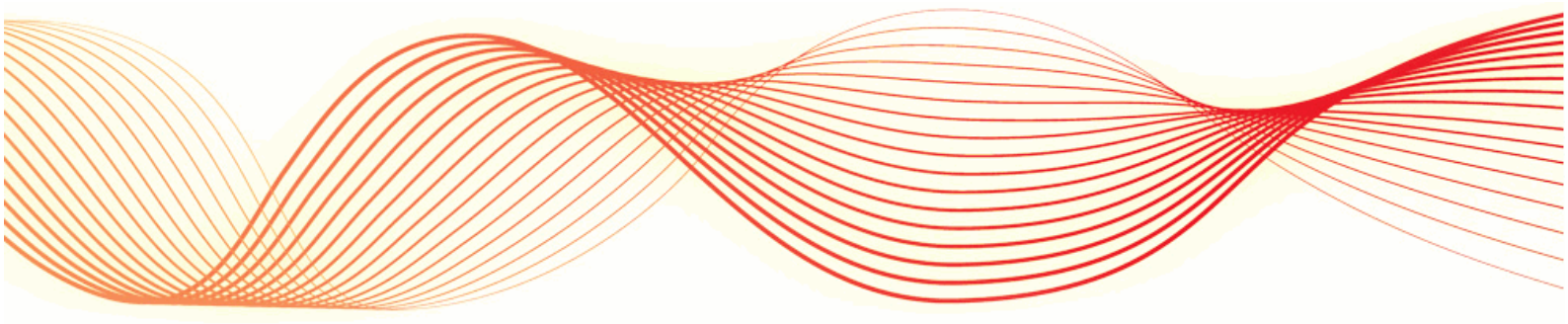

OVERVIEW OF THE SHORT TERM TRADING MARKET FOR NATURAL GAS

14 DECEMBER 2011

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

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Preface

The provisional effective date for this guide is 1 December 2011. It reflects changes that are contingent on the Queensland STTM and, as such, does not become effective for the STTM as a whole until the amended rules are proclaimed, the amended procedures are issued, and the Brisbane hub commences. Until then, readers should continue to refer to the published guides.

Further Information

For further information, please visit www.aemo.com.au or contact the appropriate AEMO help desk:

Gas Help Desk	gas.helpdesk@aemo.com.au
IT Help Desk	helpdesk@aemo.com.au

Contents

Abbreviations and Symbols

Abbreviation	Term
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
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.
EST	Eastern Standard Time
GJ	gigajoule, a unit of measure of energy equal to 10^9 joule
MCE	Ministerial Council on Energy
MOS	market operator service
NGL	National Gas Law
NGR	National Gas Rules
STTM	Short Term Trading Market (for natural gas)
T, T+n, T–n	The start of the gas day at a hub in EST, n hours after, and n hours before
TJ	terajoule, a unit of measure of energy equal to 10^{12} joule

