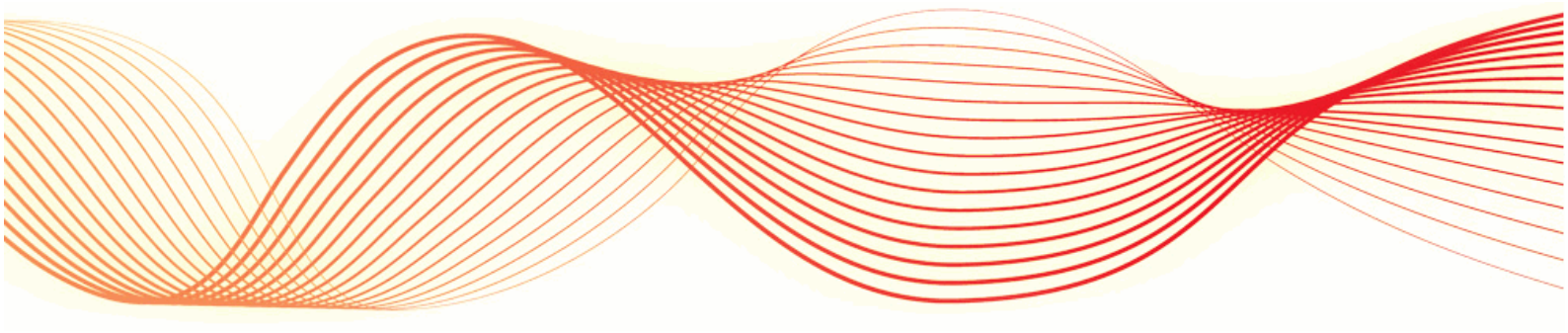

INDUSTRY GUIDE TO THE STTM V3.6

5 NOVEMBER 2015

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

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Document Changes

Changes from version 3.4		
Version	**Date**	**Changes**
3.5	**December 2014**	Updated document to incorporate the STTM deviations and the settlement surplus and shortfall changes to the STTM Procedures: • Section 14.3.3: new average MOS cost, new deviation prices, updated deviation charges and payments calculation. • Section 14.3.7: updated shortfall charges calculation, settlement calculations example, figure 14-1.
3.6	N**ovember 2015**	Updated document to incorporate the STTM Contingency Gas Evidentiary Changes: • Section 9.2 Contingency gas bids and offers • Section 14.3.5A: Ad Hoc Charges for Contingency Gas Resettlement • Section 14.3.5B: Ad Hoc Payments for Contingency Gas Resettlement

Preface

This document describes the operation of the Short Term Trading Market (STTM). An abbreviated version of this guide is also available. A glossary of terms is provided with this document.

Examples are introduced progressively through this guide to demonstrate the terms and concepts discussed. The examples do not deal with all possible outcomes, but are provided to assist with the reader's understanding of the core functions of the STTM. The examples are based on a common market scenario, which, when considered in their entirety, describe the overall bid-to-bank process.

Further Information

For further information, please visit www.aemo.com.au or contact the AEMO Support Hub:

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Abbreviations and Symbols

Abbreviation	Term
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
APC	Administered Price Cap
BP	billing period
CG	contingency gas
CP	cumulative price
CPT	Cumulative Price Threshold
CRN	contract registration number (for an RFS)
CTM	custody transfer meter
CTP	custody transfer point
D, D+n, D-n	An action performed on, n days after, or n days before gas day D with respect to gas day D; for example, the ex ante market price calculated on D-1 is for gas day D. This is different to the variable d, which is used in equations to mathematically represent a gas day.
EAMS	ex ante market schedule
GJ	gigajoule is a unit of measure of energy equal to 10^9 joule
GLMG	Gas Market Leaders Group
MCC	MOS cost cap
MCE	Ministerial Council on Energy
MMP	Minimum Market Price
MOS	market operator service
MPC	Market Price Cap
MSV	market schedule variation
NGL	National Gas Law
NGR	National Gas Rules
PFDC	pipeline flow direction constraint
RMO	retail market operator
RFS	registered facility service
T, T+n, T-n	The start of the gas day at a hub in EST, n hours after, and n hours before
SPA	scheduling and pricing algorithm
SPE	Scheduling and Pricing Engine
SPI	Scheduling and Pricing Interface
STTM	Short Term Trading Market for natural gas
TJ	terajoule is a unit of measure of energy equal to 10^{12} joule
TRN	trading right number
TCU	transmission-connected user

1 Introduction

1.1 What is the STTM?

The Short Term Trading Market (STTM) is a market for the trading of natural gas at the wholesale level at defined hubs between pipelines and distribution systems. The STTM currently operates three hubs—Sydney, Adelaide, and Brisbane—but has been designed to handle additional hubs in the future. Each hub is scheduled and settled separately, but all hubs operate under the same rules. At any hub, there can be multiple facilities that deliver gas to the hub (such as transmission pipelines, storage facilities, and production facilities) and multiple distribution systems that deliver the gas from the hub to consumers.

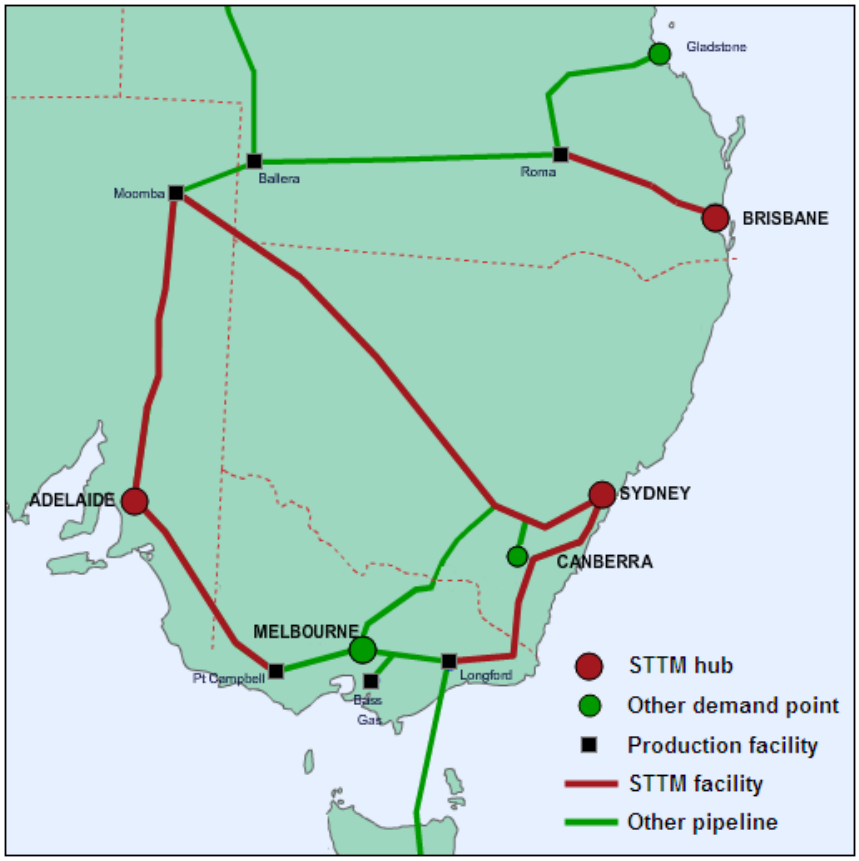

Figure 1-1 STTM hubs and facilities

All gas supplied through a hub is transacted in the STTM, including gas that is supplied under existing long-term contracts. Gas is traded a day ahead of the actual gas day, and the day-ahead price ("ex ante market price") is applied to all gas that is supplied according to the market schedules through the hub on the gas day. A market price is set each day at each hub for clearing all trades in the ex ante market. Anyone with the necessary agreements and authorities is able to buy and sell gas in the STTM. Previously, a retailer might purchase gas directly from a producer and pay someone to deliver its gas to the network. With the STTM, "shippers" deliver gas to be sold in the market, and "users" buy gas for delivery to consumers. The same organisation might sell gas into the market and purchase gas from the market, but it does so at the daily market price, and it offers gas for sale under the same terms as any other shipper, and buys gas under the same terms as any other user. But it's not "its gas" anymore. If an organisation has gas that is excess to its requirements, it can sell the gas the

next day on the open market. Or, if demand is higher than expected, it can bid to purchase the extra gas, when and if it needs to. This gives participants more choice in purchasing gas supplies.

Furthermore, price transparency ensures that the price of gas set daily by the market properly reflects the true supply-and-demand situation, which in turn provides a more reliable price indicator for future investment in production, transmission, and distribution infrastructure.

1.2 Important features of the gas supply system

The STTM brings several important features to how gas supply systems function, which arise from the creation of an open market with transparent pricing and a systematic approach to system balancing and security.

- Gas is traded a day ahead of the actual gas day, and the day-ahead price ("ex ante market price") is applied to all gas that is supplied according to the market schedules through the hub on the gas day. A market price is set each day at each hub for clearing all trades in the ex ante market.
- The market provides financial incentives for participants to keep to their schedules, and, by doing so, provides financial drivers for keeping the gas supply system balanced. There is also provision in the regulations requiring trading participants to act in "good faith" consistent with the principles of the market.
- Bids and offers are scheduled on price to deliver the maximum benefit to the market as a whole. And when required, the market ensures that firm shippers are compensated when non-firm, lower priced shippers use the capacity that they have funded.
- Mechanisms for balancing flows to and from the hub are now part-and-parcel of the normal, daily operation of the market, and system security events are resolved systematically using a well-defined set of procedures.

Importantly, the STTM delivers these benefits without disrupting the long-standing arrangements by which the gas supply industry manages the supply system. In particular:

- AEMO only operates the market and has no involvement in how production facilities, transmission pipelines, storage facilities, and distribution networks are operated. These facilities continue to be operated and scheduled by their owners without interference.
- The fundamental contract carriage arrangements on which the industry is based are preserved. Furthermore, the contractual arrangements between pipeline operators and shippers for haulage priority and contracted capacities are recognised in the STTM and form the basis for the trading rights issued by AEMO by which all gas is bought and sold.
- And although AEMO plays a key role in assessing and resolving system security events, it is not responsible for system security, which remains the responsibility of the operators. Indeed, the resolution of system security events depends on current industry practice. AEMO assists the operators by providing a commercial framework for compensating the participants who respond to the event and by coordinating the industry's response to such events.

1.3 The STTM at a glance

The main functions and features of the STTM are listed below and are described in later sections:

Scheduling and pricing

- AEMO issues two- and three-day-ahead outlooks.
- AEMO issues day-ahead market schedules by accepting offers in increasing price order and bids in decreasing price order while respecting constraints.
- Shippers nominate gas quantities to pipeline operators.
- Pipeline operators issue pipeline allocations to shippers.
- AEMO issues distribution system allocations to users.

Deviations and variations

- Shippers submit intraday renominations to pipeline operators.
- Shippers and users submit bilateral market schedule variations.
- The market provides commercial incentives for participants to forecast accurately and to follow their schedules and so avoid the added costs of variations and deviations.

Capacity payments

- When a pipeline is constrained, the market ensures that firm shippers are compensated when non-firm, lower priced shippers use the capacity that they have funded.

Market operator service (MOS)

- AEMO provides an on-the-day service that balances the difference between scheduled pipeline flows and what is actually delivered.
- MOS gas is paid according to a contracted price based on a quarterly tendering process.
- Balancing is part-and-parcel of the daily functioning of the market.
- MOS is primarily funded by those who deviate from their schedules.

Contingency gas

- AEMO balances physical demand and supply when the normal balancing mechanisms are not sufficient.
- Procedurally driven and based on current industry practice.
- Caters for both under- and over-supply situations.
- Contingency gas is primarily funded by those who deviate from the schedule.

Price limits

- Limits that safeguard participants are applied on market prices and charges.

Settlement

- AEMO manages and monitors the settlement process across all hubs.

1.4 Market governance

There are three levels of regulatory instrument associated directly with the STTM: law, rules, and procedures. These instruments, combined, provide the statutory basis for governing conduct in the STTM.

The STTM is authorised by the National Gas Law (NGL), which establishes head-of-power authorities for the STTM, governance of that market, the functions of AEMO in the STTM, and the relevant liabilities of AEMO and other participants.

The rules authorising and controlling conduct in the STTM are part of the National Gas Rules (NGR). Amendments to the NGR are the responsibility of the Australian Energy Market Commission (AEMC) in accordance with existing rule-change procedures in the NGL. Compliance with the NGR and relevant instruments will be monitored and enforced by the Australian Energy Regulator (AER).

AEMO is responsible for the formal market procedures (STTM Procedures) that cover matters of a technical or procedural nature, as required by the NGR. The process by which AEMO makes and amends the market procedures is specified in the NGR.

1.5 A typical gas day

The following descriptions refer to market operations on a particular gas day D, including activities that occur before (D-) or after (D+) the gas day. The symbol D-1 refers to an action taken one day before gas day D with respect to gas day D. For example, the "day-ahead" price for gas day D is calculated on D-1. This nomenclature is different to the symbol d-1, which means, simply, "the day before gas day d." For example, if the last gas day of a billing period is d, a preliminary statement is issued on d+7.

Similarly, the timing of a market activity is specified in relation to the gas day start time (T), which varies between hubs. Hence the expression “T+5” means “5 hours after the gas day start time.”

The main features of the STTM for balancing gas at the hub are described below, including STTM schedules, prices, processes, and arrangements, but the commercial arrangements for scheduling of pipelines and settlement under contracts external to the STTM are not described. For more information about the terms and processes introduced below, refer to the more detailed descriptions in the sections following this introduction. These terms are listed in the index and a glossary at the end of this document.

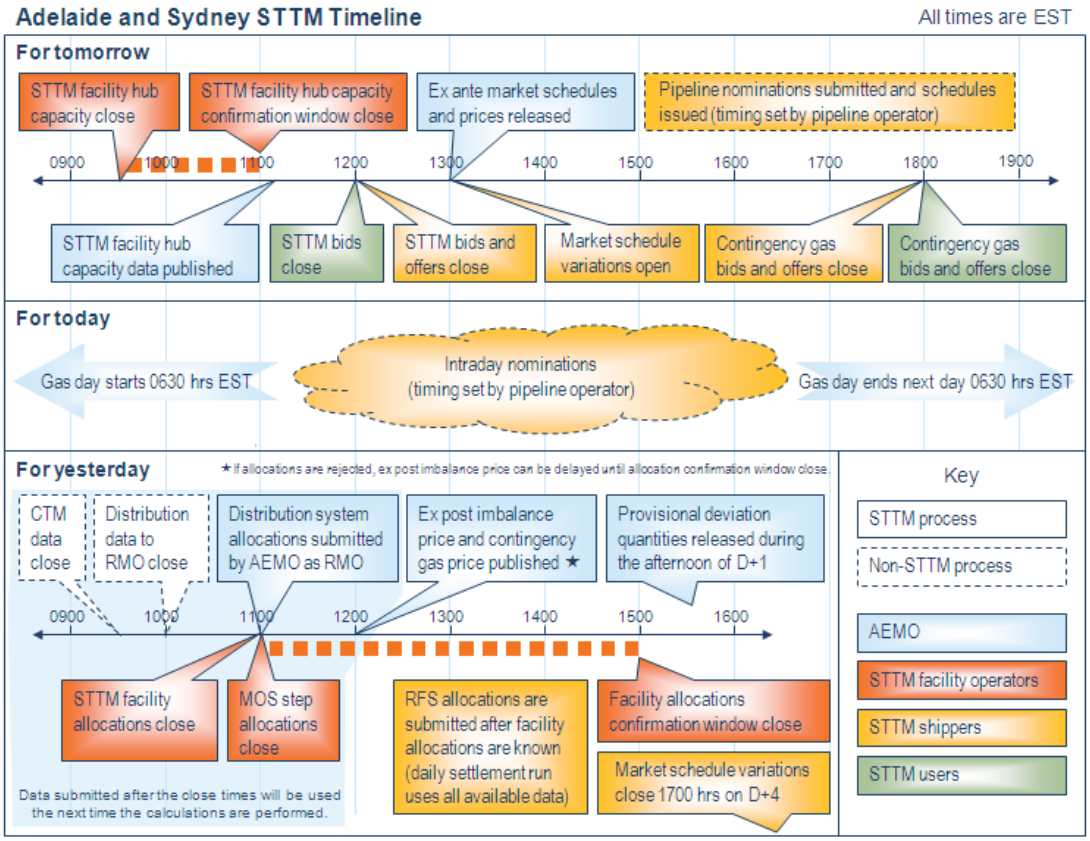

Figure 1-2 The gas day timeline in Adelaide and Sydney

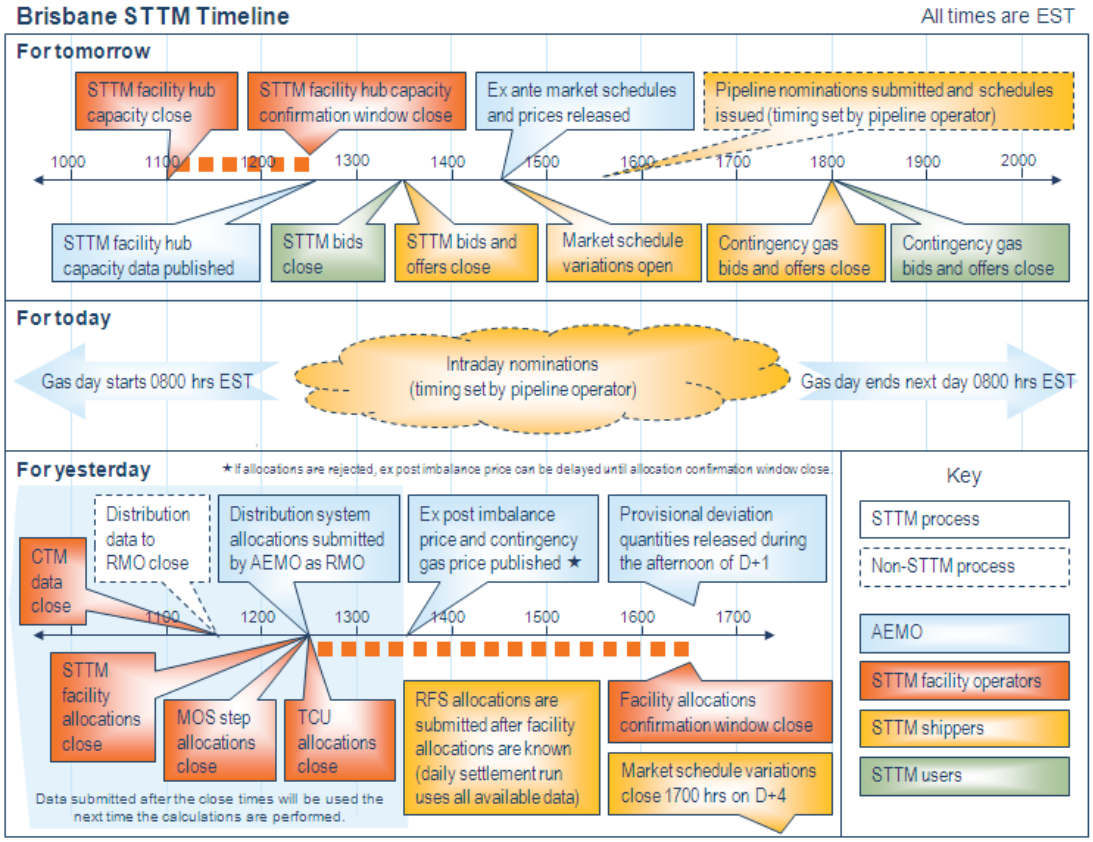

Figure 1-3 The gas day timeline in Brisbane

1.5.1 The day before

The day before the gas day (D-1), pipeline operators submit capacities for supplying the hub, and then users place bids to buy gas and shippers place bids to buy gas and offers to sell gas. Trading closes at T+5.5 (on day D-1), which triggers a series of actions by AEMO (the market operator), the shippers, and the pipeline operators:

1. AEMO determines the ex ante market price at the hub and provides ex ante market schedules for the gas flows to and from the hub for the next day.

2. Shippers then nominate the quantity of gas they require from each pipeline operator (pipeline nominations).

3. The pipeline operators prepare pipeline schedules, which detail the quantities of gas that are scheduled to be flowed over the next day for each shipper on each STTM facility (includes transmission pipelines, hub-connected storage facilities, and hub-connected production facilities).

4. After the schedules have been issued, shippers are then able to place bids and offers to AEMO for provision of contingency gas for the gas day.

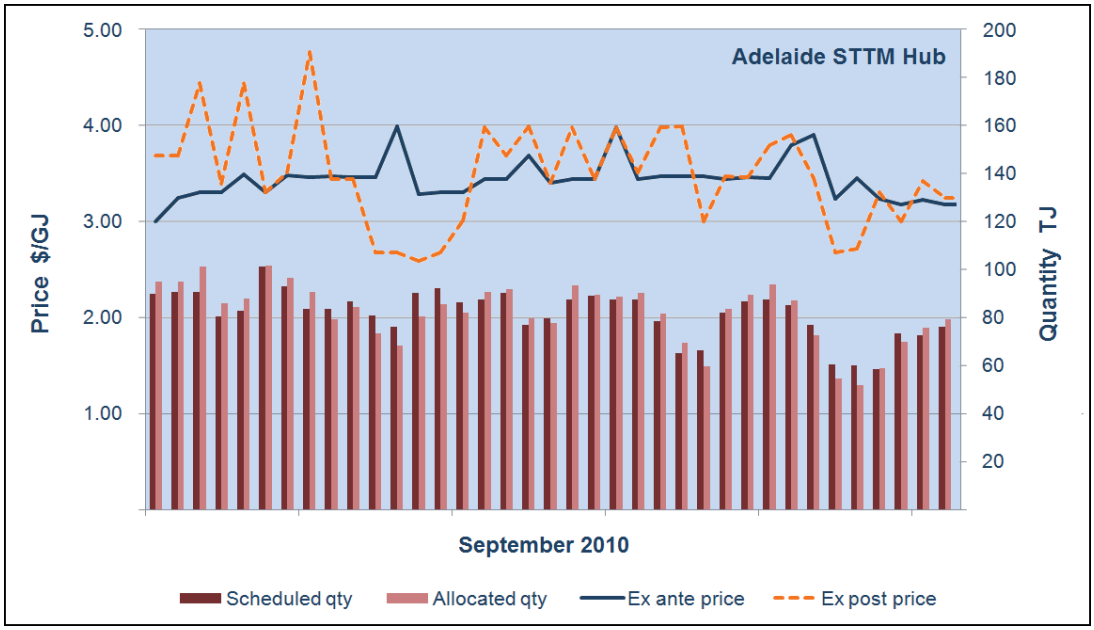

Figure 1-4 Market prices and quantities during the month of September 2010 at the Adelaide hub

The quantities of gas scheduled by the market operator to each shipper will depend on several factors, including the price and quantity of gas offered by shippers, the price and quantity of gas bid by users and shippers, the quantity that a shipper or user is contractually permitted to flow, and the capacity of each pipeline.

