PJM Credit and Clearing Analysis Project
Market Credit Comparison

June 2008

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1. Study Purpose and Approach

PJM engaged Market Reform to undertake the Credit & Clearing Analysis Project, to examine opportunities to improve how PJM manages credit risk. As an adjunct to the principal Findings & Recommendations Report, Market Reform was also engaged to prepare a series of profiles summarizing the credit practices of a selected group of markets, in electricity and other products, and a report comparing those practices – this report.

The market credit profiles were prepared based on primary documentation from the applicable market operator and/or clearing house (listed in Part 9 of each profile), supplemented in most cases by discussions and/or email correspondence with individuals from the relevant market, as well as the personal knowledge of the Market Reform team. In order to provide a common basis for comparison, the profiles do not always use the terminology that the particular market in question prefers to use, or even treat some credit topics the same. For example, some US electricity markets allow parent guarantees to be posted as collateral, whereas this study applies the common treatment that a parent guarantee is not collateral, but unsecured credit (against an affiliated entity). Ultimately, these profiles are Market Reform's assessment of how a particular market manages credit risk, not the market's own assessment.

This Market Comparison Report compares and contrasts the information gathered in the market profiles. Where sensible, it follows the sequence of discussion, and uses the terminology, in the Findings & Recommendations Report.

2. Markets Analyzed

The common feature of all the markets analyzed in this study is that they are centrally operated by a designated market operator. The scope of the study was defined to include a range of electricity cash markets – including all of the US electricity markets, and a number of international electricity markets – as well as some interesting points of contrast – a couple of markets offering electricity futures, a cash market in an energy commodity other than electricity, and a non-commodity cash market. The particular market operators studied are listed below, along with some of the factors which led to their selection:

US Electricity Cash/Spot Markets

- *California ISO (CAISO)*
- *Electric Reliability Council Of Texas (ERCOT)*
- *ISO New England (ISO NE)*
- *Midwest ISO (MISO)*
- *New York ISO (NYISO)*
- *PJM*
- *Southwest Power Pool (SPP)*

Non-US Electricity Markets

- *Elexon*: Operator of the Balancing Mechanism for Great Britain – a market with a unique market design.
- *Energy Market Company (EMC)*: Operator of the Singapore electricity market – one of the smallest markets in the world by area. Also an LMP market.
- *NEMMCO*: Operator of the Australian National Electricity Market (NEM) – one of the largest in the world by area.

- *Powernext*: Operator of the French electricity market, typical of 'spot' markets in continental Europe. Also operates an electricity futures market.
- *Single Electricity Market Operator (SEMO)*: Operator of the single electricity market for the Republic of Ireland and Northern Ireland – an electricity market operating in two countries and two currencies.

Other Markets

- *APX Gas UK*: Operator of the On-the-day Commodity Market (OCM) for natural gas in Great Britain; one of the few centrally-operated natural gas cash markets.
- *New York Mercantile Exchange (NYMEX)*: Operator of the largest futures market for energy in the world.
- *New York Stock Exchange (NYSE)*: Operator of the world's largest stock exchange.

3. General Conclusions

The comparative analysis revealed a few broad conclusions. Not unexpectedly, it indicated that energy cash markets tend to utilize settlement and credit practices that are significantly less sophisticated than futures markets, and other financial markets – including little or no knowledge prerequisite for participation, no liquidation rights, lack of credit validation on many discretionary exposures, no additional default protection beyond collateral, and uncertainty regarding the standing of the market operator in bankruptcy proceedings (in the US at least). In Market Reform's opinion this is partly driven by the complexities associated with these markets' inherent reliance on actual (versus transacted) quantities for settlement and credit management, and partly an artifact of historical settlement processes in the old utility world, in which credit risk was substantially less.

US electricity cash markets tend to dispense unsecured credit far more liberally than electricity cash markets elsewhere, and often have more generous payment terms, and therefore, more risk. Those participants in US electricity markets who do not receive unsecured credit are subject to significant collateral requirements, in large part because of these generous payment terms. While a number of markets aggregate exposures into a single collateral requirement, few seek to minimize this requirement through portfolio assessment of risk exposures (i.e. taking risk correlations into account).

The analysis also produced a number of more specific results, which are discussed in the following pages.

4. Detailed Comparison

4.1. Markets

Table 1 below provides an overview of the type of markets – cash and/or forward – operated by each market operator, and the frequency with which they transact. Also indicated is whether the cash markets on offer settle based upon transacted quantity or actual/measured quantity – a key driver of credit risk management processes and timing, given the delays inherent in receiving measured quantities, and performing settlement calculations based upon them.

Table 1 – Markets and Transaction Frequency

Market Operator	Cash Markets		Forward
	Transacted	Actual	
CAISO	Hourly, Daily	5-Minute/Hourly[1]	Annual, Monthly(CRR)[2]
ERCOT	Daily	15-Minute	Annual, Monthly
ISO-NE	Daily	5-Minute/Hourly	Annual, Monthly
MISO	Daily	5-Minute/Hourly	Annual, Monthly
NYISO	Daily	5-Minute/Hourly	Annual, Monthly
PJM	Daily	5-Minute/Hourly	Annual, Monthly
SPP	--	5-Minute/Hourly	--
Elexon	--	30-Minute	--
EMC	--	30-Minute	--
NEMMCO	--	5-Minute/30-Minute	--
Powernext	Daily, Intra-Day	--	Daily (continuous)
SEMO	--	Daily[3]	--
APX Gas UK	Daily, Intra-Day	--	Daily (continuous)
NYMEX	Daily (continuous)	--	Daily (continuous)
NYSE	Daily (continuous)	--	N/A[4]

[1] For CAISO, ISO-NE, MISO, PJM and SPP the real-time market transacts every five minutes, but the pricing period is hourly, with the market price based on the arithmetic average of 5-minute prices. Similarly, for NEMMCO market pricing is every 30 minutes, based on an average of 5-minute prices.
[2] The current FTR market operated by CAISO only operates an annual auction. The new CRR market operates annual and monthly auctions.
[3] The Irish market trades day-ahead for each half-hour the following day. Settlement is based on actual metered quantities (with prices calculated ex-post based on these quantities also).
[4] The NYSE operates forward markets but these were not of interest for the purposes of this study, and therefore were not examined.

4.2. Settlement & Credit Management Responsibility and Central Counter-Party Status

The bulk of markets analyzed, including all US electricity cash markets, carry out their own settlement and credit management functions, the exceptions being:

- *NEMMCO* (Australia) uses Austraclear, a subsidiary of the Australian Securities Exchange, to carry out banking/funds transfer functions, but carries out all other settlement and credit functions itself.
- *Powernext* (France) utilizes LCH.Clearnet to carry out all settlement and credit management functions.
- *NYSE* utilizes the Depository Trust & Clearing Corporation (DTCC) to carry out all settlement and credit management functions.

None of the US electricity cash markets act as central counter-party to trade in their markets. The use of central counter-parties is standard practice, however, in the US financial markets, including those analyzed:

- *NYMEX*, whose own clearing house serves as central counter-party.
- *NYSE*, for which the DTCC serves as central counter-party.

A number of the markets analyzed outside of the US also utilize central counter-parties:

- *APX Gas UK*, for whom APX Commodities acts as central counter-party[5].
- *Elexon*, whose subsidiary ElexonClear acts as central counter-party.
- *Powernext*, which is cleared by LCH.Clearnet, which serves as central counter-party.

4.3. Collateralization Policy

Policy towards collateralization also varies widely. In the US electricity cash markets, unsecured credit is dispensed widely, generally to companies with an investment-grade credit rating and to various unrated entities, in particular municipal entities. By contrast, full collateralization is standard policy for those operators with a pedigree in the financial markets. It is also practice for a number, though not all, energy cash market operators outside the US – though not all apply the same statistical rigor. Collateralization policy for the analyzed markets is summarized below:

Table 2 – Collateralization Policy

Market Operator	**Collateralization Policy**
CAISO	Offers unsecured credit
ERCOT	Offers unsecured credit
ISO-NE	Offers unsecured credit
MISO	Offers unsecured credit
NYISO	Offers unsecured credit
PJM	Offers unsecured credit
SPP	Offers unsecured credit
Elexon	Fully collateralized, though in the event of default, collateral held has a reasonable probability of being insufficient.
EMC	Fully collateralized.

[5] APX Gas UK is a brand name of APX Commodities.

Market Operator	Collateralization Policy
NEMMCO	Unsecured credit is technically available, though in actuality criteria are sufficiently strict that that no current market participants meet these requirements (the criteria instead serving to qualify LC providers).
Powernext	Fully collateralized
SEMO	Fully collateralized
APX Gas UK	Fully collateralized
NYMEX	Fully collateralized
NYSE	Fully collateralized

4.4. Participation Requirements

The general trend regarding participant knowledge/understanding is:

- Cash market operators do not tend to have any particular requirements vis-à-vis market understanding in order for a participant to become a member. Once an organization becomes a participant it is considered authorized to trade.
- Forward markets and stock markets (NYMEX, Powernext, NYSE) have knowledge requirements for participation, often driven by regulatory and/or legislative requirements that participants in those markets be properly authorized or licensed.

APX Gas UK straddles the two, requiring any participants to be an 'Eligible Participant' as defined in the requirements of the Financial Services Authority (FSA), which includes a stipulation that they have a "sufficient level of trading ability and competence", but participants self-certify to this requirement.

There seems to be no particular driver for the difference in practice between cash markets and other markets, other than the fact that the futures and securities markets generally have stricter regulatory requirements around trading practices.

4.5. Liquidation Rights

It is common practice in standard futures and securities markets to allow open positions to be liquidated in the event of default. Analyzed markets that allow for liquidation of forward positions are: APXGas UK, NYMEX, NYSE and Powernext.

Of the US electricity markets, only MISO and CAISO presently allow for liquidation of FTRs/CRRs.

4.6. Bid/Trading Limits

The application of credit validation limits on trading, or submissions, is summarized in Table 3 below.

Table 3 – Use of Bid/Trading Limits by Market

Market Operator	Bid/Trading Limits
CAISO	Bid validation on CRRs; submission validation on CRR transfers. No validation on cash market.
ERCOT	Bid validation on Transmission Congestion Rights. No validation on cash market.

Market Operator	Bid/Trading Limits
ISO-NE	Bid validation for 'virtual' transactions in the day-ahead market (checked at close of bidding window, rather than on submission). Validation on FTR bids.
MISO	Bid validation for 'virtual' transactions in the day-ahead market. Validation on FTR bids.
NYISO	Bid validation for 'virtual' transactions in the day-ahead market. Validation on TCC bids; Validation on ICAP bids.
PJM	Bid validation for a subset of participants, for 'virtual' transactions in the day-ahead market. Validation on FTR bids; Validation on RPM bids/offers for planned resources
SPP	None
Elexon	None
EMC	None
NEMMCO	Validation on all bid/offer submission.
Powernext	None
SEMO	None
APX Gas UK	Validation on all orders, in the cash and forward markets .
NYMEX	Validation on all order (bid/offer) submission. Credit validation of all off-exchange trades submitted for clearing.
NYSE	None

For US electricity markets, bid limits are commonplace for both FTRs (or equivalent) and 'virtual trading' on the day-ahead market. However, there are generally no such limits for 'standard' day-ahead market trading, or other 'controllable' exposures that are at the participant's discretion to incur. Only a small number of markets perform credit validation on all bids/offers submitted.

4.7. Transfer of Settlement Obligation (eSchedules)

Many electricity cash markets, including all but one US market, provide the facility for participants to request the market operator to transfer/reassign settlement obligations from one party to the other – generally on a MWh (at prevailing market price) or absolute dollar basis. These facilities go by various names – eSchedules, Financial Schedules, Bilateral Schedule, Settlement Reallocations, etc.. The common feature of these mechanisms is that they are a transfer of money in the settlement process only, and do not impact physical outcomes. What does differ, however, is their credit treatment, in particular, whether they are validated upon submission, and whether they are cancelled in the event of default. This credit treatment is summarized below, for those markets offering some form of reallocation mechanism.

Table 4 – Credit Treatment for 'Transfers of Settlement Obligation'

Market Operator	Basis	Validation	Cancellation on Default
ERCOT	MW	None	None
ISO-NE	MW	None at present. Will validate for the Forward Capacity Market	Yes – from the day a default is declared.
MISO	MW	None	None
NYISO	MW	None	None
PJM	MW	None	None
Elexon	MW, %	Only if participant is in Level 2 Default	Yes – existing allocations can be 'dis-applied', including for past days not settled.
EMC	MW	None	Yes – from the time a suspension order comes into effect.
NEMMCO	MW, $	Yes – on submission	Yes – effective from time of 'deregistration' forward.
SEMO	€/£	Yes – on submission	Yes – can cancel any agreement prior to invoice issue

4.8. *Settlement/Variation Margin – Forward Markets*

Two types of settlement apply for the forward markets – incremental settlement during the forward trading period, a process often referred to as variation margining or mark-to-market, and final settlement of the contract once it is 'delivered'. Table 5 below summarizes forward market settlement practices (both mark-to-market and delivery) for the applicable subset of markets analyzed. This shows:

- The only markets performing a mark-to-market settlement are the more 'standard' forward markets, both of which are cleared by a fully-fledged clearing house (LCH.Clearnet and NYMEX). The full clearing discipline applied in these markets is also evident in the time-to-remedy, which is substantially less than the other markets.
- Delivery billing is in most cases aligned with the cash market billing/payment cycle.

Table 5 – Forward Market Settlement Practices

Market Operator	Mark-to-Market		Delivery Billing	Time-to-Remedy[6]
	Y/N	Frequency and Lag		
CAISO	N	N/A	Billed on next cash market bill with payment prior to delivery month.	5 days
ERCOT	N	N/A	On same schedule as next (weekly) cash market bill.	2 days
ISO-NE	N	N/A	On same schedule as next (weekly) cash market bill.	1.5 days

[6] Time-to-remedy is shown in business days.

Market Operator	Mark-to-Market		Delivery Billing	Time-to-Remedy[6]
	Y/N	Frequency and Lag		
MISO	N	N/A	On same schedule as next (weekly) cash market bill.	2 days
NYISO	N	N/A	On same (monthly) schedule as cash market.	2 days
PJM	N	N/A	On same (monthly) schedule as cash market.	3 days
Powernext	Y	Each day, overnight with payment in morning.	Each day, on day of delivery (T+0)	1 hour
APX Gas UK	N	N/A	On same (monthly) schedule as cash market.	3 days
NYMEX	Y	Each day, overnight with payment in morning.	Depends on commercial terms in the cash market being delivered into.	1 hour

4.9. Settlement – Cash Markets

The principal drivers of the size of Actual Exposure, and hence aggregate credit risk, in the cash markets are the length of the billing period, and the lag between the end of the billing period and payment being made. Figure 1 below plots billing period versus payment lag for each of the analyzed markets, both expressed in terms of calendar days[7].

Practice tends to vary significantly across the markets analyzed. For the US RTOs, traditional practice for most has been monthly billing paid close to a month in arrears, but weekly billing is becoming more common. In electricity markets outside the US billing practice tends to be weekly, with some billing daily. Those markets with a financial markets pedigree tend to be the most rigorous, with daily billing, paid 1-3 days in arrears.

[7] Calendar days are used as a measure, as this best represents the risk involved (given trading occurs every day). However, these numbers are by necessity inexact, given the number of days in a month varies, as does the number of calendar days equating to a given number of business days (due to start of the period, bank holidays, etc.).

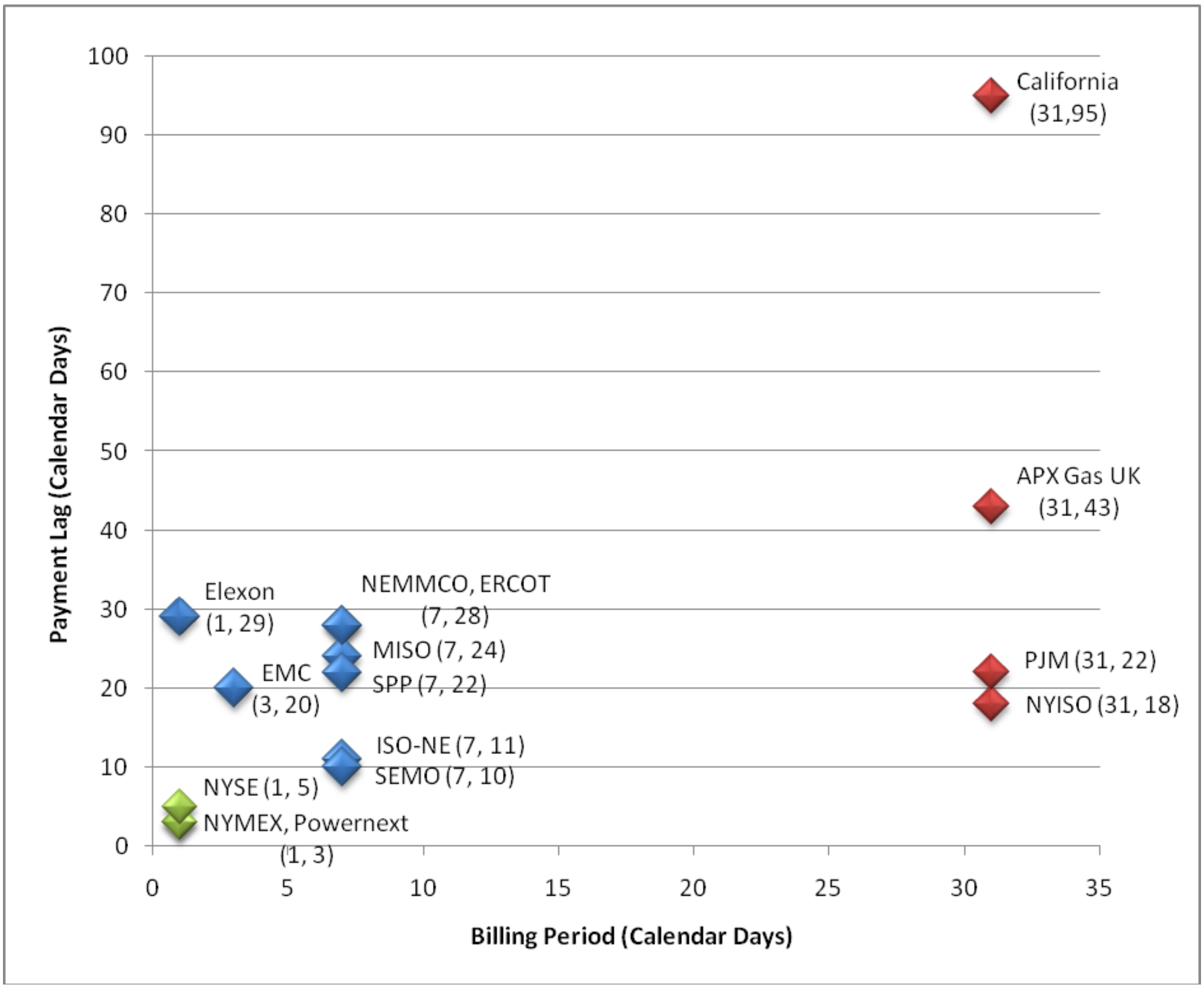

Figure 1 – Cash Market Billing/Payment Timeframes

Another settlement-related driver of aggregate credit risk is the time-to-remedy for late payment. This is discussed in Section 4.10.3 below, along with the other drivers of Future Potential Exposure.