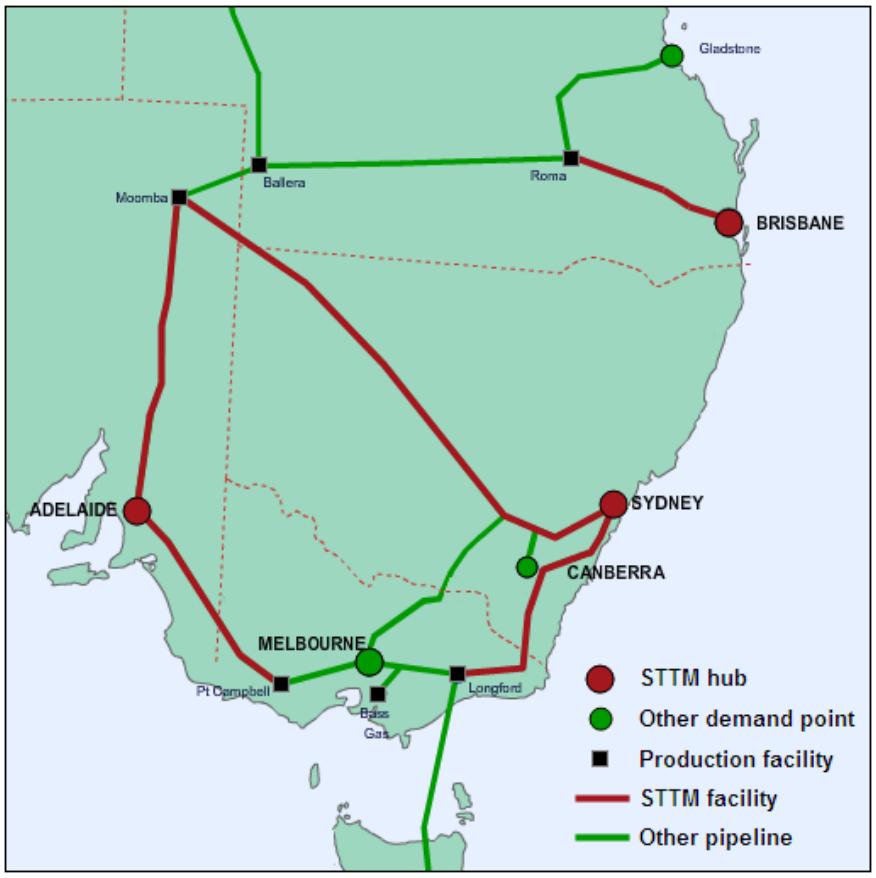
1 Background

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.

Anyone with the necessary agreements and authorities is able to buy and sell gas in the STTM. 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. 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.



STTM hubs and facilities

1.1.1 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. 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.

1.1.2 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 of offers and bids in price order.
- Shippers nominate 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, to follow their schedules, and to give timely notice when variations occur.

Capacity payments

- When a pipeline is constrained, firm shippers who are displaced by non-firm shippers are compensated for the use of their capacity.

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 the schedule.

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 are applied on market prices and charges to safeguard participants.

Settlement

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

1.2 Governance framework

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 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 the rule change procedures defined in the NGL. Compliance with the STTM rules and relevant instruments will be monitored and enforced by the Australian Energy Regulator (AER).

The law, rules, and procedures apply common regulatory provisions as far as possible, with differences handled by exception in the relevant instruments. Common areas include, but are not limited to, processes for dealing with disputes, conditions on information provision, compliance, rule and procedure change processes, AEMO fees, and liability provisions.

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.

1.3 STTM fundamentals

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 main features of the STTM for balancing gas at the hub are described, including STTM schedules, prices, processes, and arrangements, but excluding the commercial arrangements for scheduling of pipelines and settlement under contract external to the STTM. For more information about the terms and processes introduced below, refer to the more detailed descriptions in Chapter 2 “Participation” and Chapter 3 “Operation”.

The day before the gas day (D-1), users place bids to buy gas, and shippers place offers to sell gas. Trading closes five-and-a-half hours after the start of the gas day (midday in Sydney and Adelaide or 1:30 PM in Brisbane), which triggers a series of actions by the market operator (AEMO), the shipper, and the pipeline operator:

1. The market operator determines the ex ante market price at the hub and provides schedules for the gas flows to the hub required from each shipper for the next day.
2. The shipper then nominates the quantity of gas it requires from a pipeline operator.
3. The pipeline operator then prepares a pipeline schedule, which details the quantities of gas that are scheduled to be flowed over the next day for each shipper.
4. After the schedules have been issued, shippers are then able to place offers for provision of contingency gas for the gas day.