Shippers and users will typically make several offers and bids for various quantities of gas at different prices. This permits the traders to build a trading position that meets both their physical and commercial requirements. Shippers can also place bids to purchase gas from the hub, which might be used, for example, to supply an upstream customer or to store gas in the pipeline.

Because scheduling is price-driven, offers for lower-priced gas are, in general, scheduled in the STTM ahead of offers for higher-priced gas. On a capacity-constrained pipeline, this might result in as-available gas (with a low delivery priority) displacing higher-priced firm capacity gas (with a higher delivery priority). In such cases, the as-available shipper pays a capacity charge, and the

unscheduled, firm-capacity shipper is paid a capacity payment for the use of its contracted capacity. Capacity payments are restricted to flows on the same pipeline.

1.5.2 On the day

On the gas day (D), the pipeline operator delivers gas to the hub and users withdraw gas at the hub. However, the quantities delivered to or withdrawn from the hub over the full gas day might not, and generally will not, match with the STTM schedules. And so, during the day, as gas requirements become better known, and if permitted by their contracts, shippers can renominate quantities (intraday nominations) for delivery to the hub with their pipeline operators. Short-term fluctuations in supply and demand within the gas day can usually be accommodated by the storage capacities of the pipelines.

1.5.3 After the day

The actual quantities of gas delivered to the hub are measured daily by the pipeline operators, who, the day after the gas day (D+1), provide AEMO with the quantities that were allocated to each shipper (STTM facility allocations) on the gas day. In its role as retail market operator, AEMO then allocates the total of all facility allocations at a hub to the users who withdrew gas from the hub (STTM distribution system allocations). Gas that is supplied and withdrawn according to the market schedule is settled at the ex ante market price.

If a user becomes aware that its consumption on the day is higher than expected, it can arrange for additional gas to be provided by a shipper. The STTM ex ante market schedule is not updated on the gas day, and so these variations will not be reflected in the schedule. The STTM allows parties to submit market schedule variations, which AEMO uses to create a modified market schedule.

The difference between the allocated quantities and the modified market schedule is called a “deviation”. Shippers supplying gas to the hub who deviate from their scheduled deliveries will, typically, be paid less for their gas, depending on the size of the deviation. Similarly, shippers and users withdrawing gas from the hub who deviate from their scheduled withdrawals will, typically, pay more for their gas, again, depending on the size of the deviation. Variation charges are also levied on some parties who make market schedule variations, but these charges are significantly less than deviation charges. This gives participants commercial incentives to address imbalances at the hub during the gas day.

Settlement calculations are performed for each gas day for prudential monitoring purposes, whereas invoicing and settlement occurs monthly for the previous month. Settlement entails trading participants receiving payment or being charged for their net settlement amount based on the preceding month’s trading outcomes and other liabilities. The settlement process, however, is not concluded until some time later when data quality has been improved by the actual or adjusted metered flows measured by the distributors and pipeline operators.

1.6 Keeping the system balanced

Deviations by shippers and users are typically balanced by pipeline operators utilising the storage capacity of the transmission pipelines. The STTM primarily settles this balancing gas under AEMO’s market operator service (MOS) arrangements. AEMO procures the MOS gas under arrangements specifically for this purpose. All deviations are settled through the market at a price that reflects the impact of the balancing gas on that gas day.

And if normal STTM mechanisms are unlikely to achieve a balance, AEMO can call on contingency gas arrangements. This might involve increasing supply and reducing demand in an under-supply situation, or reducing supply and increasing demand in an over-supply situation.

2 STTM Roles

Note The terms "distribution system", "shipper", "user", "distributor", and "pipeline operator" are used throughout this document and imply "STTM distribution system", "STTM shipper", "STTM user", "STTM distributor", and "STTM pipeline operator" respectively, which are the formal terms defined by the NGR.

2.1 Market operator

AEMO operates the STTM, formulates and applies the procedures that govern its operation (consistent with the National Gas Rules), and provides services that help to balance the physical supply and withdrawal of gas at each hub.

AEMO has no statutory responsibility for managing gas quality or system security in the hub. The distributor remains responsible for operation of the distribution system during a supply shortfall and the STTM scope does not include involuntary curtailment of distribution end-users.

2.2 Participants

All participants must register with AEMO. Participants who operate on multiple hubs must register separately for each hub. The roles defined in the STTM are:

- STTM facility operator (see Section 2.2.1)
- STTM shipper (see Section 2.2.2)
- STTM distributor (see Section 2.2.3)
- STTM user (see Section 2.2.4)
- Allocation agent (see Section 2.2.5)

2.2.1 STTM facility operator

STTM facilities can include transmission pipelines, production facilities, and storage facilities that inject gas directly into an STTM distribution system. STTM facilities are operated by STTM facility operators.

Specifically, an STTM pipeline operator (a type of STTM facility operator) operates the gas transmission pipeline that delivers gas from production and storage facilities to the hub. STTM pipeline operators schedule the delivery of gas into the pipeline based on the shippers' haulage priority and ensure that flows are kept within operational limits. They also measure the gas flowed into and out of the pipeline and allocate quantities between shippers.

Hub-connected suppliers (the operators of an STTM storage facility or STTM production facility) also come under the general classification of STTM facility operators.

2.2.2 STTM shipper

An STTM shipper has a registered, contractual right to haul gas on an STTM facility, such as a transmission pipeline, and might also be permitted to store gas in the pipeline. Shippers delivering gas upstream of the hub are only required to register as STTM shippers if they also ship gas through the hub. Only STTM shippers are able to offer gas for sale on the STTM (see Section 2.4). STTM shippers can also bid to withdraw gas from the hub—to replenish gas stored in the pipeline, for example.

2.2.3 STTM distributor

An STTM distributor manages and operates an STTM distribution system, which delivers gas from the hub to consumers. STTM distributors collect meter data at regular intervals, which they supply to AEMO for calculating the daily allocations made to STTM users.

The STTM user (see Section 2.2.4) that registers a transmission-connected withdrawal service (typically a power station or large plant) is deemed under the NGR to be an STTM distributor but is excluded from many of the obligations that distributors must abide by under the NGR.

2.2.4 STTM user

An STTM user has a registered, contractual right to withdraw gas from an STTM distribution system or (see below) an STTM facility. Typically, STTM users are retailers or large consumers who hold distribution contracts with STTM distributors. STTM users are able to bid for gas on the STTM as trading participants. Only STTM users are able make price taker bids—that is, a bid to withdraw gas at any price (see Section 5.5).

A transmission-connected STTM user is a particular type of STTM user who has a registered, contractual right to withdraw gas from an STTM facility (instead of a distribution system). Typically, transmission-connected STTM users are large consumers, such as power stations, who withdraw gas directly from a transmission pipeline. Other than their contractual differences, there is no difference between what a transmission-connected STTM user and any other STTM user can do in the market.

2.2.5 Allocation agent

Pipeline operators, shippers, users, and AEMO (as retail market operator) must either act as or appoint allocation agents to determine the daily allocations submitted to AEMO.

2.3 Multiple roles

A single participant can register with multiple roles in the STTM. For example, if a shipper wishes to purchase gas on the STTM to replenish a storage facility fed from a distribution system, then the shipper must also be registered as an STTM user, otherwise it must purchase the gas from a STTM user.

2.4 Trading participants

Only trading participants can submit bids and offers at a hub and must be registered by AEMO at that hub as either an STTM shipper or an STTM user or both. Their registration must be supported by trading rights that allow them to haul gas on an STTM facility (pipeline) or withdraw gas from an STTM distribution system or an STTM facility.

Trading participants have ongoing obligations to meet prudential requirements (see Section 14.5).

2.5 MOS providers

AEMO has standing arrangements with STTM shippers with the ability to deliver or accept flows of MOS gas. A MOS provider is expected to hold a haulage contract that allows it to "park" gas on or "loan" gas from a transmission pipeline. A MOS provider must also have a haulage capacity that is sufficient to absorb pipeline flow deviations.

2.6 Registration, suspension, and de-registration

The processes of registration, suspension, and de-registration of participants are performed by AEMO and are governed by the market rules and procedures under National Gas Law. To be registered as a participant or trading participant, the party must satisfy certain eligibility conditions. And there are on-going obligations on participants, some of which survive de-registration.

In general, trading participants can be suspended if they fail to meet their prudential obligations within the required timeframe. Suspension can be restricted to trading in a particular hub and to specified roles. De-registration can occur at the request of the participant, or if the participant fails to meet the conditions of a suspension notice.

The participants

In the examples that follow, transactions are restricted to one hypothetical hub with four hypothetical shippers (shippers A, B, C and D) on two hypothetical STTM facilities (pipelines 1 and 2) and one hypothetical user (user A) on one hypothetical distribution system. Shipper A and user A are the same participant, although viewing them as different participants does not change the calculations.

3 STTM Facilities and Distribution Systems

The hub is a dimensionless connection between pipelines, networks, and other facilities. STTM facilities can flow gas to and from the hub, and include STTM pipelines (transmission pipelines), STTM storage facilities, and STTM production facilities. These facilities can be connected to any part of the distribution system. In other words, how they are represented in the STTM has nothing to do with the physical location of pipelines and other facilities, and can be spread anywhere around or within the distribution system. But an STTM facility must have the capability of injecting gas directly into the distribution system.

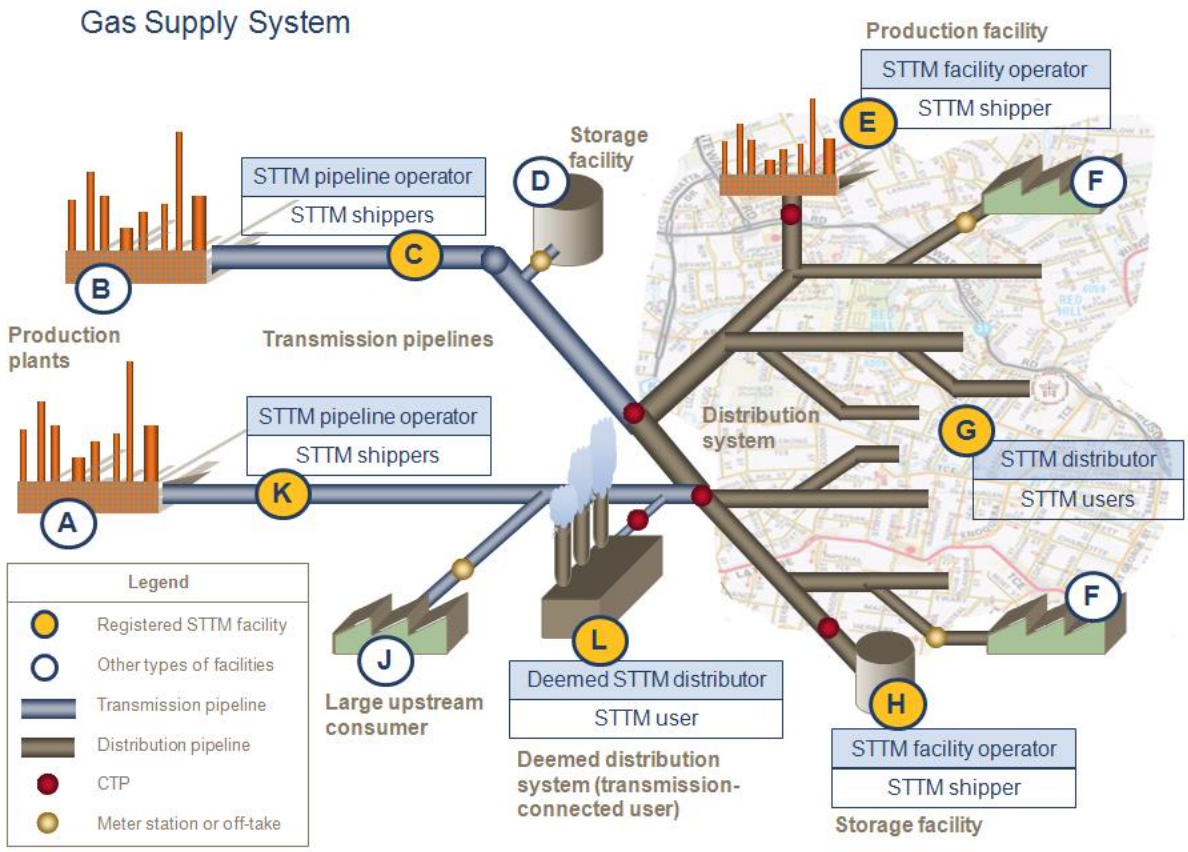

Figure 3-1 A typical gas supply system showing the facilities that are considered to be part of the STTM

The STTM Representation of Gas Supply System

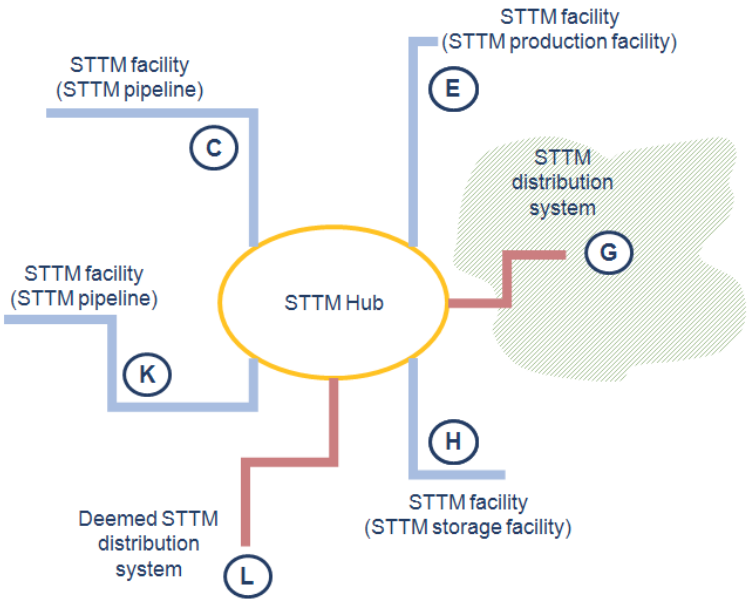

Figure 3-2 STTM representation of the gas supply system shown in Figure 3-1

STTM facilities at a typical hub

For example, referring to Figure 3-1 and Figure 3-2, STTM facilities C and K are the two transmission pipelines that supply gas from the production facilities to the hub. But the production facilities themselves (A and B) are not part of the STTM. Storage facility D is a storage facility connected to a high pressure pipeline (C), but is not connected to the distribution system, hence it is not an STTM facility. STTM facility H is also a storage facility but is connected to the (low pressure) distribution network. As far as the STTM is concerned, it is a separate hub-connected storage facility and is an STTM facility and is not part of the distribution system. Similarly, STTM facility E is also a separate hub-connected production facility. In particular, note that the storage and production facilities (H and E) are, in the STTM, functionally the same as the pipeline facilities C and K—they all deliver gas to the hub, and (in principle) they can all take gas away from the hub.

Distribution system

The STTM distribution system G, on the other hand, can only withdraw gas from the hub. In this example, the entire domestic network is represented in the STTM as a single distribution system. The STTM is, however, capable of handling multiple distribution systems connected to the same hub. Distribution system G includes all domestic and downstream large industrial consumers (F), but, as already explained, any storage or production facilities physically connected to the distribution system are not part of the distribution system.

Transmission-connected consumers

Consumers with point-to-point supply arrangements, such as factory J, are not part of the STTM. The STTM cannot “see” consumers unless they are connected to a distribution system, such as power station L. L is a transmission-connected STTM user. In this case, the transmission-connected user is deemed to be the STTM distributor. Upstream consumer J can, however, also be supplied through the hub by a shipper on pipeline K notionally shipping gas to the hub, and then (again notionally) backhauling the gas back up the pipeline.

The major difference between these two supply arrangements is that L, as an STTM user, can bid for gas directly in the market, whereas J cannot. Instead, J relies on a shipper for its gas—whether supplied directly or via the hub. Note that in the case of a transmission-connected STTM user, an STTM shipper must also supply to the hub the gas the STTM user purchases from the hub.

3.1 STTM facility hub capacity

Pipeline operators advise AEMO daily with pipeline capacity information so that gas flows are scheduled within the current operating limits of each hub-connected pipeline. Specifically, the STTM facility hub capacity is the capacity of the pipeline to deliver gas to the hub. This information is used to schedule gas flows for the next gas day and to forecast flows over the following two gas days.

The STTM facility hub capacity must take into account the gas expected to be consumed upstream, which might or might not be traded through the hub, the gas flowed into the pipeline for storage, and gas flowed for matched allocations.[1] The typical factors considered for a single pipeline are outlined in Figure 3-3.

The operational data that the pipeline operator sends to AEMO for the gas day is only an estimate, which is based on the pipeline operator's knowledge and experience. At the time the operational data is supplied to AEMO, there are several unknowns that can affect the hub capacity, including upstream consumption on the gas day and the actual quantity of gas delivered to the hub on D-1.

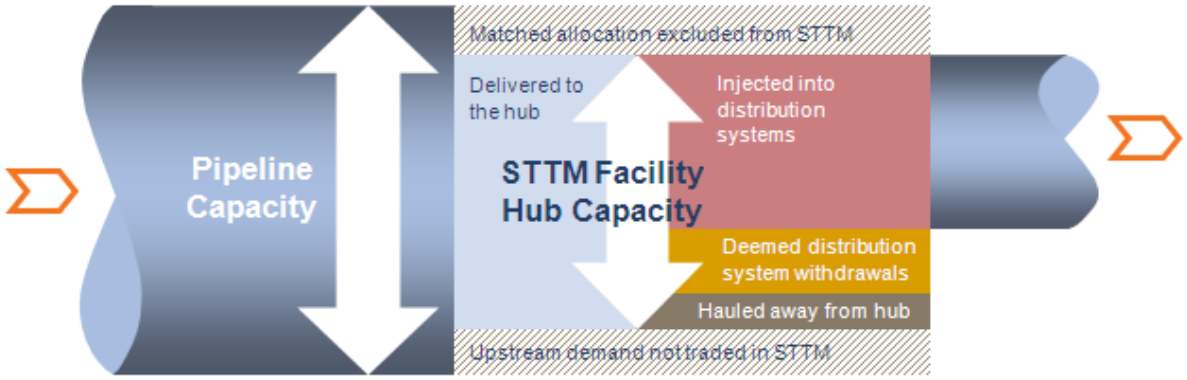

Figure 3-3 Factors considered when estimating STTM facility hub capacity on a single pipeline

This information is key to the STTM scheduling process, and so AEMO checks that any submitted capacities are within the normal limits for that pipeline before they are used in scheduling the market.

3.2 Viewing operational data

AEMO also operates the National Gas Market Bulletin Board (www.gasbb.com.au), which provides access to operational data at all stages of the gas supply chain.

[1] A gas flow that has been excluded from the STTM hub under the NGR.

4 Contracts, Registered Services, and Trading Rights

The contractual arrangements between pipeline operators and shippers and between distributors and users must be registered in the STTM. These form the basis by which all gas is bought and sold.

4.1 Transmission

The terms used to describe the contractual arrangements between pipeline operators and shippers and how these are represented in the STTM are described in Table 4.1 and explained in the sections that follow.

Table 4.1 STTM terminology applied to haulage contracts

STTM term	Description
Facility contract	A haulage contract or gas transport agreement issued by the pipeline owner or operator to transport gas to an STTM hub.
Contract issuer	The pipeline owner or operator.
Contract holder	The party that holds the transportation right, typically a shipper.
Registered facility service (RFS)	Each component of the facility contract is registered in the STTM by the contract issuer as an RFS.
Trading right	The registered capacity of an RFS by which STTM shippers can place bids and offers in the STTM.
Transferred trading right capacity	The contract holder can transfer part or all of the capacity of an RFS to another trading participant. This is equivalent to a bare transfer.
Contract participant	The recipient of a trading right capacity transfer.

Any party holding rights to transport gas to or from a distribution system must register that contract with AEMO as a facility contract. The various components that make up a facility contract (firm forward, firm tolerance, non-firm tolerance, authorised overrun, non-firm unauthorised overrun, and such) are registered as individual facility services. Trading rights are then created from these registered facility services. It is these trading rights on which the STTM operates: Every bid to buy gas and every offer to sell gas on the STTM must be associated with a trading right.

Facility contracts are issued by the contract issuer to the contract holder. The contract holder can also transfer part or all of its contracted capacity to contract participants. The capacity of the haulage contract retained by the contract holder and the capacities transferred to contract participants are the trading rights. Each trading right has properties of capacity, date range, priority, and flow direction, which are initially inherited from the registered service to which it is attached. The capacity and date range of a trading right can be subsequently changed by the contract holder, but its priority and flow direction cannot.

A typical arrangement of contracts, registered facility services (RFSs), and trading rights on an STTM facility is illustrated in Figure 4-1.