4.10. Collateral/Credit Cover

All of the markets analyzed had some process in place for the assessment of credit exposure, and the determination of credit cover requirements based on this exposure – though the sophistication of these methodologies, and their ability to accurately assess credit risk, can vary widely. Some of the key topics related to the assessment and management of this risk are discussed, and compared by market, below.

4.10.1. Frequency of Assessment and Time-to-Post

The great majority of markets tend to assess credit exposure on a daily (business day) basis. Adjustments in collateral normally follow the same timing (as there is little use being aware of a problem if you can't act on it), though the time to post additional collateral does tend to vary somewhat between markets, and those receiving unsecured credit are often un-impacted (as few are right up against the threshold of the unsecured credit allowance).

Table 6 – Credit Cover: Frequency of Assessment and Time-to-Post

Market Operator	Frequency of Assessment	Time-to-Post (Business Days)
CAISO	Weekly	5
ERCOT	Daily	2
ISO-NE	Daily, plus intra-day adjustment for day-ahead market activity	1.5
MISO	Daily	2
NYISO	Daily	2
PJM	Twice weekly	3
SPP	Daily	3
Elexon	Each settlement period, with notice to participants daily	1
EMC	Daily	5
NEMMCO	Daily	1
Powernext	Daily, and intra-day as required	<0.5[8]
SEMO	Daily	2
APX Gas UK	Hourly	2
NYMEX	Daily, and intra-day as required	<0.5[8]
NYSE	Daily, and intra-day as required	<0.5[8]

4.10.2. Forward Market

The forward markets analyzed fall into two distinct groups:

- 'Standard' Futures Markets: which tend to transact every business day and follow the standard futures clearing house disciplines of assessing initial margin (based on worst possible move prior to liquidation, to a high degree-of-confidence) and delivery margin[9] (where applicable).
- FTR Markets: which transact infrequently and assess credit cover requirements based on FTR face value (sometimes with an offset for expected payout), aggregate across all FTR holdings – a process roughly analogous to the assessment of delivery margin. Some of these markets also perform a mark-to-market process resulting in collateral adjustments (rather than settlement). Credit cover requirements are generally assessed on a path-by-path basis .

NYMEX and Powernext are in the former category. The forward markets of APX Gas UK, while not strictly futures markets, also fit this description. The FTR (or equivalent) markets of CAISO, ERCOT, ISO-NE, MISO, PJM and SPP fall squarely into the latter group.

[8] Daily collateral calculations are performed overnight and must be posted in the morning. Intra-day collateral calls must be satisfied within an hour or two.
[9] For an explanation of initial margin and delivery margin refer to the Findings and Recommendations Report.

4.10.3. Cash Market

Exposures in the cash market, and hence credit cover requirements, are driven by the sum of Actual Exposures, Future Potential Exposures and Resettlement Exposures (see the Findings & Recommendations Report for more detail).

Actual Exposures are driven by billing period and payment lag, which are compared by market in Section 4.9 above.

Future Potential Exposures are principally driven by the time it takes until the participant can no longer incur further liabilities. This consists of:

- Time lag in calculating incurred liabilities: How long after-the-fact before actual liabilities are calculated for a trading period that has passed?
- Time between credit assessments: How long from one calculation of exposure to the next?
- Time-to-remedy: How long does a participant have to remedy a failure to pay on time?
- Time-to-transfer: If the entity has an obligation to serve retail load, how long after it is suspended from the market before all customers are moved to an alternate retailer, and the entity stops incurring liability?

These various time lags are compared by market in Table 7 below.

Table 7 – Time Lags Impacting Resettlement Exposure (in Business Days)

Market Operator	Calculating Incurred Amts	Between Credit Assessment	Time-to-Remedy	Time-to-Transfer
CAISO	38	7	5	No defined timeframe
ERCOT	1	1	2	3
ISO-NE	2-3	1	1.5	1-2
MISO	4	1	2	1-3, after FERC approval
NYISO	2	1	2	No defined timeframe
PJM	3-14	3-4	3	1-3
SPP	1	1	3	No defined timeframe
Elexon	Settlement period (1/2 hour)	Settlement period (1/2 hour)	3	No defined timeframe
EMC	1	1	2	Not defined. Not a SEMO responsibility
NEMMCO	1	1	1	1
Powernext	1		1 hour	N/A
SEMO	1	1	2	14+
APX Gas UK	1 hour	1 hour	3	N/A
NYMEX	1		1 hour	N/A
NYSE	1	Each day; as required during day.	1 hour	N/A

Resettlement exposures are most relevant to those markets which settle based on actual measured amounts[10]. Typical drivers for the magnitude of resettlement exposures are the quality of initial measurement, the cut-off window for resettlement, and the frequency with which a given day can be resettled within this cut-off window. The quality of measurement is a difficult topic to assess (other than anecdotally) without significant further investigation, and as such, was not examined. Resettlement windows in the US are typically around 12 months, and in other markets can range from 3 to 14 months. The frequency with which resettlement can be performed also varies, with some markets resettling a day as soon as new data becomes available, and including it in the next bill, while others resettle only at fixed intervals (regardless of whether revised data was available earlier).

4.10.4. Portfolio Margining

Of the market operators analyzed, the majority assess credit exposures separately in each of the markets they operate, and then levy a single credit cover requirement based on the aggregate of these exposures. Some do not even go this far, and require specific collateral postings for some markets, or require part of the participant's general collateral posting to be specifically ear-marked. The futures markets (NYMEX, Powernext) tended to be the only markets performing a portfolio assessment of exposures, taking into account the risk correlation between markets.

Table 8 – Portfolio Margining Practice

Market Operator	Portfolio Assessment of Exposures	Portfolio Determination of Credit Cover Requirements
CAISO	Assessed separately	Single collateral requirement
ERCOT	Assessed separately	Single collateral requirement
ISO-NE	Assessed separately	Single collateral requirement
MISO	Assessed separately	Single collateral posting, though with specific allocation for FTRs and virtual transactions.
NYISO	Assessed separately	Single collateral posting, though with specific allocation for FTRs and virtual transactions.
PJM	Assessed separately	Separate collateral requirement for FTR and RPM markets. Remainder is collateralized in aggregate.
SPP	Assessed separately	Single collateral requirement
Elexon	Not applicable – only one market	Single collateral requirement
EMC	Assessed on a portfolio basis	Single collateral requirement
NEMMCO	Assessed on a portfolio basis	Single collateral requirement

[10] Resettlement does occur in markets that settle based on transacted quantities, but is normally associated with the correction of errors (e.g. in price calculation), and is usually resolved within the billing period (excluding disputes).

Market Operator	Portfolio Assessment of Exposures	Portfolio Determination of Credit Cover Requirements
Powernext	DAM and forward markets assessed separately. Portfolio margining within 3-day-ahead products and between forward products.	Single collateral requirement
SEMO	Assessed separately	Single collateral requirement
APX Gas UK	Assessed separately	Single collateral requirement
NYMEX	Assessed on a portfolio basis	Single collateral requirement
NYSE	Assessed separately	Single collateral requirement

4.10.5. Credit Assessment Across Related Entities

The majority of markets analyzed assess credit at the participant level, though a number of those markets accepting unsecured credit will consider parent entities for the purposes of evaluating parent guarantees and maximum unsecured credit limits. The only markets providing comprehensive assessment across related entities (provided they are not bankruptcy remote from each other) are the futures markets. As these markets are fully collateralized, their aim is to maximize the portfolio benefit to participants, and hence keep collateral requirements down, while still ensuring risks are covered.

Table 9 – Credit Assessment Across Related Entities

Market Operator	Level Assessed
CAISO	Assessed at participant level (though CAISO has the discretion to look at parents). Maximum unsecured credit limit is assessed in aggregate with affiliates.
ERCOT	QSEs may partition themselves into subordinate QSEs and be assessed at the parent. Maximum unsecured credit limit is assessed in aggregate with affiliates.
ISO-NE	Assessed at participant level, though maximum unsecured credit limit assessed in aggregate with affiliates. Parent's financial strength will also be considered if a parent guarantee is lodged (the extent to which a parent guarantee can be utilized is limited by rating).
MISO	Assessed at participant level, though maximum unsecured credit limit assessed in aggregate with affiliates. Parent's financial strength will also be considered if a parent guarantee is lodged.
NYISO	Assessed at participant level. Parent's financial strength will also be considered if a parent guarantee is lodged.
PJM	Assessed at participant level, though maximum unsecured credit limit assessed in aggregate with affiliates. Parent's financial strength will also be considered if a parent guarantee is lodged.

Market Operator	Level Assessed
SPP	Assessed at participant level, though maximum unsecured credit limit assessed in aggregate with affiliates. Parent's financial strength will also be considered if a parent guarantee is lodged.
Elexon	Assessed at participant (BSC Party) level.
EMC	Assessed at participant level.
NEMMCO	Assessed at participant level.
Powernext	Assessed at the level of 'Financial Group', which includes parent/child and affiliated entity relationships.
SEMO	Assessed at participant level.
APX Gas UK	Assessed at participant level.
NYMEX	Determined at highest level, to allow for collateral offset (excluding entities which are bankruptcy-remote from each other).
NYSE	Assessed at participant level, although rules allow for entry sponsored by a parent in certain circumstances.

4.10.6. Unsecured Credit

Table 10 below provides a brief summary of the methodology for unsecured credit calculation for each of the analyzed markets offering unsecured credit, as well as caps on unsecured credit allowance – both as a financial amount, and as a percentage of overall market activity.

Table 10 – Unsecured Credit Methodology and Limits

Market Operator	Methodology for Calculation	$ Limit	Concentration Limit (%)
CAISO	For investment-grade rated entities, based on Tangible Net Worth times % factor based on ratings. Separate evaluation for publicly-owned entities – receive $1m automatically.	$250 million	--
ERCOT	Must be investment grade or equivalent. Based on Minimum Long-Term or Issuer Rating, minimum equity level, minimum average times/interest earning ration (TIER) and debt service coverage (DSC) ratios, and minimum equity ratios.	$100 million	--

Market Operator	Methodology for Calculation	$ Limit	Concentration Limit (%)
ISO-NE	For investment-grade rated entities, Tangible Net Worth times % factor based on rating. All ratings are discounted by one level. For unrated entities, 0.5% times Tangible Net Worth. For municipal entities, fixed at $75m.	$75m $25m $75m	20%
MISO	Tangible Net Worth times % factor based on MISO credit score. For non-public entities, credit score based on 60% quantitative/40% qualitative measures. For public entities, the ratio is 40%/60%. MISO does not require commercial ratings (but may consider them if available).	$75m	--
NYISO	For investment grade rated entities, based on Tangible Net Worth times % factor based on ratings. Separate evaluation for municipal entities, considering other factors.	--	20%
PJM	For investment grade rated entities, based on Tangible Net Worth times % factor based on ratings. Separate evaluation for municipal entities, considering other factors.	Based on PJM credit score. Ranges from $5m to $150m	--
SPP	For investment grade rated entities, based on Tangible Net Worth times % factor based on ratings. Separate evaluation of Non-for-Profit Credit customers, considering other factors.	$25m	--
NEMMCO	Must be rated A-1 or better to qualify for unsecured credit. In actuality these criteria are such that no current participants qualify, and they instead serve as the requirement for LC providers.	--	--

Most of the surveyed markets review unsecured credit allowances quarterly, when new financial statements generally become available (though one or two remain on annual review). Most also reserve the right to review allowances whenever a rating adjustment is made, or other material credit event occurs.

4.10.7. Minimum Collateral Requirement

Minimum collateral requirements for the analyzed markets are summarized below.

Table 11 – Minimum Collateral Requirements

Market Operator	Minimum Collateral Requirement
CAISO	None
ERCOT	None
ISO-NE	None
MISO	$38,000
NYISO	None
PJM	$50,000
SPP	None
Elexon	None
EMC	None
NEMMCO	A$100,000 until metering data obtained; no minimum thereafter.
Powernext	€50,000
SEMO	€30,000 per supplier (i.e. LSE) €5,000 per generator
APX Gas UK	None
NYMEX	None; though a participant's clearing member may impose requirements
NYSE	$10,000; $5,000 for a mutual fund or insurance member

4.10.8. Forms of Collateral

Table 12 below summarizes the acceptable forms of collateral in the markets analyzed.

Table 12 – Acceptable Collateral

Market Operator	Cash	LCs	Treasuries	Other
CAISO	Y	Y	--	Surety bonds, CDs, payment bond certificates, escrow accounts
ERCOT	Y	Y	--	Surety bonds
ISO-NE	Y	Y	Y	--
MISO	Y	Y	--	--
NYISO	Y	Y	--	Surety bonds

Market Operator	Cash	LCs	Treasuries	Other
PJM	Y	Y	--	--
SPP	Y	Y	--	--
Elexon	Y	Y	--	--
EMC	Y	Y	Y	--
NEMMCO	Y	Y	--	--
Powernext	Y	Y	Y	--
SEMO	Y	Y	--	--
APX Gas UK	Y	Y	--	--
NYMEX	Y	Y <50%	Y	Shares of some money market mutual funds
NYSE	Y >40%	--	Y	US Govt. backed agency securities

4.11. Default Management

4.11.1. Additional Default Protections

A small number of the markets analyzed employ additional default protections as a buffer between collateral holdings and default socialization:

- *ISO-NE*: Third-party credit insurance is held on entities that receive unsecured credit. In addition, the 'late fee payment account' can be drawn upon (though this does not provide a substantial buffer).
- *NYMEX*: The Guarantee Fund is drawn upon (first the defaulting member's contribution, then all other members' contributions), followed by a default insurance policy.
- *NYSE*: Up to 25% of the retained earnings of the NSCC division of DTCC can be used.
- *Powernext (LCH.Clearnet)*: The Clearing Fund is drawn upon (first the defaulting member's contribution, then all other members' contributions), followed by the capital of LCH.Clearnet.

As expected, this list is dominated by the futures and securities markets, with ISO New England being the only electricity cash market entity utilizing additional protections.

The list above does not include various working capital funds maintained by some markets, which may be used for short-term liquidity in the event of default, but invariably must be repaid, using funds obtained through socialization if necessary.

4.11.2. Default Socialization

Table 13 below summarizes, for those market analyzed, the basis for socialization of any residual default amounts (i.e. amounts not covered by other financial resources).

Table 13 – Socialization of Residual Default

Market Operator	Residual Amounts Socialized To
CAISO	ISO Creditors (which for the most part means generators)
ERCOT	QSEs representing LSEs (which basically means load)
ISO-NE	All participants
MISO	All participants
NYISO	All participants
PJM	All participants
SPP	All participants
Elexon	All participants
EMC	All participants, excluding the transmission licensee
NEMMCO	Generators
Powernext	No socialization. The LCH.Clearnet clearing structures take on risk of any residual amounts.
SEMO	Generators
APX Gas UK	No socialization. APX Gas UK takes on the risk of any residual default.
NYMEX	All clearing members, based on capitalization, with a cap of $30m per clearing member per default.
NYSE	All Clearing Fund participants.

Where amounts are socialized to other market participants (as opposed to the clearing members of a clearing house), this is generally based on a pro-rata share of market activity during the period of default.

This table addresses only the final disposition of a socialized default. The procedures in some markets result in initial short-payment to some parties in the event of a payment failure (generally due to cashflow considerations), which is trued up later when the final socialization rules are applied. This table does not address these interim short-payments.

Appendix A – Acknowledgements

We gratefully acknowledge the assistance of all those who generously gave their time to contribute to this study, through interviews and/or email correspondence:

- Cheryl Arnold, ISO New England
- Peter Davies, Elexon
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- Tom Fritsche, SPP
- Phil Gootee, Midwest ISO
- Kevin King, California ISO
- Hal Loomis, PJM
- Phil McCraw, SPP
- Mei Yee Yuen, EMC Singapore
- Chris Muffett, NEMMCO
- Sheri Prevratil, New York ISO
- Vanessa Spells, ERCOT
- Steve Wilkin, Elexon

Appendix B – Credit Profiles

The following pages contain the credit profiles for:

APX Gas UK
California ISO (CAISO)
Electric Reliability Council Of Texas (ERCOT)
Elexon, Great Britain
Energy Market Company (EMC), Singapore
ISO New England (ISO NE)
Midwest ISO (MISO)
NEMMCO, Australia
New York ISO (NYISO)
New York Mercantile Exchange (NYMEX)
New York Stock Exchange (NYSE)
PJM
Powernext, France
Single Electricity Market Operator (SEMO), Ireland and Northern Ireland
Southwest Power Pool (SPP)

Credit Profile – APX Gas UK

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

APX Gas UK[11] operates the on-the-day commodity market (OCM) for natural gas in Great Britain, providing a real-time 24 hours a day facility to buy and sell within-day and day-ahead gas at the National Balancing Point (NBP). Products are traded continuously and settled against traded quantity.

2) Which forward markets are operated? How frequently do they transact?

GPF (Gas Physical Futures) market provides for the trading of gas up to seven days in advance of delivery, through prompt days, weekend, balance-of-week and working-days-next-week products.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

APX Gas UK carries out these functions itself.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

Yes. APX Commodities Ltd is the central counter-party for trades.

c) Is unsecured credit provided? If so, on what basis?

No. A member's Net Exposure (see answer 4(d)) must be covered by collateral.

d) Is there a minimum credit requirement for participation in the market?

No.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

Credit risk for a member is aggregated for OCM and GPF markets.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

Invoices cover one month and are issued 23 business days after the end of the month. Payment is due 12 calendar days after the invoice is published. Hence the payment lag is approximately 73 days after the first day in the invoiced month, and approximately 43 days after the last day in the invoiced month.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

Yes, by the end of the third business day after the payment was due.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

No. APX Gas UK has no responsibilities related to retail load.

d) How are a participant's credit limit and collateral requirements determined?

A member must ensure that their:

Net Exposure < Approved Credit Limit

[11] APX Gas UK is a brand name of APX Commodities Ltd.

