GUIDE TO VAR DISPATCH

PROVIDES DETAILS ABOUT USING THE VAR DISPATCH INTERFACES

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AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

IMPORTANT NOTICE

Purpose
This Guide to Var Dispatch, prepared by AEMO, provides guidance for market participants about its use under the National Gas or Electricity Rules (Rules), as at the date of publication.

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Notes
This guide provides an understanding of VAr Dispatch and how to use it. It describes the use of all interfaces but it's primary purpose is to explain how to use it in the EMMS Web Portal.
Version 0.07 is updated for Swaps, Caps & Floors.

Documents made obsolete
The release of this document changes the version of Guide to Var Dispatch and EMMS Reallocations User Interface Guide.

Further Information
For further information, please visit AEMO's website www.aemo.com.au or contact AEMO's Information and Support Hub, Phone: 1300 AEMO 00 (1300 236 600) and follow the prompts. Email: supporthub@aemo.com.au.

CONTENTS

GLOSSARY

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AEMC
Australian Energy Market Commission

AEMO
Australian Energy Market Operator

AEST
Australian Eastern Standard Time

ControlNet
AEMO's SCADA system

CSV
Comma-separated values; a file format for exchanging data

DI
Data Interchange

EMMS
Wholesale Electricity Market Management System; software, hardware, network and related processes to implement the energy market.

EMS
Energy Management System

Energy Market Systems Web Portal (Web Portal)
Single web portal interface to access AEMO's IT systems

FTP
File transfer protocol

MarketNet
AEMO's private network available to participants having a participant ID

MSATS
Retail Market Settlement and Transfer Solution

MW
Megawatt

NEM
National Electricity Market

NER
National Electricity Rules; also often just called the Rules

NOS
Network Outage Scheduler; used for the programming and scheduling of transmission equipment outages

NSP
Network Service Provider (TNSP and DNSP for Transmission and Distribution respectively)

PA
participant administrator

Participant ID
Registered participant identifier

Pre-production
AEMO's test system available to participants

Production
AEMO's live system

RPO
Reactive Plant Operator; Generators and Network Service Providers (NSPs) operating reactive plant in accordance with reactive plant dispatch instructions from the AEMO control centres.

SCADA
Supervisory Control and Data Acquisition

URM
User Rights Management; see the Guide to URM on AEMO's website

VAr
Volt-Ampere reactive power, relating to voltage control in the power system

VDS
VAr Dispatch Scheduling; the system that produces instructions for reactive plant

ABOUT THIS GUIDE

Purpose

This guide provides an understanding of VAr Dispatch and how to use it. It's primary purpose is to describe how to use it in the EMMS web portal.

Additional interfaces for are described in Data Interchange software on page 13.

Audience

The primary audience for this guide is Reactive Plant Operators (RPOs) requiring an understanding of VAr Dispatch and how to use it.

The secondary audience is participant administrators wanting to know the user rights management (URM) entity to grant for participant users to access VAr Dispatch.

What's in this guide

- About VAr Dispatch on page 2 explains what it is for, who can use it, how it is used, and how to access it.
- Using the VAr Dispatch Web Portal on page 6 explains the various elements on the VAr Dispatch web interface and its data.
- Needing Help on page 16 provides information to assist you with IT related issues and provides guidance for requesting assistance from AEMO.

How to use this guide

- If you require more technical VAr Dispatch details, see the VAr Dispatch Participant Interfaces 2016 Technical Specification.
- Text in this format indicates a link to a resource on AEMO's website.

For easy reading, this guide is written in plain language. If there is a discrepancy between information or a term in this document, the Rules and procedures take precedence.

ABOUT VAR DISPATCH

In this chapter:

What VAr Dispatch is for

VAr Dispatch is a term used for issuing instructions to achieve stable voltage control of the electricity grid. These instructions typically request changes to reactive plant (such as, capacitors, reactors, and generating units), to increase or decrease the VAr contribution to the grid.