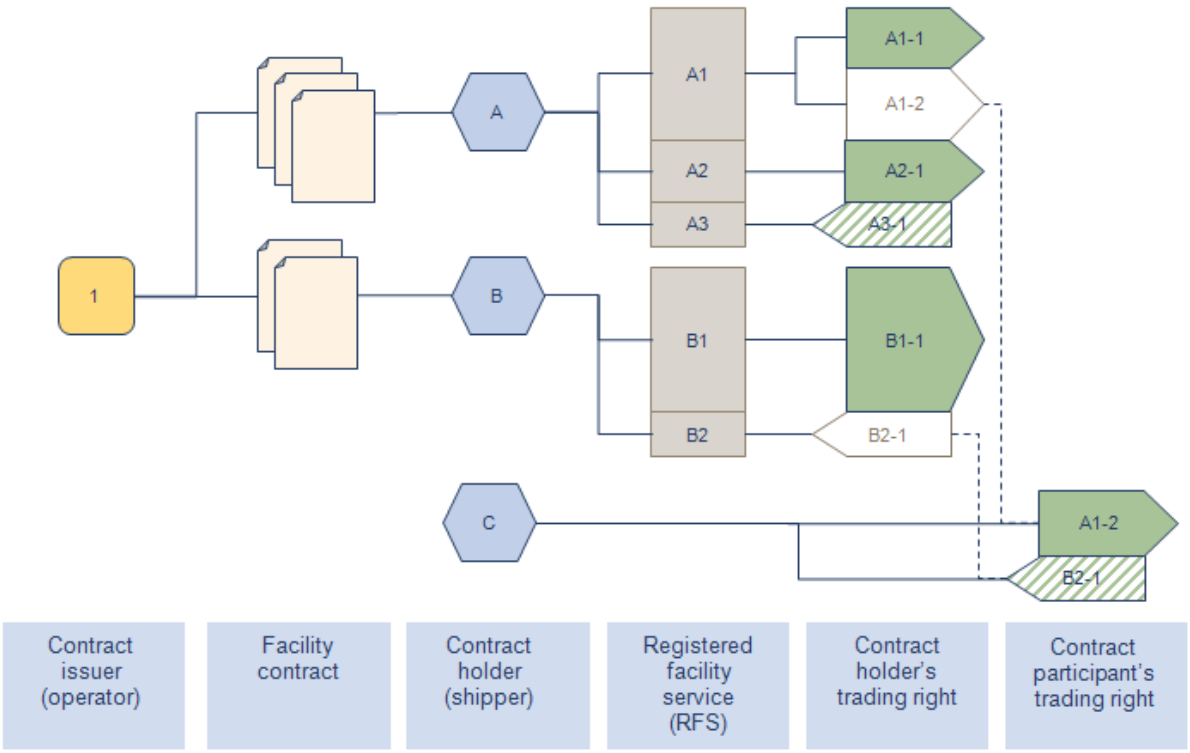

Figure 4-1 Facility contracts, registered services, and trading rights on an STTM facility

In the above diagram, the pipeline operator 1 has issued two facility contracts. The first, issued to shipper A has three components, which are registered as three RFSs in the STTM. Each RFS has a unique contract registration number (CRN). Part of the capacity of A1 has been transferred from the contract holder (shipper A) to shipper C as trading right A1-2. The remaining capacity of A1 is retained by shipper A as trading right A1-1. Shipper A holds two other RFSs: A2 and A3, and retains the full capacity of these RFSs as trading rights A2-1 and A3-1. RFSs A1 and A2 are based on forward haul contracts (to the hub), whereas A3 is based on a contract that permits the shipper to haul gas away from the hub.

Similarly, shipper B holds two contracts with the pipeline operator, which have been registered in the STTM as two RFSs: B1 (to hub) and B2 (away from hub). Shipper B has transferred the entire capacity of B2 to shipper C as trading right B2-1.

4.2 Distribution

The contractual arrangements for distribution of gas are similar to those for transportation, but there are some important differences to the terminology, the nature of trading rights, and the process by which they are created.

Any party holding rights to withdraw gas must register that agreement with AEMO. A distribution contract is registered as a single distribution service. A trading right is then created from the distribution services held by an STTM user. Every bid to buy gas on the STTM must be associated with a trading right.

Table 4.2 STTM terminology applied to distribution contracts

STTM term	Description
Distribution contract	A distribution agreement issued by the distributor (network operator) to deliver gas from an STTM hub to consumers.
Contract issuer	The distributor
Contract holder	The user, typically a retailer or large consumer.
Registered distribution service (RDS)	The distribution contract is registered in the STTM by the contract holder as an RDS,
Trading right	The registered capacity of an STTM user by which they can place bids in the STTM. An STTM user can hold only one trading right at a hub. The capacity of that trading right can be derived from one or more RDSs.

The important features of an RDS are:

- The capacity of an RDS cannot be transferred.
- The date ranges of RDSs held by the same user on the same distribution system cannot overlap.
- Where a hub has multiple distribution systems, the same contract holder can hold multiple distribution services at the same hub.
- An STTM user can hold only one trading right per hub. Where a hub has multiple distribution systems, the capacity of an STTM user's trading right is the sum of the capacities of all RDSs it holds.

The major difference between this and an RFS is that an STTM shipper can hold multiple trading rights at the same hub, which are transferable, whereas an STTM user holds only one trading right per hub, which is not transferable.

A typical arrangement of contracts, registered distribution services, and trading rights on an STTM distribution system is illustrated in Figure 4-2.

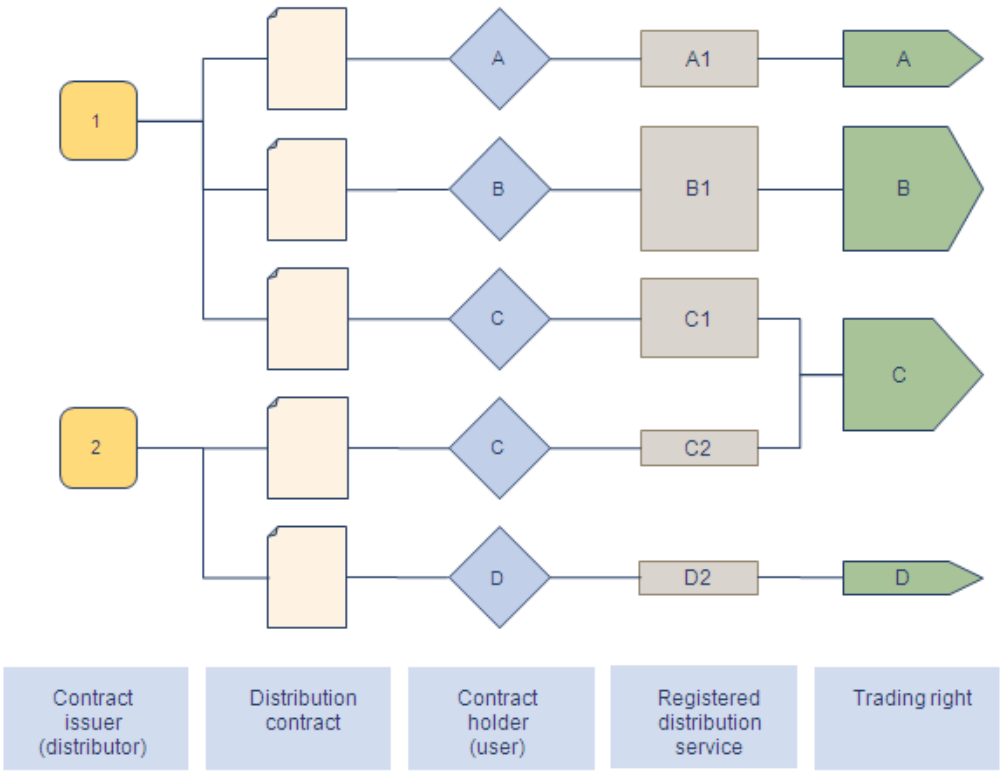

Figure 4-2 Distribution agreements, registered distribution services, and trading rights

In the above diagram, there are two distribution systems on this hub. Distributor 1 has issued three distribution contracts. User A is the registered holder of distribution service A1, which forms its entire trading right at this hub. User B is the registered holder distribution service B1, which also forms its entire trading right at this hub. User C, however, holds distribution services on both distribution systems 1 and 2, and so its trading right is the sum of the capacities of distribution services C1 and C2.[2] User D, like A and B, holds a single RDS, but in this case, on distribution system 2.

4.3 Who provides the information?

It is the responsibility of the contract holder (shipper or user) to register facility and distribution services with AEMO. The contract issuer (pipeline operator or distributor) must confirm the details of any services registered with AEMO before any related trading rights can be activated in the STTM. When a contract holder updates the details of a registered service, the contract issuer is required to confirm the changes before they can be applied in the STTM.

In the case of an RFS, when a contract holder transfers part of its capacity to another party, it is the responsibility of the contract holder to register the contract participant's trading right. The contract holder takes all responsibility for the contract with the contract issuer. The capacity of any trading rights held by contract participants can only be updated by the contract holder. The capacity of the contract holder's trading right is automatically set to the residual of the registered service capacity less the cumulative capacity of the trading rights transferred to contract participants.

[2] Note that in the STTM information systems, there is not a one-to-one relationship between an RDS and the contract registration number (CRN) recorded by the system. The capacity of any additional RDSs are added to the CRN that it initially registered. The user can hold multiple RDSs, but there is only one CRN and one TRN recorded by the system for that user at that hub.

The contract participant (RFS only) does not register its trading right with AEMO, but can view the trading right information registered on its behalf by the contract holder. This includes the registered facility service, the name of the contract participant, the capacity of the trading right, and the effective dates of the trading right.

In the case of an RDS, when a contract holder registers a distribution service, AEMO, after confirming the details with the contract issuer, will add the registered capacity to the user's trading right at that hub.

4.4 Long-term gas supply arrangements

Long-term investment in gas production and distribution infrastructure is, in general, reliant on the ability of the investor to secure a matching long-term return. This is typically achieved by setting up long-term contractual arrangements with shippers and users. Long-term contracts are also advantageous to shippers and users because this usually means that the gas is acquired on more attractive terms.

Although a user is able to acquire its entire gas requirements solely by bidding in the STTM, there are countervailing forces that encourage users and shippers to seek longer-term arrangements. Firstly, a user who purchases gas solely on the short-term market can expect to pay a higher average price and is more likely to experience higher volatility with day-to-day pricing, with a consequentially lower profit margin and higher commercial risk. And secondly, because of scheduling priorities, a user who relies heavily on uncontracted or as-available gas is also likely to deviate from the market schedule more frequently and so incur higher deviation charges. This creates clear commercial drivers for users to contract for a substantial portion of their expected gas supply with firm capacity.

4.5 Contractual obligations outside the STTM

As already noted, AEMO requires shippers and users to hold trading rights with sufficient capacity for the quantities of gas they are scheduled to flow. However, AEMO has no knowledge of the supporting contractual arrangements they might have with the producers who supply the gas. If these external contractual commitments cause an under- or over-supply to the hub, as far as the STTM is concerned, it will be treated as a deviation.

4.6 Firm and non-firm capacity

When pipelines are scheduled, the terms of haulage contracts usually give shippers with firm gas haulage rights priority over shippers with lesser priority haulage rights—such as contracts with a non-firm or as-available capacity. However, the STTM scheduling process does not take account of these priorities when scheduling offers other than to resolve tied offer prices. So, if a pipeline's capacity is constrained, an as-available shipper can theoretically displace a firm capacity shipper in the STTM by offering gas at a lower price. This prevents the firm-capacity shipper from using the pipeline capacity that it has funded.

Furthermore, because a shipper's pipeline nominations are independent of the STTM, it is possible for a firm shipper to nominate a higher quantity of gas than it is scheduled to provide to the market. This can prevent a shipper with a lower priority in the pipeline from hauling its market-scheduled quantity of gas. The firm shipper's physical gas supply would be in excess of its market-scheduled gas supply, and the as-available shipper's physical gas supply would be less than its market-scheduled gas supply. And so both shippers would have deviations on the STTM.

On a constrained pipeline, if an as-available shipper has been scheduled by the pipeline operator to flow gas to the hub, and, in doing so, has prevented a shipper with firm pipeline haulage rights from shipping gas on the same pipeline, then the as-available shipper pays a capacity charge based on the actual quantity of gas flowed. The firm-capacity shipper who is displaced on that pipeline receives a capacity payment based on the amount of gas they offered into the ex ante market but did not flow.

In general terms, the capacity price used to calculate capacity charges and payments reflects the difference between the ex ante market price and the maximum price offer scheduled on that particular pipeline for that hub.

Capacities, haulage contracts, and distribution contracts

Refer to Figure 4-3. Pipeline 1 has a capacity to flow 10 GJ of gas to the hub. All flow quantities in the STTM are in units of gigajoules (GJ), although realistic numbers will be measured in thousands or tens of thousands of GJ. A thousand gigajoules (1000 GJ) is also called a terajoule (TJ). The pipeline operator of pipeline 1 has sold two haulage contracts. Shipper A holds a firm haulage contract with a capacity of 10 GJ, and shipper B holds an as-available haulage contract with a capacity of 5 GJ. Shipper A has priority access to pipeline 1 and has contracted for its full 10 GJ capacity. Shipper B has a lower priority but will only pay for this capacity when it is scheduled. The total capacity sold to shippers A and B exceeds the capacity of the pipeline. Hence, if both shippers wish to haul their full capacity, then shipper A will be scheduled for 10 GJ but shipper B will not be scheduled. Shipper B will only be scheduled if shipper A does not use its full capacity on a given day.

The situation on pipeline 2 is similar. Pipeline 2 has a capacity of 12 GJ and shipper C holds a firm haulage contract for 12 GJ with the pipeline operator of pipeline 2. Shipper D has as-available capacity of 8 GJ.

There is only one user represented at the hub and has a distribution contract with its distributor for 22 GJ of withdrawals from the hub.

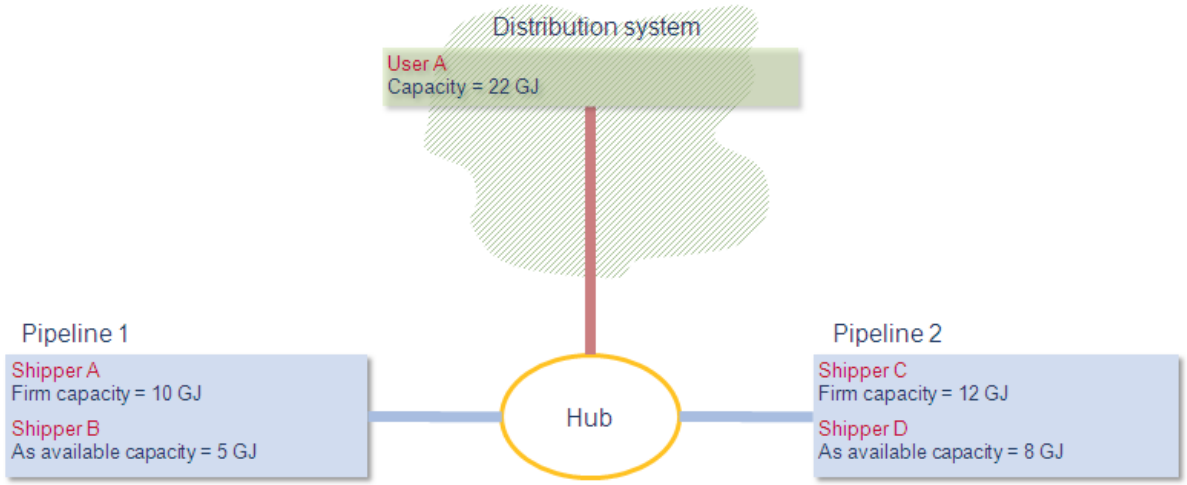

Figure 4-3 Example: facility services, distribution services, and trading rights

5 The Ex Ante Market

5.1 Market time

Market time is always measured in Eastern Standard Time (EST), regardless of local time at the hub, and does not change for daylight saving time.

5.2 The gas day

The STTM gas day is a 24-hour period commencing at 6:30 AM EST in Adelaide and Sydney and at 8:00 AM EST in Brisbane.

This guide refers to market operations relating to a particular gas day D, including activities that occur before (D-) or after (D+) the gas day. The term D-1 refers to actions taken the day before the gas day with respect to gas day D.

Because there are different start times at different hubs, market time at a hub is expressed as T+n, where T is the gas day start time in EST at that hub, and n is the number of hours after the start of the gas day. For example, bids and offers for gas day D close at T+5.5 hrs on gas day D-1, which is sometimes abbreviated as (D-1, T+5.5). This is 12 noon EST in Sydney and Adelaide or 1:30 PM EST in Brisbane. The symbol d, however, is used to refer to actions that are not tied to a particular gas day. For example, a report issued on day d might report market prices for the five-day period d-5 through d-1.

5.3 Forecasting supply, demand, and prices

Each day AEMO publishes provisional schedules and prices, which give participants a three-day outlook for the projected supply and demand at each hub. The report provides the market with early warning of potential imbalances at a hub and the availability of MOS and contingency gas over the forecast period. This information alerts trading participants to potential limitations of the market to absorb deviations from scheduled quantities.

5.4 Trading rights

Only trading participants with registered trading rights (see Chapter 4 “Contracts, Registered Services, and Trading Rights”) are permitted to place bids and offers in the STTM. Bids and offers must be associated with a trading right, which is associated with a registered facility service or distribution service. The trading right specifies information used in scheduling bids and offers, including limits on how much gas can be scheduled on that trading right, the haulage priority of the registered service, and the type of service (haulage to the hub, for example). Importantly, AEMO will only schedule gas flows up to the limit of a trading participant’s trading right.

5.5 Bids and offers

Up to T+5.5 on D-1 (see Section 5.2 for the explanation of this nomenclature), shippers can submit offers to supply gas to a hub on gas day D, and shippers and users can submit bids to procure the gas they want to withdraw from the hub on gas day D. If flows are to be included in the market schedule, bids and offers must be provided for all gas delivered to and withdrawn from the hub, whether it is sourced from gas production or gas parked on the STTM facility, or whether the gas is consumed outside of the hub or parked in an STTM facility.

STTM bids and offers can include up to 10 price-quantity steps. Offer steps are given in increasing price order with increasing, cumulative quantities. Bid steps are given in decreasing price order with increasing, cumulative quantities. Users, but not shippers hauling gas from the hub, can also submit a price taker bid quantity, which represents a quantity of gas that the user will accept at any price. Prices offered or bid must be within limits set by the market (see Chapter 13 “Limits on Prices and Risks in the Market”). Prices are expressed to four decimal places and quantities in whole gigajoules (GJ).

Each submission includes an effective date range with a minimum time unit of one full gas day. Trading participants can submit a new bid or offer, which can overlap with previous bids or offers. The last submission for a given gas day is used to produce market schedules. For example, if an STTM bid submission applies from July 3 to July 10 and a new submission for the period July 6 to July 12 is subsequently made, then the first submission will be used from July 3 to July 5 and the new submission from July 6 to July 12.

Running the market

Figure 5-1 illustrates the data used in running the ex ante market for a particular gas day. The contracts are registered with AEMO prior to the market schedule being produced. On the day the ex ante market is run, the pipeline operators provide estimates of the capacity they can supply to the hub. For example, pipeline 1 has a hub capacity of 10 GJ. Each shipper submits an offer on the trading rights associated with its registered facility services. For simplicity only one offer step is shown for each shipper, but up to ten can be submitted on each trading right. User A submits a price-taker bid on the trading right associated with its registered distribution service.

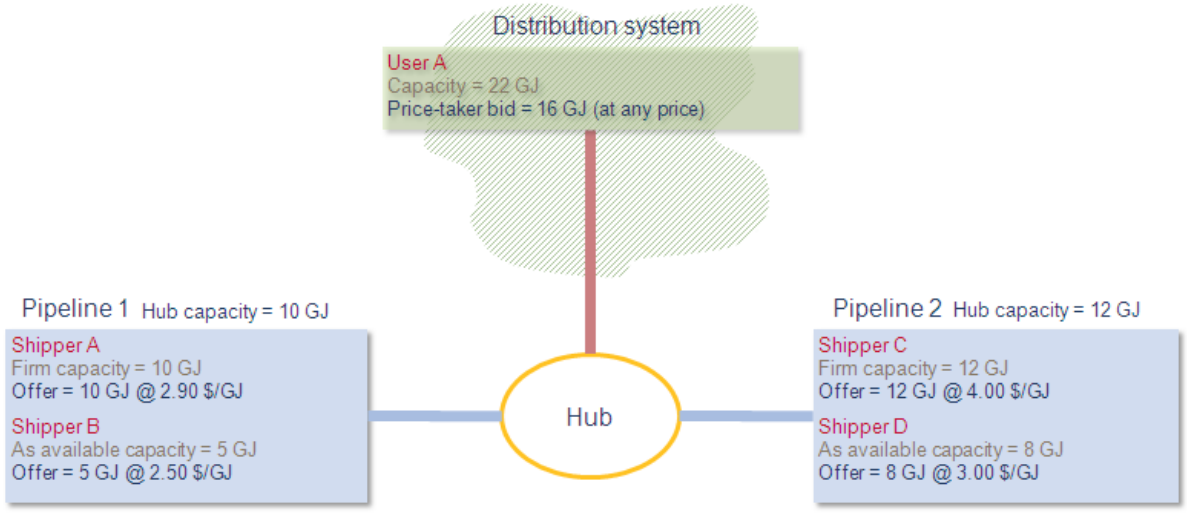

Figure 5-1 Example: data used to run the ex ante market

5.6 Tie-breaking

In situations where bids (including price-taker withdrawals) or offers have the same price and the total quantity bid or offered cannot be scheduled, then a set of tie-breaking rules is applied to determine which bids or offers are scheduled. In general, tied bids are scheduled in proportion to the quantity bid, and tied offers are scheduled firstly according to haulage priority and then in proportion to the quantity offered. The tie-breaking rules are applied hierarchically to account for a variety of possible situations—for example, a specific logic is applied to tied offers on different pipelines.

