMO suggests creating a back-up URM user account. In the event of an account lock-out, the self-forecast provider can then switch over to the back-up account to make submissions.
- URM does not provide automatic reminders of upcoming password expiry, therefore providers should set up their own reminders to change passwords on a regular basis.
- The PA has the ability to unlock accounts and reset passwords.
- The ChangePassword API can also be used to refresh passwords before they reach their expiry date, see the API documentation portal for more info on the IdentityService API.

1.4 Self-Forecast Assessment

1.4.1 Why is it necessary to assess SF before being used in Dispatch?

- AEMO seeks to use the most accurate forecasts reasonably available. Before a SF is used in Dispatch, AEMO will assess its performance against the AWEFS/ASEFS forecasts, to provide a reasonable level of assurance that the SF will not provide materially worse inputs to Dispatch than AWEFS/ASEFS.

- For further details, please refer to the Semi-Scheduled Generation Dispatch Self-Forecast - Assessment Procedure.

1.4.2 How do I start the initial assessment process?

- The nominated SF contact requests AEMO via email (op.forecasting@aemo.com.au).
- AEMO will reply and advise the start date of DI ended 0005 hrs the next Tuesday.

1.4.3 If SF is not used in Dispatch, why not assess the latest received submission for the dispatch interval, rather than the submission received at least 10 seconds before the start of the dispatch interval?

- Because later submissions are not guaranteed to be available in time for use in dispatch.
- If this approach were used, the self-forecasts would be systematically assessed with more recent inputs than were otherwise achievable for use in dispatch.

1.4.4 What is a "constrained-off" dispatch interval?

- When the DUID Target < UIGF. This can result from:
  - Binding security constraint.
  - Technical constraints on unit.
  - Economic withdrawal (bidding capacity out of the market, for example during low or negative spot prices).
  - Available Capacity (Availability) < UIGF. This occurs when bid Max Avail < UIGF[1].
- Note that dispatch intervals where the DUID target is constrained by the SCADA Local Limit signal are not considered “constrained-off” intervals, and are included in the assessments.

1.4.5 Other than constrained-off dispatch intervals, what other intervals are excluded from assessments?

- API outages that affect a majority of SF providers.
- Note this will reduce the DIS_TOTAL amount as recorded in the SF assessment summary report.
- AEMO will not retrospectively exclude other specific intervals from the assessment process.

1.4.6 What is an assessable window?

- Forecast performance can be assessed over a particular window (an assessable window) if at least 60% of dispatch intervals over that window satisfy the following criteria:
  - the SF was used in dispatch for the dispatch interval, or AEMO received an unsuppressed SF at least 10 seconds prior to the start of the dispatch interval; and
  - the generating unit’s energy target was greater than or equal to its UIGF (that is, the generating unit was not constrained-off), unless the participant submitted a good quality unit SCADA Possible Power for the dispatch interval.
- The initial assessment has one assessment window, initially 8 weeks but increasing each week up to a maximum of 16 weeks.
- The ongoing assessment has a 1-week, 4-week and 8-week assessment window.

1.4.7 When is the SF used in Dispatch?

- **If NO windows are assessable**, then there is NO CHANGE to the forecast that is currently used as the dispatch UIGF.
- **If at least one window is assessable**, and the SF performs better than the AWEFS/ASEFS forecast on BOTH the MAE and RMSE measures over ANY of those windows, then the SF is used as the dispatch UIGF.
- **If ALL windows are assessable**, and the SF performs worse on EITHER the MAE and RMSE measures over ALL of those windows, then the SF is NOT used as the dispatch UIGF and the AWEFS/ASEFS forecast is used.

[1] A semi-dispatch cap will be set when bid Max Avail < UIGF unless the DUID target (TotalCleared) is greater than the UIGF.