The purpose of VAr Dispatch is to introduce productivity gains in the National Electricity Market (NEM) control rooms by providing a systematic approach to voltage control. The approach allows for operation of voltages at higher levels, potentially reducing losses on the transmission system.

RPO basic functional requirements

As a minimum, RPOs need:

1. One or more displays to show the instructions and conformance status sent by AEMO.
2. The ability to change the availability status of the plant and communicate the status to AEMO.
3. The ability to implement the instructions, for example, execute required changes to the reactive plant (such as: switching, setpoint control, or tap changes).

Who can use VAr Dispatch web interface

The intended recipients of VAr dispatch instructions, relating to reactive power devices, are:

- Generator control rooms and network operators (RPOs), who control the reactive power devices.
- Generator traders may also be interested in viewing VAr instructions.

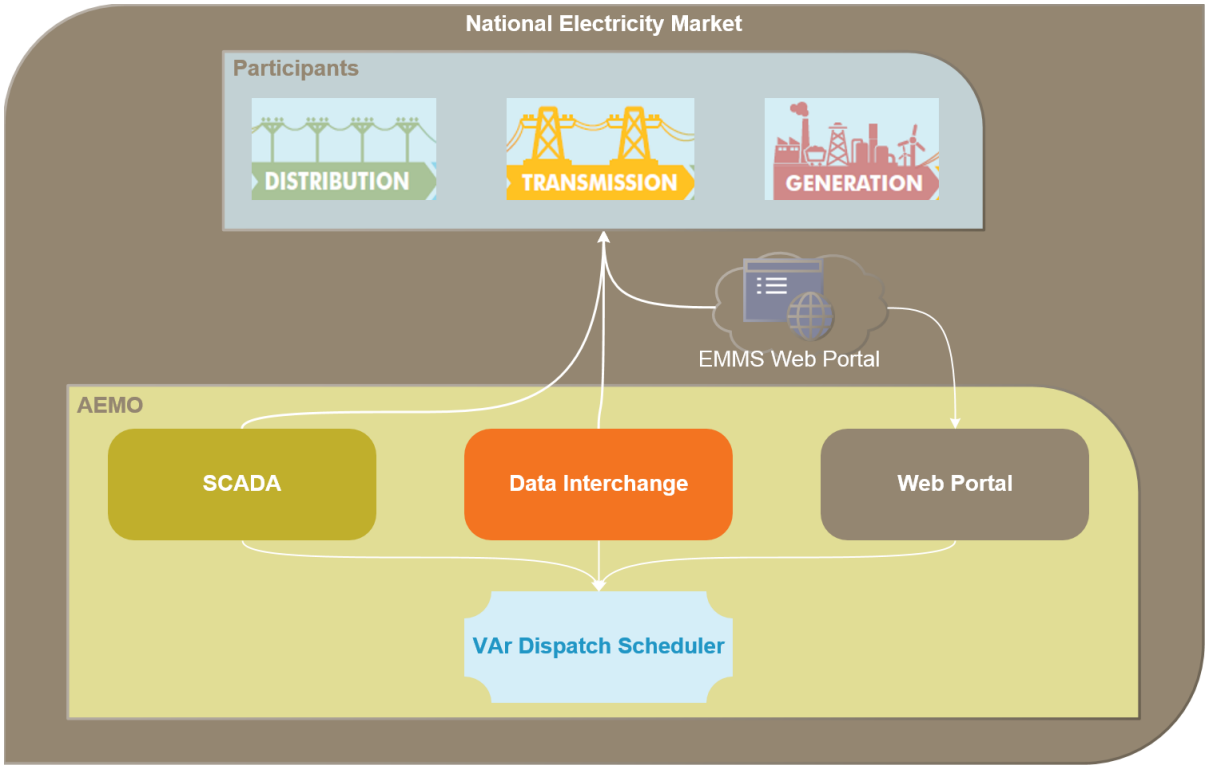
VAr Dispatch interfaces

RPOs can use any of the following interface options to receive electronic instructions:

1. The **VAr Dispatch web interface** in the EMMS Web Portal is a low cost option needing only a web browser with MarketNet access, see Web Portal interface on page 5.
2. **Data Interchange (DI) software** is a low cost option providing a file, similar to the MW instructions currently received by many participants. AEMO expects most generators will use DI software to receive VAr Dispatch instructions, see Data Interchange software on page 13
3. **ControlNet** is typically used between AEMO and TNSPs. Some generators are connected to ControlNet but electronic instructions are sent directly to the TNSP, not the generator. Be aware that some TNSPs impose a service charge on generator's RPOs seeking a SCADA option, see ControlNet (SCADA) on page 15.

Participants' can choose their preferred interface for the receipt of VAr Dispatch instructions. Any of the interface methods are available for participants to use. Interfacing costs are borne by each RPO.
The EMMS interfaces are not two-way communication mechanisms and cannot be used by participants to inform AEMO of device availability, see Reactive device availability on the next page.

Figure 1 VAr Dispatch interface options



Reactive device availability

There are three options available to submit plant availability information:

1. ControlNet (SCADA) interface.
2. AEMO's Network Outage Scheduler (NOS) for periods when the plant is unavailable (excluding generators).
3. Verbal advice to the AEMO control room. This option is only for devices that rarely require communicating their unavailability and is at AEMO's discretion.

For more details about using any of the above options, see VAr Dispatch Participant Interfaces 2016 Technical Specification.

VAr Dispatch pre-conditions

RPOs can follow these rule to maximise their use of VAr Dispatch:

1. Test and confirm your chosen interface is receiving VAr electronic instructions.
2. Check and confirm the VAr electronic instructions are delivered to the people who will action them.
3. Ensure operational and technical staff of RPOs are familiar and trained in the relevant areas of the VAr Dispatch Scheduling System (VDS).

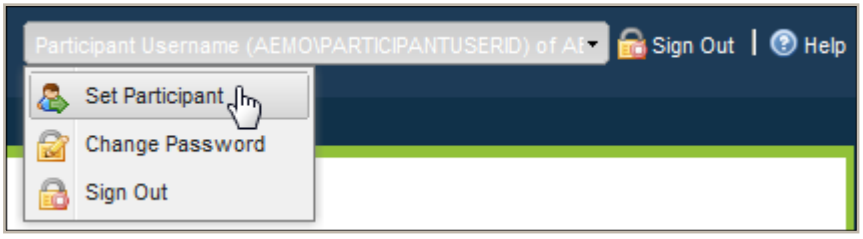
WEB PORTAL INTERFACE

Environments

The web portal has both pre-production and production environments.

Set Participant

You can see information for other participant IDs you have permission to access, using the Set Participant function. This function allows you to act for another participant without having to log out, change IDs, and log in again. For permission to see other participant IDs using Set Participant, see your company's PA.



Web portal requirements

The only requirement is access to the web portal, no changes are required to participant systems. You need:

- A user ID and password provided by your company's participant administrator (PA) who controls access to AEMO's web portals. For more details see Guide to User Rights Management (URM).
- The website address where the application is located on AEMO's network, see Accessing the VAr Dispatch web interface on the next page.
- Microsoft Internet Explorer (IE) version 9 or later (IE version 10 Compatibility View is not supported). Chrome is also a viable option.
- A monitor capable of 1024 x 768 screen resolution.
- Access to MarketNet, for more details, see Guide to Information Systems.

VAr Dispatch runs on both Windows and Unix-like operating systems.

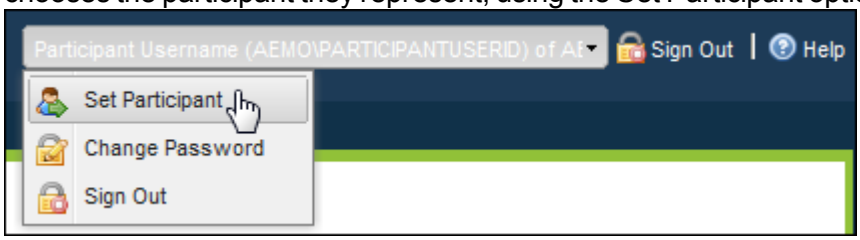
User rights access

Your company's participant administrator (PA) grants you permission to use VAr Dispatch in the MSATS Web Portal.