5.7 Timeline for bids and offers

The STTM bid and offer submission window for the gas day opens some time prior to the gas day and might be months before the event. New data (including bids, offers and trading rights data) can be submitted at any time up to T+5.5 on gas day D-1.

If there is a change to the trading right to which a bid or offer is associated, then the contract participant needs to revise the affected bids or offers before the market is run. Any original bids and offers will be used, but these cannot be scheduled beyond the trading right capacity limit that applies when the schedule is produced.

The last, valid submitted bids and offers are used to generate the two- and three-day ahead provisional schedules and the (one-day ahead) ex ante market schedules. This applies even if a participant's access to the market is restricted for any reason or there is an interruption to the STTM information systems. The STTM timeline is fixed and is never adjusted by the market operator. Under certain conditions, when schedules cannot be generated by the stipulated times, an administered market state might be invoked under which market prices or schedules are administered by the market operator (see Chapter 15 "Administered Market States")

5.8 Validation of bids and offers

STTM bids and offers are validated for format and against the relevant trading right applicable to the gas days to which the submission relates. Submissions will be rejected if the format is invalid or the aggregate quantity of all price-quantity steps exceeds the capacity limit of the trading right. When the market is run, the trading rights data applicable for that gas day is applied to limit how much gas can be scheduled.

5.9 Validation of Pipeline Hub Capacities

Pipeline hub capacities are validated for format and against upper and lower limits that are set by the pipeline operator. Submissions will be rejected if the format is invalid or the hub capacity is outside these limits.

If the submission fails the validation test, the pipeline operator is advised and is given the opportunity to either confirm the original data or submit new data. If the pipeline operator fails to confirm the submission and does not supply new information, the original data is used.

If the pipeline operator fails to submit hub capacities for the next gas day, AEMO uses the provisional hub capacity information submitted on the previous days. If no data is available, then the default capacity is used.

5.10 Determining schedules and market prices

AEMO produces market schedules that set out the quantity of gas that each shipper and each user is expected to flow to or from each hub on a gas day. Market schedules for each hub for each gas day are limited in aggregate on each facility by the hub capacity submitted by the facility operator for that day and, for individual participants, by their registered trading rights.

5.10.1 Market schedule

On D-1, AEMO produces the market schedules and prices using a scheduling and pricing algorithm, which sets a single daily ex ante market price for all gas at the hub. The ex ante market price is determined by stacking and matching offers (supply) with bids (demand) in price order. Demand can be satisfied from any STTM facility subject to its physical capacity for day D. Scheduling does not discriminate between firm and as-available capacity, except where equally priced offers are received for the same facility (see Section 5.6).

5.10.2 Ex ante market price

The ex ante market price is the marginal cost at which demand from all distribution systems and shippers is met by supply from all shippers on all STTM facilities. In other words, it is the cost at which a small change in demand will be supplied.

If all STTM facilities had limitless capacity, a market supply curve is formed by combining all offer steps across all contracts and STTM facilities. The marginal cost of supplying the hub increases as the quantity supplied increases. Similarly, the market demand curve is formed by combining all bid steps across all distribution systems.

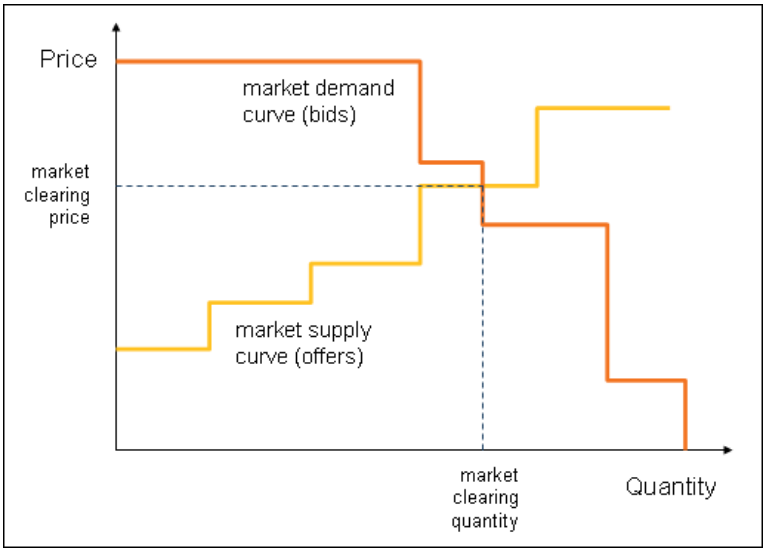

Figure 5-2 Unconstrained market supply and demand curves

As illustrated in Figure 5-2, the point at which the market supply curve and the market demand curve cross defines the market clearing point. At this point no buyer is required to pay more than it considers the gas to be worth, and no seller is paid less than its cost for supplying the gas. The crossing point defines the market clearing price (the ex ante market price), and all gas offered or bid to the left of the market clearing quantity (the demand at the hub) will be scheduled.

During this scheduling process, one or more pipelines might reach their hub capacity—the pipeline is then said to be capacity-constrained. If the demand at the hub has not been met when a pipeline becomes constrained, the scheduling process continues as before, but offers are only considered from unconstrained facilities. The scheduling proceeds in this manner until the market clearing point is achieved (where supply to the hub meets the demand at the hub).

A pipeline can also be flow direction–constrained, which will also restrict what offers can be scheduled from that pipeline, but is much less common. For more information about flow direction constraints, see Section 5.10.4.

Determining market prices

Refer to Figure 5-3. Gas from shippers is primarily scheduled based on price, so shipper B (2.50 $/GJ) is scheduled first and is fully scheduled to its trading right capacity of 5 GJ. The next least expensive supply source, shipper A (2.90 $/GJ), is then scheduled. Because shipper B has been scheduled to use 5 GJ of the available 10 GJ of pipeline capacity, shipper A can only be scheduled for 5 GJ. Although shipper A has higher priority haulage, shipper B is scheduled ahead of it based on price. Pipeline 1 is now fully scheduled. The demand at the hub is 16 GJ, and so pipeline 2 supplies the remaining 6 GJ. Shipper D (3.00 $/GJ) is the lowest cost source for this last 6 GJ and is scheduled. The capacity of pipeline 2 is not fully utilised (12 GJ available, 6 GJ scheduled), and shipper C (4.00 $/GJ) has not been scheduled. Shipper D has spare capacity on its contracts, but there is no demand for this gas.

If demand at the hub were to increase or decrease slightly, the change in demand would be matched by a change in supply by shipper D at a cost of 3.00 $/GJ. Hence, the price at the hub, or the ex ante market price, is 3.00 $/GJ.

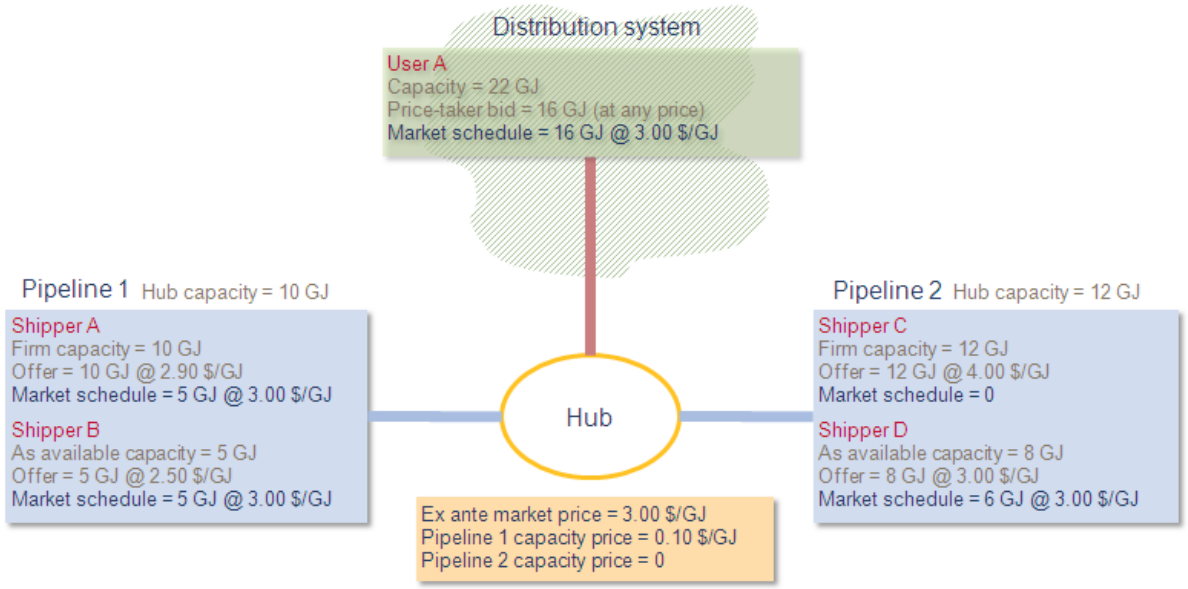

Figure 5-3 Example: ex ante market schedule

5.10.3 Capacity price

The capacity price on a capacity-constrained pipeline is the difference between the price of the last offer cleared on that pipeline and the ex ante market price. The capacity price on an unconstrained pipeline is zero.

Determining capacity prices

Refer again to Figure 5-3. The highest priced gas flowed on pipeline 1 has a price of 2.90 $/GJ (shipper A). It follows that if pipeline 1 could flow 1 GJ more gas, then the market would be able to reduce flow from pipeline 2 by 1 GJ, at 3.00 $/GJ, and increase flow from pipeline 1, costing 2.90 $/GJ. This would generate a net saving of 0.10 $/GJ. A capacity price on pipeline 1 is established, being the incremental value of pipeline 1 capacity or 0.10 $/GJ. Pipeline 2 is not constrained, so its capacity price is zero. These capacity prices are used in settlement processes to provide compensation to firm shippers whose offers are not scheduled because of lower-cost as-available offers.

5.10.4 Pipeline flow direction constraint price

The market stipulates that the amount of gas withdrawn from a hub on a pipeline cannot exceed the amount of gas scheduled to flow to the hub on that pipeline. This constraint ensures that the market cannot schedule a net flow away from the hub on a pipeline when the pipeline operator will only ever schedule net flows to the hub. A pipeline for which the flows to and from the hub are equal is said to be flow direction–constrained.

Situations can arise where it is economically attractive to withdraw more from the hub than is supported by the hub price. In such cases, the optimum solution might involve increasing flows to the hub. To compensate the supplying shippers, the market will determine a pipeline flow direction constraint price, which reflects the marginal value of withdrawing gas from the hub beyond the marginal cost of flows scheduled to the hub.

The pipeline flow direction constraint price is included in the market design for reasons of robustness. However, it is anticipated that flows to the hub on pipelines will rarely, if ever, be so low as to equal the flows from the hub. Hence the pipeline flow direction constraint price will almost always be zero.

6 Pipeline Nominations

After the market schedules are published, shippers make nominations to the pipeline operators in accordance with their relevant contracts. There is no requirement for these nominations to match the quantities scheduled in the market. The STTM, however, is designed to create incentives for participants to align their nominations with the market schedules.

The process by which trading participants communicate their nominations to their pipeline operators is not part of the STTM. Similarly, the STTM has no involvement in any distribution processes for managing the scheduling of withdrawals from a hub. Shippers will nominate to pipeline operators and users will nominate to distributors in accordance with the contracts they hold with those operators.

To the extent that the day-ahead pipeline schedules issued by pipeline operators to shippers differ from the day-ahead market schedules issued by AEMO, then these differences will be seen in settlement of the market as deviations from the day-ahead market schedule. There can be no guarantee, however, that such deviations will not occur. A shipper is not obligated to nominate in accordance with the quantities in the market schedules issued by AEMO. Furthermore, a pipeline operator might, for operational reasons, be unable to schedule the pipeline in accordance with nominations received from shippers, even if shippers nominate in accordance with their market schedules.

Pipeline nominations

Figure 6-1 shows that shipper A, despite only being scheduled in the market to flow 5 GJ of gas, nominates to flow 6 GJ of gas. Shipper A can do this because pipeline nominations are governed by haulage contracts between shippers and the pipeline operator, not what is scheduled through the ex ante market. Because shipper A has haulage priority over shipper B, and because the pipeline is constrained, the pipeline operator schedules shipper A to flow 6 GJ, which means it can only allow 4 GJ to be scheduled from shipper B. Because shipper A has "bumped" 1 GJ of flow from shipper B, there will be a settlement consequence, with shipper A being seen to over-supply the hub and shipper B being seen to under-supply the hub. Shippers C and D nominate exactly their ex ante market schedules.

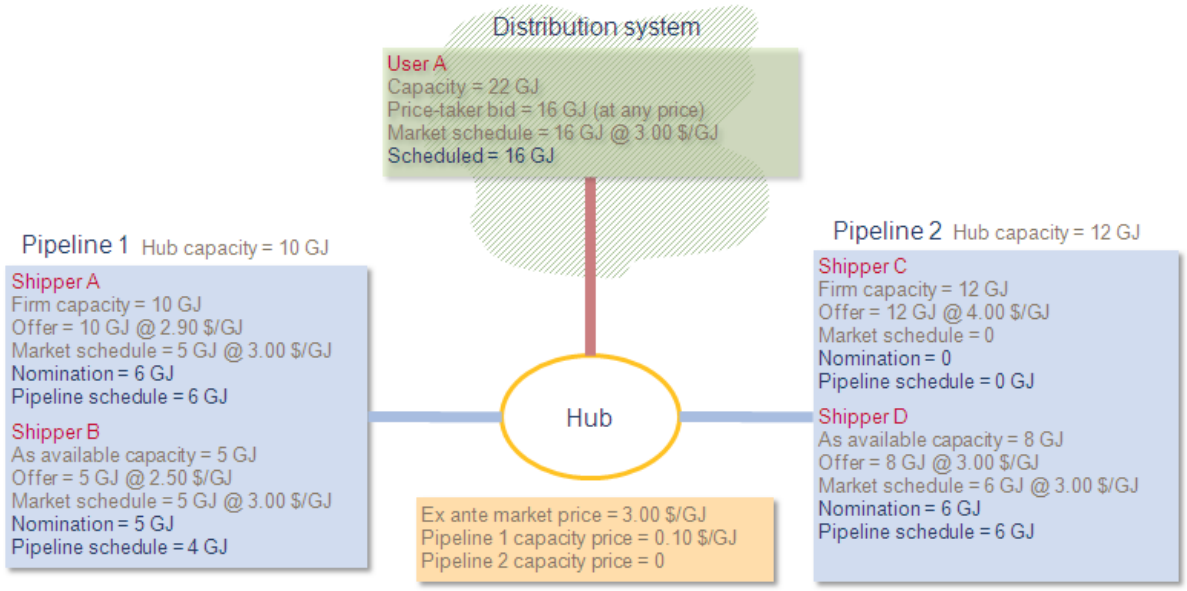

Figure 6-1 Example: pipeline schedule

7 Gas Day Operations

7.1 Intraday nominations

During the gas day, as consumption requirements at the hub become clearer, and depending on the terms of their haulage contracts, shippers are often able to renominate quantities to adjust their positions. To the extent that these renominations can be accommodated within the available capacity, the pipeline operator will usually schedule the adjusted quantities for transportation.

Note A shipper can make an intraday nomination to a pipeline operator on one pipeline to flow gas to the hub and to separately make an intraday nomination to a second pipeline operator so that it can backhaul that gas on the second pipeline. Provided that both pipeline operators accept the intraday nominations, the shipper can effectively source gas to be delivered on one pipeline from another pipeline.

When a pipeline operator accepts a shipper's intraday nomination, the shipper should also submit a market schedule variation to AEMO, which enables AEMO to correctly account for the intraday nomination in settlement of the market. Market schedule variations are discussed in Section 10.3.

On the gas day

During the gas day it becomes apparent to user A that its consumption will be 3 GJ higher than it expected. If user A does nothing about this, it will be forced to purchase gas to support this 3 GJ deviation quantity through the market's ex post settlement processes, which can potentially be at unattractive prices. To avoid this, shipper C agrees to supply additional gas to user A during the gas day. User A pays shipper C directly for this gas, with no involvement by AEMO. Shipper C makes an intraday nomination to its pipeline operator and is scheduled for an additional 3 GJ. Shipper C might match this additional 3 GJ of haulage service with an intraday nomination of 3 GJ from its upstream producer contract, or this gas might be provided from line-pack in the pipeline. The outcome is that more gas over the gas day will be delivered to the hub to supply user A and the intraday nomination changes the effective pipeline schedule, as is shown below in Figure 7-1.

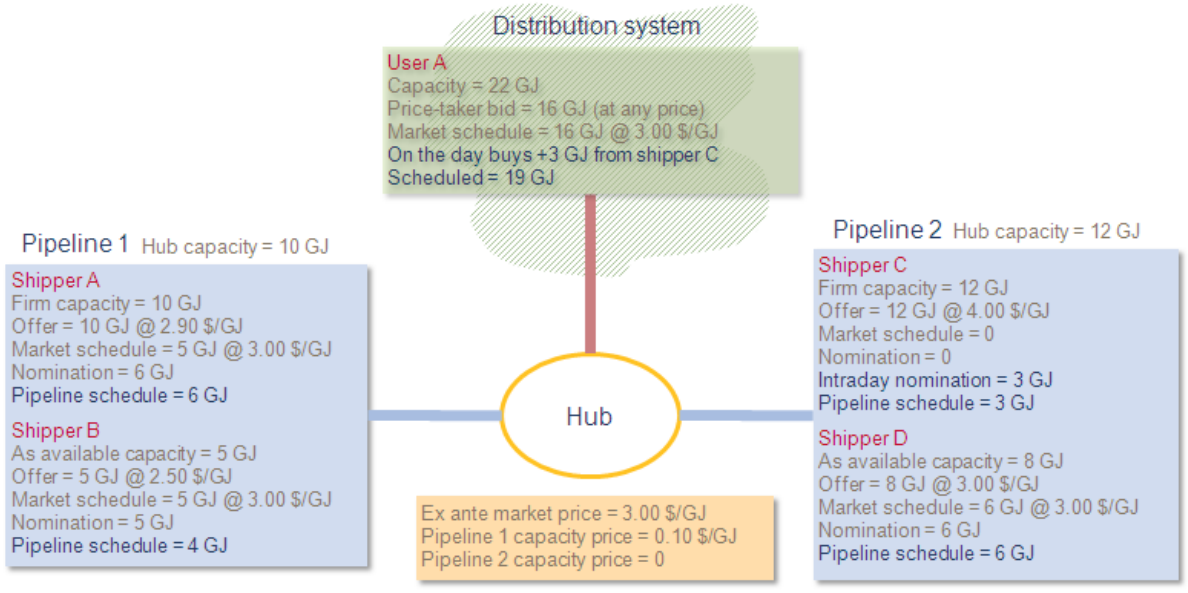

Figure 7-1 Example: intraday nominations

8 Market Operator Service

To ensure that the physical demand on each pipeline continues to be met, AEMO manages the balancing of what was scheduled by the pipeline operator for each pipeline at each hub on each gas day with the actual quantities of gas flowed on the gas day. This physical balancing is known as the market operator service (MOS). This balancing service is managed by AEMO through standing arrangements with shippers that have the capability to increase or decrease flows to the hub.

When the flow on a transmission pipeline into the hub deviates from the pipeline schedule, and the deviation is not allocated by a pipeline operator to a shipper, then MOS is deemed to have provided the gas. Normally, the MOS will match net changes in consumption at a hub.

A MOS provider is expected to hold contracts with a pipeline operator that will allow it to park gas on or loan gas from the STTM facility or have overrun facilities on forward haulage contracts to provide MOS. The price offered by a MOS provider for MOS gas reflects the cost of this service and associated haulage, but does not include the cost of replacing the gas supplied (see Section 8.5). MOS providers must also have a haulage capacity to or from the hub that is sufficient to absorb pipeline flow deviations. It is the responsibility of each MOS provider to manage this inventory of gas and to incorporate the additional costs of providing MOS into the offered price.

8.1 Forecasting MOS

AEMO will, prior to seeking offers from providers, publish an estimate of the required MOS that reflects the expected distribution of required MOS usage over the three-month MOS period. The estimate is provided for information purposes only, and AEMO takes no responsibility for any differences between the estimate and the actual MOS usage.

Historical data is used to determine a basic distribution of MOS required. Adjustments are made for growth in average and peak gas volumes, step changes in demand (for example, as a result of a gas power generator being commissioned), and observed changes in participant behaviour or pipeline operation that could change MOS flows—for example, improvements in the forecasting accuracy of participants.

8.2 MOS offers

The NGR defines the obligations on AEMO with respect to setting MOS requirements and the timelines and processes for procuring MOS. At regular intervals, AEMO seeks offers from shippers on each hub-connected transmission pipeline. MOS can be provided by one or more shippers that have a haulage contract on that pipeline. Shippers provide MOS increase offers comprised of price-quantity steps of increased flows to the hub and MOS decrease offers for price-quantity steps of decreased flows to the hub. AEMO will accept all valid offers. There is no cost to the market in accepting a MOS offer unless MOS gas is actually allocated to that offer on a gas day.

A limit, called the MOS cost cap, is imposed on the maximum amount that AEMO will pay for MOS. This protects the market from having to fund arbitrarily high costs for MOS where there is a lack of competition in the provision of MOS.