1.4.8 What are the implications of not providing a SCADA Possible Power signal?

- SCADA Possible Power is used as the forecast performance benchmark for dispatch intervals where the unit's target is less than the dispatch UIGF (regardless of whether the UIGF is from AWEFS/ASEFS or from the self-forecast provider).
- If not provided, those dispatch intervals are ignored in the performance assessments, and are not counted in the minimum % of Dis required to perform an assessment.
- If this occurs for more than 40% of Dis over all of the assessment windows, then forecast performance cannot be assessed over those windows on the next Tuesday, and the self-forecast dispatch usage status remains unchanged.
- For example:
  - If the SF is being used as dispatch UIGF at the time of the Tuesday assessments, and forecast performance cannot be assessed over any windows, then the SF continues to be used as the dispatch UIGF and performance is re-assessed the following Tuesday.
  - Conversely, if the SF is NOT being used as dispatch UIGF at the time of the Tuesday assessments and forecast performance cannot be assessed over any windows, then the SF continues NOT to be used as the dispatch UIGF.
  - All this is re-assessed the following Tuesday.

1.4.9 Where can I find the AWEFS/ASEFS UIGF that was used in the assessment?

- This is the UIGF field in the DISPATCHLOAD table of the MMS Data Model Report[2].

1.4.10 How will hybrid generating systems operating under Aggregate Dispatch Conformance (ADC) be assessed?

- The purpose of self-forecasting is to assess the accuracy of a generating unit's self-forecasts relative to AWEFS/ASEFS therefore, generating units within a hybrid generating system operating under ADC will be assessed as per the current SF assessment procedure.
- Both AWEFS/ASEFS and SF will be impacted in the same way by ADC operation and therefore, will be assessed equally with respect to dispatch forecast accuracy.

1.5 Self-Forecast Usage

1.5.1 What SF is used in dispatch?

- The SF that meets the following conditions:
  - Unsuppressed by AEMO.
  - Unsuppressed by self-forecast provider.
  - Latest received of the self-forecasts with the highest Priority Number.
  - Received at least 10 seconds prior to the start of the respective dispatch interval.

1.5.2 Will my SF be used if it misses the 10 second gate closure?

- No, it must be received by AEMO at least 10 seconds before the start of the dispatch interval.
- AEMO recommends that participants submit a single or additional self-forecast earlier (eg. at least 15 seconds before the start of the dispatch interval) to ensure it's used in dispatch.

[2] More information found at https://visualisations.aemo.com.au/aemo/di-help/Content/Data_Model/MMS_Data_Model.htm.

1.6 Self-Forecast Suppression

1.6.1 How does SF suppression work?

- By default, at the start of the initial assessment process all DUID SF will be suppressed by AEMO, which prevents that SF from being used in dispatch. This suppression overrides the suppression/unsuppression flag self-forecast providers use in a submission.
- Once the SF for a DUID has successfully passed the initial assessment process (outlined by the Semi-Scheduled Generation Dispatch Self-Forecast - Assessment Procedure), the SF is unsuppressed by AEMO, allowing future SF submissions to be used in dispatch.
- Each Tuesday (or the following business day if the Tuesday is a public holiday), AEMO assesses the performance of all DUID SFs. If the assessment fails, the SF is suppressed by AEMO until a re-assessment can be performed the following Tuesday.
- AEMO control room suppression results in all DUID self-forecast (from all providers and models) not being used in dispatch until AEMO's next weekly assessment on Tuesday.

1.6.2 What is AEMO control room's process for dealing with a 'suspect' SF value?

- If the self-forecast provider has been submitting self-forecasts that are leading to large dispatch errors, AEMO control room can make a manual assessment that the AWEFS/ASEFS forecast is more accurate in the current conditions and that the self-forecast should be suppressed.
- However, once AEMO control room has suppressed a self-forecast, it cannot be unsuppressed until the following Tuesday when AEMO Operational Forecasting makes its weekly assessments.