The entity required for access is:

- EMMS - Mvar Webpage

Where a user has user rights assigned by more than one participant, the user interactively chooses the participant they represent, using the Set Participant option in the Web Portal.



For help with user administration and the Set Participant option, see Guide to User Rights Management.

Accessing the VAr Dispatch web interface

1. Using your web browser, access the energy market systems web portal, either:
    - Pre-production: https://mms.preprod.nemnet.net.au
    - Production: https://mms.prod.nemnet.net.au
2. Sign in using the user ID and password provided by your company's PA.
3. On the top menu, click **System Security**, and then **View Var Dispatch**.

The EMMS web portal provides you with a clear indication of the environment you are working in by providing a different background colour behind the participant identifier bar located beneath the menu bar. The production environment has a navy background and the pre-production environment has a green background (see).

Figure 2 EMMS web portal home page

Using the VAr Dispatch Web Portal

In this chapter:

The VAr Dispatch web interface displays the latest instructions issued by the VAr Dispatch Scheduling System (VDS), illustrated in Figure 3 and Figure 4. Table 1 explains the information in the interface.

Figure 3 VAr Dispatch web interface

Figure 4 Non conforming devices

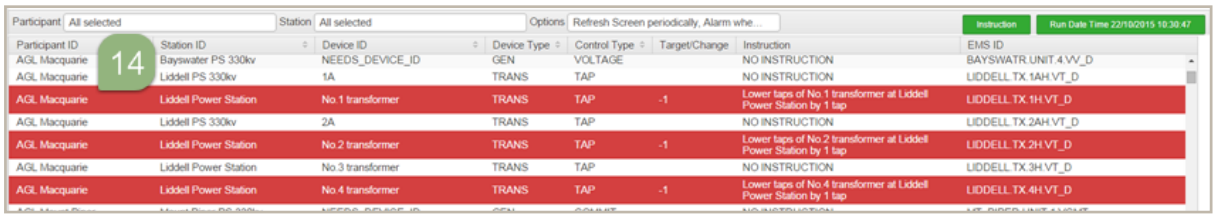


Table 1 VAr Dispatch interface elements

No.	Interface element	Description
1	Participant filter	A list of RPO participant's preferred names (see page 8)
2	Station filter	A list of all station names in the most recent instructions file (see page 9)
3	Options filter	(see page 10)
4	Instructions	Informs participant users if instructions are currently active or a signal file is issued to clear instructions (see page 11)
5	Run date time	The date and time of the latest VDS run (see page 11)
6	Participant ID	The participant's preferred name for the RPO
7	Station ID	The company or participant's preferred name for the substation where the equipment is located
8	Device ID	The company or participant's preferred name for equipment
9	Device Type	Either REACTOR, CAPACITOR, GEN, SVC, TRANS or GENGRP but can extend to other types

No.	Interface element	Description
10	Control Type	The type of issued control
11	Target/Change	Instruction for the device for this interval – null denotes no instruction
12	Instructions	Detailed summary instruction
13	EMS ID	The unique identifier that matches equipment names between NOS and EMS (for reference within AEMO)
14	Non-conforming device	Non-conforming devices are highlighted in red

Participant filter

The participant filter (see below) displays a list of RPO participant's preferred names for the most recent instructions.