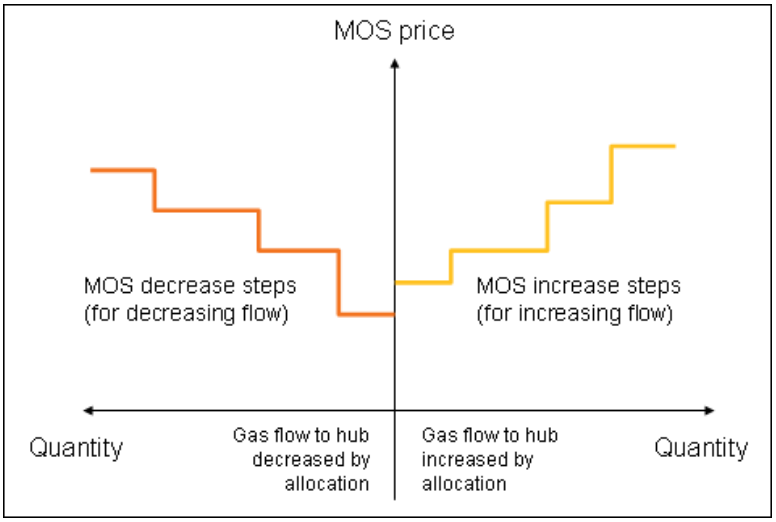

Figure 8-1 MOS increase and MOS decrease steps

8.3 Operation of MOS

MOS is allocated by pipeline operators in accordance with MOS increase stacks and MOS decrease stacks, which are provided, for each pipeline, by AEMO. The stack order follows the MOS price steps submitted by MOS providers on each pipeline. After a gas day on which MOS is flowed, the pipeline operator notifies AEMO of all MOS allocations.

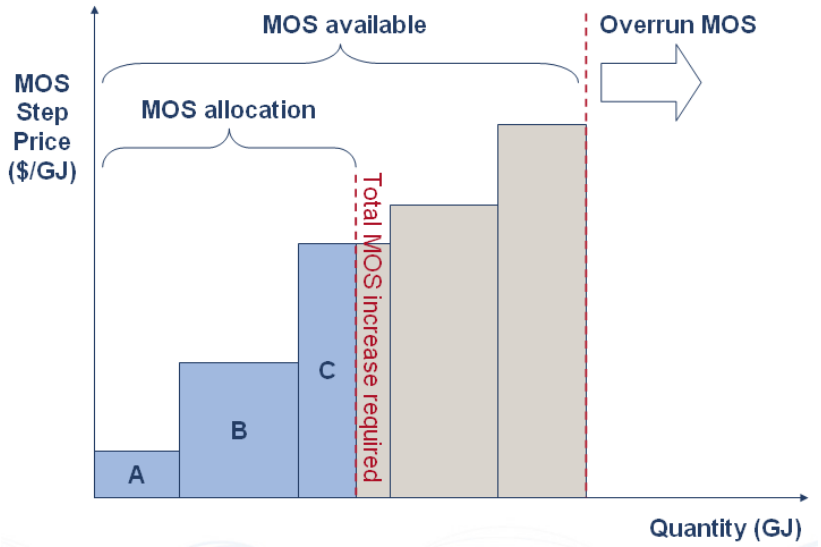

Figure 8-2 MOS allocation from a MOS increase stack

If the deviation on a pipeline exceeds the allocation capacity of either MOS stack, the residual quantity is allocated by the pipeline operator to shippers in accordance with the allocation rules on that pipeline. The pipeline operator submits these to AEMO as overrun MOS allocations. Shippers are paid for overrun MOS according to a pre-determined formula.

MOS stacks

In this scenario, shipper A is contracted to provide the market operator service on pipeline 1 and will accept allocations of any unscheduled flow on that pipeline. And shippers C and D are contracted MOS providers on pipeline 2. On pipeline 2, shipper C sits above shipper D in both (increase and decrease) MOS stacks. Which shipper is allocated the MOS gas on any given day depends on which pipeline flows MOS gas (which is determined by the pipeline operators, not the market), whether the MOS flow is positive or negative, and the position of the shipper in the MOS stacks. The MOS gas is settled in the market, but its allocation is not restricted by the market schedules.

8.4 Pipeline allocation rules

Pipeline operators allocate actual gas flows according to allocation rules agreed collectively by all of the shippers on a pipeline and in accordance with their contracts with the pipeline operator. It is the responsibility of the MOS providers to agree allocation rules that meet the requirements of the STTM and to ensure the pipeline operator implements the required process and system changes.

8.5 Restoring MOS gas

Where a pipeline deviation occurs on gas day D and is allocated to a MOS provider, the MOS provider is paid according to their MOS step price on a pay-as-bid basis. Any resulting deviations incurred by the MOS provider are exempt from deviation payments and charges. AEMO pays or charges the MOS provider for the MOS gas allocation on the gas day at the ex ante market price two days after the gas day, which covers the cost of restoring its inventory of MOS gas. The MOS provider can then choose to submit bids or offers the next day for the gas it needs to replace its MOS gas allocation or, alternatively, it might decide to run down its MOS gas provision.

The ex ante market price two days after the gas day is used so that the MOS provider has an opportunity to protect itself from price risks by bidding to buy or offering to sell gas in the ex ante market at a known price. If the gas is traded in the gas day d+2 ex ante market, the amount it pays to or is paid by AEMO will exactly compensate it for the amount it must pay to buy the gas or receive when it sells the gas in the market. The MOS provider, however, is not required to actually trade its gas in the d+2 ex ante market, but it bears all associated risks if it does not.

Failure to restore MOS gas does not prevent pipeline operators from making further MOS allocations to the MOS provider. However, the cost to the MOS provider can be significantly increased if it cannot cover those allocations from a park-and-loan account on the pipeline. This is a primary driver for a MOS provider to restore gas.

8.6 Impact of MOS on settlement shortfall and surplus

AEMO funds the commodity cost of MOS at the d+2 ex ante market price, and so the cost difference between deviation payments and charges on gas day d and settlement of MOS gas on day d+2 will contribute to the settlement shortfall or surplus over the billing period.

The cost of providing the MOS service is funded by the MOS offer price, which is paid-as-bid. That is, the price paid to individual MOS providers varies in relation to the price of each allocated MOS increase or decrease step. This is an overhead on the operation of the market and is also recovered through the settlement shortfall or surplus over the billing period.

8.7 MOS timeline

The steps involved in offering and providing MOS are summarised in Table 8.1.

Table 8.1 MOS Timeline

Timing	Action
Prior to MOS period	AEMO publishes MOS estimate.
	AEMO calls for offers for MOS.
	Shippers submit MOS offers.
	AEMO publishes MOS stacks and issues to pipeline operators.
Gas day	Pipeline flows vary from the schedule to match supply with withdrawals at the hub.
The next day	Pipeline operators allocate gas between shipper haulage contracts.
	The pipeline operator informs AEMO and shippers of the quantities allocated to the MOS price steps used and on which haulage contract the gas flowed.
	The MOS provider (optionally) places bids and offers to restore MOS gas in the next day ex ante market.
	AEMO runs the ex ante market to determine the market schedules and prices for the next day.
	MOS providers (optionally) nominate to pipeline operators to make up its MOS gas used the day before.
Two days after	MOS gas is (optionally) restored.
End of billing period	Settlement of MOS.

9 Contingency Gas

Market schedules, pipeline schedules, and intraday nominations only define the quantity of gas to be delivered or withdrawn from the hub over the gas day. But they provide no guarantee that a supply and demand balance is maintained over shorter periods within the gas day. Gas stored in pipelines can accommodate fluctuations in demand, to some degree, but at some stage pressure issues might arise. Furthermore, if the ex ante market fails to schedule enough gas to be delivered to meet demand over the day, then there is a danger that actual supply and withdrawal will not match over the gas day.

Contingency gas is a limited mechanism for balancing supply and withdrawals at a hub when both the ex ante market and bilateral intraday pipeline flow variations are unable (or not expected to be able) to match supply and demand within or over a gas day. Contingency gas provides pipeline operators and distributors with a means of avoiding, or at least minimising, the need to involuntarily curtail shippers supplying the hub or users at the hub. However, its availability or use does not imply any limit on the rights of these operators to implement involuntary curtailment.

Note Contingency gas is not intended to address events on pipelines that do not impact a hub.

AEMO procures contingency gas, but its use is determined in consultation with pipeline operators and distributors.

9.1 Who can supply contingency gas?

Contingency gas providers can be shippers on STTM facilities (which can be producers registered as shippers) or users at a hub that hold trading rights (including transmission-connected users). If a consumer, however, wants to provide contingency gas, it must do so through a retailer (STTM user).

Shippers able to increase supply to a hub and users and shippers able to reduce consumption at a hub will offer contingency gas to meet under-supply situations. Whereas, shippers able to decrease supply to a hub and users and shippers able to increase consumption at a hub will bid contingency gas to meet over-supply situations.

9.2 Contingency gas bids and offers

Trading participants can submit bids and offers for contingency gas on gas day D at any time up to 6 PM (1800 hrs) on day D-1. Submissions are made by users and shippers using the STTM bidding systems. Contingency gas bids and offers will be priced between limits set by the market, and the format is similar to that of regular bids and offers.

In under-supply situations, contingency gas offers are called in order of increasing price. If called, a shipper is paid for selling that gas at the high contingency gas price, and a user sells back gas that it has purchased on the ex ante market at the high contingency gas price. In over-supply situations, bids are called in order of decreasing price. If called, a shipper repurchases gas that it has sold on the ex ante market at the low contingency gas price, and a user purchases gas at the low contingency gas price.

Contingency gas bids and offers reflect what the participant can provide from its portfolio of load at a hub or, separately, from its portfolio of supply on an STTM facility. Consequently, the settlement of contingency gas does not require that the scheduled quantity is associated with registered contracts nor trading rights. However, when a shipper is called to provide contingency gas, an intraday nomination must be made to a pipeline operator by the shipper (or by its contract holder) for that gas to be delivered. This ensures that the pipeline allocation reflects the contingency gas that is called.

When contingency gas is called, a contingency gas provider has an opportunity to confirm how much gas they can provide at that time. After the event, the contingency gas provider needs to demonstrate that it has delivered the contingency gas scheduled by the time and at the location required. Consequently, the participant will be exposed to ad hoc charges where the evidence shows that it has not delivered contingency gas according to the contingency gas requirements (see Section 14.3.5).

9.3 Triggers for the use of contingency gas

Participants are able to view the aggregate supply and withdrawal outlook at a hub up to three days ahead of the gas day, and price information for the gas day is available when the market schedule has been produced the day before. This information permits trading participants to plan for system security events. For example, if a supply shortfall is predicted two days ahead, the forecast ex ante market price will reflect the shortfall, and trading participants can then decide to sell more or buy less gas at the hub, which might obviate the need for contingency gas.

AEMO, when required, will call on the contingency gas bids and contingency gas offers until the need is removed or until the available contingency gas is exhausted. If further curtailment of users or shippers is required, then distributors and pipeline operators will have to make those decisions.

Contingency gas will only be scheduled as a result of consultation with key players in the industry. After triggering a contingency gas event, AEMO follows several investigative steps before calling on contingency gas. These steps are outlined in Figure 9-1. In the event that contingency gas is called, then a notice will be issued by AEMO to participants informing them of the activation of contingency gas.

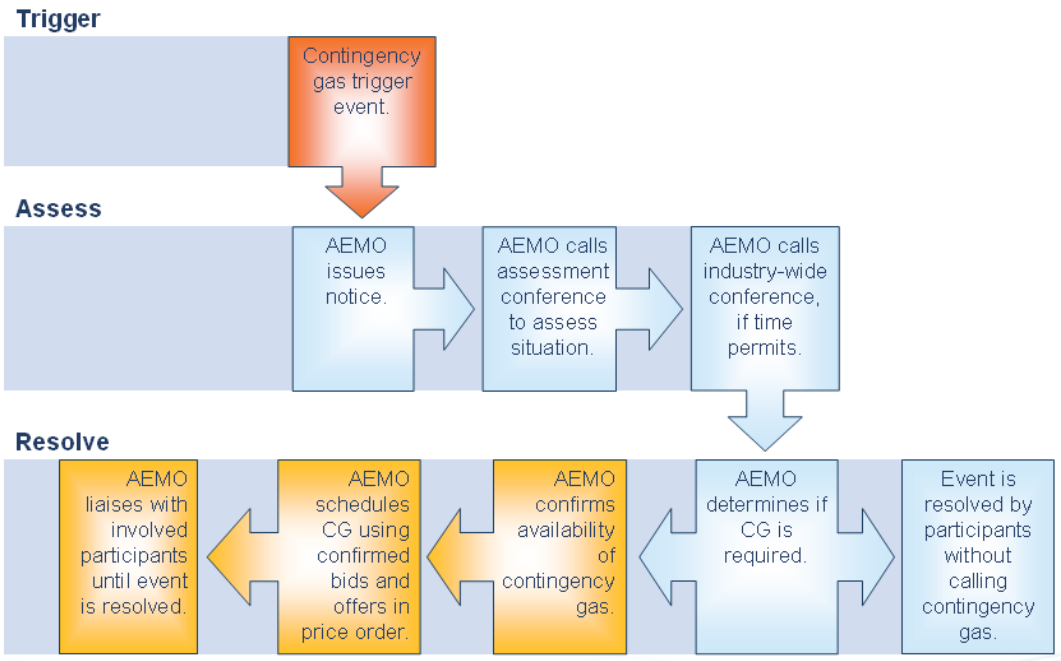

Figure 9-1 Overview of the contingency gas process

9.4 Scheduling of contingency gas

When contingency gas is called, AEMO will consider a range of factors when deciding who will provide the gas. Factors considered include the capabilities of potential providers, current operational restrictions on facilities, and the associated costs.

Contingency gas will typically be called ahead of the gas day, which allows distributors time to plan curtailment measures if there is an inadequate response. On the day, AEMO can reduce the requirement for contingency gas and can request contingency gas providers to reduce their response. However, responses to these requests by contingency gas providers will be voluntary because reductions might have already been committed. There are occasions where contingency gas can be called intraday; the same procedure is followed, but the response capability might be reduced.

When contingency gas is called from a shipper as a contingency gas provider, the shipper should make an intraday nomination to its pipeline operator for the supply of the contingency gas, but does not submit a market schedule variation for this transaction.

Note Because AEMO calls contingency gas, AEMO records that the shipper's expected gas flows will be updated by the quantity of contingency gas called, which removes the need for the market schedule variation.

9.5 Contingency gas prices

AEMO will determine a price for contingency gas for the gas day when it is called. This will be finalised after the gas day, when all contingency gas called is known.

A high contingency gas price is paid to contingency gas providers whose contingency gas increases supply and or reduces withdrawals. This price is set at the contingency gas offer price of the most expensive contingency gas provider who is called.

A low contingency gas price is paid by contingency gas providers whose contingency gas decreases supply or increases consumption. This price is set at the contingency gas bid price of the least expensive contingency gas provider called.

10 Determining Actual Gas Flows

10.1 STTM facility allocations

After the gas day, the pipeline operator for each STTM facility measures the actual gas flowed on its pipeline and then allocates this quantity to each shippers on that pipeline. In the STTM, this is referred to as an STTM facility allocation, or more generally as a “pipeline allocation”. Pipeline operators base their allocations on readings at custody transfer points on their STTM facility at a hub. How the pipeline allocations are determined is not fundamentally of concern to the STTM. The STTM will settle the market according to the allocation data provided to AEMO.

Where the pipeline allocations at a hub deviate from the pipeline schedule, the pipeline operator allocates these deviations to MOS providers in a defined order, which is provided by AEMO (see Section 8.3).

10.2 STTM distribution system allocations

Allocations to individual users (called STTM distribution system allocations) are made by AEMO as retail market operator (RMO) after the gas day using metered data provided by distributors. These are aligned with the flows measured by the facility (pipeline) operators such that the net flow at the hub on any day is zero (gas in = gas out).

Because not all meter data is known or available the day after the gas day, AEMO (as RMO) uses historical load profiles to allocate flows to users (see Section 10.3). As more meter data becomes available, these estimates are revised by AEMO and resubmitted to the STTM.

Allocation data for transmission-connected users—from deemed STTM distribution systems—is supplied by the pipeline operators.

Figure 10-1 illustrates the allocation process applied at the Adelaide and Sydney hubs, and Figure 10-2 shows the process at the Brisbane hub. The differences shown in these diagrams arise because Brisbane has multiple distribution systems and some are deemed distribution systems. As a result, the pipeline operator is required to make additional submissions (Brisbane only) so that AEMO can calculate the aggregated flows for each distribution system and determine the allocations to the transmission-connected users. In Sydney and Adelaide, however, the aggregated flows are obtained from the STTM facility allocations and there are no transmission-connected users.

There is also a timing difference, which means that the initial allocations to users made on D+1 in Adelaide and Sydney are obtained from distributor data only. The aggregated flows are applied on D+2 and recalculated. In Brisbane, however, the aggregated flows are applied on D+1.

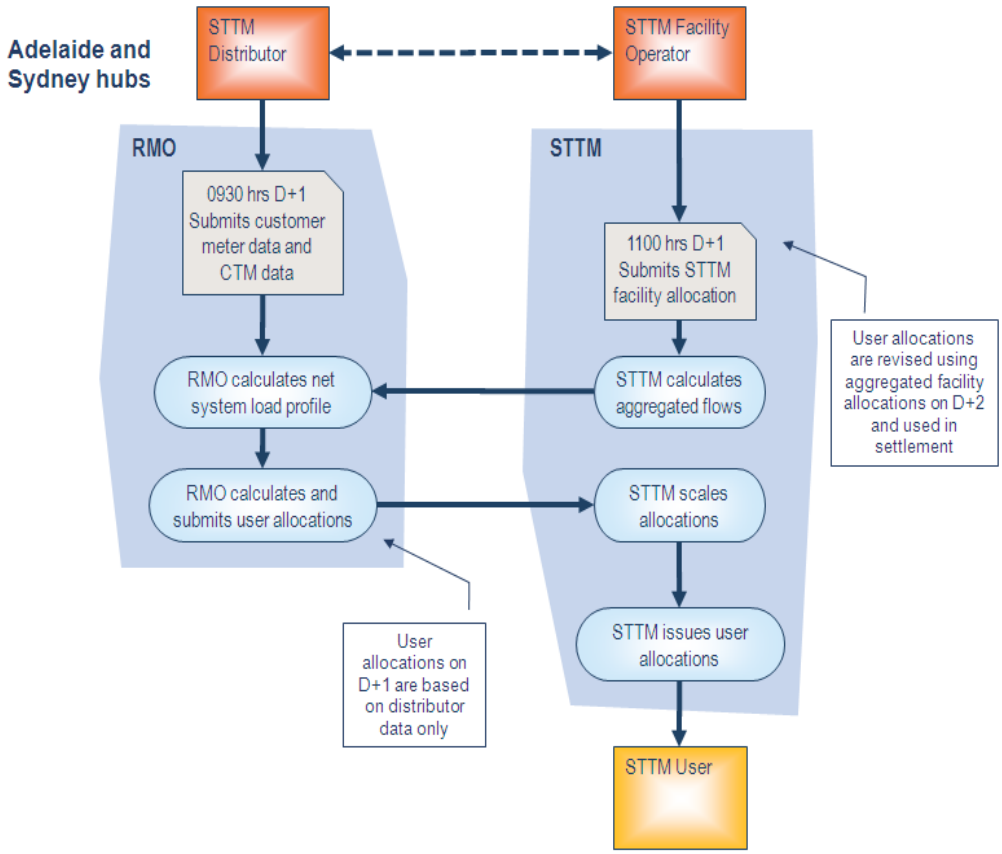

Figure 10-1 Distribution system allocation process at the Adelaide and Sydney hubs

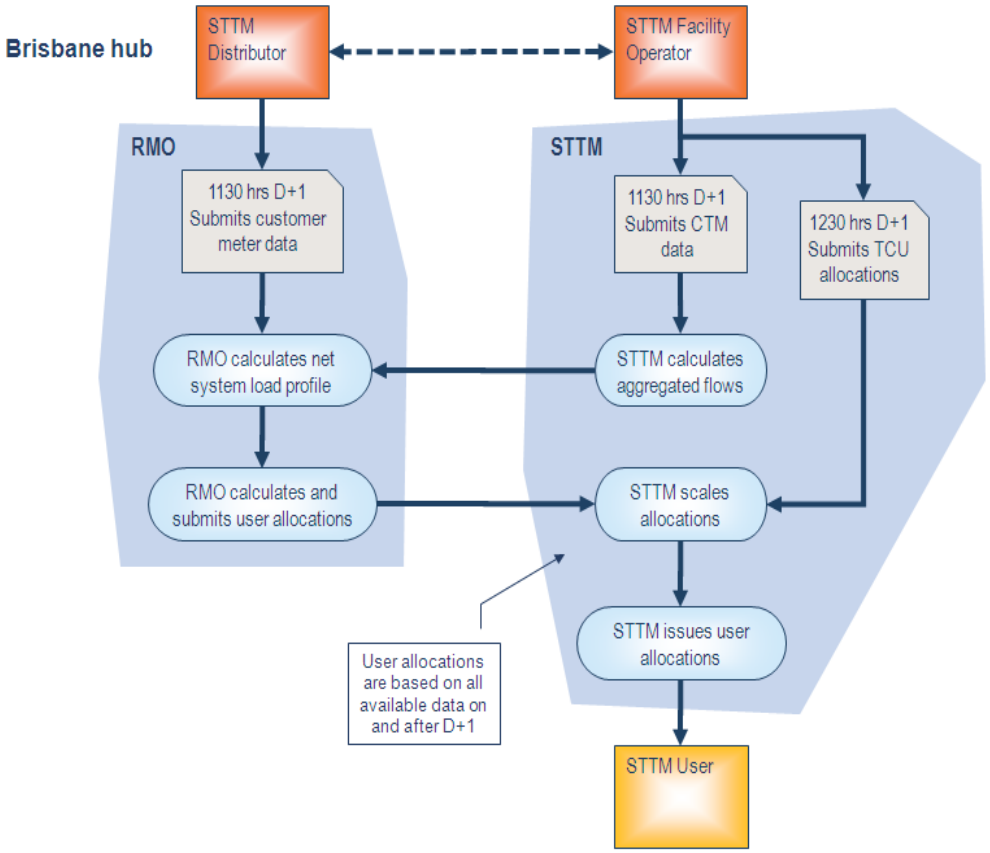

Figure 10-2 Distribution system allocation process at the Brisbane hub

Allocated flows

Figure 10-3 shows the gas that actually flowed on the gas day. Despite an intraday nomination of 3 GJ, user A consumes 21 GJ instead of the 19 GJ it forecast in the modified market schedule. This additional gas was supplied, on the day, from gas stored in pipeline 2. After the gas day, the pipeline operator for pipeline 2 allocates that additional gas to shipper C—the highest ranked MOS provider on the MOS increase stack on pipeline 2. This means that the allocations for each shipper on the two pipelines will match the day-ahead pipeline schedule, as modified by intraday nominations, and shipper C flows an additional 2 GJ of MOS gas.