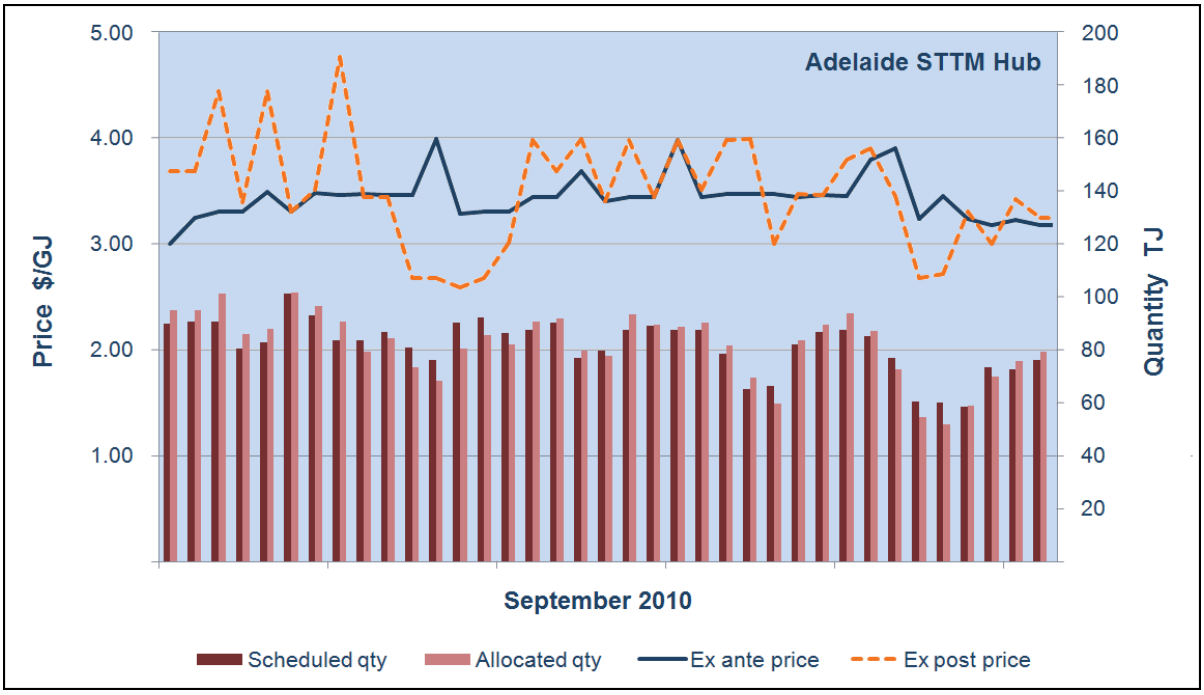
The quantities of gas scheduled by the market operator to each shipper will depend on several factors, including the price and quantity of gas the shipper offered to supply, the price and quantity of gas that users bid to purchase, and the capacity of the pipeline.

Because scheduling is price-driven, offers for lower-priced gas are scheduled in the STTM ahead of offers for higher-priced gas. On a constrained pipeline, this can result in lower-priced "as available" gas (with a low delivery priority) displacing "firm capacity" gas (with a high delivery priority). In such cases, the unscheduled, firm-capacity shipper is paid a "capacity payment", and the as-available shipper pays a “capacity charge” for the use of the contracted capacity. Capacity payments and charges are restricted to flows on the same pipeline.

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 typically will not match exactly with the ex ante market schedules. And during the day, as gas requirements become better known, and if permitted by their contracts, shippers can renominate quantities ("intraday nominations") with their pipeline operators.

The actual quantities of gas delivered to the hub are measured daily by the pipeline operator, who, the day after the gas day (D+1), provides AEMO with the quantities that were allocated to each shipper ("STTM facility allocations") on the gas day. AEMO then allocates the total of all pipeline 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.

The difference between the allocated quantities and the 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.



Market prices and quantities during the month of September 2010 at the Adelaide hub

Deviations by shippers and users are physically balanced by pipeline operators maintaining pressures at the distribution gates within agreed operating ranges. The STTM settles this balancing

gas under AEMO's market operator service (MOS) arrangements. AEMO procures the MOS gas under standing arrangements with shippers who have the capacity to absorb these daily fluctuations.

If normal STTM mechanisms are unlikely to achieve this balance, AEMO can also call on contingency gas to safeguard the continuity of supply. Contingency gas arrangements might involve increasing supply and reducing demand in an under-supply situation or reducing supply and increasing demand in an over-supply situation.

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.

Transactions can also occur off-market between traders, which might need to be reflected in the market. For example, 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 or an STTM user outside the STTM. The 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 will reduce their deviations and consequential costs. Charges are still levied on parties who make market schedule variations, but these charges are less than the costs of the equivalent deviation.

Settlement calculations are performed daily 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 sometime later when data quality has been improved by the actual or adjusted metered flows measured by the STTM distributors and pipeline operators.

2 Participation

Note The terms "distribution system", "shipper", "user", "distributor", and "pipeline operator" are used throughout this document and refer to "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 STTM roles

2.1.1 Market operator

The 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-customers.

2.1.2 Participants

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

- STTM facility operator (see Section 2.1.2.1)
- STTM shipper (see Section 2.1.2.2)
- STTM distributor (see Section 2.1.2.3)
- STTM user (see Section 2.1.2.4)
- Allocation agent (see Section 2.1.2.5)

2.1.2.1 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 STTM 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 STTM shippers.