Using the filter

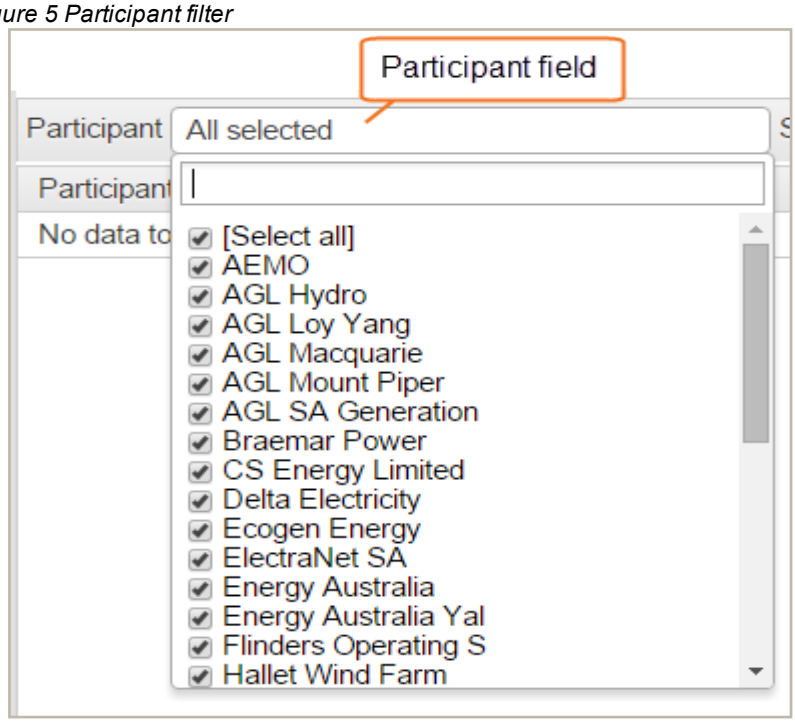
To filter the instructions for specific participants:

1. Click the **Participant** field.
2. In the participant list, select or deselect the checkboxes.
   The filter automatically applies as you select or deselect.

To hide the participant list:

- Click the **Participant** field.

Figure 5 Participant filter



Station filter

The Station filter (see Figure 6 below) displays a list of all station names in the most recent instructions file. It populates dynamically with the stations operated by the participants selected in the participant filter (see Figure 1). Stations are grouped by participant, with the participant name shown in bold.

Using the filter

To filter the instructions displayed on the screen for specific stations:

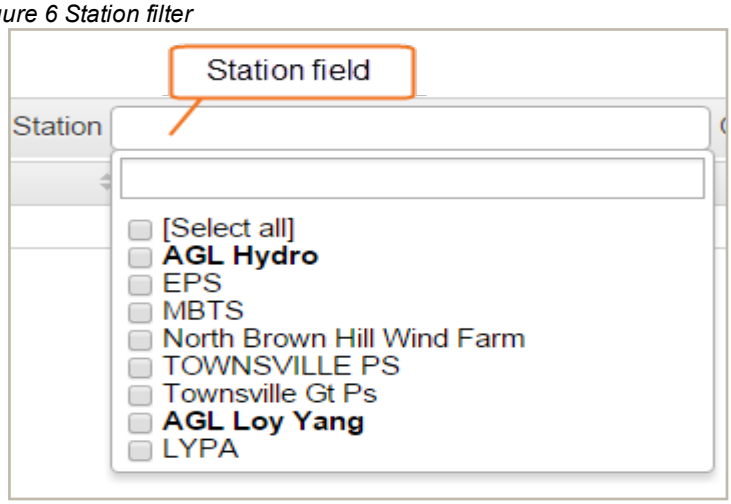
1. Click the **Station** field.
2. In the station list, select or deselect the checkboxes.
   The filter automatically applies as you select or deselect.

Clicking the participant name in the station list selects or deselects stations listed for that participant group.

To hide the station list:

- Click the **Station** field.