APX Gas UK sets the Approved Credit Limit for the member. It is set at the sole discretion of APX Gas UK, but in practice is equal to the collateral posted by the member. Hence, the process is that a member decides what its maximum exposure is likely to be and posts collateral accordingly. APX Gas UK then sets the approved credit limit accordingly.

Net Exposure includes:

- Net invoiced amounts due
- Net amounts due yet to be invoiced
- Order margin – exposure related to orders (i.e. bids/offers) that have been posted but not yet executed
- Any other amounts due

In addition, a member may provide Short Term Security for payments due. This form of collateral has the effect of reducing Net Exposure, but does not constitute a change in the Approved Credit Limit.

e) How frequently are credit limits and collateral requirements reviewed?

Routinely, six months after entry for a new member, then, subsequently, annually. APX Gas UK may review the credit limit at any time where there are indications that the creditworthiness of the member might be deteriorating.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

A margin run is executed each hour to compare Net Exposure with Approved Credit Limit and collateral posted.

g) Are bidding/ trading limits imposed for credit purposes?

Yes. When an order is presented, the member's Net Exposure is recalculated and compared with its Approved Credit Limit. A member must not place an order that would result in their Net Exposure exceeding their Approved Credit Limit: the system will reject any orders that are inconsistent with this criterion.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

No, not for settlement. Invoiced amounts are calculated on the day before delivery. However, the Net Exposure calculation involves marking to market (see Question 5(e), (f)).

b) When a position goes to 'delivery', what is the billing period and payment lag?

Invoices cover one month and are issued 23 business days after the end of the month. Payment is due 12 calendar days after the invoice is published. Hence the payment lag is approximately 73 days after the first day in the invoiced month, and approximately 43 days after the last day in the invoiced month.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Yes, by the end of the third business day after the payment was due.

d) If a participant is in default, does the market operator liquidate its open positions?

Yes. The relevant section of the rules states "In case of an Event of Default or Potential Event of Default in respect of a Member, APX Gas UK may buy, sell or enter into as many Products at such times and at such prices as APX Gas UK in its absolute discretion considers necessary either for its own account or as agent for the Member……"

e) How are a participant's credit limit and collateral requirements determined?

A member must ensure that their:

Net Exposure < Approved Credit Limit

APX Gas UK sets the Approved Credit Limit for the member. It is set at the sole discretion of APX Gas UK, but in practice is equal to the collateral posted by the member. Hence, the process is that a member decides what its maximum exposure is likely to be and posts collateral accordingly. APX Gas UK then sets the approved credit limit accordingly.

Net Exposure includes:

- Net invoiced amounts due
- Net amounts due yet to be invoiced
- Delivery Margin (calculated for positions for which trading is closed but delivery is not yet complete)
- Initial Margin (to reflect expected cost of closing out a defaulting members open positions which are still available for trading, in the event of default)
- Variation Margin (to reflect difference between contract market price and prevailing market price of positions for which trading is not yet closed – this margin is accrued as a collateral requirement, rather than being settled)
- Order Margin (calculated at the point of order submission, and to reflect the initial margin that would be charged, if the order were matched)
- Any other amounts due

In addition, a member may provide Short Term Security for payments due. This form of collateral has the effect of reducing Net Exposure, but does not constitute a change in the Approved Credit Limit.

f) How frequently are credit limits and collateral requirements reviewed?

A margin run is executed each hour to compare Net Exposure with Approved Credit Limit and collateral posted. This margin run includes a calculation of Variation Margin, which in effect is a mark-to-market.

g) Are bidding/ trading limits imposed for credit purposes?

Yes. When an order is presented, the member's Net Exposure is recalculated and compared with its Approved Credit Limit. A member must not place an order that would result in their Net Exposure exceeding their Approved Credit Limit: the system will reject any orders that are inconsistent with this criterion.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

No.

b) Is there any credit validation on submission of a settlement reallocation?

Not applicable.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Not applicable.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Two business days.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

No unsecured credit provided.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Credit assessed at the level of member.

d) What forms of collateral are acceptable?

Cash and irrevocable standby letter of credit. Funds must be received within 24 hours of the presentation of the letter of credit.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No. If for any reason the collateral posted is inadequate to cover liabilities, then APX Commodities Ltd bears the cost of the default.

There is no socialization at present. However, other members of the APX group do have arrangements for mutualisation; the introduction of similar provisions is being considered for APX Gas UK.

f) To whom are any residual default amounts socialized?

No socialization.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

APX Gas UK requires that members qualify as an "Eligible Counter-party" and an "Eligible Participant", reflecting the regulatory requirements of the Financial Services Authority (FSA). As an Eligible Counter-party the member is not entitled to certain regulatory protections that apply to Professional and Retail clients.

As an Eligible Participant, the member must be (reflecting FSA rules):

1. An investment firm, or
2. A credit institutions, or
3. Other person who:
   - Is fit and proper;
   - Has a sufficient level of trading ability and competence;
   - Has adequate organisational arrangements;
   - Has sufficient resources taking into account the financial arrangements established by APX Gas UK in order to guarantee the adequate settlement of transactions.

Members are required to self certify that they are an Eligible Participant, and are required to inform APX Gas UK if at any time they cease to meet the requirements.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- APX Market Rules, Version 8.0

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- George Frankland, APX, London (interviewed May 2008)

Credit Profile – California ISO (CAISO)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

CAISO operates the following cash markets:

- **Day Ahead Market**: Balanced schedules day-ahead for each hour of the following day; settles based on day-ahead prices and usage charges against Final Schedules.
- **Hour Ahead Market**: Balanced schedules hour-ahead for each hour of the trade day; settles based on hour-ahead prices and usage charges against Final Schedules.
- **Real-Time market**: For balancing on the day; transacts every five minutes, with prices averaged out on an hourly basis; settles against actual
- **Ancillary Services Markets**: Ancillary services markets for regulation, spinning reserve, non-spinning reserve, and replacement reserve on a day-ahead and hour-ahead basis; settles based on awarded quantities for each ancillary service.

2) Which forward markets are operated? How frequently do they transact?

- **Firm Transmission Rights (FTR) Market:** market for financial instruments entitling holders to payments based on the price differential (in the DAM) between zones; can be acquired in annual auction and/or secondary market; settled based on traded quantities and day ahead usage charges. These will be replaced with CRRs with the rollout of MRTU (see next bullet).
- **Congestion Revenue Rights (CRR) Markets**: **-** market for financial instruments entitling holders to payments based on the price differential (in the DAM) between prices at two specified points (nodes or aggregate points); can be acquired in auctions (annual and monthly) and/or secondary market; settled based on traded quantities and day ahead LMPs. CRRs are analogous to FTRs in PJM.
  NOTE: CRRs implemented as a part of Market Rules and Technology Upgrade (MRTU) project; 2008 Annual Auction was held in 2007; However due to delays in implementing MRTU, a timeline and methodology for "unwinding" the released CRRs was published on April 15, 2008; Due to launch of CRR market and effective language in the tariff related to CRRs, changes to the credit and settlement policy have been included in this credit profile.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

CAISO carries out these functions itself, through its Settlement Department and Credit Management Department respectively.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No.

c) *Is unsecured credit provided? If so, on what basis?*

Unsecured credit is based on the participant's Tangible Net Worth times a percentage factor based on the participant's credit ratings, default probability, and financial statements. In the case of government entities, unsecured credit is based on the participant's net assets. Unrated government entities have special rules depending on whether they stand alone or receive appropriations from the federal government or a state government. In the case of receiving appropriations, an unrated government entity may receive the lesser of the amount appropriated for the purpose of procuring energy and energy-related products or $250 million in unsecured credit. The unsecured credit limit for local publicly-owned electric utilities is $1 million, regardless of its net assets. A local publicly owned electric utility may request an unsecured credit limit greater than $1 million based on its net assets.

A participant's unsecured credit cannot be greater than $250 million. This limit is currently under review as part of proposed credit policy enhancements anticipated to go through the stakeholder process during 2008. It is also anticipated that this limit may be able to be further reduced with the rollout of Payment Acceleration six months after the rollout of MRTU.

d) *Is there a minimum credit requirement for participation in the market?*

No. However, CAISO requires new Market Participants to estimate their initial Estimated Aggregate Liability (EAL) and post security to cover this.

e) *Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?*

A participant's Estimated Aggregate Liability is assessed in aggregate across all markets operated by CAISO.

4) *Credit Management – Cash Markets*

a) *What is the billing period and payment lag?*

The billing period is monthly.

Payment lag is a maximum of 95 calendar days – consisting of:

- 38 business days following the Operating Day (~52 to 55 calendar days) to issue Preliminary Settlement Statements
- Zero (0) to 33 calendar days following the issuance of the Preliminary Settlement Statement to issue the Monthly Preliminary Invoice
- Five (5) business days (~7 calendar days) for payment

b) *If payment is not made when due, is there a time-to-remedy and how long is it?*

Any amount or partial amount that has not been paid by 10:00 a.m. on the Payment Date is referred to as the "Default Amount". Participants have five (5) business days to remedy a payment default before they are suspended.

c) *If a participant is in default, is there a delay while its retail customers are moved to a new retailer?*

At present there is no defined period for transfer of retail customers.

d) *How are a participant's credit limit and collateral requirements determined?*

A participant's Aggregate Credit Limit is equal to the sum of its unsecured credit and any financial security provided. This must exceed the participant's Estimated Aggregate Liability. CAISO calculates the Estimated Aggregate Liability based on a "Level Posting Period" equal to 102 days – consisting of:

- The maximum number of Trading Days outstanding at a given time – 95 calendar days – which consists of 57 days of actual known obligations, and a 38-day 'blind-spot' which must be estimated (see 4f below).

- The allowable period for participants to post additional collateral – 7 calendar days

CAISO will monitor actual EAL and make a call for additional Financial Security when the EAL is 90% of the amount of Financial Security.

e) How frequently are credit limits and collateral requirements reviewed?

Unsecured credit is reviewed quarterly, or annually in the case of participants who do not prepare quarterly statements.

Credit limits, including collateral requirements, are reviewed weekly as part of the Estimated Aggregate Liability run, or upon delay or default in payments.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

Actual obligations are compared against credit limits weekly. The calculation of actual liabilities can lag 38 business days behind the trading day. Because of the lag between trade date and when the actual obligations are known, CAISO will estimate the exposure for this 'blind spot' based on the moving average of daily obligations (from the last preliminary invoice through the preceding two months), multiplied by the number of calendar days over this period.

With MRTU, this lag will be reduced to seven business days.

g) Are bidding/ trading limits imposed for credit purposes?

There is currently no mechanism for comparing submitted schedules against Aggregate Credit Limit.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

No. However, CRR portfolio values are reassessed for credit cover purposes as a result of each month's auction price.

b) When a position goes to 'delivery', what is the billing period and payment lag?

CRR auction results are billed on the next available invoice and must clear before the delivery month.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Any amount or partial amount that has not been paid by 10:00 am on the Payment Date is referred to as the "Default Amount". Participants have five (5) business days to remedy a payment default before they are suspended.

d) If a participant is in default, does the market operator liquidate its open positions?

CAISO has the right to resell CRRs in whole or in part in subsequent CRR Auctions or in bilateral transactions.

e) How are a participant's credit limit and collateral requirements determined?

A portion of the participant's Aggregate Credit Limit must be allocated to FTR/CRR Auctions if they wish to participate.

Participant's that wish to participate in the CRR Auction must ensure their Aggregate Credit Limit minus their Estimated Aggregate Liability is greater than $500,000 or greater than the sum of the absolute values for all bids submitted into the CRR Auction.

[Note: A new proposal expected to go to FERC shortly is the greater of $500,000 or the sum of the absolute values for all bids plus credit margin submitted in the CRR auction.]

Participant's that obtain CRRs in the initial CRR Allocation are required to comply with the credit requirements associated with the CRRs. Credit requirements for CRRs are equal to the negative of the most recent CRR Auction Price plus the Credit Margin (the fifth percentile congestion revenue).

[Note: Part of the proposal going to FERC would disallow netting of Allocated and Auctioned CRRs in the CRR Holder's portfolio.]

f) How frequently are credit limits and collateral requirements reviewed?

Credit requirements for holding CRRs are evaluated and adjusted at least monthly. CAISO also has the authority to reassess credit requirements as a result of an extraordinary event.

g) Are bidding/ trading limits imposed for credit purposes?

Bid limits are imposed on the CRR auction (and previously, the FTR auction). If credit validation fails, all submitted bids are rejected. Also, The ISO will not implement the transfer of a CRR if the transferee or transferor has an Estimated Aggregate Liability in excess of their Aggregate Credit Limit.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

No.

b) Is there any credit validation on submission of a settlement reallocation?

Not applicable

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Not applicable

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Participants have five (5) business days to post additional financial security once their Estimated Aggregate Liability exceeds their Aggregated Credit Limit. CAISO will request additional Financial Security when Estimated Aggregate Liability exceeds 90% of the Aggregate Credit Limit. CAISO will require additional Financial Security when the amount exceeds 100%. The cure period for both is five business days.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Unsecured credit is reviewed quarterly or annually, in the case of participants who do not prepare quarterly statements and is based on the participant's credit rating, financial reports, and default probability.

To be considered for unsecured credit, an entity must submit an Application for Unsecured Credit as a means of providing company, credit and contact information. The application is only submitted once.

In the event of a payment default the ISO may temporarily revoke a participant's unsecured credit for a period of time.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

CAISO will assess and determine if the overall creditworthiness of a participant should be considered in aggregate with its affiliates. CAISO will inform the participant and its affiliates in writing if it determines that the maximum unsecured credit limit applies to the combined activity of the participant and its affiliates.

d) *What forms of collateral are acceptable?*

CAISO accepts:

- Cash Deposits
- Letters of Credit maintained by a bank or financial institution that is reasonably acceptable to CAISO
- Surety Bonds issued by an insurance company that is reasonably acceptable to CAISO
- Certificates of Deposit in the name of CAISO issued by a bank or financial institution that is reasonably acceptable to CAISO
- Payment Bond Certificates
- Escrow account maintained by a bank or financial institution that is reasonably acceptable to CAISO

The standard CAISO uses in establishing reasonable acceptability for issuing banks, financial institutions or insurance companies is that the institution maintains a minimum corporate debt rating of an "A-" by S&P, "A3" by Moody's. "A-" by Duff & Phelps, "A-" by Fitch or an equivalent short-term debt rating by any of these agencies.

Participants may request to use a non-standard form of security. CAISO will evaluate and determine if the non-standard form of security is acceptable within ten (10) business days of the request.

CAISO's credit policy also lists 'pre-payments' as a form of collateral. For the purpose of this analysis, however, this is considered a way for the participant to reduce its total liability (and hence its credit cover requirement), rather than collateral.

e) *In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?*

No.

Initially CAISO may debit the ISO Reserve Account upon default, in order to pay ISO Creditors, to the extent this account has funds. This, however, is just a cashflow management mechanism, not an account specifically setup to manage payment default, and must be replenished.

f) *To whom are any residual default amounts socialized?*

Any residual default amounts are socialized to ISO Creditors – those owed payment from the market, which for the most part means generators. Any additional recoveries (e.g. through bankruptcy proceedings) are returned to the same participants.

8) *Other Questions*

a) *Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?*

No.

9) *References and Acknowledgements*

The following documents were referenced in compiling this profile:

- Conformed Currently Effective California ISO Tariff as of March 12, 2008
- Section 8 – Ancillary Services
- Section 11 – ISO Settlements and Billing
- Section 12 – Creditworthiness

- Section 27.1 – Congestion Management
- Section 30 – Bids and Bid Submission
- Section 31 – Day Ahead Market
- Section 33 – Hour Ahead Market
- Section 34 – Real Time
- Section 36 – Firm Transmission Rights
- Scheduling and Bidding Guidelines
- Business Practice Manual for Congestion Revenue Rights; November 15, 2007
- Business Practice Manual for Credit Management Version 1.2; November 19, 2007
- Timeline and Methodology for Unwinding Congestion Revenue Rights Released Through the 2007 Annual CRR Auction; April 15, 2008

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Kevin King, Senior Financial Analyst and Credit Manager, California ISO

Credit Profile – Elexon, Great Britain

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

Elexon is the administrator of the Balancing & Settlement Code (BSC) for Great Britain, and operator of the balancing market for electricity.

The market operates close to real-time, in 30 minute settlement periods, with 'gate closure' (i.e. bid/offer cutoff) 60 minutes prior to period commencement. Settlement is based on actual quantities (or more specifically, the difference between actual and nominated quantities), and imbalance prices (based on accepted bids/offers to balance the system, with a separate buy and sell price set).

2) Which forward markets are operated? How frequently do they transact?

No forward markets.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

ELEXON retains the authority and responsibility for settlement and credit management, including managing credit events such as defaults. ELEXON uses agents to carry out some settlement and credit management functions, specifically:

- Operation of the market systems (including credit calculations, settlement calculations, receipt of contract notifications, etc.).
- Preliminary identification of a credit limit breach and notification of participants and Elexon
- Management of collateral.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

ELEXON Clear, a subsidiary of ELEXON, is the central counterparty for imbalance settlement payments. Bank accounts are in the name of ELEXON Clear.

c) Is unsecured credit provided? If so, on what basis?

Unsecured credit is not explicitly provided. All Parties must provide security, with the amount required assessed according to the BSC. This calculation is based on the trading charges for the previous 29 settlement days (which includes actual and estimated elements).

Strictly speaking, this does not prevent a Party obtaining unsecured credit, since the estimated element of trading charges has a reasonable probability of turning out to be too low. There is no forward looking element to account for – for example, the time taken to remove a defaulting Party from the BSC.

d) Is there a minimum credit requirement for participation in the market?

No.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

Not applicable – only one market

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

The billing period is one day. Payment date is approximately 29 calendar days after settlement day (or nearest business day). Amounts due are notified to Parties at least 3 business days before payment date.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

In the event that a payment is not made at the required time, ELEXON will issue a formal notice to the Party. If the amount due has not been fully paid by the third business day after the notice is issued, the Party is in payment default.

In these circumstances, the amount due is net of any collateral that has been called in the meantime (see 7(e)). Elexon may call on the defaulting party's collateral commencing at 3:30 pm on the payment date.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

Yes. Defaulting participants can continue to incur liabilities in these circumstances. The period is not defined in the BSC. The BSC simply requires ELEXON to facilitate the transfer as soon as is reasonably practicable.

There have been some instances of a failing supplier continuing to incur liabilities. As a policy, the regulator seeks to encourage a trade sale of the company or its assets. Depending on the exact nature of this sale, ELEXON can change billing arrangements "overnight" (If , for example, a complete supplier ID is being transferred with all its related balancing units). In these circumstances, the credit risk is minimised.

If a trade sale cannot be arranged and it emerges that the failing supplier cannot or will not meet its debt obligations, the Regulator may invoke the Supplier of Last Resort Process. This process itself can be executed in a few days. However, precursor processes may, depending on circumstances take 3 weeks or more. In these circumstances there is material credit risk.