2.1.2.2 STTM shipper

An STTM shipper has a registered, contractual right to haul gas on an STTM facility and may also be permitted to store gas in the pipeline. Shippers delivering gas upstream of the hub are only required to register as an STTM shipper if they also ship gas through the hub. Only STTM shippers are able to

offer gas for sale on the STTM (see "trading participant"). STTM shippers can also bid to withdraw gas from the hub (to replenish gas stored in the pipeline, for example).

2.1.2.3 STTM distributor

An STTM distributor manages and operates a network of gas distribution pipelines that 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.

A transmission-connected user (see Section 2.1.2.4) 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.

2.1.2.4 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 to place price-taker bids—that is, to purchase gas at any price. Large consumers who register as STTM users are referred to as self-contracting users.

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 from a transmission pipeline. Other than their contractual arrangements, there is no difference between what a transmission-connected STTM user and any other STTM user can do in the market.

2.1.2.5 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.

2.1.3 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 an STTM distribution system, then the shipper must also be registered as an STTM user, otherwise it must purchase the gas it requires from an STTM user.

2.1.4 Trading participants

Anyone who wishes to submit bids and offers at a hub must be registered by AEMO at that hub as an STTM shipper or an STTM user or both. Their registration must be supported by trading rights that allow them to haul gas on a pipeline or withdraw gas from a distribution system.

2.1.5 Prudential requirements

Trading participants (STTM shippers and STTM users) must satisfy ongoing prudential requirements to cover their expected net liability in the STTM, at any time, and across all hubs. AEMO sets a trading limit for each trading participant, which is a percentage of the credit support provided. The trading participant is required to maintain this margin as its exposure to the market changes. AEMO will assess each trading participant's liability on a daily basis against its trading limit and will, if necessary, make a margin call to bring a participant's liability within its trading limit. AEMO also has the power to call in securities at short notice if a trading participant is unable to meet its settlement commitments.

2.2 Settlement

Settlement occurs monthly. The settlement amount is 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 typically includes a settlement shortfall or surplus, which AEMO adds or deducts from settlement amounts of 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. Settlements by users rely on the allocations made by AEMO (as further adjusted by allocation agents) of the actual quantity of gas withdrawn by each user from the hub.

The STTM includes measures to limit the exposure of a trading participant to market risks through minimum and maximum prices and administered price caps, in some circumstances.

2.3 Capacity and trading rights

2.3.1 Registration of contracts

The STTM rules require that only registered contracts or trading rights are considered in operating the market. This means that any party holding rights to transport gas must register that contract with AEMO, and any party holding rights to withdraw gas must register that agreement with AEMO.

The holders of haulage or withdrawal rights need not be participants in the STTM, and can transfer all or part of its capacity to one or more shippers and users. The transferred capacity is termed an STTM "trading right". If the holder is also a trading participant for that hub, then its retained capacity also constitutes an STTM trading right. A trading participant must register its trading right with AEMO before it can trade on the STTM.

Where a hub comprises two or more distribution systems (as in Brisbane), users register each distribution service that they hold rights to at that hub. The user is then issued a single trading right for the total capacity of all distribution services they hold at that hub. The capacities of individual distribution services that make up the trading right capacity for that user are not considered when bids are placed, nor when they are scheduled.

Importantly, AEMO will only schedule gas flows up to the limit of a trading participant's trading right.

2.3.2 Pipeline 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. This information is used to schedule gas flows to and from the hub for the next gas day and to forecast flows over the following two gas days.

2.3.3 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 will always 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 costs through deviation charges and payments. This creates clear commercial drivers for users to contract for a substantial portion of their expected gas supply with firm capacity.

2.3.4 Contractual commitments

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 should cause an under- or over-supply to the hub, as far as the STTM is concerned, it will be treated as a deviation.

3 Operation

3.1 Scheduling and pricing

3.1.1 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.

3.1.2 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).

Note 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.

3.1.3 Bids and offers

Up to T+5.5 on D-1, shippers can submit offers to supply gas to a hub, and users can submit bids to procure the gas they wish to withdraw from the hub, on gas day D. Bids and offers are only accepted if the participant has appropriate trading rights to flow the gas offered or bid for. Bids and offers can comprise up to ten price-quantity steps. A user can include a quantity in a bid that is not priced, representing a withdrawal quantity that cannot be controlled by the end user—typically small-customer demand.