1.6.3 Can I suppress my SF before AEMO does?

- Yes, AEMO encourages the SF provider to continually monitor the quality of its self-forecasts and proactively suppress them from use in dispatch if determined to be inaccurate.
- AEMO control room may allow up to two dispatch intervals before suppressing all DUID self-forecasts due to gross error, however this process might be accelerated if power system security is threatened.
  - Inaction by a self-forecast provider in proactively suppressing or de-prioritising its poor DUID self-forecast might disadvantage other self-forecast providers for that DUID that are submitting unsuppressed but lower priority self-forecasts that would otherwise have been used in dispatch (and might have performed better than AWEFS/ASEFS).
  - Even if AEMO suppresses the DUID self-forecast before the SF provider, the SF provider should still suppress or de-prioritise any self-forecasts that they don't want to be used in dispatch and don't want AEMO to include in their weekly performance assessment the following Tuesday. Inaction here could result in a failed self-forecast performance assessment and continued AEMO suppression.
  - Please do not contact AEMO control room regarding self-forecast suppression or unsuppression. If there are any concerns, please email op.forecasting@aemo.com.au.

1.6.4 Can I retrospectively suppress my SF?

- No, suppression is via SF submissions which are always for the next dispatch interval.
- Any submissions outside the next dispatch interval are invalid, rejected and not loaded into the AEMO database.

1.6.5 How do I know if AEMO has suppressed/unsuppressed my SF?

- If the participant has subscribed to the 'AUDITLOG_MP5F_FORECAST' file in Data Interchange through the Markets Portal, they will immediately receive a file that confirms suppression of the self-

forecast, and the reason for suppression (either 'GROSS ERROR' if suppressed by AEMO control room, or 'PERFORMANCE' if suppressed during the Tuesday performance assessment). The AUDITLOG_MP5F_FORECAST file is not produced when the SF is unsuppressed.

- The private DISPATCHIS file sent to participants after each dispatch run will also reflect which forecast is used in the INTERMITTENT_FORECAST_TRK table. This information is publicly available the next day from here.

1.6.6 Why does AEMO's SF suppression/unsuppression sometimes not take effect immediately in the next dispatch run?

- AEMO's suppression of all DUID self-forecasts only applies to self-forecasts received after that suppression.
- The suppression does not retrospectively apply to self-forecasts previously received during that dispatch interval, which can still be used in dispatch for that interval and used in SF assessments.

2 Further information

Further information on participant forecasts and intermittent generators can be found here:

1. Semi-Scheduled Generation Dispatch Self-Forecast - Assessment Procedure: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/Semi-Scheduled-Generation-Dispatch-Self-Forecast---Assessment-Procedure.pdf
2. API documentation portal: https://dev.aemo.com.au
3. Solar and wind energy forecasting: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Solar-and-wind-energy-forecasting.
4. Market Participant 5-Minute Self-Forecast: https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Other-meetings/Market-Participant-5-Minute-Self-Forecast.
5. How semi-scheduled generators operate in dispatch: https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3705-dispatch.pdf.
6. Intermittent Generator Forum: https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Other-meetings/Intermittent-Generator-Forum.
7. NEM Operational Forecasting and Dispatch Handbook for wind and solar generators: https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/dispatch/policy_and_process/nem-operational-forecasting-and-dispatch-handbook-for-wind-and-solar-generators.pdf
8. ARENA Short Term Forecasting Funding Announcement FAQs: https://arena.gov.au/assets/2018/04/short-term-forecasting-faqs.pdf

Glossary

Term	Definition
Term	Definition
5MPD	5-minute Pre-dispatch
API	Application Programming Interface
ASEFS	Australian Solar Energy Forecasting System
AWEFS	Australian Wind Energy Forecasting System
B2B	Business-to-Business
CSR	Certificate Signing Request
DUID	Dispatchable Unit Identifier
ECM	Energy Conversion Model
EMMS	Electricity Market Management System
IP	Internet Protocol (address)
Max Avail	Maximum Availability in the energy bid
MMS	Market Management System
MSATS	Metering, Settlements and Transfers Solution
NER	National Electricity Rules
PA	Participant Administrator
SCADA	Supervisory Control and Data Acquisition
SF	Dispatch Self-Forecast
TLS	Transport Layer Security
UIGF	Unconstrained Intermittent Generation Forecast
URM	User Rights Management
VPN	Virtual Private Network