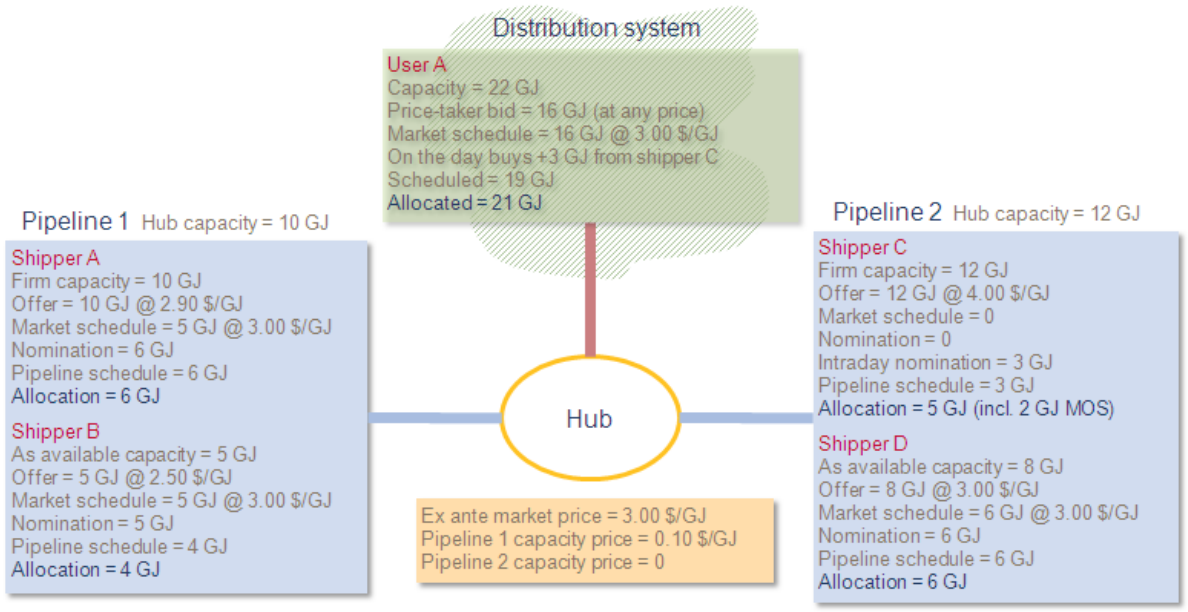

Figure 10-3 Example: pipeline allocations, distribution system allocations, and MOS

10.3 Metering and profiling

Distribution meter data is collected over a range of time frames, from sub-daily to quarterly, and to a range of resolutions. This requires that non-interval meter customers are profiled. The quality of meter data available improves over time, so the meter data provided for the first settlement run for a billing period can be expected to be inferior to that of subsequent settlement runs produced over a period of months. These are functions of AEMO in its capacity as retail market operator and are not part of the STTM.

11 Market Schedule Variations

Market schedule variations allow shippers and users to adjust their market schedules in line with their pipeline allocations and so avoid deviation charges. When a shipper deviates from its ex ante market schedule, it can submit a market schedule variation (MSV) to AEMO. MSVs are bilateral—that is, the quantity of gas by which the shipper varies from the market schedule is matched by a receiving shipper or user.

If the MSV results in a change in demand at the hub, the variation will attract a variation charge, which is designed to encourage more accurate day-ahead forecasting. The variation charge is on a sliding scale such that the larger the variation, the larger the charge. However, variations that do not change the net flow from the hub are exempt.

Consider a shipper that has been scheduled to flow 10 TJ in the ex ante market schedule and has been scheduled by the pipeline operator to flow that 10 TJ as part of their day-ahead scheduling process. On the gas day, the user informs the shipper that it expects its withdrawals to be 12 TJ instead of 10 TJ and asks the shipper to provide additional gas. The shipper makes an intraday nomination to the pipeline operator to flow an additional 2 TJ of gas. The pipeline operator schedules 12 TJ to flow for the shipper. If the shipper fails to inform AEMO that it has scheduled a further 2 TJ and to associate it with the user, then AEMO will assume that the shipper has over-supplied the market by 2 TJ and that the user has over-consumed by 2 TJ and will apply a deviation payment to the shipper and a deviation charge to the user. To avoid these deviation payments and charges, the shipper can inform AEMO of the changes as a market schedule variation. The MSV instructs AEMO to modify the shipper's market schedule by 2 TJ and the user's market schedule by 2 TJ. The modified market schedules ensure that neither party has a deviation.

11.1 Submitting market schedule variations

A shipper or user submits market schedule variations to AEMO after the event. To avoid duplication, only the supplying shipper or user (with a positive gas variation) can submit an MSV. An MSV is usually associated with an intraday nomination, but it doesn't have to be. For example, an MSV can be used to transfer the cost of a deviation from a user to a shipper. Or it might be used to correct for an error made when a shipper nominates its market scheduled flow to a pipeline operator.

Market schedule variation submissions must specify the hub, the originating shipper, the originating STTM facility, the facility contract, the receiving user or shipper, the receiving STTM facility (if hauling away from the hub on a different pipeline), the receiving participant's facility contract or distribution contract, and the quantity of the variation.

The receiving participant must confirm its acceptance of a market schedule variation before the variation can be applied in settlement. Agreements between users and shippers can span several STTM facilities; however, a market schedule variation must be submitted and confirmed for each originator-receiver pair.

Modifying the market schedule

AEMO needs to know about the intraday nomination between shipper C and user A if this transaction is to avoid deviation payments and charges. To achieve this, shipper C submits a market schedule variation to AEMO so that AEMO knows to increase shipper C's market schedule flow by 3 GJ and to increase user A's market schedule withdrawal by 3 GJ. Because MSVs only impact market settlement, shipper C can make this submission after the gas day, before the submission window closes four days later.

Figure 11-1 shows the modified market schedule resulting from the MSV and from shipper C flowing 2 GJ of gas to supply MOS. The modified market schedule reflects what AEMO expects to see flow if no deviations occur. A small market variation charge will be imposed on user A as a result of the MSV; this provides encouragement to user A to improve its forecasting.

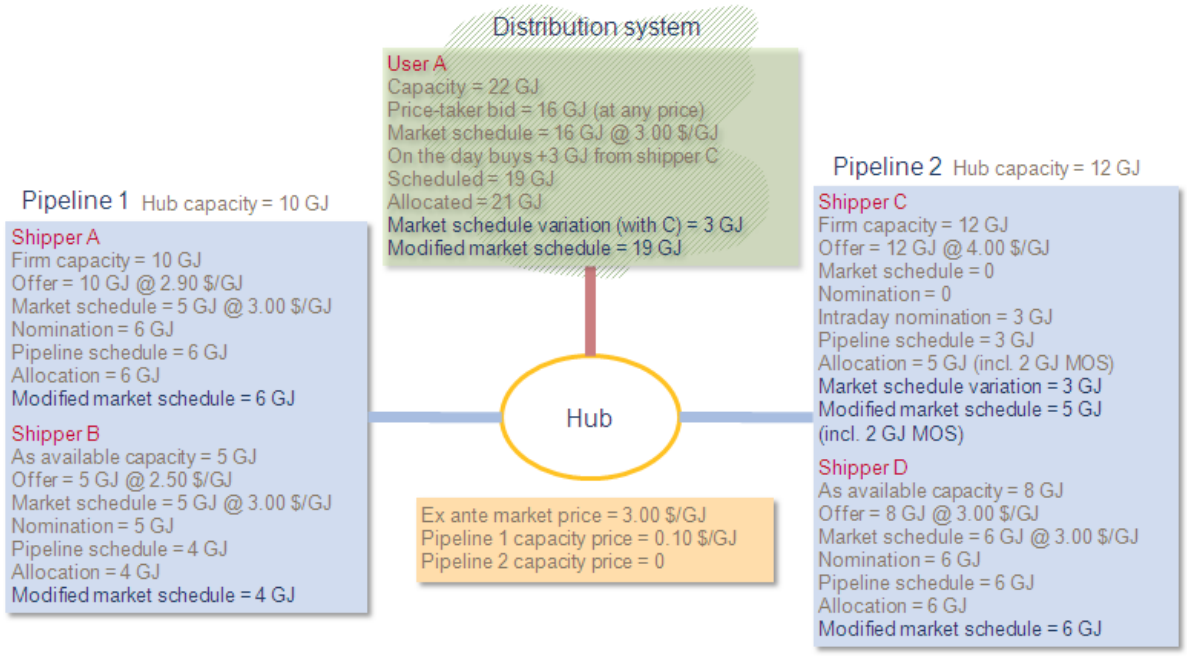

Figure 11-1 Example: market schedule variations

12 Deviations from the Market Schedule

In meeting physical demand on a gas day, actual quantities of gas that flow to and from the hub typically will not exactly match the market schedule for that gas day. Deviations are the difference in the quantity of gas that the STTM is expecting to flow—as modified by market schedule variations, MOS and contingency gas—and the actual quantity of gas that flowed on behalf of each trading participant in each of their registered roles, in each direction, on each facility.

Importantly, deviations by the same trading participant on separate facilities or in different flow directions do not balance out. And so, if a shipper does not submit a market schedule variation, an increased flow on one pipeline and an equal and opposite decreased flow on another pipeline will result in two deviations by that shipper. Similarly, a decreased flow to the hub and a decreased withdrawal at the hub by the same trading participant (registered as both shipper and user) will result in two deviations.

If a user, however, is registered on two or more distribution systems at the same hub, the deviation for that user is calculated across the hub. A user's trading right is registered at the hub level—not for each distribution system within the hub. Hence the STTM is only concerned with the total withdrawal by a user. A shipper's trading right, on the other hand, is specific to one or another pipeline or other STTM facility.

12.1 Deviation charges and payments

Deviation payments and charges reflect the impact the deviation had on the STTM and will vary for each participant. The cost of a deviation is always less attractive than if it was settled at the ex ante price (on the market schedule) or with a variation charge (on a market schedule variation). In this way, the STTM provides incentives for trading participants who are able to meet their market schedules.

Where a shipper is "long" at the hub (that is, it has supplied more gas than was required in the market schedule) or a user is long at the hub (that is, it consumed less gas than was expected in the market schedule), it will receive a deviation payment. Where a shipper or a user is "short" at the hub, it must pay for the shortfall as a deviation charge.

Deviation payments and charges are essentially used to offset the cost of MOS gas used to physically balance the hub; however, because deviations and MOS gas are calculated on a different basis, there is usually a shortfall or surplus, which is dealt with separately at settlement.

Deviations, and hence the deviation payments and charges, will vary over time as pipeline or distribution system allocations are revised. Market schedule variations, which can be submitted up to four days after the gas day, can reduce or increase a participant's deviations on any given gas day.

12.2 The ex post imbalance price

The ex post imbalance price is calculated after the gas day to determine a price that reflects the changes that actual flows to the hub would have had on the ex ante market. It is determined using the same data used to determine the ex ante market schedules and prices, but includes a dummy bid or

offer that simulates the effect of the deviations if they had been scheduled in the market. If the market was long (more gas was scheduled than consumed) on the gas day, the market supply curve (offer stack) is moved right by the quantity by which the market is long. If the market was short (more gas was consumed than scheduled), the market demand curve (bid stack) is moved right by the quantity by which the market is short.

Figure 12-1 shows the original ex ante market on the left. The other two charts illustrate how the ex post imbalance price is determined when the market is long or short. The ex post imbalance price is less than or equal to the ex ante market price when the market is long and is greater than or equal to the ex ante market price when the market is short.

The ex post imbalance price is published after the gas day and is never amended. Consequently, and because the ex post imbalance price can affect the amounts that trading participants pay or receive for deviations, the calculation of the ex post imbalance price can be delayed in certain circumstances. This occurs, typically, when allocation data from facility operators fails a validation test, and the facility operator is allowed extra time to resubmit their allocations.

Figure 12-1 Calculating the ex post imbalance price

Determining the ex post imbalance price

To determine the ex post imbalance price, AEMO re-runs the ex ante scheduling process, but adds the 5 GJ that flowed to the hub that was not scheduled in the ex ante schedule process. The ex ante market schedule provided for 16 GJ of demand, which, combined with the additional 5 GJ, gives an ex post demand at the hub of 21 GJ. In the ex ante market schedule, shipper D had an additional unused 2 GJ of gas available at 3.00 $/GJ, while shipper C had all its 12 GJ available at 4.00 $/GJ. Hence, to make up an additional 5 GJ, 2 GJ would come from shipper D and 3 GJ from shipper C (leaving 1 GJ spare capacity on pipeline 2). Therefore, shipper C sets the ex post imbalance price at the hub, that is, 4.00 $/GJ. Note that this ex post pricing run is only used to determine a price for settlement purposes; the schedules produced during the process are not used. The ex post imbalance price can be interpreted as what the ex ante price would have been had the market had perfect information as to what the supply and demand situation at the hub was going to be on the gas day.

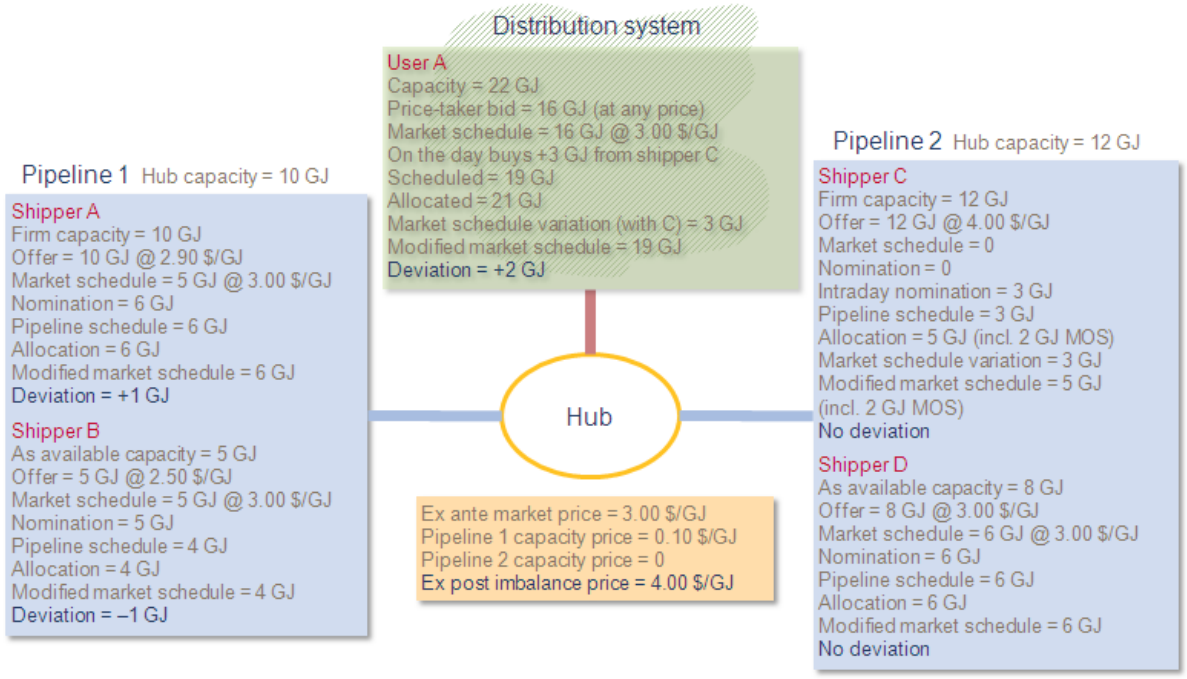

Figure 12-2 Example: deviations and ex post imbalance price

13 Limits on Prices and Risks in the Market

The NGR establishes a number of limits on market prices and charges to safeguard trading participants' exposure to inadvertent or unexpected risk. These limits include:

Market Price Cap

Market Price Cap (MPC) is the maximum price allowed in the STTM for any type of bid, offer, or market price, including STTM and contingency gas offers and bids. It is also applied by the market schedule and pricing processes when there is insufficient forecast supply to meet forecast withdrawals and caps deviation prices and the cost of trading gas under market schedule variations. Specifically, variation charges cannot exceed the difference between MPC and the ex ante market price.

Minimum Market Price

The Minimum Market Price (MMP) is the minimum price allowed in the STTM for any type of bid, offer, or market price. It is set at zero. The MMP defines the floor for the ex ante market price, the ex post hub price, and the high and low contingency gas prices. Any deviation price calculated with a value less than MMP will be reset to MMP.

The maximum capacity price possible on an STTM facility is the difference between MPC and the MMP.

Cumulative Price Threshold

The Cumulative Price Threshold (CPT) is the value that if exceeded by the cumulative total of specified maximum prices over a 6-day period will result in an administered pricing period. The administered pricing period caused by exceeding the CPT ends on the gas day when the accumulated prices for the past days plus the ex ante market price for the gas day cease to exceed the threshold. This protects participants from uncontrollable risks due to very high prices being maintained for a long period of time.

Administered Price Cap

The Administered Price Cap (APC) is the maximum market price that can be set during an administered pricing period and applies to the ex ante, ex post imbalance, and high and low contingency gas prices. An administered pricing period occurs when the CPT is exceeded or when a market price otherwise needs to be administered. During an administered price period, the market clears based on the original STTM bids and STTM offers, but all prices are capped at the APC and, in settlement, all bid and offer prices are capped at the APC.

The pipeline flow direction price is not capped by APC, although it can be defined to be zero when the market is administered.

MOS cost cap

The MOS cost cap is the maximum price that AEMO can pay for MOS service. The MOS cost cap is set as low as is necessary for MOS to be made available to AEMO, while still being greater than the cost of securing additional pipeline capacity.

14 Settlement

Settlement occurs monthly. The settlement amount is the net of all ex ante sales and purchases, deviation charges, variation charges, capacity charges, settlement revisions, and other charges and credits, including payments for MOS and contingency gas.

The settlement amount can include a settlement shortfall or surplus, which AEMO adds or deducts from settlement amounts of some or all trading participants to balance the total receipts and payments on the STTM. And to ensure that the market operates with a positive cash flow, payments are not made until all amounts owed have been paid to AEMO.

Settlements by shippers rely on the allocations by pipeline operators (or allocation agents) of the actual quantity of gas delivered by each shipper to or from the hub. Allocation agents can further allocate quantities at the trading right level for shippers. Settlements by users rely on the allocations made by AEMO of the actual quantity of gas withdrawn by each user from the hub.

14.1 Settlement processes

The STTM is settled separately at each hub. Settlement calculations are performed daily across all hubs for prudential monitoring purposes, however, invoicing and settlement only occurs monthly, for the previous month. Settlement entails trading participants receiving payment or being charged for their net settlement amount.

AEMO will provide trading participants with a preliminary settlement statement for the gas month, which allows trading participants to query the statement before it is finalised. AEMO issues a final settlement statement based on revisions arising from queries and any new non-interval meter data available for the gas month.

Any net settlement amounts owing to AEMO are paid before net settlement amounts owed by AEMO are paid out. All payments are made by electronic funds transfer.

14.2 Settlement revisions

Meter data is not finalised for some time after final settlement and, in the case of domestic meters, can be many months later. Hence the quantities of gas allocated to trading participants will change over time as meter readings are received. This affects the settlement amounts, and so they are recalculated after nine months. Trading participants will receive settlement revision payments or charges, with interest paid or charged as appropriate.

The STTM provides for further revisions to be made for a period of 18 months if there is a material impact on trading participants—for example, if a faulty meter was found to have caused significant errors.

The ex ante market price, pipeline capacity prices, pipeline flow direction constraint prices, ex post imbalance price, and contingency gas prices are not changed by a revision.

14.3 Settlement components

Calculation of the settlement amount can include:

- Charges and payments for the net quantity of gas supplied to, or withdrawn from, the hub in accordance with the ex ante market schedule, at the ex ante market price.
- Variation charges based on market schedule variations, at a small variation charge that increases as the impact of the variation increases.
- Deviation charges or payments in respect of the imbalance between gas scheduled to flow in the STTM and the pipeline or distribution system allocations, at the deviation price for each trading participant.
- MOS contract payments, at the contracted price.
- Payments for the replacement of MOS gas for gas day d, at the d+2 ex ante market price.
- Capacity charges and payments.
- Contingency gas payments and charges.
- Allocation of market surplus or shortfall to the extent that total payments to trading participants do not equal total payments from trading participants. The surplus or shortfall is allocated between trading participants based, typically, on the extent of their deviations or their total allocations over the month.
- Market fees.

14.3.1 Settlement of the ex ante market

For gas scheduled in the ex ante market, the payment to a trading participant is calculated by the ex ante market price of gas multiplied by the net supply scheduled from that trading participant as either a user or a shipper. If the net supply is positive, then the trading participant is paid by the market. If the net supply is negative, then the trading participant is a net buyer and must pay money to the market.

If the pipeline flow direction constraint price on an STTM facility is non-zero, then an additional payment is made to a shipper on that STTM facility equal to the pipeline flow direction price for that STTM facility multiplied by the net supply scheduled from that shipper on that STTM facility.

14.3.2 Settlement of variation charges

Variation charges are applied to the receiving party to a market schedule variation (MSV) when the MSV results in a change in demand at the hub. Other MSVs are free of charge.

The variation charge is calculated by two methods in quantity and percentage steps on a graduated pricing scale. The variation step charges are summed for each method, and the total that is most advantageous to the trading participant is applied. The average variation price is capped at the difference between the MPC and the ex ante market price.

Variation charges cause an increase in the market net settlement surplus.