For instance, the SOLR process requires that the licence of the failing supplier be revoked. Once again, in principle the Regulator can do this in one day, but may be unwilling to do so, if, for example, an Administrator is offering to pay its market debts. Again, the Regulator may decide to await a court decision on a creditor's Statutory Demand for payment – a 21 day period is allowed legally for the supplier to satisfy the demand.

d) How are a participant's credit limit and collateral requirements determined?

A Party's credit status is continually monitored by assessing how adequately its posted collateral covers estimated liabilities, both being expressed in terms of equivalent MWh.

A Party's credit status is determined by comparing its "Energy Credit Cover" (derived from posted collateral) with its "Energy Indebtedness" (derived from actual trading charges and assessed volumes for the last 29 settlement days). The Credit Cover Percentage (CCP) is the Energy Indebtedness divided by the Energy Credit Cover, as a percentage.

> [A Credit Assessment Price (CAP, set annually by the BSC Panel) is used to convert collateral values and actual trading charges to equivalent MWh values.
>
> Energy Credit Cover is calculated by dividing posted collateral by CAP.
>
> Energy Indebtedness is a sum over the previous 29 settlement days, and comprises two components. For settlement days for which settlement results are available, actual trading charges are used, and divided by the CAP to give a MWh value. For other days, an assessment is made using unit parameters and the CAP, once again giving a MWh value.]

A Party must post sufficient collateral to ensure that its CCP is not above 80%.

If the CCP is above 80%, the Party is warned that they will be in Level 1 Credit Default, unless the matter is resolved through a query or by the posting of further collateral.

If this proportion is above 90%, the Party is declared to be in Level 2 Credit Default.

The consequences of Level 1 and 2 Credit Default are explained in 7 (g), below.

e) How frequently are credit limits and collateral requirements reviewed?

The credit cover calculation is done as soon as is practicable after gate closure for *each settlement period*. Parties are informed of their credit status as soon as practicable after the end of each settlement day.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

See (d) & (e) above.

g) Are bidding/ trading limits imposed for credit purposes?

No. Elexon does not receive bids at all, nor decide which bids/offers are transacted (these functions are both performed by National Grid Co.).

5) Credit Management – Forward Markets

Not applicable.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. Parties may specify the reallocation of metered volumes between units for the purposes of imbalance settlement. A fixed MWh amount or a percentage of total metered volume may be specified.

b) Is there any credit validation on submission of a settlement reallocation?

No, not as a matter of routine. However, if a Party is in Level 2 Credit Default, then any reallocations which would increase the indebtedness of the Party are rejected.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Yes. In the event of Level 2 Credit Default Elexon can dis-apply previously submitted metered volume reallocations which apply to future settlement periods, if these would increase the indebtedness of the Party.

In the event of a Party being in Default, new reallocations may be rejected and existing reallocations dis-applied.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Once a Level 1 Credit Default notice is issued, the defaulting Party has 1 day to query the calculation. Subsequently, the Party has 1 further day to post further collateral.

A Party in Level 2 Credit Default must remedy this (by posting further collateral). A cure period is allowed, if the Level 2 default occurred outside business hours (and other defined conditions are met). In this case, further collateral must be posted by noon on the next business day.

If the Party's CCP has risen above 100%, and if the Party's CCP has not been reduced to below 90% within 2 working days, the Party is declared in default of the BSC.

b) *If unsecured credit is allowed, how is it assessed, and how frequently?*

Unsecured credit is not explicitly allowed, though as discussed in 3(c), may result inadvertently where actual liabilities exceed the projected amounts.

c) *If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?*

Credit is assessed separately for each BSC Party, with no regard to corporate relationships between Parties.

d) *What forms of collateral are acceptable?*

Cash and letters of credit. Letters of credit must provide for 'immediate' payment (i.e. same business day) upon presentation of a claim.

e) *In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?*

There is no intermediate credit protection between collateral and socialization. ELEXON Clear does manage a short-term borrowing facility, but this is used for managing cashflow shortfalls (e.g. due to late payment), not for credit protection.

f) *To whom are any residual default amounts socialized?*

To all Parties in relation to their annual funding shares for the month in which the default occurs (annual funding shares reflect Parties' percentages of the total energy settled)

g) *What events are required to trigger suspension of a participant for credit reasons?*

As described in 7(a), a Party's credit status is monitored through its CCP. Failure to provide adequate collateral leads to the Party being in Level 1 or Level 2 Credit Default. The Party may be declared in default of its BSC obligations on the basis of its credit history alone, regardless of whether or not the Party has defaulted on payment. The BSC sets out the detailed rules (examples: a continuous period of 90 days in Level 1 Credit Default; 60 continuous days in Level 2 Credit Default, or excursions with CCP above 100%)

Once a Party is declared in default the BSC Panel may apply sanctions. These include removal of the right to submit contract notifications and bids and offers, the right to register new metering systems, and the right to vote. There is no specific process to "suspend" the Party. However, the BSC Panel may decide to expel the Party from the BSC. This process, which would involve consultation with the Regulator, would take a total of 56 days to complete.

8) Other Questions

a) *Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?*

No.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- The Balancing and Settlement Code, Sections A, H, M, N,P. May be viewed at http://www.elexon.co.uk/bscrelateddocs/BSC/default.aspx.

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Peter Davies and Steve Wilkin of ELEXON who gave clarifications regarding the meaning and operation of the BSC.

Credit Profile – Energy Market Company (EMC), Singapore

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

The Singapore wholesale market comprises two markets:

- The real time spot market for energy, regulation and reserve (scheduled simultaneously) which transacts at half-hourly intervals, and;
- The procurement market for other ancillary services. The Energy Market Company (EMC) procures these services on a contract basis.

2) Which forward markets are operated? How frequently do they transact?

None by the EMC

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

Yes, the EMC carries out settlement for the market. Citibank N.A. Singapore serves as the clearing bank.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

It has not been possible to confirm unambiguously that EMC is the central counter-party to all trade, and the current presumption is that it is not. However, EMC have confirmed that: “When an event of default takes place, EMC as the market operator has the rights to recover the monies owed to the market.” Additionally, EMC have noted that:

“In accordance with section 49 of the Electricity Act, the market rules have the effect of a contract between each market participant and the EMC. Each market participant and the EMC shall be deemed to have entered into a contract with one another under which each market participant and the EMC agree to perform and observe the market rules so far as they are applicable to each market participant and the EMC as provided for in the market rules.”

Even if not a formal central counter-party, the Electricity Act would appear to grant EMC some rights vis-à-vis the performance of participants.

c) Is unsecured credit provided? If so, on what basis?

No, all participants are required to provide credit support (i.e. post collateral).

d) Is there a minimum credit requirement for participation in the market?

No, though all participants must post collateral based on their exposures.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

On a portfolio basis.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

The preliminary settlement statement for each trading day is issued six business days after the trading day. The final settlement statement for each trading day is issued ten business days after each trading day. A single invoice is then issued for the trading days to which the final settlement statements relate.

Payment lag is 20 calendar days following the trading day, or the next business day after the 20th calendar day. Those owed money are paid the following business day.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

If a market participant fails to pay monies due, they are issued a notice of default which requires them to remedy the default within two business days.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

The default process only covers the relationship between EMC and the market participants, the market rules do not cover processes between retailers and their customers.

The market rules make no specific allowance for a retailer of last resort, but rather allow for the Market Surveillance and Compliance Panel to request the issuance of a special administration order under the Electricity Act in the event of a default which results in a suspension order.

d) How are a participant's credit limit and collateral requirements determined?

A participant's Credit Support Value = Estimated Average Daily Exposure x 30 days. The Estimated Average Daily Exposure of a market participant on a given day is the arithmetic average of the net settlement amounts on the 90 most recently available preliminary settlement statements (or corresponding final settlement statements if available) of that market participant which have been issued on or before that given day.

e) How frequently are credit limits and collateral requirements reviewed?

The rules state the Credit Support Value can be revised: "as and when necessary in the sole discretion of the EMC". In actuality, as credit limits are based on the last rolling 90 days' exposure, these limits are revised every business day. EMC advise that: "EMC does not exactly review through all credit limits for participants. However, EMC does inform participants of their risk exposure on a daily basis…"

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

Current exposure is determined by the EMC each business day. This occurs on the next business day following the trading day. i.e. a typical lag of 1-3 calendar days following the trading day.

g) Are bidding/ trading limits imposed for credit purposes?

No

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

Not Applicable.

b) When a position goes to 'delivery', what is the billing period and payment lag?

Not Applicable.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Not Applicable.

d) If a participant is in default, does the market operator liquidate its open positions?

Not Applicable.

e) How are a participant's credit limit and collateral requirements determined?

Not Applicable.

f) How frequently are credit limits and collateral requirements reviewed?

Not Applicable.

g) Are bidding/ trading limits imposed for credit purposes?

Not Applicable.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes – for energy, regulation and reserve.

b) Is there any credit validation on submission of a settlement reallocation?

There are no validation checks for bilateral transactions

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Yes. If a suspension order is issued against a selling market participant, it shall constitute a revision to any bilateral contract quantities that relate to the period during which the suspension order is in effect. The bilateral quantities will be treated as zero in this case.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

A margin call is issued when the estimated net exposure of a market participant exceeds 70% of the value of their credit support. A margin call must be satisfied by the close of banking business on the second business day following the date of the margin call.

If a participant's Credit Support Value is increased, it has five (5) business days after notification to provide the revised credit support.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Not Applicable.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Exposures are assessed at an individual participant level.

d) What forms of collateral are acceptable?

Credit support value must be met through the provision to the EMC and the maintenance or credit support in one or more of the following forms:

A guarantee or irrevocable commercial letter of credit provided by a financial institution identified on the list of acceptable financial institutions published by the EMC.

Cash deposits made with or assigned to the EMC by or on behalf of the market participant

Singapore Government Treasury bills assigned to the EMC by or on behalf of their market participant. Treasury bills shall be values as cash at the current market value less 2% to take into account the potential eroding effects of interest rate increases.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No. EMC has a reserve settlement account and overdraft facility that are used to address short-term payment failures, but these are only an interim measure which allows for remedy of the situation before a default levy is imposed on the non defaulting participants.

f) To whom are any residual default amounts socialized?

Ultimately, if a market participant defaults on a payment and cannot remedy the default, the shortfall in funds is required to be satisfied by all non-defaulting market participants (excluding the transmission licensee) through the payment of a default levy.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- Singapore Electricity Market Rules
- EMC Settlement Market Operations Manual
- EMC Prudential Requirements Market Manual
- Singapore Electricity Act
- EMA Introduction to the Singapore New Electricity Market (Jan 2006)
- Singapore Market Support Services Code

We are grateful to the following individuals who corresponded by email during the compilation of this profile:

- Mei Yee Yuen of the EMC Singapore

Credit Profile – ERCOT

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

ERCOT operates the following markets:

- **Day Ahead Market:** Balanced schedules day-ahead for each hour of the following day; settles based on the price within a Congestion Zone and scheduled quantities.
- **Real Time Balancing Energy Market (Adjustment Period and Operating Period):** For balancing on the day; transacts every fifteen minutes, with prices for each fifteen minute settlement interval; settles against actual quantities.
- **Ancillary Service Markets:** Ancillary services markets trade on a day-ahead basis for each hour of the following day; settles based on the Market Clearing Price for Capacity[12] (MCPC) (the highest-priced capacity reservation bid accepted in the DAM), against awarded quantities. A separate MCPC is generated for each Ancillary services capacity market (Regulation Up, Regulation Down, Responsive Reserve, Non-Spinning Reserve).

2) Which forward markets are operated? How frequently do they transact?

- **Transmission Congestion Rights (TCR) Market:** market for financial instruments entitling holders to payments based on the price differential (in the DAM) between prices at two specified pricing points (local or inter-zonal); can be acquired in auctions (annual and monthly) and/or secondary market; settled based on traded quantities and day-ahead prices.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

ERCOT carries out these functions itself, through its Settlement Department and Credit Management Department respectively.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No.

c) Is unsecured credit provided? If so, on what basis?

Unsecured credit is provided to some parties. This is generally on the basis of credit rating and audited financial statements. In the case of non-rated privately held companies or electric cooperatives, an assessment is performed by ERCOT to determine the applicant's financial viability based on the company's equity level and financial statements.

The cap on the level of unsecured credit which might be provided to a participant is $100 million. The unsecured credit limit is assessed in aggregate at the parent level.

d) Is there a minimum credit requirement for participation in the market?

No.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

A Market Participant's estimated liabilities are assessed in aggregate across all markets operated by ERCOT.

[12] 'Capacity' here refers to the participant's capacity to provide the service, and is not related to markets in installed generation capacity found in other jurisdictions.

4) *Credit Management – Cash Markets*

a) *What is the billing period and payment lag?*

ERCOT produces a weekly settlement invoice based on any Initial Statements, Final Statements, True-Up Statements and Resettlement Statements produced in the last seven (7) days from the prior Settlement Calendar.

Payment lag is around 28 calendar days – consisting of:

- 10 business days following the Operating Day (~14 calendar days) to issue Initial Statements
- Seven (7) calendar days to issue Statement Invoice
- Five (5) bank business days (~7 calendar days) for payment

b) *If payment is not made when due, is there a time-to-remedy and how long is it?*

A participant has two (2) days to remedy a 'Late Payment' before it is considered to be in 'Payment Breach'.

If a Market Participant makes a payment, a partial payment, or collateral call within two (2) Bank Business Days of the due date, then the payment will constitute a **Late Payment** and the **Payment Breach** (i.e. payment default) will be waived.

In the event of repeated late payments, ERCOT may require the participant to post collateral to cover its liabilities, and/or initiate termination proceedings. An escalating sequence applies to the first through fourth late payments made within a twelve month period, and includes:

- Level I Enforcement – Within two (2) Bank Business Days, provide security at or above 110% of the participant's Total Estimated Liability (TEL) or Estimated Aggregate Liability (EAL) minus its unsecured credit.
- Level II Enforcement – Within two (2) Bank Business Days, provide security, in the form of a cash deposit or letter of credit, in the amount of 110% of the participant's Total Estimated Liability (TEL) or Estimated Aggregate Liability (EAL) minus its unsecured credit. Increased security requirements remain in effect for a minimum of 60 days. Failure to comply may result in suspension.
- Level III Enforcement – Advise that subsequent late payments could result in termination and/or take action to begin termination procedures.

c) *If a participant is in default, is there a delay while its retail customers are moved to a new retailer?*

A mass transition of Electric Service Identifiers (ESI IDs) will be initiated taking approximately three (3) Retail Business Days, following revocation of rights or termination of a Qualified Scheduling Entity (QSE). This consists of two (2) Retail Business Days for the QSE to respond to ERCOT's request for off-cycle meter reads and one (1) Retail Business Day for ERCOT to notify the Provider of Last Resort (POLR) and designated Competitive Retailer (CR).

An LSE affiliated with a terminated QSE will be designated as a Virtual QSE for up to two (2) Bank Business Days following the termination of its QSE, during which time it must affiliate itself with a new QSE or meet the credit requirements for QSEs to become an Emergency QSE. If the LSE fails to meet these requirements, a mass transition of ESI IDs will be initiated, following the timings above.

d) *How are a participant's credit limit and collateral requirements determined?*

A participants Posted Collateral + Unsecured Credit Limit must be greater than or equal to its Total Estimated Liability (TEL) + Estimated Aggregate Liability (EAL) + Aggregated Net Load Imbalance and Net Resource Imbalance Liability (NLRI).

ERCOT may determine that the formula used to calculate the TEL, EAL or NLRI does not adequately match the financial risk that the Market Participant poses, and may specify a larger or smaller TEL, EAL or NLRI.

e) How frequently are credit limits and collateral requirements reviewed?

Unsecured credit is reviewed quarterly. If a participant has experienced a material change (i.e. credit rating change) that might reduce its unsecured credit limit, it has three (3) business days to post collateral.

Collateral requirements will be monitored daily and calculated at least weekly.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

ERCOT assesses a participant's current activity in the market (via the NLRI) against its credit limit on a daily basis. This assessment occurs one (1) business day after the trading day.

g) Are bidding/ trading limits imposed for credit purposes?

No. Balanced Energy schedules entered to meet AS Obligations are limited to the QSE's credit requirement with ERCOT, but each Market Participant is responsible for ensuring that their liability does not exceed their collateral and unsecured credit limit. ERCOT does not have any automatic process to impose trading limits for balancing energy.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

No. For the nodal market ERCOT is looking to include a mark-to-market process, though this will be used for adjustment of collateral, rather than settlement.

b) When a position goes to 'delivery', what is the billing period and payment lag?

Same billing period and settlement timeframe as day-ahead market. Weekly billing, ~ 28 calendar days in arrears.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

The time-to-remedy provisions for **TCR Account Holder Default** are the same as Payment Breach remedies ~ two (2) Bank Business Days.

d) If a participant is in default, does the market operator liquidate its open positions?

No.

e) How are a participant's credit limit and collateral requirements determined?

Unsecured credit is provided to TCR Account Holders generally on the basis of credit rating and audited financial statements. In the case of non-rated privately held companies or electric cooperatives, an assessment is performed by ERCOT to determine the applicant's financial viability based on the company's equity level and financial statements. Unsecured credit limit will not exceed $125 million.

TCR Account Holders may submit additional collateral to provide additional security and meet ERCOT approved credit limits.

f) How frequently are credit limits and collateral requirements reviewed?

Unsecured credit is reviewed quarterly. If a participant has experienced a material change (i.e. credit rating change) that might reduce its unsecured credit limit, it has three (3) business days to post collateral.

Collateral requirements are monitored daily and calculated at least weekly.

g) Are bidding/ trading limits imposed for credit purposes?

ERCOT will reject any submitted bids for TCRs that violate the participant's credit limit.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

QSEs within the same Congestion Zone may reallocate MWs for supply through Responsibility Transfers (RspT).

b) Is there any credit validation on submission of a settlement reallocation?

No. ERCOT will approve Intra-zonal Responsibility Transfers (RspTs) unless the transfer compromises reliability or settlement accuracy.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

No.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

By 15:00 on the second business day after notifications.

When the participant's EAL reaches 90% of its posted security, ERCOT will notify the participant. If, by 15:00 on the second (2nd) Business Day, the participant has not posted additional collateral, then ERCOT may issue notification of potential suspension.