3.1.4 Pipeline hub capacity

The capacity of an STTM pipeline to deliver gas to the hub is not a simple limit on the gross amount of gas that can be shipped to that hub. It must take into account the gas consumed upstream, which might or might not be traded through the hub. 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 impact the pipeline hub capacity, including upstream consumption on the gas day and the actual quantity of gas delivered to the hub on D-1.

3.1.5 Market scheduling and pricing

AEMO produces market schedules that set out the quantity of gas that the shippers and users are 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 by the hub capacity and, for individual participants, by their registered trading rights at each hub.

On D-3 and D-2, AEMO produces forecasts of prices and quantities for gas day D. These are based on the then current bids and offers and demand information.

On D-1, AEMO produces the formal market schedule 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 pipeline subject to its physical capacity for day D, and each market participant is limited to their registered trading rights.

Scheduling for the STTM does not discriminate between firm and as-available (non-firm) capacity, except where equally priced offers are received for the same facility. When offers are tied, the offer from the shipper with firm capacity will be scheduled first. If the offers have the same haulage priority, then the offers will be scheduled in proportion to the quantities offered in the market.

3.1.6 Pipeline nominations and renominations

After the market schedules are published, shippers make nominations to their pipeline operators in accordance with their relevant contracts. This occurs outside the STTM. 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.

Depending on the terms of their haulage contracts, shippers are also able to renominate quantities during the gas day 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.

3.1.7 Market schedule variations

When a shipper deviates from its ex ante market schedule, it can submit a "market schedule variation" to AEMO. The variation must be matched by an opposite variation from either another shipper or a user. Market schedule variations allow shippers to adjust their schedules in line with their pipeline allocations and so avoid deviation charges.

A market schedule variation can also be submitted for a flow from the hub, which must also be matched with a variation of flow to the hub. Variations that cause a change in withdrawals at the hub attract a variation charge, which is designed to encourage more accurate day-ahead forecasting. The variation charge has a sliding scale such that the bigger the variation, the bigger the charge. However, variations that do not change the demand at the hub are exempt.

3.2 Allocations and deviations

3.2.1 Allocations

Allocations define the actual quantities flowed to and from the hub on the gas day. AEMO uses this information to settle the market. Allocations to individual shippers are provided by the pipeline operators, and the allocations to individual users are determined by AEMO using metered data provided by distributors and aligned with the pipeline allocations. Allocations for transmission-connected users are also provided by the pipeline operators.

3.2.2 Deviations

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 and the actual quantity of gas that flowed on behalf of each trading participant on each STTM facility, in each direction, and in each of their registered roles.

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." The payment is set at a relatively low price, which is less attractive than if the participant had sold or purchased that gas in the ex ante market.

Where a shipper or a user is "short" at the hub, it must pay for the shortfall as a "deviation charge." This charge is set at a relatively high price, which is less attractive than if the participant had sold or purchased that gas in the ex ante market.

Deviation payments and charges reflect the impact the deviation had on the STTM and will vary for each participant. Each deviation is assessed by the impact it had on the ex ante market price, on the ex post imbalance price (see Section 3.2.3), and, if contingency gas was called, on the contingency gas price.

Deviation payments and charges are always less attractive than if they were settled at the ex ante payment (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.

Deviation payments and charges are essentially used to balance the cost of MOS gas, which is 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.

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 seven days after the gas day, will also affect deviation payments and charges on any given gas day.

3.2.3 Ex post imbalance price

The ex post imbalance price is calculated on D+1 (the day after gas day D) to determine a price that reflects the net impact of the deviations on that gas day on the overall supply and demand situation. It is determined in a similar way to the ex ante price, but with the addition of the quantities by which net consumption at the hub increased or decreased.

The ex post imbalance price is published after the gas day and is never amended.

3.3 Capacity price and payments

The terms of haulage contracts usually give shippers with firm gas transportation rights priority over shippers with lesser priority transportation rights, such as an 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 in accordance with its market schedule, and, in doing so, has prevented a shipper with firm pipeline transportation 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, the capacity payment reflects the difference between the ex ante market price and the maximum price offer scheduled on that particular pipeline for that hub.