14.3.3 Settlement of deviation payments and charges

Deviation payments and charges are applied separately to shippers for flows to and away from the hub on each STTM facility, and to deviations by users. These charges and payments are calculated separately for each deviation—by role, by hub, by facility, and by flow direction. In each case, the deviation quantity equals the difference between the pipeline allocation or distribution system allocation and the modified market schedule. The modified market schedule quantity equals the total quantity of the ex ante market schedule for a shipper supplying gas to a hub or withdrawing gas from a hub, or a user withdrawing gas from a hub, inclusive of market schedule variations, pipeline MOS allocations, and contingency gas called.The deviation charge or payment at a hub is calculated using the deviation quantity and either a short deviation price (where the supply to the hub has been decreased), or the long deviation price (where supply to the hub has been increased). The components used to determine the deviation prices for a hub and gas day include:

- Ex ante market price;
- Ex post price;
- MOS price (either MOS increase cost or MOS decrease cost); and
- High or low contingency gas price (if set).

A MOS price (average MOS cost) is calculated as either a MOS increase cost or a MOS decrease cost for each hub and gas day. The MOS price is based upon allocation data for a gas day provided by 11am (or 12.30pm) the next day (as is used for the ex post imbalance price calculations), and the ex ante price for the gas day + 2. If the ex post imbalance price is delayed, the calculation of the MOS price will also be delayed to account for changes to allocation data.

The short deviation price is the maximum of the ex ante market price, the ex post price, the increase MOS price (if any) and the high contingency gas price (if any). It is limited by maximum deviation price, or the administered price cap.

The long deviation price is the minimum of the ex ante market price, the ex post price, the decrease MOS price (if any) and the low contingency gas price (if any). It is limited by minimum deviation price.

In the case of a shipper or a user that has deviated in a manner that decreases net supply to the hub (i.e. short deviation), the shipper or user pays a deviation charge. The deviation charge is calculated by multiplying the short deviation quantity by the short deviation price.

In the case of a shipper or a user that has deviated in a manner that increases net supply to the hub (i.e. long deviation), the shipper or user receives a deviation payment. The deviation payment is calculated by multiplying the long deviation quantity by the long deviation price.

Deviation payments and charges are dependent on pipeline allocation and distribution system allocation data. Hence, deviation charges and payments can change if allocation data is revised.

14.3.4 Settlement of capacity payments and capacity charges

Shippers using as-available haulage make a capacity payment based on the gas that they actually flow on the gas day on the constrained STTM facility. Shippers using firm haulage, receive capacity payments based on the amount of gas that was offered into the ex ante market but which did not flow.

The total capacity revenue on an STTM facility is calculated by the capacity price multiplied by the lesser of the quantity of as-available gas scheduled and the quantity of firm gas offered but not scheduled, net of MOS allocations. Shippers who used as-available haulage are charged a rate equal to the total revenue divided by the total quantity of as-available haulage used. Shippers with firm

haulage who do not flow gas are paid a rate equal to the total revenue divided by the total quantity of firm gas offered but not scheduled.

For example, if the capacity price is 2.00 $/GJ on an STTM facility and 10 TJ of as-available haulage is used on that pipeline and 12 TJ of firm gas does not flow, then the total revenue recovered is 2.00 $/GJ × 10,000 GJ = $20,000. As-available shippers each pay ($20,000/10,000 GJ =) 2.00 $/GJ, and firm shippers are paid ($20,000/12,000 GJ =) 1.67 $/GJ. If, instead, 10 TJ of as-available gas had flowed and 8 TJ of firm gas had not flowed, then the total revenue recovered is 2.00 $/GJ × 8,000 GJ = $16,000. As-available shippers each pay ($16,000/10,000 GJ =) 1.60 $/GJ, and firm shippers are paid ($16,000/8,000 GJ =) 2.00 $/GJ.

14.3.5 Settlement of contingency gas

Contingency gas providers are paid or charged based on the contingency gas called, regardless of whether the service is actually delivered. However, the scheduled contingency gas is incorporated in the modified market schedules, which exposes providers who do not conform to their modified market schedules to deviation charges and payments. The contingency gas price also has a significant impact on the level of deviation charges and payments used in settlement. Hence, those who deviate during a contingency gas event (including contingency gas providers) will incur significant additional costs.

Settlement surpluses and shortfalls can also be created by calling too much contingency gas for the conditions that actually prevail. If AEMO calls 10 TJ of contingency gas, but it turns out that none is required, then it will be absorbed by MOS and the costs will be reflected in the settlement shortfall.

Participants called to provide contingency gas will be settled at the relevant contingency gas price. If a hub has a shortfall of supply, so that contingency gas offers are scheduled, then the high contingency gas price applies. Contingency gas providers who increase the quantity of gas shipped to that hub or who reduce the quantity withdrawn at that hub are paid this price.

Conversely, if a hub has a surplus of supply, so that contingency gas bids are scheduled, then the low contingency gas price applies. Contingency gas providers who decrease the quantity of gas shipped to that hub or who raise the quantity of withdrawn at that hub are charged this price.

14.3.5A Ad Hoc Charges for Contingency Gas Resettlement

Ad hoc charges for Contingency Gas Resettlement will apply where the evidence shows that a Trading Participant has not delivered contingency gas according to the contingency gas requirement.

When contingency gas is called to increase supply to the hub, the amount payable by the Trading Participant is an ad hoc charge calculated by determining the undelivered contingency gas quantity and charging for this quantity at the difference between the high contingency price and the deviation price for a long deviation quantity.

When contingency gas is called to decrease supply to the hub, the amount payable by the Trading Participant is an ad hoc charge calculated by determining the undelivered contingency gas quantity and paying for this quantity at the difference between the low contingency gas price and the deviation price for a short deviation quantity.

14.3.5B Ad Hoc Payments for Contingency Gas Resettlement

Funds received by AEMO through the ad hoc charges for Contingency Gas Resettlement will be distributed by way of ad hoc payments to other Trading Participants who are impacted as a result of the undelivered contingency gas.

Any residual funds will be distributed through the Market Surplus and Shortfall mechanism.

14.3.6 Settlement of MOS

When a pipeline operator makes a MOS allocation for a MOS provider, AEMO pays the MOS provider a service payment at the relevant MOS offer step price. In addition to the MOS service payment, the MOS provider is paid for MOS allocations which increase net flow to the hub and are charged for MOS allocations which decrease the net flow from the hub on gas day d at the gas day d+2 ex ante market price.

14.3.7 Settlement of market surplus or shortfall

The daily settlement payments to trading participants do not usually match the daily settlement charges paid by trading participants. This is caused by the pricing of deviations, market schedule variations, MOS, capacity payments, and contingency gas.

Over a billing period, AEMO accumulates the daily settlement surpluses and shortfalls at a hub and distributes the net settlement surplus or shortfall over the billing period to trading participants based on a formula that accounts for the participant's total, absolute deviation quantities and total withdrawals over that billing period.

The settlement surplus paid according to total, absolute deviations is capped such that the average surplus or shortfall cannot exceed $0.14 per GJ of deviation. This cap is designed to stop participants with very large deviation quantities and large deviation charges, which will increase the surplus, from recouping those charges as settlement shortfalls and surpluses. The balance of the shortfall or surplus plus the total of all variation charges is then distributed in proportion to the total withdrawals of each trading participant at the hub.

Settlement calculations

Figure 14-1 presents the information used when AEMO settles the gas scheduled in the ex ante market at the ex ante market price. Thus, shipper A sold 5 GJ in the ex ante market and will be paid 3.00 $/GJ for this gas. User A was scheduled to purchase 16 GJ in the ex ante market schedule and will be charged 3.00 $/GJ for this gas. Because shipper A and user A are the same entity, it will only have to pay the net of these two amounts, that is, 16 GJ x 3.00 $/GJ – 5 GJ x 3.00 $/GJ = $33.

There is no settlement of the gas traded under intraday nominations (which might be subject to MSVs) because these are settled bilaterally by the parties involved. However, user A will incur a variation charge based on its MSV.

AEMO compares the modified market schedules with the allocated flows to determine the quantities by which trading participants deviate. Shipper A has supplied 1 GJ more than AEMO expected, while shipper B has supplied 1 GJ less. After accounting for its MSV and MOS provided, shipper C matches its modified market schedule and has no deviation. Shipper D also matches its market schedule and has no deviation. User A has consumed 2 GJ more than expected.

Shipper C, as a MOS provider, has provided 2 GJ of MOS increase on pipeline 2 at a MOS increase step price of 2.00 $/GJ. So shipper C receives a service payment of $4. Let's say that the ex ante market price two days later is 6.00 $/GJ. So shipper C also receives a commodity payment of $12. The deviation payment by user A (which caused MOS to be used) will go some way to fund this, but any additional cost will be shared by participants who deviate during the billing period.

The net MOS quantity of the hub is 2 GJ (MOS increase quantity) which is provided by shipper C and no overrun MOS on the day. The MOS increase cost for the hub on the day is $8 ($4 + $12 / 2 GJ). MOS decrease cost is not determined because the MOS increase quantity is greater than the MOS decrease quantity.

The STTM makes a deviation payment to shipper A for over-supplying gas. Shipper A will be paid at the long deviation price of 3.00 $/GJ for its 1 GJ of over-supplied gas, and so it will be paid $3.

The STTM applies a deviation charge to shipper B for under-supplying gas. Shipper B will be charged at the short deviation price of 8.00 $/GJ for its 1 GJ deviation, and so pays $8. Similarly, user A is charged 8.00 $/GJ for its 2 GJ deviation, and so pays $16. Shipper C and shipper D have no deviations.

The capacity price determined in the ex ante market for the pipeline shared by shipper A and shipper B was 0.10 $/GJ. Shipper A, as a firm shipper, has paid for firm access to the pipeline but did not get to use all of that capacity because shipper B offered lower cost as-available gas. Shipper B actually flowed 4 GJ, and shipper A offered 10 GJ, but only flowed 6 GJ, so 4 GJ of haulage capacity was not flowed because of the pipeline capacity constraint. Hence shipper B pays the capacity price on 4 GJ of gas flowed, or $0.4, and shipper A receives a capacity price on the 4 GJ that it was prevented from flowing, or $0.4.

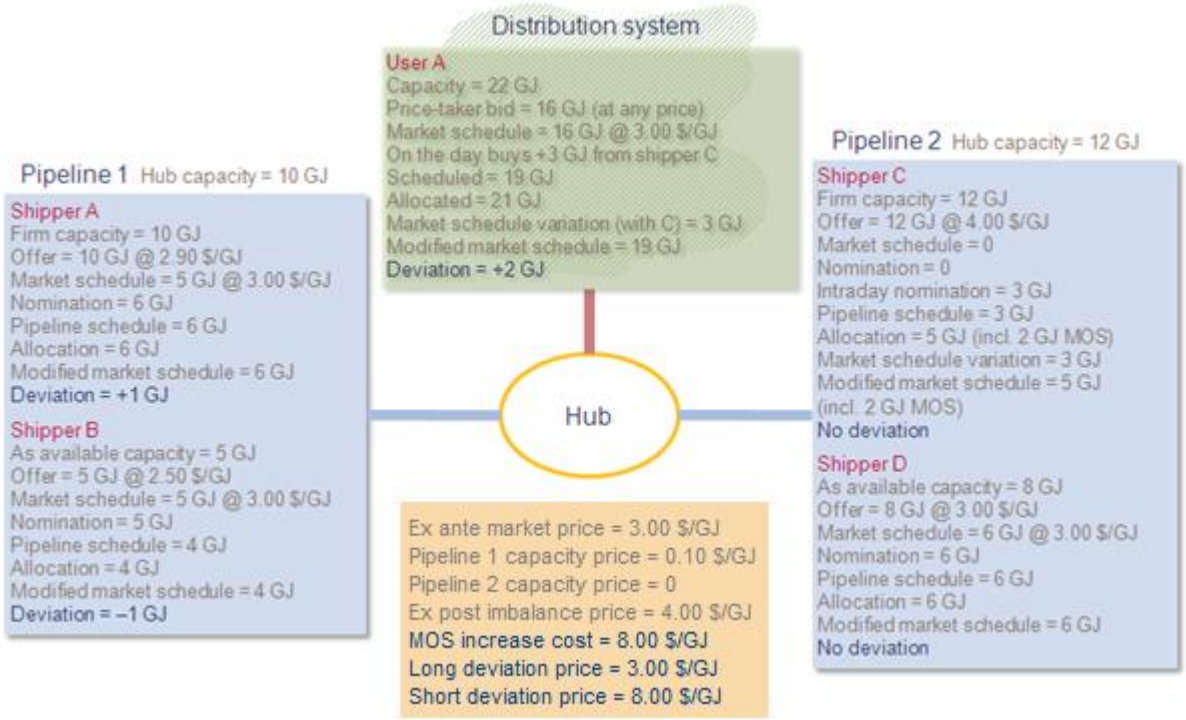

Figure 14-1 Example: market settlement data

14.4 Scheduling errors and compensation

A scheduling error occurs where AEMO fails to schedule trading participants in accordance with the NGR, such that a trading participant's schedule is inconsistent with the prevailing prices.

Compensation might apply in circumstances where a trading participant incurs cost in the market that is not funded in the market. This can occur when prices are administered or when a scheduling error occurs. Compensation is determined through a dispute resolution panel.

Compensation will not be paid in respect of errors in MOS allocations. Pipeline operators will allocate MOS based on data provided by AEMO, even if that data is in error. To the extent that the pipeline operator allocates differently to this, then this must be resolved between the shipper and the pipeline operator.

A participant compensation fund is administered by AEMO. STTM participants make regular contributions to the fund on the basis of their level of trade in the market. Compensation is only paid to the extent that the participant compensation fund can pay that compensation.

14.5 Prudential requirements

Trading participants (shippers and users) must satisfy ongoing prudential requirements to cover their expected net liability in the STTM, at any time, and across all hubs. AEMO also has the power to call on securities at short notice if a trading participant is unable to meet its settlement commitments.

Credit support is provided by trading participants to cover both known and unknown liabilities. A trading participant's known liability comprises amounts invoiced but not yet paid; and amounts calculated after the gas day but not yet invoiced. A trading participant's unknown potential liability includes amounts related to allocated gas flows for which there is no settlement calculation yet, amounts which could be incurred prior to deregistration of a participant, and revised settlement amounts from previous billing cycles.

Each trading participant determines the level of credit support they wish to provide. As a guide, this should be approximately 2.55 times the trading participant's maximum monthly exposure. AEMO will set a trading limit at 85 percent of the credit support provided. The trading limit is less than the credit support to cover the unknown, potential liability of the trading participant. For prudential purposes, a single business trading as a shipper and a user can net off trading amounts, including amounts across multiple STTM hub.

Figure 14-2 below shows the various components of the liability and how they relate to the credit support and trading limit amounts. The diagram is simplified and does not include all components used in assessing the liability.

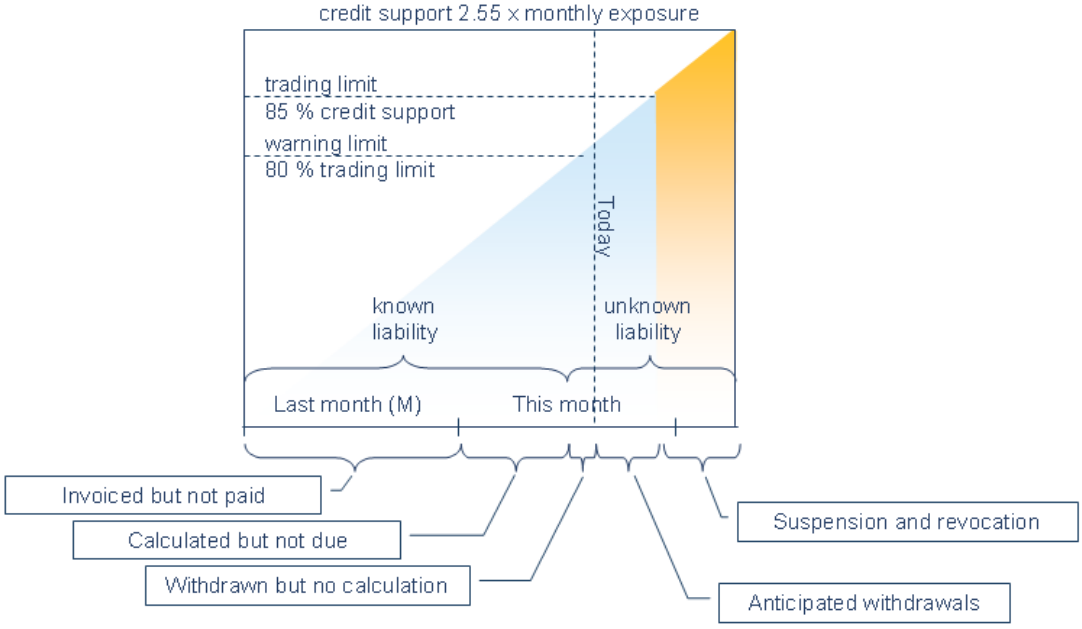

Figure 14-2 Credit support components

AEMO monitors the exposure of the market to each trading participant daily. When the trading participant's exposure reaches 80 percent of their trading limit, AEMO will advise the trading participant that it is nearing its trading limit and, if required, agree a course of action.

If the trading limit is breached, AEMO will issue a margin call and the participant must respond by increasing the amount of security cover or by pre-paying an amount against the next invoice. This must be done on the same business day or next business day, depending on when the margin call was issued. If the trading participant fails to respond to the margin call, AEMO calls in the security and suspends the trading participant until the problem has been rectified. Suspension applies to specified roles at specified hubs, and the participant can continue to operate in other roles not affected by the suspension.

AEMO can then revoke a participant if it fails to meet the conditions of the suspension notice.

Trading participants are required to inform AEMO of changes in their business or contracting arrangements that could result in a material change in the volume of business they transact with the market, such as the acquisition of another retailer.

15 Administered Market States

The NGR prescribes what actions are taken in the event of technical, governance, or other issues that might prevent the normal operation of the STTM. Schedules and prices can be administered under these events.

AEMO can invoke administered market states and suspend the normal operation of the STTM for a variety of reasons, including widespread involuntary curtailment; a period of extreme prices; invoking the Retailer of Last Resort (ROLR); interruption to supply on a transmission pipeline or distribution system; interruption to STTM processes; delays in publishing market forecasts, prices, and schedules; intervention of a government agency, and other causes.

The application of an administered state at one hub does not affect another hub.

AEMO must notify participants as soon as practicable of the application of an administered state, including in the notification the commencement time, the expected duration, and anticipated time of conclusion of the state, and the reasons for it reaching this decision. If the state must be extended beyond the expected duration, or is to be terminated, then a notification of this is also required. In the case of termination, notification must be provided with sufficient warning for normal processes to be resumed.

16 Accessing the STTM

The STTM is implemented as software and data that can be accessed on the Internet. The sources of data used by the STTM are summarised in Appendix A, and the associated business processes are listed in Appendix B.

16.1 Data security and system integrity

AEMO has implemented electronic, physical, and administrative safeguards that provide a high level of data security. These safeguards are designed to prevent unauthorised access to system data and to maintain the confidentiality of all participant information.

System integrity is assured through the disaster recovery measures employed by the STTM system architecture. These include hardware redundancy, systematic data backup and restoration, and the mirroring and replication of data on geographically separate data storage and processing systems.

16.2 Access by participants

Participants can access the processes and functions of the STTM either directly using an Internet browser, or by interfacing their business systems to the STTM.

16.2.1 Access STTM with a browser

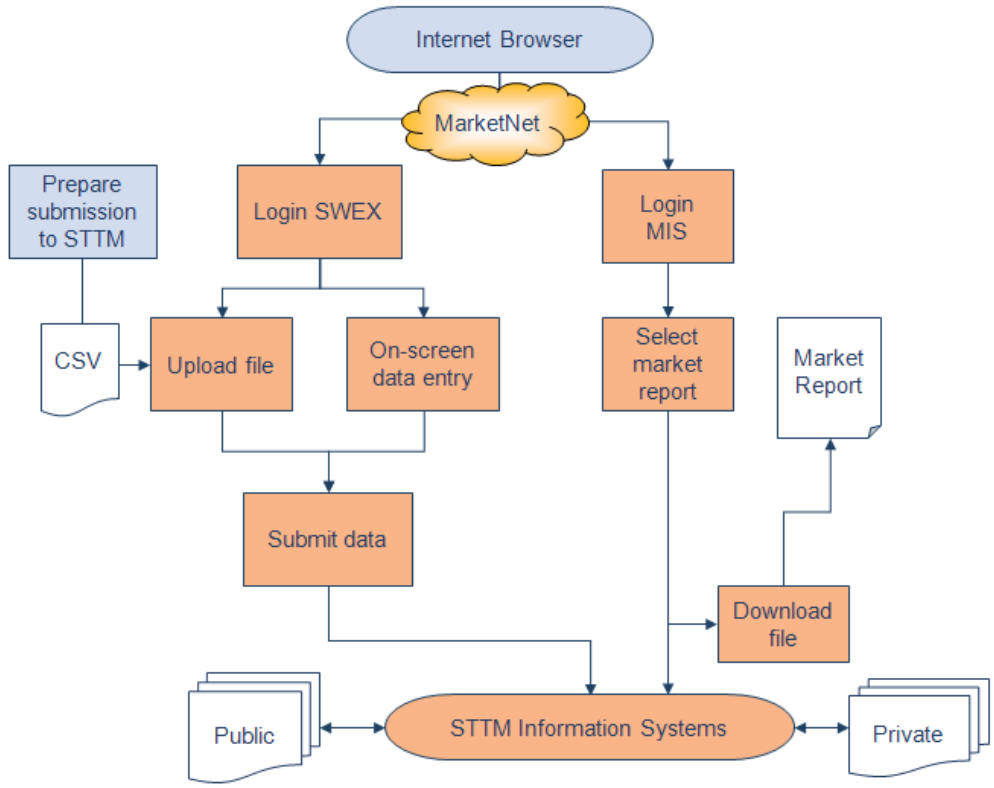

Figure 16-1 Accessing the STTM systems with a browser

When users log in to the STTM, they are presented with an interactive interface to all the data and functions that their participant account is authorised to access. Users can choose to submit data (bids, offers, trading rights data, market schedule variations, and such) by typing the data directly into the interactive forms provided, or they can upload the data as text (CSV format) files to the STTM file server.