When the sum of the participant's TEL, EAL, and NLRI reaches 100% of its posted security, ERCOT will notify the participant. If, by 15:00 on the second (2nd) Business Day following, the participant has not posted additional collateral, then ERCOT:

- Will notify credit contacts by 15:30.
- May require the participant to self-arrange all of its Ancillary Service (AS) Obligations and will not permit the participant to bid AS.
- Notify each LSE and Resource represented by the QSE that it may have to designate a new QSE(s).
- Suspend the participant's right to schedule.
- Not make payments to the participant up to the amount of additional collateral required.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Unsecured credit is provided on the basis of Minimum Long-Term or Issuer Rating, minimum equity level, minimum average times/interest earning ration (TIER) and debt service coverage (DSC) ratios, and minimum equity ratios. These levels are approved by the ERCOT Board of Directors.

Unsecured credit is reviewed quarterly, though can be reviewed more frequently at ERCOT's discretion (e.g. due to a change in credit rating). Participants eligible for unsecured credit must submit balance sheet information quarterly, within 60 days of quarter-end. Annual financials are required within 120 days of year-end. ERCOT may extend this period on a case-by-case basis.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

A single entity acting as a QSE may partition itself into subordinate QSEs. However, security and financial liability will be cumulated for all subordinate QSEs for the entity executing the Standard Form Market Participant Agreement.

QSEs can post a corporate guarantee, which allows them to utilize the unsecured credit of a parent or related entity that meets or exceeds minimum rating standards set by the ERCOT Board. Corporate guarantees may be in an amount equal to the QSE's TEL or EAL, minus the QSE's unsecured credit limit.

d) *What forms of collateral are acceptable?*

ERCOT accepts:

- Cash Deposits
- Letters of Credit
- Surety Bonds issued by Insurance companies with a minimum agency rating of A-. Note that, to date, surety bonds have not been issued within ERCOT.

Within ERCOT policy, corporate guarantees are treated as a form of collateral. However, corporate guarantees are more properly considered unsecured credit, and as such, are discussed in 7(c) above.

e) *In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?*

ERCOT can use any accumulated late fees to offset the amount of a default. Otherwise there is no intermediate layer of protection between collateral and socialization.

f) *To whom are any residual default amounts socialized?*

Initially, all Invoice Recipients are short-paid. 180 days following the short pay, the total short pay amount minus expected payments from the defaulting Invoice Recipient will be uplifted to QSEs representing LSEs (i.e. to load).

QSEs that were initially short paid will be paid based on a Load Ratio Share for the three (3) calendar months prior to the invoice issue date.

8) *Other Questions*

a) *Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?*

No.

9) *References and Acknowledgements*

The following documents were referenced in compiling this profile:

- ERCOT Protocols
    - Section 4 – Scheduling
    - Section 6 – Ancillary Services
    - Section 7 – Congestion Management
    - Section 9 – Settlements and Billing
    - Section 15 – Customer Registration
    - Section 16 – Registration and Qualification of Market Participants

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Vanessa Spells, ERCOT

Credit Profile – ISO New England (ISO-NE)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

ISO New England operates the following markets:

- **Day Ahead Energy Market:** Trades day-ahead for each hour of the following day; settles against traded quantity.
- **Real Time Energy Market:** For balancing on the day; transacts every five minutes, with prices averaged out on an hourly basis; settles against prices calculated throughout the day, and actual quantities (specifically the differential between measured quantity and day-ahead traded quantity).
- **Regulation Market:** market for provision of frequency regulation service; trades Real-Time (RT) on an hourly basis for each hour during the Operating Day; settles against Real-Time Regulation Clearing Price (RCP) (calculated from generation offers) and participants' Adjusted Regulation Obligations and Net Regulation Purchases.

2) Which forward markets are operated? How frequently do they transact?

- **Forward Capacity Market:** (starting in 2008 for 2010 commitments) annual auction to purchase capacity resources based on ISO projection of the power system in the next three years; settled based on auction results (interim period – settlement based on first year $3.05/kilowatt month)
- **Financial Transmission Rights (FTR) Market:** market for financial instruments entitling holders to payments based on the price differential (in the DAM) between prices at two specified pricing points (nodes or aggregate points); can be acquired in auctions (annual and monthly) and/or secondary market; settled based on traded quantities and DA LMPs.
- **Forward Reserve Market:** twice annual auction for acquiring operating reserves; payments to sellers based on traded quantities and prices (with penalties, for failure to perform as contracted, calculated and settled hourly); charges are socialized to participants based on RT Load Obligations within the applicable Load Zone.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

ISO New England carries out these functions itself, through its Settlement Department and Credit Management Department respectively.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No.

c) Is unsecured credit provided? If so, on what basis?

Unsecured credit is provided to some parties. This is generally on the basis of credit rating (discounted by one rating) and audited financial statements. Non-rated municipal entities can receive unsecured credit by posting a parent guarantee. Rated Municipals are allowed unsecured credit based on ratings.

d) Is there a minimum credit requirement for participation in the market?

No.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

A Market Participant's Obligations are assessed in aggregate for all markets.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

ISO NE produces a weekly statement for all hourly charges. Monthly statements are produced for non-hourly charges.

Payment lag is typically around 11 calendar days – consisting of ~ six (6) calendar day delay in billing, and three (3) business days (~5 calendar days) for payment.

ISO-NE has the facility to bill all charges calculated at the time the bill is issued, which can result in some variation in payment lag, to be greater than or less than 11 days at various times

b) If payment is not made when due, is there a time-to-remedy and how long is it?

The time-to-remedy for both **Payment Default** and **Credit Test Default** (i.e. Credit Default) is the same.

For a default, within one (1) business day of when the payment was due, ISO NE will send notices. If the default is not resolved by noon on the second (2^{nd}) business day after the amount was due, ISO NE will suspend the participant until the default has been resolved.

For a payment default, ISO-NE will seize collateral immediately upon the default occurring, though the participant can continue to trade throughout the time-to-remedy.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

Yes. There is no stipulated timeframe for carrying out this process, but it typically takes 1-2 business days, once a suspension notice is issued.

d) How are a participant's credit limit and collateral requirements determined?

A participant's credit limit is determined by the sum of its unsecured credit (which ISO NE tends to refer to as a 'credit limit'), and collateral posted ('financial assurances' at ISO NE).

Financial assurance requirements are calculated as follows:

For **Unqualified New Non-Municipal MPs** and **Returning Non-Municipal MPs**, credit cover requirements are calculated as the greater of the FAR or the actual requirements under the policy, where:

$$FAR = G + T + L + E$$

FAR =	the Initial Non-Municipal Market Participant Financial Assurance Requirement (FAR)
G =	a formula based on the capacity of the unit, hours of generation, DAM and RTM price differentials, MW amounts, and hours passed
T =	a formula based on the MWs traded, hours passed, maximum energy price differential, and MW amounts
L =	a formula based on the MWs of RT load obligation, average load factor, hours passed, average price of energy in the DAM, MW amounts, and hourly transmission charges
E =	Average monthly share of participant expenses

Unqualified New Non-Municipal MPs (has been an MP for less than three months AND does not have Investment Grade rating) must post FAR for three (3) months or greater.

Returning Non-Municipal MPs (MPs terminated due to Financial Assurance Default or Payment Default AND has been an MP for less than six months) must post FAR for six (6) months or greater.

For **Non-Qualified Municipal MPs**,

- Financial Assurance = 3.5* the aggregate Hourly Charges on four most recent weekly Invoices + the average monthly Non-Hourly Charges over the two most recently invoiced calendar months + LSE Capacity Charges + FTR Requirements + FCM Requirements + unresolved Disputed Amounts

For **Non-MP Transmission Customers**,

- FA must be at least 3.5 times the average Non-Hourly Charges over the two most recently invoiced calendar months plus the amount of any unresolved dispute amounts.

Qualified entities can also post collateral in order to increase their trading limits.

If a participant's obligations are in excess of its credit limit (unsecured credit plus collateral posted), it is considered to be in 'Credit Test Default'.

Warnings are generated when a participant's obligations reach 80% of this credit limit. No further action is taken.

Warnings are also generated when a participant's obligations reach 90% of this credit limit. If the situation is not remedied within (5) business days, a notice is issued to NEPOOL Budget & Finance Committee and Participant Committees. At this point the participant is considered to be in Financial Assurance Default (FA Default). If the participant is in FA default for greater than five days, or if they show a repeated pattern of FA default, ISO New England will recommend their termination to the Membership Sub-Committee.

e) *How frequently are credit limits and collateral requirements reviewed?*

Unsecured credit is reviewed at least quarterly, though ISO New England can also review at its discretion (and can require the submission of interim financial information within 10 days). If a participant's rating falls below investment grade it has five (5) days to post collateral. ISO NE subscribes to Moody's, S&P and Fitch, which includes an e-mail service that notifies of any changes in the ratings of the Participants included in its established portfolio of customers.

Collateral requirements can be revised daily.

f) *How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?*

ISO New England performs a credit assessment every morning. This includes actual exposures incurred up to and including the previous day. At 12 noon the credit assessment is re-run, based on virtual bids in the DAM.

Exposures in the RTM take three days to form part of the credit assessment. Exposures in the DAM typically lag by two days.

The FAMS (Financial Assurance Management System) displays updated data twice daily to participants.

g) Are bidding/ trading limits imposed for credit purposes?

Bid limits are applied for virtual bidding participants. These limits are verified at the close of the DAM bidding window. If the exposure of virtual bids submitted (based on the highest value bid set that could clear) > credit cover (unsecured credit + collateral) – existing exposures, then virtual bids will be progressively rejected until the exposure is back within required limits.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

No.

b) When a position goes to 'delivery', what is the billing period and payment lag?

Same settlement timeframe as day-ahead market. i.e. 7-day billing period, with payment lag of 4 business days.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

FTRs are delivered into the cash market, and therefore rules for payment are as per that market. Financial assurance requirements are aggregate across all markets. Therefore the time-to-remedy for Financial Assurance Default is also the same.

For a default, within one (1) business day of when the payment was due, ISO NE will send notices. If the default is not resolved by noon on the second (2nd) business day after the amount was due, ISO NE will suspend the participant until the default has been resolved.

d) If a participant is in default, does the market operator liquidate its open positions?

No.

e) How are a participant's credit limit and collateral requirements determined?

For FTRs:

- Prior to an FTR auction, participants must post sufficient credit cover (which may consist of financial assurance or unsecured credit) to cover the exposure of all bids they have entered if they were to be executed. This is based on the bid value, with an offset for FTR payouts (based on a proxy value by bid quantity).
- After the auction, collateral requirements are adjusted, to be based on awarded quantities and auction prices, minus an offset for estimated FTR payouts (based on a proxy value and awarded quantity).

During the actual 'delivery' period of the FTR, the estimated amount for FTR payouts is replaced with actual amounts, as the day rolls around.

For the Forward Capacity Market only new resources post collateral (i.e. resources classified as 'existing' do not):

- When a new capacity resource is 'qualified' (through the ISO issuing a notice), it must provide credit cover (unsecured or collateral) equal to $2/kW of summer capacity (or winter capacity if only a winter plant).
- At auction, if the facility is awarded a New Capacity Supply Obligation, it must post credit cover equal to Cost of New Entry (CONE) x MW awarded – collateral already posted.
- 15 days prior to running of second auction, must post additional collateral equal to CONE x MW awarded for that commitment period, in the first auction.
- 15 days prior to running of third auction, must post additional collateral equal to CONE x MW awarded for that commitment period, in the first auction.

This credit cover is effectively a performance bond, to ensure that replacement cost can be covered in the event the facility is not available to produce as claimed. When a resource becomes 'commercial' it is deemed an 'existing' resource, and receives this collateral back. If the resource does not meet the capacity rating that it was qualified for, ISO NE will retain that portion of collateral related to those MWs the participant was short and use it to offset load's capacity costs during the commitment period that the capacity was supposed to be provided.

At the start of the commitment period, LSEs post collateral equaling one month of charges.

f) How frequently are credit limits and collateral requirements reviewed?

Unsecured credit is reviewed at least quarterly, though ISO New England can also review at its discretion (and can require the submission of interim financial information within 10 days). If a participant's rating falls below investment grade it has five (5) days to post collateral.

Exposures are assessed daily. Collateral requirements can be revised daily.

g) Are bidding/ trading limits imposed for credit purposes?

Bid limits are used for the FTR market. As bids are submitted, the ISO runs report to show them their credit requirements.

At the close of the bidding window, the ISO runs a calculation to value positions (if they were to be awarded). If collateral is not sufficient to cover the maximum exposure due to FTR purchases, all the participant's bids are removed from the FTR auction.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. These are a reallocation of MW.

For the Forward Capacity Market, contracts will be received with an associated price.

b) Is there any credit validation on submission of a settlement reallocation?

There is no validation on submission of contracts at present.

For the Forward Capacity Market, contracts will be validated on submission.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

If a bilateral contract would increase liabilities of a participant in default, it will be cancelled from that day forward (all previous days' settlement still stand). Even if the cause of the default is later cured, participants must resubmit their contracts (the ISO will not automatically put them back in).

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

By midday on the second day after.

Five days is given to act on a warning at 90%, but if exposures do not exceed 100%, no further action is taken (directly).

b) If unsecured credit is allowed, how is it assessed, and how frequently?

For **rated non-municipal MPs**, allowed unsecured credit is equal to the lesser of:

a. Applicable % (based on credit rating) of MP tangible net worth
b. $75 million
c. 20% of total aggregate obligation due across the entire pool.

For **unrated non-municipal MPs**, allowed unsecured credit is equal to the lesser of:

a. 0.5% of MP tangible net worth
b. $25 million
c. 20% of total aggregate obligation due across the entire pool.

For **Qualified Municipal MPs**, the allowed unsecured credit is equal to the lesser of

a. $75 million
b. 20% of the total amount due and owing across the entire pool.

Participants eligible for unsecured credit must submit balance sheet information quarterly, within 55 days of quarter-end. Annual financials are required within 100 days of year-end. ISO New England can also call for financial information at other times (e.g. due to signs of financial distress), which must be provided within 10 days.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Credit is assessed separately for each participant. They can post a corporate guarantee, however, which allows them to utilize the unsecured credit of a parent or related entity. If the guarantor is a market participant, they can use the guarantee to cover their entire exposure. In such cases the obligations for both the parent and the child will be added together, and the guarantee must cover both. If the guarantor is not a market participant, and is rated:

- better than BBB: the participant can use the guarantee to over their entire exposure.
- BBB: the participant can use the guarantee to cover no more than 75% of their exposure.
- BBB-: the participant can use the guarantee to cover no more than 50% of their exposure.

d) What forms of collateral are acceptable?

ISO-NE accepts:

- Letter of Credit
- US Treasury Obligations
- Cash Deposits in the form of a BlackRock Investment account (investment account holding the participant's cash)[13]

Within ISO New England policy, corporate guarantees are treated as a form of collateral. However, corporate guarantees are more properly considered unsecured credit, and as such, are discussed in 7(c) above.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

Initially, ISO NE charges any amounts in excess of collateral to the 'late fee payment account'

ISO NE also obtains third-party credit insurance coverage on entities that receive unsecured credit. These are basically investment grade entities, and municipal entities with an investment grade discounted debt rating. These entities are responsible for paying the cost of this insurance pro rata, based on the average amount of the invoiced issued to the Qualified MPs during the preceding calendar year.

f) To whom are any residual default amounts socialized?

Residual amounts are eventually socialized to all participants, based on pro-rata share.

[13] Some forms of account, bearing greater risk, are considered at a discount to face value (known as a 'haircut' in financial industry parlance).

However, there is a sequence of events that is followed. In the event that collateral is not sufficient to cover a default, ISO New England initially:

- Uses the funds in the 'late fee payment account'
- Uses funds in the ISO's working capital Shortfall Funding Account, totaling around $4 million.
- Short-pays all those due money.
- In the event that the default cannot be corrected by the next week:
- The Shortfall Funding Account and those short-paid are made whole
- The defaulted amount (taking into account any monies recovered to date, including insurance) is socialized to all participants.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- OATT Section I General Terms and Conditions, FERC Electric Tariff No 3
  - Exhibit IA - ISO New England Financial Assurance Policy For Market Participants
  - Exhibit IB - ISO New England Financial Assurance Policy For Non-Market Participant Transmission Customers
  - Exhibit IC - ISO New England Financial Assurance Policy for Non-Market Participant FTR Customers and Non-Market Participant Demand Response Providers
  - Exhibit ID - ISO New England Billing Policy
- OATT Section III Market Rule 1, FERC Electric Tariff No 3

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Cheryl Arnold, Controller, ISO New England (interviewed April 2008)

Credit Profile – Midwest ISO (MISO)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

MISO operates the following markets:

- **Day Ahead Energy Market:** Trades day-ahead for each hour of the following day; settles against traded quantity. This includes virtual transactions, which are effectively a sale of electricity and re-purchase in the real-time market (or conversely a purchase and re-sale), and do not require the participant to have the ability to make/take delivery of electricity.
- **Real Time Energy Market:** For balancing on the day; transacts every five minutes, with prices averaged out on an hourly basis; settles against actual.
- **Ancillary Services Markets:** (Anticipated Go-Live: Sept 2008) Ancillary services markets for provision of frequency regulation capability and reserves; trades on both day-ahead and real time basis.
  NOTE: Changes to the credit and settlement policy as a result of the Ancillary Services Market are not included in this credit profile.

2) Which forward markets are operated? How frequently do they transact?

- **Financial Transmission Rights (FTR) Market:** market for financial instruments entitling holders to payments based on the price differential (in the DAM) between prices at two specified pricing points (nodes or aggregate points); can be acquired in auctions (annual and monthly) and/or secondary market; settled based on traded quantities and DA LMPs.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

MISO carries out these functions itself, through its Settlement Department, Credit Management Department and Accounting Department.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No.

c) Is unsecured credit provided? If so, on what basis?

Unsecured credit is based on the participant's Tangible Net Worth times a percentage factor assigned by MISO based on the participant's Credit Score. The Credit Score is generated by MISO based on credit ratings, financial statements, and significant trade references. Public entities' Credit Score is comprised of 40% financial measures and 60% qualitative measures. Non-public entities' Credit Score is comprise of 60% financial measures and 40% qualitative measures. MISO does not require commercial ratings to qualify for unsecured credit.

Unsecured credit allowance cannot be greater than $75 million. The unsecured credit minimum for credit-worthy public entities is $250,000.

Cooperatives, government agencies and municipalities may be required to submit additional information for MISO's financial review in determining creditworthiness. Public entities that issue revenue bonds may have their Tangible Net Worth adjusted to include the balance of outstanding revenue bonds.

d) Is there a minimum credit requirement for participation in the market?

Approximately $38,000

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

Total Potential Exposure must be less than the participant's Total Credit Limit.

Total Credit Limit is applied in aggregate for all markets. However, to participate in the FTR Auction, a portion of the total credit limit must be allocated to the FTR Auction Credit Allocation. Participants must also propose a Virtual MWh Limit within their Total Credit Limit to participate in virtual transactions in the Day-Ahead Market.