3.4 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 a market operator service (MOS). This balancing service is managed by AEMO through supply arrangements established with shippers and pipeline operators that have the capability of increasing or decreasing the gas flow on a gas day.

3.4.1 MOS offers

At regular intervals, AEMO seeks offers for the provision of MOS on each hub-connected transmission pipeline. MOS can be provided by one or more shippers that have a transportation contract on that pipeline, or it can be provided by the pipeline operator.

Under the terms of a MOS provision, the MOS provider agrees to accept an additional allocation quantity (positive or negative) on a gas day to balance the difference between the pipeline operator's schedule of gas flows and the total quantity allocated by the pipeline operator.

It is expected that MOS providers will utilise "park-and-loan" pipeline services or over-run facilities on forward haulage contracts to provide MOS. The offer price for MOS gas reflects the cost of this park-and-loan-type service and associated haulage, which is in addition to the cost of replacing the gas supplied.

3.4.2 Operation of MOS

Based on the prices and quantities offered by MOS providers, AEMO maintains a standing order ("MOS stack") by which pipeline deviations on a gas day are allocated to MOS providers. There are separate MOS stacks for positive and negative pipeline deviations. AEMO provides these stacks to each pipeline operator, who in turn allocates pipeline deviations to the MOS providers according to the stack order. The pipeline operator notifies AEMO of all MOS allocations.

To accommodate this service, shippers may need to collectively agree to amend the pipeline allocation rules in any associated contracts with pipeline operators.

3.4.3 Payment and replacement of MOS

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 offer price. 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 for the gas it needs to replace or run down its MOS gas allocation on the gas day.

3.5 Contingency gas

Contingency gas balances physical supply and demand at a hub if normal STTM mechanisms (including MOS) are unlikely to achieve this balance. It is implemented through an industry consultation procedure and is expected to be rarely needed.

Trading participants can submit bids and offers for contingency gas on gas day D at any time up to 1800 hrs on day D-1.

Shippers who are able to increase supply to the hub and users who able to reduce withdrawal from the hub can offer contingency gas to meet under-supply situations. These offers will be called in order of increasing price. When called, a shipper is paid at a price higher than the ex ante market price for the additional gas, and a user sells back gas that it has purchased on the ex ante market at a higher price.

Shippers able to decrease supply to the hub and users able to increase withdrawal from the hub can bid contingency gas to meet over-supply situations. These bids will be called in order of decreasing price. When called, a shipper repurchases gas that it has sold on the ex ante market at a lower price, and a user purchases gas at a reduced price.

AEMO plays a coordinating role in procuring and scheduling contingency gas but, otherwise, has no operational role during a contingency gas event.

3.6 Maximum and minimum prices

The NGR establishes a number of limits on market prices and charges to safeguard the trading participants against inadvertent or unexpected risk exposure. These limits apply to offer and bid prices, market prices, and MOS prices. The market price is also monitored over an extended period to limit periods of sustained, excessive pricing. If this running average price exceeds a defined threshold, then an administered market state (see Section 3.8) is triggered.

3.7 Settlement of the STTM

3.7.1 Settlement processes

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

Calculation of the settlement amount can include:

- The net quantity of gas supplied to, or withdrawn from, the relevant hub in accordance with the ex ante market schedule, at the ex ante market price.
- 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. These also help to cover the settlement of contingency gas and MOS gas.
- Variation charges based on market schedule variations, at a small variation charge that increases as the impact of the variation increases.
- MOS service payments, at the offered MOS step price.
- Payments for the replacement of MOS gas at the ex ante market price set for two days after the gas day on which MOS was flowed.
- Net capacity charges and payments.
- Contingency gas payments and charges.
- Allocation of a market surplus or shortfall (the net payment to and from all trading participants). The surplus or shortfall is allocated between trading participants based, typically, on the extent of their deviations and their total allocations over the month.
- Market fees.

3.7.2 Settlement revisions

Meter data is not finalised for some time after 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 cause significant errors.

3.7.3 Payment of settlement amounts

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

3.8 Abnormal conditions

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

AEMO can invoke administered market states and suspend the normal operation of the STTM for a variety of reasons. AEMO will notify participants as soon as practicable when an administered state is invoked, or if the state needs to be extended, and when it will be terminated.