16.2.2 Access STTM with a participant's business system

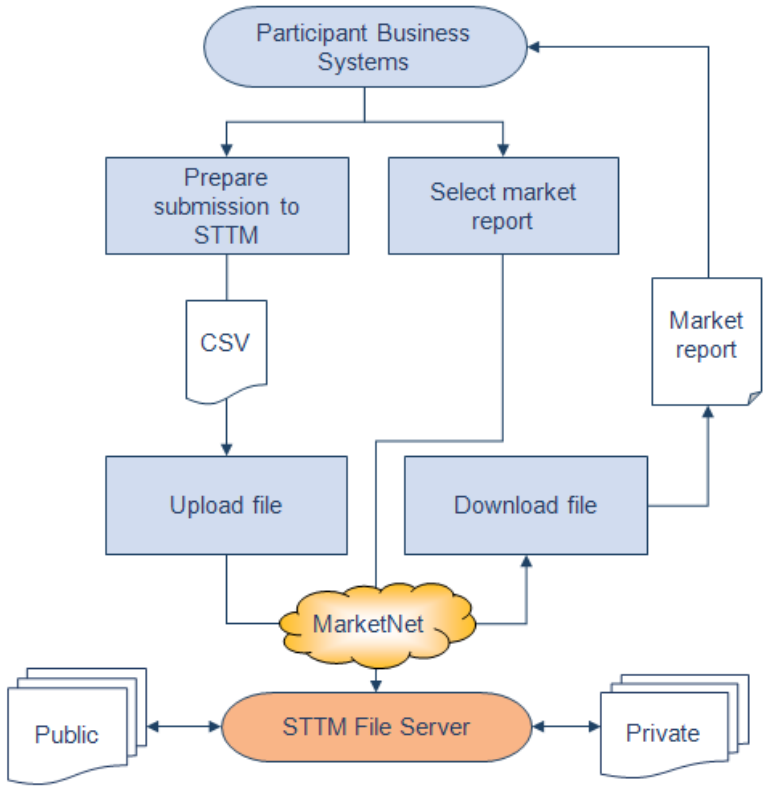

Figure 16-2 Accessing the STTM systems with a participant's business system

The *Participant Build Pack* (available from the AEMO website) details how participants can configure their business systems to communicate directly with the STTM information systems.

Appendix A Data Sources

The following table summarises the originating source for data used in the STTM.

Table A1 STTM Data Sources

Data	Source
Market parameters	AEMO
Facility service and distribution service data	shippers and users (confirmed by pipeline operators and distributors)
Ex ante bids and offers	shippers and users
STTM facility hub capacity	pipeline operators
Market schedules and prices	AEMO
STTM facility allocation (pipeline) data	pipeline operators
Custody transfer meter (CTM) data	distributors and pipeline operators
STTM deemed distribution system allocation data	pipeline operators
STTM distribution system allocation data	AEMO
Market schedule variations	shippers (confirmed by receiver)
Contingency gas bids and offers	shippers and users
Deviation estimates	AEMO
MOS offers	shippers
MOS increase stack and MOS decrease stack	AEMO

Appendix B Market Processes

The processes listed are consolidated into functional groups and do not necessarily indicate a single process in the STTM system. The “non-STTM” description indicates that, although still an AEMO process, it is not handled directly by the STTM market systems.

Table B2 Market processes

Action	Process	Actor
Registration		
Register as an STTM participant	non-STTM	All intending participants
Maintain participant registration data	STTM	AEMO
Register STTM facilities and distribution systems	non-STTM	STTM operators and distributors
Maintain STTM facility and distribution system registration data	STTM	AEMO
Register facility and distribution services and trading rights data	STTM	contract holders
Submit new trading rights data	STTM	contract holders
Confirm registered details of facility and distribution services	STTM	contract issuers
Trading and scheduling		
Issue market notices	STTM	AEMO
Publish scheduling and pricing data	STTM	AEMO
Publish provisional schedules	STTM	AEMO
Publish MOS period information	STTM	AEMO
Submit MOS offers	non-STTM	shippers
Issue MOS stacks to pipeline operators	STTM	AEMO
Submit STTM facility hub capacity data	STTM	pipeline operators
Publish STTM facility hub capacity data	STTM	AEMO
Submit ex ante bids	STTM	shippers, users
Submit price-taker bids	STTM	users
Submit ex ante offers	STTM	shippers
Publish ex ante market price data	STTM	AEMO
Issue ex ante market schedules	STTM	AEMO
Submit contingency gas bids and contingency gas offers	STTM	shippers, users
Submit nominations to pipeline operators	External	shippers
Submit intraday nominations to pipeline operators	External	shippers
Submit market schedule variations	STTM	supplying shipper
Confirm market schedule variations	STTM	receiving user or shipper
Publish ex post imbalance price	STTM	AEMO
Publish contingency gas price	STTM	AEMO
Settlement and prudential monitoring		
Submit CTM data (Brisbane)	STTM	pipeline operator

Action	Process	Actor
Submit STTM facility allocations	STTM	allocation agents (for pipeline operators)
Submit MOS price step allocations	STTM	allocation agents (for pipeline operators)
Submit STTTM deemed distribution system allocations (Brisbane)	STTM	pipeline operator
Submit STTM distribution system allocations	STTM	AEMO (as retail market operator)
Issue deviation estimates	STTM	AEMO
Submit allocation revisions	STTM	allocation agents, AEMO
Issue preliminary settlement statements	STTM	AEMO
Issue final settlement statements/invoices	STTM	AEMO
Issue settlement revision	STTM	AEMO
Submit security information	STTM	AEMO
Issue prudential monitoring notices	STTM	AEMO
Market exceptions		
Issue contingency gas notices	STTM	AEMO
Issue market administration notices	STTM	AEMO

Glossary of Terms

The descriptions in this glossary are provided only to assist the reader's understanding of the terms used in this document. For definitions of these terms, the reader should always refer to the applicable NGR. The terms listed relate to the STTM and the supply of natural gas through STTM hubs and, as such, modifiers such as "STTM …", "on a gas day", "natural gas", and "to or from the hub" are implied and have been omitted from the descriptions unless their omission might cause misreading. Selected, generic terms in common usage are also provided. Usage of obsolete or discontinued terms—indicated by (obs.)—should be avoided.

access agreement (obs.)

See *distribution contract*.

administered market state

An abnormal market state (includes Administered Price Cap State, Administered Ex Post Pricing State, Market Administered Scheduling State, and Market Administered Settlement State) under which prices, schedules, and settlements may be conducted under alternative rules.

administered price

A price that is applied during an administered pricing period.

Administered Price Cap

A price limit that is applied during an administered pricing period.

administered pricing period

An abnormal market state under which prices may be limited by the market operator.

allocation

A generic term that describes the quantity of gas allocated to a trading participant based on their facility contracts, distribution contracts, and trading rights. Allocations are guided by allocation rules that are generally based on metered flows and contractual terms. Also see *STTM facility allocation* and *STTM distribution system allocation*.

allocation agent

A party appointed by a facility operator or contract holder to determine allocations of gas flows to trading participants that are submitted to AEMO for settlement purposes.

allocation revision

An allocation that is revised after the initial allocation has been submitted, typically due to new meter data or errors.

allocation rules

The contractual rules by which gas is allocated to shippers by a pipeline operator.

as available

Pertaining to a facility contract that has a haulage priority that is not firm. Also described as *non-firm capacity* (compared with *firm capacity*).

back haul

A generic term that describes a notional process by which gas traded in the STTM is delivered upstream of the hub. Also referred to as a "negative flow" or "hauling away from the hub," and is the opposite of a "forward haul".

bid

A generic term for a submission made by a trading participant to withdraw specified quantities of gas at specified prices. Bids should, in general, be referred to explicitly by type as "ex ante bid", "price taker bid", or "contingency gas bid."

capacity charge

The charge paid by a shipper with a lower haulage priority when they displace a shipper with firm capacity on a capacity-constrained pipeline.

capacity limit

The maximum quantity of gas that can be scheduled to be withdrawn or delivered over a gas day on a facility service, distribution service, or trading right.

capacity payment

The payment made to a shipper with firm capacity when displaced by a shipper with a lower haulage priority on a capacity-constrained pipeline.

capacity price

The price calculated on each pipeline on which a capacity charge or payment is made.

constrained

An STTM facility or pipeline is said to be capacity-constrained when its capacity is fully scheduled. An STTM pipeline can also be flow-direction constrained, whereby the flow away from the hub is limited by the flow to the hub.

contingency gas

Gas that is supplied under contingency gas arrangements, which can be called when normal market processes are not expected to keep pipeline pressures within their operating limits.

contract holder

The party that acquires the ability to transport gas on a pipeline through a facility contract or to withdraw gas from a distribution system under a distribution contract.

contract issuer

The party that issues a contract that permits gas to be transported on a pipeline or a distribution system.

contract participant

The party that holds the benefit of a trading right associated with a with a registered facility service.

credit support

The financial security provided to AEMO by a trading participant.

Cumulative Price Threshold (CPT)

A price limit that, if exceeded by a basket of prices over a specified number of day, will trigger an Administered Price Cap State.

custody transfer meter (CTM)

A device for measuring, recording, and transmitting gas flow data at a custody transfer point.

custody transfer point (CTP)

The physical location at which gas passes from a pipeline, storage facility, or production facility into a distribution system.

deemed STTM distribution system

A distribution system from which a transmission-connected STTM user withdraws gas from the hub.

deemed STTM distribution system allocation

The quantity of gas allocated by an STTM pipeline operator to a transmission-connected STTM user, which is submitted to AEMO for settlement of the market.

deviation

The difference in the quantity of gas that a trading participant is scheduled to flow—as modified by market schedule variations, MOS, and contingency gas—and the actual quantity of gas that flowed. Also see *long deviation* and *short deviation*.

deviation charge

A charge paid by a trading participant for a short deviation.

deviation payment

A payment received by a trading participant for a long deviation.

deviation quantity

The quantity in GJ of a trading participant's deviation.

distribution contract

An agreement between an STTM distributor and an STTM user that allows the STTM user to transport gas across an STTM distribution system.

distribution network (obs.)

See *STTM distribution system*.

distribution service

A registered service provided under a distribution contract relating to the transportation of gas across a distribution system.

distribution system

See *STTM distribution system*.

end user

A gas consumer.

ex ante bid

A submission made by a trading participant to withdraw specified quantities of gas from a hub at specified prices on a specified gas day.

ex ante market

A generic term that describes a market in which goods are traded before the day on which they are supplied.

ex ante market price

The price of natural gas for a gas day at a hub as set out in the ex ante market schedule.

ex ante market schedule

The schedule issued by AEMO that sets out the price and quantities of natural gas that trading participants are scheduled to withdraw from and deliver to a hub on a gas day.

ex ante offer

A submission made by a trading participant to deliver specified quantities of gas to a hub at specified prices on a specified gas day.

ex post imbalance price

A price calculated after the gas day that reflects what the ex ante market price would have been if the actual allocations for a gas day had been used in the market schedule.

facility contract

Any agreement under which services are provided with respect to an STTM facility. Typically a contract between a pipeline owner or operator (contract issuer) and a shipper (contract holder) by which trading rights can be registered with AEMO.

facility service

A component service provided under a facility contract by which gas is transported or injected. Also see *registered facility service*.

final statement

The statement of the settlement amounts at the end of a billing period that a trading participant is required to pay.

firm capacity

Pertaining to a facility contract that has the highest haulage priority (compared with *non-firm capacity* or *as available*).

gas day

The 24-hour period (commencing at 6:30 a.m. AEST) over which the STTM schedules deliveries and withdrawals of gas at a hub.

haul or haulage

A generic term that describes the transportation of gas, usually on a transmission pipeline from a production facility to a hub or other delivery point.

haulage contract

See *facility contract*.

haulage priority

The priority given when a pipeline operator schedules gas on a pipeline. Also see *firm capacity* and *as available*.

high contingency gas price

The price paid for contingency gas that increases supply or reduces withdrawals in an under-supply situation.

hub

A notional gateway in the gas supply system defined by custody transfer points between pipelines and distribution systems at which the STTM schedules gas deliveries and withdrawals.

hub-connected supplier

See *STTM production facility* and *STTM storage facility*.

intraday nomination

Renominations made by shippers to pipeline operators during the gas day.

long deviation

A deviation in which an STTM shipper's allocation is greater than its modified market schedule or an STTM user's allocation is less than its modified market schedule.

long deviation price

A deviation price of a long deviation for a trading participant on a gas day for withdrawals from or supply to the hub.

low contingency gas price

The price paid for contingency gas that decreases supply or increases withdrawals in an over-supply situation.

margin call

An amount called by AEMO when a trading participant exceeds its trading limit.

market

See *short term trading market*.

market long offer

An artificial offer that is added to the ex post schedule to simulate a long market.

market short bid

An artificial bid that is added to the ex post schedule to simulate a short market.

market operator service (MOS)

A standing arrangement between AEMO (the market operator) and pipeline operators for supplying or withdrawing gas beyond the quantities provided by the pipeline schedules.

Market Price Cap (MPC)

The maximum price at which gas can be bid, offered or scheduled in the market. Formerly *Value of Lost Load (VoLL)*.

market schedule

See *ex ante market schedule*.

market schedule variation

A quantity of gas, submitted to AEMO by a trading participant, that is added to the trading participant's modified market schedule, for which there is an equal and opposite adjustment to the modified market schedule of a second trading participant. Also see *modified market schedule*.

market surplus or shortfall

The net revenue received by and paid to the market over a billing period, which is allocated to trading participants at settlement.

matched allocation

A gas flow that has been excluded from the STTM hub under the National Gas Rules.

Minimum Market Price (MMP)

The minimum price at which gas can be bid, offered or scheduled in the market.

modified market schedule

A trading participant's ex ante market schedule adjusted for confirmed market schedule variations, allocations of MOS gas, and scheduled contingency gas.

MOS

See *market operator service*.

MOS cost cap

The maximum price that the market operator will pay for MOS gas.

MOS decrease cost

The average cost of MOS for a gas day at a hub when the net total of MOS gas allocated on all facilities supplying the hub is negative (decrease MOS).

MOS decrease stack

An ordered list of price steps by which MOS gas is allocated to MOS providers when the gas flow expected under a pipeline schedule exceeds the quantity of gas that flowed.

MOS decrease offer

An offer made by a MOS provider, comprising one or more price steps, to decrease flow on a pipeline to a hub.

MOS gas

Gas that is allocated to MOS providers (shippers) under the market operator service.

MOS increase cost

The average cost of MOS for a gas day at a hub when the net total of MOS gas allocated on all facilities supplying the hub is positive (increase MOS).

MOS increase stack

An ordered list of price steps by which MOS gas is allocated to MOS providers when the gas flow expected under a pipeline schedule is less than the quantity of gas that flowed.

MOS increase offer

An offer made by a MOS provider, comprising one or more price steps, to increase flow on a pipeline to a hub.

MOS overrun

See *overrun MOS*.

MOS period

The effective dates for MOS stacks.

MOS price step

A price-quantity increment by which MOS gas increases or decreases flows to the hub. Formerly *MOS increase step* (obs.) or *MOS decrease step* (obs.).

MOS provider

An eligible contract holder (that is, a shipper on a transmission pipeline) that is included in a MOS stack.

MOS stack

See *MOS increase stack* and *MOS decrease stack*.

MOS step allocation

The quantity of gas allocated to a step in a MOS stack, which is submitted to AEMO for settlement of the market.

network (obs.)

See *STTM distribution system*.

network allocation (obs.)

See *STTM distribution system allocation*.

network operator (obs.)

See *STTM distributor*.

network user (obs.)

See *STTM user*.

nomination

The quantity of gas that a shipper nominates to a pipeline operator to be flowed on a pipeline.

non-firm capacity

See *as available*. Also see *firm capacity*.

offer

A generic term that refers to a submission made by a trading participant to deliver specified quantities of gas at specified prices (also see *price steps*). Offers should, in general, be referred to explicitly by type as “ex ante offer”, “contingency gas offer”, “MOS decrease offer” or “MOS increase offer”.

overrun MOS

A MOS allocation made when the quantities of MOS gas available in a MOS stack have been exhausted.

participants

A collective term used to describe the various parties who interact with the STTM, and can include trading participants, STTM facility operators, STTM distributors, contract issuers, and allocation agents. Note that, in the context of this document, the word “participant,” on its own, has no legal meaning, and should not be confused with *trading participant*.

pipeline

A gas transmission pipeline. Also see *STTM facility*.

pipeline allocation (obs.)

See *STTM facility allocation*.

pipeline capacity

The operational capacity of a transmission pipeline over a gas day. Also see *STTM facility hub capacity*.

pipeline deviation

The difference between the net quantity of gas in a pipeline schedule and the net quantity of gas that was determined to have flowed.

pipeline flow direction constraint price

The marginal value of increasing the quantity of gas delivered to a hub to allow an increased quantity of gas to be withdrawn from that hub on the same pipeline.

pipeline nomination

See *nomination*.

pipeline operator

See *STTM pipeline operator*.

pipeline schedule

The schedule produced by a pipeline operator that shows the quantities of gas that the operator intends to flow for each shipper on a gas day.

preliminary statement

A provisional settlement statement issued before the final statement has been issued.

price step

A price-quantity increment included in a bid or an offer or a MOS stack.

price taker bid

A bid for a quantity of gas that the STTM user will accept at any price.

price-taker withdrawal (obs.)

See *price taker bid*.

provisional schedule

A market schedule that is issued before the ex ante market schedule is finalised.

prudential requirements

The credit support requirements that AEMO imposes on trading participants.

publish, publishing

The process by which AEMO makes information publicly available on its Web site.

quantity

A quantity of natural gas measured in energy units of gigajoules (GJ).

register, registration

The processes by which AEMO recognises a party as a trading participant, or by which AEMO recognises a facility, distribution system, and related contracts and trading rights.

registered facility service

A facility service that is registered with AEMO under which gas flows are allocated to shippers. Each RFS is registered in the STTM with a unique CRN (contract registration number) identifier.

registered facility service allocation

The quantity of gas allocated to trading rights associated with a registered facility service, which is submitted to AEMO for settlement of the market.

retailer

A generic term that describes an STTM user who on-sells gas to end users.

revised statement

A settlement statement issued after the final statement has been issued that contains revised settlement amounts that the trading participant is required to pay.

RFS

See *registered facility service*.

scheduled, scheduling

The process by which AEMO resolves and sequences bids and offers in the market.

scheduling and pricing algorithm (SPA)

The logic applied to produce market schedules.

self-contracting user

A generic term that describes an STTM user who consumes the gas they buy from the STTM.

settlement

The process by which AEMO settles the market.

settlement statement

A statement of the amounts owed by or owed to a trading participant. Also see *preliminary statement*, *final statement*, and *revised statement*.

shipper

A generic term that describes a party that transports or stores gas on transmission pipelines. Also see *STTM shipper*.

short deviation

A deviation in which an STTM shipper's allocation is less than its modified market schedule or an STTM user's allocation is greater than its modified market schedule.

short deviation price

A deviation price of a short deviation for a trading participant on a gas day for withdrawals from or supply to the hub.

Short Term Trading Market (STTM)

A wholesale market for natural gas operated by AEMO.

single trading right

Informal term used to indicate the difference between a user's and a shipper's trading right. Specifically, an STTM user holds only a single trading right at a hub, whose capacity is the sum of all its registered distribution service capacities on all STTM distribution systems at that hub.

STTM distribution system

A network of distribution pipelines that (typically) supplies gas from a hub to end users. Also see *deemed STTM distribution system*.

STTM distribution system allocation

The quantity of gas allocated by AEMO (in its role as retail market operator) to an STTM user on a gas day.

STTM distributor

The operator of an STTM distribution system.

STTM facility

A transmission pipeline, production facility or storage facility that is connected to a hub.

STTM facility allocation

The quantity of gas allocated by an STTM pipeline operator to an STTM shipper, which is submitted to AEMO for settlement of the market.

STTM facility hub capacity

The operational capacity of an STTM facility to flow gas to a hub.

STTM facility operator

The operator of an STTM facility (transmission pipelines, storage facilities, and production facilities).

STTM pipeline operator

The operator of a transmission pipeline that is connected to the hub. Also see *STTM facility operator*.

STTM production facility

A production facility from which gas is injected directly into an STTM distribution system.

STTM shipper

A registered party that holds the right to transport gas from an STTM facility to a hub.

STTM storage facility

A storage facility from which gas is injected directly into an STTM distribution system.

STTM information systems

The computer software and hardware, operated by AEMO, with which participants submit and access market data.

STTM user

A registered party (retailer or end user) that holds a contract to withdraw gas from an STTM distribution system (with an STTM distributor) or a deemed STTM distribution system (with an STTM pipeline operator). Also see *transmission-connected user*.

trading limit

A credit limit placed on each trading participant based on the amount of credit support provided.

trading participant

A party with a financial role in the STTM, which can be either an *STTM shipper* or *STTM user*.

trading right

A contractual right, registered with AEMO, by which the STTM determines the quantities of gas that a trading participant can deliver to or withdraw from the hub.

trading right holder

The trading participant who is the registered holder of a trading right.

transmission pipeline

A high-pressure pipeline that transports gas from a production facility.

transmission-connected user (TCU)

A user that is connected to the high-pressure transmission system (instead of the lower pressure distribution system). Also see *deemed STTM distribution system*.

user

An *STTM user*.

Value of Lost Load (VoLL)(obs.)

See *market price cap*.

variation

See *variation quantity* and *market schedule variation*.

variation quantity

The quantity in GJ of a trading participant's market schedule variation.

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