Total Potential Exposure is calculated separately for the following service categories:

- Real Time Energy Market
- Day Ahead Energy Market
- Virtual Transactions
- FTR Auction activity
- FTR portfolio
- Congestion and losses
- Transmission Service

Total Potential Exposure formulas are based on amounts invoiced but not paid, amounts settled but not invoiced and estimated amounts for potential activity.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

All cash markets are billed weekly. Payment lag is typically around 31 calendar days – consisting of ~ twenty-four (24) calendar day delay in billing and seven (7) days for payment.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

Participants have two (2) business days to remedy a failure to pay before default proceedings are commenced.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

Upon default, approval from FERC is required before suspension of service can be effected for LSEs in non-retail choice states, and to retail suppliers / providers of last resort in retail choice states. Although subject to the ruling of FERC, MISO can move retail customers in approximately one (1) to three (3) business days.

d) How are a participant's credit limit and collateral requirements determined?

A participant's total credit limit is equal to the sum of its unsecured credit allowance and any financial security provided. A portion of the participant's total credit limit must be allocated to FTR Auctions if they wish to participate. Participants must also propose a Virtual MWh Limit within their Total Credit Limit to participate in Virtual Transactions.

When a given participant's Total Potential Exposure meets or exceeds 90% of its Total Credit Limit, a notice is sent to all participants. When the participant's Total Potential Exposure equals or exceeds 100% of its Total Credit Limit, a notice is sent to all participants and the participant has two (2) business days to reduce its Total Potential Exposure below its Total Credit Limit before it will be considered to be in default.

e) How frequently are credit limits and collateral requirements reviewed?

Credit evaluations used in determining a participant's unsecured credit are required to be assessed on an annual basis, at a minimum. MISO's credit department performs an additional two (2) to three (3) reviews on a participant's credit limits during the course of a year.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

MISO reviews a participant's exposure against their credit limit daily. Daily reviews are based on actual activity approximately four (4) days after the operating day (known as "E4"). A second review of a participant's total potential exposure is performed when the Initial Settlement Statement is issued.

g) Are bidding/ trading limits imposed for credit purposes?

Bid limits are imposed on Virtual Bidding. Participants must submit a Virtual MWh Limit to MISO. The proposed Virtual MWh Limit is rejected if would cause the participant's Total Potential Exposure to meet or exceed its Total Credit Limit. When the sum of Virtual bids/offers for an Operating Day exceed the approved Virtual MWh Limit, the submitted Virtual bids/offers causing the Virtual MWh Limit to be exceeded will be rejected. Participants must allocate at least two (2) days of trading exposure from their Total Credit Limit before they may begin Virtual Trading in the Day-Ahead Market.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

No.

b) When a position goes to 'delivery', what is the billing period and payment lag?

Same settlement timeframe as day-ahead market. i.e. 7-day billing period, with payment lag of 31 business days.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Participants have two (2) days to remedy a failure to pay before default proceedings are commenced.

d) If a participant is in default, does the market operator liquidate its open positions?

Yes. After a participant is in default, MISO may "terminate" or liquidate all FTRs held by the participant no sooner than ten (10) days after a written notice is provided to the defaulting participant.

Valuation of the FTR will be made on or around the date the FTR would have lapsed based on the amount that would have been owed or based on the amounts paid to or by purchasers for similar FTRs at auctions.

MISO will determine the participant's Settlement Amount based on the total losses (or gains) and costs of the FTR against unpaid amounts owed. Settlement Amounts will be paid two (2) business days after the participant is notified of the amount and calculations.

e) How are a participant's credit limit and collateral requirements determined?

Participants are recommended to set their FTR Auction Credit Allocation amount via the Market Portal at least fifteen (15) business days prior to the start of the bid window for the FTR Auction. Modifications to their FTR Auction Credit Allocation take approximately three (3) days to process and take effect. Participants must post financial security associated with their FTR Auction Credit Allocation or allocate remaining unsecured credit no later than five (5) business days before the start of the bid window for the FTR Auction. (A filing was made with FERC on February 29, 2008 to reduce this to two (2) business days.)

Credit Allocation Requirements for FTR Auctions must be such that:

FTR Auction Credit Exposure < FTR Auction Credit Allocation.

Total Potential Exposure - FTR Auction Credit Exposure < Total Credit Limit - FTR Auction Credit Allocation.

The exposure associated with FTRs is calculated as the value of FTRs due in current month plus charges associated with FTRs due in the next 12 months. Credits associated with FTRs due in the next 12 months are zeroed out.

f) How frequently are credit limits and collateral requirements reviewed?

Participants set the amount of their Total Credit Limit they wish to allocate to FTR trading prior to each auction, with collateral requirements also directly driven by this limit. MISO reviews and approves FTR allocations based on the participants' Total Credit Limit and Total Potential Exposure. Therefore, with monthly FTR auctions, credit limits and collateral requirements are also reviewed monthly (though conceivably could be adjusted multiple times prior to the FTR auction, at the participant's discretion).

Participants may request a refund of their FTR Auction Credit Allocation one (1) business day after an auction clears, not to exceed their FTR Auction Credit Allocation minus the sum of all cleared FTR bids and the absolute value of all cleared FTR offers. Participants may also request a refund of their FTR Auction Credit Allocation one (1) business day after payment is received for any cleared bids for an auction. MISO typically responds to requests for refunds within one (1) business day but has five (5) business days.

g) Are bidding/ trading limits imposed for credit purposes?

Bid limits are imposed on the FTR auction process. Submitted FTR bids and/or offers will be rejected if the FTR Auction Credit Requirement exceeds the participant's FTR Auction Credit Allocation for an annual, monthly, or conjoined bid window.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. Participants can submit Internal Bilateral Schedules as financial schedules (finSched) and must define the MWhs for each hour and market to be settled against (e.g. DA LMP or the RT LMP).

b) Is there any credit validation on submission of a settlement reallocation?

No.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

No.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Two (2) business days.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Credit evaluations are performed by MISO at least on an annual basis or upon notification of a material change in the participant's creditworthiness. However, MISO may modify unsecured credit allowance at any time.

Ongoing credit evaluations take into account agency ratings, financial statements, material changes in financial conditions, litigation and other disclosures.

Public entities' Credit Score is comprised of 40% financial measures and 60% qualitative measures. Non-public entities' Credit Score is comprise of 60% financial measures and 40% qualitative measures. MISO does not require commercial ratings to qualify for unsecured credit.

c) *If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?*

Unsecured credit is aggregated for affiliated applicants or affiliated participants and subject to the $75 million unsecured credit maximum.

In the case of Corporate Guarantees, the child's unsecured credit will be the lesser of:

- The amount determined by MISO based on the financial review of the parent Guarantor
- The amount guaranteed by the parent Guarantor (as approved by MISO)
- $75 million or the portion of the $75 million maximum as allocated by the parent Guarantor

d) *What forms of collateral are acceptable?*

Cash and letters-of-credit

Letters of credit must automatically renew at least 120 days prior to expiration for a duration of at least one year. If the letter of credit is not renewed, the participant must submit another form of financial security (including but not limited to a new letter of credit) no later than 110 days prior to the expiration of the letter of credit. Letters of credit must be issued by an institution rated A-/A3 or better. If the issuer no longer fulfils these criteria another LC, or cash, must be posted within ten (10) business days.

e) *In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?*

No.

f) *To whom are any residual default amounts socialized?*

Uncollectable Obligations are allocated to all participants invoiced in the same period as the unpaid invoice (this may include up to four weekly invoices before the default is realized). The loss obligation is allocated according to a ratio share of gross charges and credits.

8) *Other Questions*

a) *Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?*

No.

9) *References and Acknowledgements*

The following documents were referenced in compiling this profile:

- Midwest ISO Credit Policy; Attachment L of the MISO Tariff
- Billing and Payment; Defaults and Remedies; Section 7 of the MISO Tariff
- Business Practice Manual 005 Market Settlements
- Frequently Asked Questions – Virtual Transactions

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Phil Gootee, Credit Manager, MISO (interviewed May 9th, 2008)

Credit Profile – NEMMCO, Australia

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

NEMMCO (National Electricity Market Management Company) operates the following markets

- Spot market: Every five minutes, with market prices determined every half hour on a time-weighted average basis. Financial liability calculated daily and settled weekly with the NEM. Financial settlement operates four weeks in arrears. Settled against actual quantity
- NEMMCO also operates eight different ancillary services markets. They are co-optimised with energy in the dispatch algorithm and settled on actual quantities. Contingency raise payments are recovered from generators, contingency lower payments are recovered from load customers. Recovery of payments for regulation services are based on a "causer pays" methodology. Ancillary services charges are billed on the same statement together with the energy for that period.
    - Regulation Raise
    - Regulation Lower
    - Contingency Fast Raise (6 second)
    - Contingency Fast Lower (6 second)
    - Contingency Slow Raise (60 second)
    - Contingency Slow Lower (60 second)
    - Contingency Delayed Raise (5 minute)
    - Contingency Delayed Lower (5 minute)

2) Which forward markets are operated? How frequently do they transact?

None by NEMMCO.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

NEMMCO facilitates the billing and settlement of trades in the NEM including spot market trades, settlement reallocations and ancillary services market transactions.

The Sydney Futures Exchange "Austraclear" payment system is used for electronic funds transfers. Austraclear settles electronic cash transfers using the Reserve Bank of Australia's real time gross settlement system.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

While NEMMCO acts as a central administrator, the Rules do not establish it as the central counter-party in a legal sense. Any legal disputes would be referred to the Australian Energy Regulator. NEMMCO confirms it has no legal rights to act on behalf of participants in the case of bankruptcy.

c) Is unsecured credit provided? If so, on what basis?

Yes. Any entity meeting the following criteria will not be required to post collateral, or be subject to trading limits:

"(a) be either:

- any entity under the prudential supervision of the Australian Prudential Regulation Authority; or
- a central borrowing authority of an Australian State or Territory which has been established by an Act of Parliament of that State or Territory;

(b) be resident in, or have a permanent establishment in, Australia;

(c) not be an externally administered body corporate (as defined in the Corporations Act) or under a similar form of administration under any laws applicable to it in any jurisdiction;

(d) not be immune from suit;

(e) be capable of being sued in its own name in a court of Australia; and

(f) have an acceptable credit rating of A-1 or higher by Standard and Poor's (Australia) or P-1 or higher credit rating by Moody's Investor Service, for short-term unsecured counterparty obligations."

In actuality, these criteria are sufficiently strict that only financial institutions could qualify, and as such, typically end up being the criteria that apply to institutions providing credit guarantees to market participants (i.e. LC providers). NEMMCO advises that no current market participants meet these requirements.

d) *Is there a minimum credit requirement for participation in the market?*

Participants must post a minimum of $100,000 until metering data or estimated data is obtained. After this, their required credit support is based upon their exposures, with no 'floor' requirement.

e) *Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?*

On a portfolio basis.

4) *Credit Management – Cash Markets*

a) *What is the billing period and payment lag?*

A billing period is seven days. Settlement occurs weekly, approximately four weeks in arrears.

A preliminary statement is issued five business days after the end of the billing period as an indication to market participants. The final statement is issued within 18 business days of the end of each billing period. Payment is due on the 20th business day after the end of the billing period, or two business days after the issue of the final statement (whichever is later).

For participants paying monies to NEMMCO, payments must be cleared by 10.30am on settlement day. NEMMCO payment transactions are then made, once all receipts have been received, by 2pm on settlement day. If all receipts are not cleared by 10.30am, short payment is commenced by 4pm.

b) *If payment is not made when due, is there a time-to-remedy and how long is it?*

Yes. Participants receive a Call Notice, and have until 11am the next business day to pay (i.e. ~1 day).

In the event that the Call Notice is not satisfied, a Default Notice is issued. The default must be remedied by 1pm on the next day – though an extension can be approved by the NEMMCO board. NEMMCO can seize any collateral as soon as a default is declared.

It may take a further two (2) days for the NEMMCO Board to meet and decide to suspend the participant, during which they can continue to incur liability.

c) ***If a participant is in default, is there a delay while its retail customers are moved to a new retailer?***

Yes. There is a lag of 1 day from issuance of a suspension notice to the assignment of its customers to a Retailer of Last Resort (ROLR).

A retailer of last resort (ROLR) may be nominated to assume responsibility for delivery electricity supply to the customers of a suspended market participant. Jurisdictional ROLR arrangements must be kept current and operational at all times to ensure they can be activated promptly. Where these arrangements are in place, NEMMCO initiates the process immediately following the issue of a suspension notice. The jurisdiction involved must provide approval in writing before retail customers can be transferred under the ROLR.

If no ROLR agreement in place, customers are disconnected.

d) ***How are a participant's credit limit and collateral requirements determined?***

The Maximum Credit Limit (MCL) is a reasonable worst-case estimate of NEMMCO's financial exposure to a participant over a 42 day trading period and is set to a probability level such that it would not be exceeded more than once in 48 months.

The MCL represents the level of financial exposure that NEMMCO is comfortable with a participant carrying and determines the amount of acceptable collateral that the participant is required to lodge. In setting the MCL, NEMMCO considers the following factors

- The average level and volatility of the relevant regional spot price
- The pattern and quantity of the participant's normal energy trading activity in the market
- The quantity and pattern of reallocation transactions expected in the immediate future
- The correlation between the metered amounts of electricity and the regional spot price.

A participant's Trading Limit is set at 84% of its MCL. If this is exceeded, NEMMCO will issue a Call Notice to the participant. This provides an opportunity to receive additional credit support before the exposure exceeds the value of credit support held.

Reduced maximum credit limits are allowed in exchange for the participant accepting a lower trading limit. This lower limit is 67% of the MCL and the trading limit is set at 75% of the RMCL

e) ***How frequently are credit limits and collateral requirements reviewed?***

At least once a year - usually quarterly. Any changes to the participant's operations, changes in market-wide methodology inputs and any other relevant factors are taken into account as part of the review. NEMMCO conducts a review of a participant's MCL when:

- The participant requests such a review
- The participant breaches their trading limit
- The participant's average daily electricity load changes significantly

f) ***How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?***

A formal assessment of liability is performed daily

g) ***Are bidding/ trading limits imposed for credit purposes?***

Yes. Participants cannot submit bids/offers such that the potential value of the transaction, plus all other uncompleted transactions (i.e. a transaction with components into the future), would exceed their trading margin (which is essentially the headroom between its trading limit and liabilities already incurred).

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market[14]?

Not Applicable

b) When a position goes to 'delivery', what is the billing period and payment lag?

Not Applicable

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Not Applicable

d) If a participant is in default, does the market operator liquidate its open positions?

Not Applicable

e) How are a participant's credit limit and collateral requirements determined?

Not Applicable

f) How frequently are credit limits and collateral requirements reviewed?

Not Applicable

g) Are bidding/ trading limits imposed for credit purposes?

Not Applicable

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. Settlement reallocation can be made in relation to trading amounts that are based either on quantity (an agreed half hourly energy profile), or on value (an agreed dollar amount). There are two types of reallocation available:

- Ex-ante reallocation agreements based on quantity of electricity traded and NEMMCO is advised prior to the spot price being determined.
- Ex-post agreements are based on value of trading and the agreement to reallocate is advised to NEMMCO after the time when the spot price is set.

b) Is there any credit validation on submission of a settlement reallocation?

Prospective reallocations submitted ex-ante are included in the determination of a participant's MCL and may be used to reduce credit support requirements.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

NEMMCO may 'deregister' a reallocation request if a default event occurs in relation to one of the parties, or if the prudential requirements of one of the parties are not met.

The deregistration is effective immediately upon NEMMCO notifying both parties to a reallocation request of the deregistration. The deregistration:

(1) is effective for all trading intervals commencing after the time specified in the notice, and notwithstanding that the default event may be subsequently cured; and

(2) prevents the completion of the requested reallocation transactions in the trading intervals that commence at or after the time specified in the deregistration notice."

[14] An incremental settlement process, that marks all positions to the price of the most recent auction (or settlement price of the most recent trading session), realizing any gains or losses that have occurred since the last mark (the first mark is from the price at which the contract was initiated).

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

The participant has 24 hours (until 11am following day) to respond to a Call Notice.

In the event that the Call Notice is not responded to, a Default Notice is issued. The participant then has until 1pm the following day to remedy their default.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

If a participant meets the requirements set out in 3(c), there is no particular limitation based on the amount of unsecured credit it can obtain.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

While not explicitly stated, it appears to be at the child level – the market participant itself is assessed.

d) What forms of collateral are acceptable?

Financial guarantees and letters of credit which are financial obligations in writing to pay unconditionally upon demand from an instrument that meets acceptable credit criteria and is not, itself a market participant. The bulk of credit support is in the form of bank guarantees. 60% of the aggregate amount of credit support must be available at one hour call, up to 20% at seven-day call and the remainder at two-day call. Security deposits in the form of cash may be lodged with NEMMCO either voluntarily or in response to a call notice. Replacement credit support must be provided at least 10 business days before the expiry or termination of an existing credit support.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No.

f) To whom are any residual default amounts socialized?

Short payments are made to the generators in proportion to the amounts owed to each for energy and reallocation.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- NEM Settlement Process (NEMMCO)
- NEM Settlement Prudential Supervision Process (NEMMCO)
- Reallocation Information Paper and Examples (NEMMCO)
- Reallocation Procedure: Energy and Dollar Offset Reallocations (NEMMCO)
- Australia's National Electricity Market: Wholesale Market Operation - Executive Briefing (NEMMCO)
- Australia's National Electricity Market: Trading Arrangements in the NEM - Executive Briefing (NEMMCO)
- Australia National Electricity Rules (Chapter 3 – Market Rules)

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Chris Muffett, Metering and Settlements, NEMMCO (interviewed April 2008)

Credit Profile – New York ISO (NYISO)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

- Real-time market: For balancing on the day; transacts every five minutes, with prices averaged out on an hourly basis; settles against prices calculated throughout the day and actual quantities.
- Day-ahead hourly market: Trades day-ahead for each hour of the following day; settles against traded quantity. This market includes 'virtual bidding' with no resulting physical delivery.
- Market Based Ancillary Services include Operating Reserve (10 minute spinning, 10 minute non synchronized, 30 minute spinning and non-synchronized reserve), Regulation and Frequency Response. They are co-optimized with energy and settled in the day-ahead and real-time markets. Energy imbalance is settled in the real-time market.

2) Which forward markets are operated? How frequently do they transact?

- Transmission Congestion Contract (TCC) market: Forward market in basis hedges between two pricing points (nodes or aggregate points). TCCs are analogous to FTRs in other US markets The NYISO conducts Capability Period Auctions and monthly Reconfiguration Auctions.
- Installed Capacity Market: The NYISO conducts Capability Period Auctions, Monthly Auctions and monthly Spot Market Auctions.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

Yes, NYISO carries out settlement and credit management for its markets.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No, NYISO does not take title to any energy, capacity or ancillary services.

c) Is unsecured credit provided? If so, on what basis?