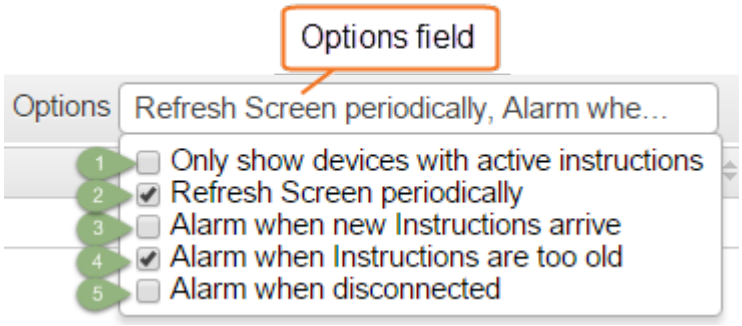
Figure 6 Station filter



Options filter

The options filter (see Figure 7 below) displays a list of choices for interacting with the VAr Dispatch interface.

Figure 7 Options filter choices



Using the filter

To apply the active instructions filter:

1. Click the **Options** field.
2. Select one or more options.
   The filter automatically applies as you select or deselect.

To hide the options list:

- Click the **Options** field.

Table 2 Options filter choices explained

No.	Option	Description
1	Only show devices with active instructions	Filters the interface, displaying only devices with active instructions. Inactive instructions are identified by the words NO INSTRUCTION in the Instruction field.
2	Refresh screen periodically	The automatic screen refresh option triggers the interface to periodically check for new instructions for a set time interval. On first selection, a disclaimer explains that this option prevents the session from time-out and automatic log off that can potentially expose the computer to unauthorised access. Accepting, the disclaimer prevents it from re-appearing during future visits using the same computer. By default, all three alarm options are selected. For more details about alarm options, see the 3 alarm options below. **To manually refresh the screen, click the refresh button on your browser.**
3	Alarm when new instructions arrive	This option triggers an audible alarm when it detects the web browser receives new active instructions (target is not null), for one or more devices on the screen. The check occurs with each page refresh, so the option is only active if the automatic screen refresh option is selected
4	Alarm when Instructions are too old	This option triggers an audible alarm when it detects that the instructions displayed on the screen have exceeded their expiry time. The expiry time is determined by the time elapsed since the Run Date Time of the instructions. This check occurs with each page refresh, so this option is only active if the automatic screen refresh option is selected
5	Alarm when disconnected	This option triggers an audible alarm when the web browser detects a loss of connectivity with the web portal server. The check occurs with each page refresh, so the option is only active if the automatic screen refresh option is selected

Alarm options trigger when the browser refreshes, so if an alarm option inactive, select **refresh screen periodically**.

Interface instructions and run date time

The instruction status informs participant users if instructions are currently active or a signal file is issued to clear instructions. The run date time displays the date and time of the latest VDS run. Table 3 summarises the interface instructions according to the scenario.

Table 3 Summary of screen instructions

Scenario	Instructions displayed	Instruction status message and colour	Run date time colour
New instructions issued	Yes	Instruction	Run Date Time 22/10/2015 10:30:47
Instructions exceeded expiry time limit	No	Instructions expired	Run Date Time 22/10/2015 08:47:45
Signal issued	No	No Instructions	Run Date Time 22/10/2015 10:30:47
Signal exceeded expiry time	No	No Instructions	Run Date Time 22/10/2015 08:47:45
Instruction or signal exceeded system error warning time limit	No	Experiencing Delays	Run Date Time 22/10/2015 08:13:47
Web browser lost connectivity to the web portal server	No	Error: unable to contact server	Run Date Time 22/10/2015 08:13:47

DATA INTERCHANGE SOFTWARE

This section describes the basic requirements for using the Data Interchange (DI)software to receive VAr Dispatch instructions. For more details about DI and setting up a DI environment, see Concise Guide to Data Interchange and Setting up a Standard Data Interchange Environment.

Environments

DI has both pre-production and production environments.

Data Interchange requirements

Successfully implementing and managing Data Interchange requires good IT skills, including networking, database management, batch file management, and disaster recovery.

To use Data Interchange (DI) requires:

- Access to MarketNet; if your company is a registered participant, you probably already have access because it is set up during the registration process, for more details, see Guide to Information Systems.
- A Participant ID and password, provided by your company's participant administrator (PA). PAs are set up during the registration process, if you don't know who your company's PA is, contact AEMO's Information and Support HubEmail: supporthub@aemo.com.au.
- A DBMS supporting the MMS Data Model. The MMS Data Model supports versions of Oracle and Microsoft SQL Server.
- A Java runtime engine suitable for the target DBMS. The distribution file from AEMO contains supported JDBC drivers for Oracle and SQL Server.
- The Replication Manager software runs on Windows OS only, other DI components run on both Windows and Unix-like operating systems.

Setting up Data Interchange

To set up DI to use VAr Dispatch:

1. Set up a Data Interchange environment with the latest MMS Data Model, see Setting up a Standard Data Interchange Environment.
2. Subscribe to the MMS Participant Data Model package VAR_DISPATCH. For help, see MMS Data Model Subscription Services User Guide.

3. Develop functionality to retrieve and interpret the new VAr Dispatch datasets, including dispatch instructions, synchronising signal and conformance flags.
4. Provide the RPO control room with one or more displays for viewing instructions and conformance.

The DI packages and tables required for VAr Dispatch are:

Type	Name	Description
Package	VOLTAGE_INSTRUCTIONS	voltage instructions
Table	VOLTAGE_INSTRUCTION_TRK	tracking for voltage instructions (parent records)
Table	VOLTAGE_INSTRUCTION	data for voltage instructions (child records)

For detailed data definitions, see the MMS Data Model Report v4.25.
For details about AEMO's CSV format, see Technical Guide to Electricity IT Systems.
For help subscribing to files, see MMS Data Subscription Services User Guide.

Accessing the Data Interchange software and guides

You can find Data Interchange software and associated documentation in the following locations:

5. Releases directory on the participant file share: FTP to 146.178.211.25 > Data Interchange, pdrBatcher, pdrLoader, or Replication Manager.
6. Data Subscription web application in the energy market systems web portal:
   - Production: https://portal.prod.nemnet.net.au
   - Pre-production: https://portal.preprod.nemnet.net.au
3. IT Systems & Change web page on AEMO's website.

CONTROLNET (SCADA)

ControlNet is typically used between AEMO and TNSPs and is the most expensive interface option. Some generators are connected to ControlNet but electronic instructions are sent directly to the TNSP, not the generator. Be aware that some TNSPs impose a service charge on generators RPOs seeking a SCADA option.

Environments

SCADA only has a production environment.

ContolNet (SCADA) requirements

AEMO can only directly deliver electronic instructions by SCADA to RPOs connected to ControlNet. RPOs wanting to use SCADA to interface with VAr Dispatch must have the necessary ControlNet access arrangements in place.

Setting up and using Scada is out of scope for this guide, for more details contact AEMO's Information and Support Hub.

NEEDING HELP

AEMO's Information and Support Hub

Assistance is requested through AEMO's Information and Support Hub using one of the following methods:

- Phone: 1300 AEMO 00 (1300 226 600) and follow the prompts.
- Email: supporthub@aemo.com.au
- The Customer Portal, http://helpdesk.preprod.nemnet.net.au/nemhelplite/ allows you to log your own requests for assistance. For access credentials, see your organisation's IT security contact or participant administrator.

For non-urgent issues, normal coverage is 8:00 AM to 6:00 PM on weekdays, Australian Eastern Standard Time (AEST). AEMO recommends participants call AEMO's Information and Support Hub for all urgent issues, whether or not you have logged a call in the Customer Portal.

Information to provide

Please provide the following information when requesting assistance from AEMO:

- Your name
- Organisation name
- Participant ID
- System or application name
- Environment: production or pre-production
- Problem description
- Screenshots

For AEMO software-related issues please also provide:

- Version of software
- Properties or log files
- Replication Manager support dump and instance name (if Data Interchange problem)

Feedback

Your feedback is important and helps us improve our services and products. To suggest improvements, please contact Email: supporthub@aemo.com.au.

INDEX