Yes, unsecured credit is provided. Rated Customers having Senior Long Term Unsecured Debt must be investment grade (BBB- or better from S&P or Fitch; Baa3 or better from Moody's). Rated Customers without Senior Long Term Unsecured Debt can use an Issuer Rating and Non-Rated Customers may qualify for an Equivalency Rating. Each must be rated BBB or higher from S&P or Fitch or Baa2 or higher from Moody's to qualify for unsecured credit. All Customers qualifying for unsecured credit are subject to a 20% market concentration cap (calculated using the highest monthly sum of receivables in previous calendar year) and a credit assessment involving liquidity, leverage and debt coverage, performance and profitability.

d) Is there a minimum credit requirement for participation in the market?

No, customer must meet their operating requirement.

e) *Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?*

Credit requirements are calculated separately for each of the markets and products (Energy, UCAP, TCCs, Virtual Transactions, WTSC, DADRP and DSASP) and are then combined on a portfolio basis to give a single operating requirement for each participant.

4) *Credit Management – Cash Markets*

a) *What is the billing period and payment lag?*

The billing period is monthly and invoices for the previous month are required to be paid by the first business day after 15th day of month (i.e. normally 15-18 calendar days lag). Customers owed money are paid the first business day after the 19th day of the month.

However, each trading month is only finalized ten months later. i.e. resettlement can take place for up to 10 months. Each monthly invoice also contains adjusted billing information for the invoices four months and six months prior.

b) *If payment is not made when due, is there a time-to-remedy and how long is it?*

Two business days for a payment default and three business days for a collateral default.

c) *If a participant is in default, is there a delay while its retail customers are moved to a new retailer?*

The NYISO may terminate a participant in default immediately following the expiration of the cure period, following notification to the PSC and FERC. In this event, load is shifted to the providers of last resort (the transmission owners). NYISO were not able to provide a definitive timeframe within which this must take place.

d) *How are a participant's credit limit and collateral requirements determined?*

A customer is required to allocate unsecured credit and or provide collateral in an amount equal or greater to its Operating Requirement.

A customer's operating requirement is comprised of the credit requirements calculated separately for each market, including energy, unforced capacity, TCCs and virtual transactions:

- Energy – based on the higher of the highest month of energy purchases for the prior equivalent capability period, extrapolated over 50 days or the daily run rate over the previous 10 days multiplied by 50 days.
- UCAP – credit must equal desired bid amount, and once bids transact, credit must equal billed, but not paid or unbilled UCAP obligations.
- TCC – credit to cover bids submitted into a TCC auction must equal a minimum amount per MW, dependent upon duration of the TCC ($1,500 Annual, $2,000 six month, $600 monthly auctions), multiplied by the MW quantity bid.

  The credit requirement to hold TCCs is the higher of:

  ⇒ a calculation based on probability curves by duration (3% for monthly and six-month auctions and 5% for annual auctions). Inputs to this calculator include POI, POW, source/sink zones for the TCC, market clearing prices from the auction, and duration of TCC held, or;

  ⇒ The projected amount of the primary holder's payment obligation to the NYISO, if any, considering the net mark-to-market value of all TCCs in the primary holder's portfolio.
- Virtual transactions – credit equals maximum daily MWh trading limit x $/MWH x 2 days.

Additional collateral is required to be posted if the Operating Requirement exceeds unsecured credit and any existing collateral.

If at any point in the monthly billing cycle, the amount owed to the ISO for virtual transactions reaches 50% of credit support, the ISO will request payment or additional credit support by the next business day and may suspend authorization to engage in virtual transactions. If the amount owed reaches 100% of credit support, the ISO may cancel any pending day ahead transactions and immediately suspend authorization to engage in virtual transactions.

e) *How frequently are credit limits and collateral requirements reviewed?*

Operating Requirements for Energy, TCC and virtual transactions are reviewed daily. Additionally, there is a monthly review of historical requirements for energy. UCAP is reviewed at least 3 times a month, prior to auctions. Operating requirements for market participants can also be prepared upon request.

Customers must inform the ISO within 5 business days if there is a material change in their financial status which could impact their unsecured credit allowance. This includes:

- down-grade of a long or short term debt rating
- placement on a negative credit watch
- bankruptcy filing, insolvency or default under financing arrangement
- resignation or termination of key officer
- initiation of lawsuit that could materially and adversely affect current or future financial performance
- restatement of prior financial statements

Unsecured credit limits are reviewed at least annually, but more typically quarterly. They are also reviewed if a Customer has been downgraded by any of the ratings agencies.

f) *How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?*

Settlement exposure is compared against credit limits daily. The information is usually at a two day lag, except for virtual transactions which are at a one day lag.

g) *Are bidding/ trading limits imposed for credit purposes?*

For virtual transactions in the day-ahead market, credit support is calculated as the maximum amount of MWhs the customer has applied to be authorized to bid per day x credit support per MWh x 2. The credit support per MWh is determined by looking at the price differentials at the 97th percentile between the day ahead and real time markets over two monthly periods in the preceding two calendar years. The highest price differential of the two years that applies for the current two month period is used (i.e. the higher of May/June 2006 and 2007 will be used in May/June 2008). Each Customer chooses the zones in which they would like to trade. Their price differential is the highest of those in the zones in which they have chosen to trade. This credit support can be met using unsecured credit and any of the forms of acceptable collateral.

Bids are capped in the NYISO systems by a Customer's authorized number of MWhs. All bids will be rejected for the day if the MWhs exceed the maximum number of MWhs.

5) *Credit Management – Forward Markets*

a) *Are forward positions marked-to-market?*

No. However, for operating requirement purposes the projected amount of the TCC primary holder's payment obligation to the NYISO is adjusted after each auction period based on the revised value of all TCCs in the primary holder's portfolio.

b) When a position goes to 'delivery', what is the billing period and payment lag?

TCCs settle with the Day Ahead Market and are billed alongside the cash markets on a monthly basis.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

As for the cash markets, two business days.

d) If a participant is in default, does the market operator liquidate its open positions?

No, the NYISO cannot liquidate TCCs.

e) How are a participant's credit limit and collateral requirements determined?

See 4d The TCC and ICAP credit components form part of the customer's Operating Requirement.

f) How frequently are credit limits and collateral requirements reviewed?

TCC requirements are reviewed daily. UCAP is reviewed at least three times per month, prior to auctions.

g) Are bidding/ trading limits imposed for credit purposes?

Yes, customers must apply for bidding authorization in TCC auctions and ICAP auctions and may not exceed this amount.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. NYISO allows 'Internal Bilateral Transactions', which are a reallocation of settlement allocation, generally for a defined MW amount per hour, from one party to another.

b) Is there any credit validation on submission of a settlement reallocation?

No.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

No.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Typically two (2) business days. If it is not met a Customer may be declared in default. A participant has three business days to cure a default resulting from failure to comply with credit worthiness arrangements or one (1) business day following the termination of a pre-payment agreement.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Unsecured credit limits are reviewed at least annually, but more typically quarterly. Reviews are also carried out based on any upgrades or downgrades from the ratings agencies. Unsecured credit may be cancelled in the event of late payments occurring twice in a year.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Credit is assessed at child level based on their operating requirement. The parent may be able to provide an affiliate guarantee.

d) What forms of collateral are acceptable?

NY ISO accepts the following forms of collateral: cash deposits, letters of credit and surety bonds.

NYISO's rules also treats the netting of amounts receivable by participants as collateral. This netting provides a credit to participants based upon net receivables they have amassed up to the 19^{th} of the month (i.e. amounts that are calculated but not billed). For the purposes of this analysis (and that in the Recommendations & Findings Report), however, these amounts are instead treated as an offset to the participant's exposure. This offset reduces the participant's overall collateral requirement (resulting in a similar outcome to treating the receivables as collateral).

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No. The NYISO has no credit insurance policies. Participant's contribute to a Working Capital Fund, to support the NYISO's working capital requirements. In the event of default, the participant's contribution to this fund can be seized to satisfy their obligations.

It should be noted that the Working Capital Fund is not a default fund, and while it may be used to bridge short-term non-payment, it must be restored and does not act as a Default Fund.

f) To whom are any residual default amounts socialized?

They are socialized to all customers as a proportion of gross accounts receivable and gross accounts payable.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- NYISO Market Services Tariff and Attachment K
- NYISO Open Access Transmission Tariff and Attachments M, U, V
- NYISO Market Participants User Guide (March 07)
- NYISO TCC Manual (May 07)
- NYISO NYMOC Course Notes for "Energy Market Summary", "Settlement Ins and Outs", "The NYISO … a two settlement system" and "Market Based Ancillary Services".

We are grateful to the following individuals who were consulted during the compilation of this profile:

- Sheri Prevratil, Corporate Credit Manager, NYISO

Credit Profile – New York Mercantile Exchange (NYMEX)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

NYMEX does not offer trading in cash products. It does, however, offer clearing services for a number of daily electricity futures, the nearest days of which could be considered as de-facto cash products, as they settle after the electricity has been delivered. These are cash-settled products, with final settlement against prices in the underlying RTO-operated cash market.

2) Which forward markets are operated? How frequently do they transact?

NYMEX is the world's largest energy and metals market. It offers trading and clearing in an extensive range of products in electricity, natural gas, crude oil, refined products, coal, base metals, precious metals and environmental products. Within its electricity product suite it provides products based on a number of defined hubs (e.g. PJM Western Hub) or zones (NY Zone J), mostly in regions with an underlying RTO-operated cash market, which provides the underlying price reference for final settlement.

The tenor of most of NYMEX's products is monthly. These products are typically listed for a minimum of 24 months into the future, and some as far as 84 months. 36 months is fairly typical for electricity. Some short-term forward products in electricity and natural gas have a daily tenor, and are generally listed only in the few weeks prior to the 'delivery' day.

Contracts are available for trading every working day. i.e. a participant could trade a PJM Western Hub peak monthly contract for October on one day, and trade it again the following day.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

NYMEX carries out all settlement and credit risk management for its markets through its wholly-owned clearing house.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

Yes. NYMEX serves as the legal central counter-party to all trade.

c) Is unsecured credit provided? If so, on what basis?

All positions on NYMEX are fully secured. Unsecured credit is not provided.

d) Is there a minimum credit requirement for participation in the market?

Many of entities trading on NYMEX utilize the services of a Clearing Member (also known as a Futures Commission Merchant – or FCM). NYMEX does not impose minimum credit requirements on these entities, other than the posting of collateral to cover their positions, but their FCM's might.

NYMEX does impose relatively strict controls on FCMs with respect to capital adequacy, including a requirement that they "show a minimum working capital of $5 million"[15].

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

NYMEX assesses credit risk on a portfolio basis, taking account of the risk correlations both between products (inter-commodity spreads) and contract periods (calendar spreads).

[15] Source: http://www.nymex.com/ss_main.aspx?pg=3.

4) *Credit Management – Cash Markets*

a) *What is the billing period and payment lag?*

Those products with cash-like features are settled according to the same timetable as all NYMEX products. See Section 5.

b) *If payment is not made when due, is there a time-to-remedy and how long is it?*

See Section 5.

c) *If a participant is in default, is there a delay while its retail customers are moved to a new retailer?*

Not applicable.

d) *How are a participant's credit limit and collateral requirements determined?*

See Section 5.

e) *How frequently are credit limits and collateral requirements reviewed?*

See Section 5.

f) *How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?*

See Section 5.

g) *Are bidding/ trading limits imposed for credit purposes?*

See Section 5.

5) *Credit Management – Forward Markets*

a) *Are forward positions marked-to-market?*

Yes. Variation margin, for new trades and those positions already held, is calculated each night and must be paid the following morning.

b) *When a position goes to 'delivery', what is the billing period and payment lag?*

The billing period for a contract in 'delivery' will depend upon standard commercial terms in the cash market associated with that market. NYMEX will hold delivery margin from both parties until it has been confirmed that delivery has occurred and payment has been made. All NYMEX electricity products are presently cash-settled.

c) *If payment is not made when due, is there a time-to-remedy and how long is it?*

If a payment is not made when due, the participant will receive a margin call and has one hour in which to produce funds.

d) *If a participant is in default, does the market operator liquidate its open positions?*

Yes – or if the FCM is still intact, the FCM will do this.

e) *How are a participant's credit limit and collateral requirements determined?*

All positions are fully collateralized. Collateral requirements are calculated based on the risk that the position represents, which is generally the worst adverse move, to 99% statistical confidence, between the last mark-to-market and when the position could be liquidated. For liquid markets, this is usually the one-day move, but for less liquid markets might be greater than one day. e.g. a number of electricity contracts are collateralized based on 99% worst two-day move.

In determining collateral requirements for a participant's portfolio, account is taken of risk correlation between the contracts in that portfolio. The tool used for this function – known as SPAN (Standard Portfolio ANalysis of risk) – is used by many of the world's futures markets.

f) How frequently are credit limits and collateral requirements reviewed?

Each working day. NYMEX also reserves the right to revise collateral requirements intra-day (and require new collateral postings), if it deems a situation warrants it.

g) Are bidding/ trading limits imposed for credit purposes?

Yes, NYMEX imposes Risk Allocation Value (RAV) limits on the electronic submission of orders for trading, as well as on submission of off-exchange-traded deals for clearing, via Clearport. It is difficult to impose hard-and-fast limits on floor trading, though this is becoming an increasingly smaller part of NYMEX's business, and any participant exceeding limits set by their FCM is liable to have the FCM sell their positions out from under them.

Additionally, for those products that can be physically-delivered, position limits are imposed in the few trading days before delivery. These serve a number of purposes, including avoidance of a liquidity crunch (with participants who can't make/take delivery scrambling to get out of deals), mitigating the ability of a party to corner a market, etc. Position limits may be lifted for certain participants, on application and proof of their ability to make/take delivery.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

No – there is no need, as NYMEX is a forward market, and any forward deals can be left in the clearing house.

b) Is there any credit validation on submission of a settlement reallocation?

Not applicable.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Not applicable.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

A participant has until 10am each morning to post any additional required collateral, based on the assessment performed overnight.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Not applicable.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

NYMEX's processes and systems provide explicit support for cross-account netting. NYMEX's clearing system, allows the definition of multi-level hierarchies to track relationships between entities. e.g. parent-child. Collateral requirements are determined at the highest level, based upon the net risk represented by the positions held by all entities within the hierarchy. It should be noted that entities which are bankruptcy-remote cannot take advantage of cross-account netting. These entities, by the way they are setup, are structured to be financially remote from other entities in the event of bankruptcy. As a result, they cannot share risk, and associated collateral postings, with other entities, even if owned by the same parent.

d) What forms of collateral are acceptable?

Cash

Treasury instruments

Letters-of-credit from certain specified banks, payable within one-hour of demand. LCs may represent no more than 50% of a participant's total collateral postings.

Holding in certain specified money-market mutual funds.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

Yes. NYMEX has a trade guarantee hierarchy in place:

- If a customer defaults it is first up to their Clearing Member to make the deal good, with their own funds if necessary.
- If this forces the Clearing Member to default, NYMEX will utilize that Clearing Member's contribution to the Guarantee Fund.
- If and when this is exhausted, NYMEX will use the remainder of the Guarantee Fund (the total size of the Guarantee Fund is close to $300m).
- If the Guarantee Fund is depleted, NYMEX can call on $115m in insurance.
- Finally, NYMEX can assess its Clearing Members to cover the remainder. i.e. socialize the residual to the FCMs.

To date, NYMEX has never had to access the Guarantee Fund or any higher level of guarantee.

f) To whom are any residual default amounts socialized?

All Clearing Members (not customers)

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

Yes. NYMEX requires traders (both through its electronic system and floor traders) to undergo training. FCMs must also prove certain risk management capabilities before they are allowed to become FCMs.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- NYMEX Rulebook (accessed via NYMEX website).
- Various pages on the NYMEX website concerning risk management functions.

This profile is also based in part on the personal knowledge of the author.

Credit Profile – New York Stock Exchange (NYSE)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

The New York Stock Exchange operates the world's largest market in corporate equities. Trading takes place from 9.30am – 4pm on normal working days. Trades are settled against the price and quantity agreed at the time the trade is executed.

2) Which forward markets are operated? How frequently do they transact?

NYSE operates various derivatives markets, but these do not form part of the scope of this profile.

3) Settlement/Credit Management High-Level Structure and Policy

a) *Does the market operator carry out its own settlement and credit management, or use an external party?*

Settlement and credit management are carried out by the National Securities Clearing Corporation (NSCC), which is a subsidiary of the Depository Trust and Clearing Corporation. (DTCC)

b) *Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?*

Yes, the NSCC is the legal central counter-party to all trades.

c) *Is unsecured credit provided? If so, on what basis?*

No.

d) *Is there a minimum credit requirement for participation in the market?*

Yes, $10,000 in cash or $5000 for a mutual fund or insurance member.

e) *Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?*

A participant's liabilities are assessed separately, as they are effectively independent, and aggregated. This aggregate liability is compared against the participant's credit cover.

4) Credit Management – Cash Markets

a) *What is the billing period and payment lag?*

The billing period is daily (each work day). Settlement is on a T+3 basis. i.e. there is a payment lag of three (3) work days (3-5 calendar days).

b) *If payment is not made when due, is there a time-to-remedy and how long is it?*

Yes. Any failure to pay must be remedied the next business day.

If a participant is in default of any delivery of funds or securities to the NSCC, summary action can be taken to suspend the participant or restrict their access to services. This action can be taken by the membership committee or one or more designees subject to confirmation within 3 business days by the membership committee. Fines may also be imposed on the participant, of up to $20,000 for a single offense.

c) ***If a participant is in default, is there a delay while its retail customers are moved to a new retailer?***

This question is not directly analogous to equities trading, as it does not have the same obligation to serve as with electricity retailers.

The NSCC has authority to close out or manage positions of a defaulting participant.

d) ***How are a participant's credit limit and collateral requirements determined?***

Credit requirements depend on the type of membership and use of services. They are based on a two standard deviation volatility range for unsettled positions as well as the difference between contract and current market prices for unsettled positions. Extra payments may be required for market makers whose net unsettled positions in dominated securities exceed their excess net capital, additional payments related to fluctuation in or volatility or lack of liquidity in a security and an amount for certain activity (specified activity).

e) ***How frequently are credit limits and collateral requirements reviewed?***

They are monitored continuously – collateral requirements can change daily depending on a participant's open positions.

f) ***How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?***

Daily with the option for intra-day assessment as well.

g) ***Are bidding/ trading limits imposed for credit purposes?***

The NSCC rules do not make any mention of credit validation on receipt of new orders. It is therefore likely that credit management is done after the fact.

5) Credit Management – Forward Markets

a) ***Are forward positions marked-to-market?***

Not Applicable

b) ***When a position goes to 'delivery', what is the billing period and payment lag?***

Not Applicable

c) ***If payment is not made when due, is there a time-to-remedy and how long is it?***

Not Applicable

d) ***If a participant is in default, does the market operator liquidate its open positions?***

Not Applicable.

e) ***How are a participant's credit limit and collateral requirements determined?***

Not Applicable

f) ***How frequently are credit limits and collateral requirements reviewed?***

Not Applicable

g) ***Are bidding/ trading limits imposed for credit purposes?***

Not Applicable

6) Credit Management – Settlement Reallocation

a) ***Does the market support settlement re-allocation between participants?***

Not Applicable.

b) ***Is there any credit validation on submission of a settlement reallocation?***

Not Applicable.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Not Applicable.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

One hour

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Not Applicable

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Child Level, although membership rules allow for entry sponsored by a parent in certain cases

d) What forms of collateral are acceptable?

Cash, US Government Treasury Securities, Agency Securities guaranteed by the US Government. At least 40% of the required amount must be in cash.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

"NSCC has entered into a multilateral netting contract and limited cross-guaranty agreement with DTC, FICC and OCC, under which these clearing agencies have agreed to make payments to each other for any remaining unsatisfied obligations of a common defaulting participant to the extent that these clearing agencies have excess resources belonging to the defaulting participant.

"Additionally, the NSCC will apply no less than twenty-five percent (25%) of its retained earnings, existing at the time of a Member impairment which gives rise to a loss or liability not satisfied by the impaired Member's Clearing Fund deposit, to such loss or liability."[16]

f) To whom are any residual default amounts socialized?

Clearing Fund participants are charged pro rata based on their clearing fund requirement.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

In order to trade on the NYSE, participants must become members and must hold a trading license in order to trade on the floor. There are orientation sessions and membership examinations that apply to those seeking a trading license and membership.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- NSCC Rules and Procedures (March 2008)
- NSCC Assessment of Compliance with the CPSS/IOSCO Recommendations for Central Counterparties (Oct 2007)
- NYSE Trading License Information and Forms

[16] NSCC *Assessment of Compliance with the CPSS/IOSCO Recommendations for Central Counterparties*. Oct 10, 2007. Pg 17.

Credit Profile – PJM

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

PJM operates the following cash markets:

- Real-time market: For balancing on the day; transacts every five minutes, with prices averaged out on an hourly basis; settles against prices calculated throughout the day (and finalized by noon the following day) and actual quantities (specifically, the differential to DAQ)
- Day-ahead hourly market: Trades day-ahead for each hour of the following day; settles against traded quantity.
- Regulation market: Ancillary services market for provision of frequency regulation capability; trades on a day-ahead basis; settles based on scheduled provision.
- Synchronous reserve market: Ancillary services market for provision of synchronous reserve; trades on a day-ahead basis; settles based on scheduled provision.

2) Which forward markets are operated? How frequently do they transact?

Financial Transmission Right (FTR) market: Forward market in basis hedges between two pricing points (nodes or aggregate points). There is a main annual auction, and residual auctions each month.

Reliability Pricing Mechanism (RPM): Capacity market to incent generation investment, transmission investment and demand reduction.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

PJM carries out these functions itself, through its Settlement Department and Credit Management Department respectively.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No. PJM does not take any title, and is not the central counter-party to trade.

c) Is unsecured credit provided? If so, on what basis?

Unsecured credit is provided to some parties. This is generally on the basis of credit rating and tangible net worth, though unsecured credit is also extended to some unrated entities such as municipal electricity companies, based on a credit assessment by PJM staff.

d) Is there a minimum credit requirement for participation in the market?

Yes. $50,000.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

Credit assessment in the cash market is based on net billed amounts, and as a result is assessed in aggregate for those markets.

Credit for FTR and RPM markets is assessed on a stand-alone basis, though with account taken of any unsecured credit not used in the cash markets. A change is pending in front of FERC that would also allow those participants who are frequently payment recipients in the cash market to gain partial credit offset for this against FTR credit requirements.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

All cash markets are billed monthly, with payment due approximately 22 days after the end of the month.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

Participants have three (3) days to remedy a failure to pay before default proceedings are commenced.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

Yes. Defaulting participants can continue to incur liabilities for three (3) days while their customers are moved to a new retailer.

If the defaulting participant was a Provider of Last Resort (PoLR), the amount of time to wind-up their position is indeterminable, as FERC approval is first required.

d) How are a participant's credit limit and collateral requirements determined?

A participant must post collateral so that:

Unsecured Credit Allowance + Collateral Posted ≥ Peak Market Activity

…where Peak Market Activity is equal to the participant's highest two-consecutive-month financial obligation across all PJM markets (this may be based on the previous year's history, or the participant's estimate of their activity for the next 12 months). If PJM believes a participant's Peak Market Activity is not representative of their expected activity, it can adjust their collateral requirement.

The Working Credit Limit established for a participant = 85% * (Unsecured Credit + Collateral Posted). If a participant wishes to increase its credit limit it can post additional collateral beyond that required to cover Peak Market Activity.

e) How frequently are credit limits and collateral requirements reviewed?

Credit limits are assessed every month at a minimum, though can be adjusted more frequently.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

Actual obligations are compared against credit limits on a bi-weekly basis, based on the receipt of settlement reports.

Depending on the time of month, the receipt of information on actual settlement obligations can lag 3-14 days behind the trading day, depending on the time of month.

g) Are bidding/ trading limits imposed for credit purposes?

Certain (but not all) participants engaging in virtual bidding are subject to Virtual Bid Screening (there is an analysis to determine if a candidate is put on the screening list; once on, they do not come off). These limits are applied to bid/offer submissions (not traded quantities). If Virtual Credit Exposure of submitted virtual bids exceeds Credit Available for Virtual Bidding, then the bids are rejected, where:

- Credit Available for Virtual Bidding = Working Credit Limit – Participant's Outstanding Net Obligation to PJM – any credit already utilized for FTR or other credit purposes
- Virtual Credit Exposure = Min(VCE-A,VCE-B)
- VCE-A = Nodal Reference Price x Max (bid quantity, offer quantity at node) x 2, summed across all nodes and hours.

- VCE-B = Nodal Reference Price x Max (bid quantity, offer quantity at node) , summed across all nodes and hours + Nodal Reference Price x |cleared offers – cleared bids at a node|, summed over all nodes and hours for the three previous day-ahead markets.
- Nodal Reference Price = 97th-percentile price differential between day-ahead and real-market price for that node (or aggregate price point).

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market[17]?

No.

b) When a position goes to 'delivery', what is the billing period and payment lag?

(Final) Settlement of FTRs and the RPM occurs in conjunction with the settlement of PJM's cash markets; on a monthly basis, with a 25-day lag until payment.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Participants have three (3) days to remedy a failure to pay before default proceedings are commenced.

d) If a participant is in default, does the market operator liquidate its open positions?

No.

e) How are a participant's credit limit and collateral requirements determined?

Exposures related to the RPM are part of Peak Market Activity, and incorporated within the credit limit/collateral processes for the cash market.

A participant's FTR Credit Limit is equal to the collateral it posts for FTR auctions plus the unused portion of any unsecured credit allowance it has. There is a rule change pending that would give additional credit to participants who are generally sellers in the cash market (based on 2/3 x the amount they were in credit during the 3rd lowest month of the previous year).

After the auction, participants can request the return of any excess collateral, based on actual awards.

f) How frequently are credit limits and collateral requirements reviewed?

Submitted FTR bids are validated against the FTR Credit Limit upon submission, based on the formula described in the next section. This will usually occur sometime shortly before each auction. i.e. monthly.

g) Are bidding/ trading limits imposed for credit purposes?

Yes. If a submitted set of bids would cause the FTR Credit Limit to be exceeded, the entire submission will be rejected.

For a normal flow FTR, exposure is calculated as the Auction Cost minus 90% of Historical Payout on the path. This is assessed for each incremental set of bids for the path (for that participant), with the maximum taken, and results then summed across all paths.

For a counterflow FTR, exposure is calculated as the 110% of the Historical Payout on the path, minus the Auction Cost (which will be negative). This is assessed for each incremental set of bids for the path (for that participant), with the maximum taken, and results then summed across all paths.

[17] An incremental settlement process, that marks all positions to the price of the most recent auction (or settlement price of the most recent trading session), realizing any gains or losses that have occurred since the last mark (the first mark is from the price at which the contract was initiated).

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. Participants can reallocate the settlement responsibility for a mutually agreed number of MW, by hour, by node, based on either day-ahead or real-time prices.

b) Is there any credit validation on submission of a settlement reallocation?

No.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

No.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Three (3) days.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Based on credit rating (or pseudo-rating), participants are assigned a percentage factor. This is multiplied by their Tangible Net Worth to get their Unsecured Credit Allowance, subject to a cap, which is also based on credit rating.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

PJM assesses credit at the level of member. If the children are members, credit is assessed at that level. The child may lodge a parent guarantee, which means that the parent's financial strength will be considered in assessment of unsecured credit, to the limit of the guarantee.

If the parent is a member, the child's total obligations may also be assigned to them. This would allow netting across subsidiaries. e.g. if one child was a generator and one a load, and both assigned obligations to the parent, it could net them for credit and credit purposes.

d) What forms of collateral are acceptable?

Cash and letters-of-credit (no timeframe for performance is specified)

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No.

f) To whom are any residual default amounts socialized?

To all members who traded in PJM markets during the period for which the default has occurred – both buyers and sellers.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- PJM Credit Policy; Appendix Q of PJM Operating Agreement

We are grateful to the following individuals who were interviewed during the compilation of this profile:

- Hal Loomis, Credit Manager, PJM (interviewed April 2008)

Credit Profile – Powernext, France

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

Powernext operates the following short-term markets for electricity (energy) in France:

- Day-ahead auction: Trades day-ahead for each hour of the following day; settles against traded quantity.
- Day-ahead continuous trading: Continuous trading mechanism for each hour of the following day, or pre-defined blocks of hours; settles against traded quantity.
- Day-ahead intra-day; Intra-day continuous trading mechanism for hours or blocks of hours on the current day; settles against traded quantity.

2) Which forward markets are operated? How frequently do they transact?

Forward market for energy, continuously traded, with segments for delivery for 3 months, 4 quarters, and three years.

Powernext also offers an OTC Clearing service, for receipt of OTC transactions and passing them through to LCH Clearnet SA for clearing.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

LCH.Clearnet SA[18] carries out settlement and credit management for Powernext.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

LCH.Clearnet is the central counter-party.

c) Is unsecured credit provided? If so, on what basis?

No. Participants must deposit "initial margin" before commencing trading. This is subsequently adjusted to reflect their trading activity.

d) Is there a minimum credit requirement for participation in the market?

Yes, €50,000 is the minimum security deposit. However, this market minimum may be increased for individual participants.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

Exposures are calculated separately for the day-ahead and forward markets. Portfolio margining is provided within the three day-ahead markets (taking account of the risk correlation between products), and similarly across the various listed forward contracts. An aggregate collateral requirement is assessed, and all funds are netted in settlement (with the collateral used to satisfy any failure to pay).

[18] This is the former 'Clearnet' part of LCH.Clearnet – at present the two parts of LCH.Clearnet still run as ostensibly separate clearing houses, for regulatory and other reasons.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

The billing period is daily. Payment lag is one (1) business day. i.e. T+1 settlement, with payments due by 10:30 am the day after the trading day.

This includes netted market settlement amounts, any required adjustments to collateral postings, and any trading charges.

Settlement statements are published at 11.30am on the trading day for the day-ahead auction, and at 11.30pm for the Intra-day and Continuous market segments. Supporting documents detailing the amount due for the previous day's trading are available by 9.30am the next day.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

There is a time to remedy of 1 hour.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

No. Powernext has no responsibilities related to retail load. Any such issues are managed by RTE which manages the balancing mechanism (not market).

d) How are a participant's credit limit and collateral requirements determined?

Collateral ("Initial Margin") must be posted to cover the participant's projected exposure. Initial Margin requirement are equal to: the daily average of the participant's purchases across Powernext's three day-ahead market segments over the five previous trading days, multiplied by:

- 1.5 from Monday to Thursday, with a minimum deposit of €50,000;
- 1+n on the eve of n non-business days (i.e. 3 for Friday before a normal weekend) with a minimum deposit of (n+1)* €50,000.

The value calculated as above may be further increased by the application of a "participant factor" which is set by LCH.Clearnet for a participant individually, based on any additional perceived risk or volatility in the participant's exposures.

An additional margin call may also be made during the day if, in particular, a participant's "risk exposure limit" has been exceeded. LCH.Clearnet sets the "risk exposure limit" individually for each participant.

e) How frequently are credit limits and collateral requirements reviewed?

Collateral requirements are calculated every day. The participants' credit positions are also kept under review throughout the day, and further collateral may be required by LCH.Clearnet at its discretion (known as an 'intra-day margin call').

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

Less than one (1) day. Actual settlement exposures are compared against collateral holdings intra-day, with an additional call for collateral made if necessary. These exposures are settled the following morning (they also form an input into the formula for projected exposure of future days).

g) Are bidding/ trading limits imposed for credit purposes?

Only in the event of default, where LCH.Clearnet may request Powernext to remove all a participants' transactions from the market system.

5) *Credit Management – Forward Markets*

a) Are forward positions marked-to-market?

Yes, on a daily basis.

b) When a position goes to 'delivery', what is the billing period and payment lag?

Each day during the billing period, the current delivery day is settled on a T+0 basis, with payments due by 8:00 am or 10:30 am on the delivery day, depending on the banking arrangements of the participant. i.e. billing period is daily, and there is no net payment lag. (On the day before each delivery day, a delivery statement is available, summarising volumes/payments for the next day's delivery. Documents supporting settlement are made available at 5.30am on the delivery day.)

In addition, the remaining days of the month that is 'in delivery' are marked-to-market. Contingent Variation Margin is assessed based on the difference between the last mark and the price of the balance-of-month contract (not traded on Powernext), as determined by the Price Committee. This is settled in cash each day.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

The remedy time is 1 hour.

d) If a participant is in default, does the market operator liquidate its open positions?

LCH.Clearnet may act on the Powernext exchange to liquidate a defaulting participant's open positions.

e) How are a participant's credit limit and collateral requirements determined?

Initial Margin for a given forward contract (both short and long positions) is calculated based on potential price fluctuations (i.e. volatility), and therefore replacement cost in the event of default. Risk offsets are applied based on the correlation between different products (e.g. peak and off-peak) and time periods, to arrive at a portfolio margin requirement. This would be similar to LCH.Clearnet's other markets

For products entering delivery, Delivery Margin is collected at the beginning of the delivery period. Delivery Margin requirements are based on the potential price fluctuation between the last settlement price and the spot price for electricity underlying these positions, taking into account portfolio effects as with initial margin. They are adjusted each day based on the amount of electricity that has actually been delivered. i.e. margin is released throughout the delivery period.

After delivery commences, *Initial Delivery Margin* reflects the expected replacement cost if a participant defaults, and takes account of expired positions.

f) How frequently are credit limits and collateral requirements reviewed?

Collateral requirements are reviewed at least daily. They may be revised more frequently when market conditions or participant positions demand. i.e. an intra-day call may be made.

g) Are bidding/ trading limits imposed for credit purposes?

Only in the event of default, where LCH.Clearnet may request Powernext to remove a participant's orders from the trading system, and prevent the participant from undertaking further trades unless these are deemed to result in a reduction in risk.

6) *Credit Management – Settlement Reallocation*

a) Does the market support settlement re-allocation between participants?

No.

b) Is there any credit validation on submission of a settlement reallocation?

N/A

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

N/A

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Margin requirements are revised each day – with final amounts available by 11:30pm and payment due by 10:30 am the following morning. If an Intra-Day Margin Call is made at or after 11.30am, the supporting documents will be available by 2.15pm, and the collateral must be deposited by 2.35pm.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

N/A

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

LCH.Clearnet recognizes a "Financial Group" of companies; two companies are in the same Financial Group if one exercises control over the other. Margin requirements are calculated based on the net position of a Financial Group, as recorded in its Performance Bond Account.

d) What forms of collateral are acceptable?

Cash in Euro, as well as GBP and USD (at a discount to face value. i.e. a 'haircut').

Certain European and US government securities (with haircut based on maturity).

The shares of certain securities that form part of major indices cleared by LCH.Clearnet SA (at 35% discount to face value).

[Note: As a general rule, LCH.Clearnet SA also accepts Bank Guarantees (i.e. letters of credit), though this is not explicitly acknowledged LCH's operating rules for clearing of the Powernext markets – see Section 9 for reference.]

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

Yes. A Clearing Fund is maintained which all Clearing Members are obliged to contribute to (it should be remembered that a participant need not clear itself at LCH.Clearnet, but may elect to use the services of a General Clearing Member as an intermediary).

In the event of a default, the defaulting Clearing Member's contribution to the Clearing Fund shall be used in the first instance, followed by all other Clearing Members' contribution. If the Clearing Fund is exhausted, the capital of LCH.Clearnet is used to satisfy any residual.[19]

f) To whom are any residual default amounts socialized?

There is no socialization of default.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No explicit knowledge requirement is stated for participant in Powernext's Day-Ahead Market. In order to trade in Powernext's Futures Market: "Traders must prove their ability to use the trading system and must attend a course about Powernext Futures™'s market structure, products characteristics, clearing and delivery mechanisms."

[19] Note that this discussion refers to the guarantee structure of LCH.Clearnet SA, which clears Powernext. The guarantee structure of LCH.Clearnet Ltd is profiled in another paper, and is slightly different.

LCH has a number of minimum requirements for an entity to be a Clearing Member, including that it:

> c) meet the financial requirements as determined by LCH.Clearnet SA from time to time and specified in Articles 1.4.2.12 to 1.4.2.19, and also meet any further requirements as to liquidity and/or solvency as may be set by LCH.Clearnet SA,
>
> d) meet the quality requirements as specified in an Instruction,
>
> e) satisfy LCH.Clearnet SA that it has sufficient expertise in relation to clearing activities, that its technical systems and related organisational structure are operationally reliable and that its risk management policy is adequate,
>
> f) ensure that the persons who represent the Applicant fulfil the requirements of expertise and ability determined by LCH.Clearnet SA in Articles 1.4.2.9 to 1.4.2.11, and ensure that the persons competent to take decisions will be accessible to LCH.Clearnet SA during working hours of every Clearing Day.

(Extracted from Article 1.4.1.7 of Powernext SA Rulebook)

9) *References and Acknowledgements*

The above description is derived from information published on the Powernext and LCH.Clearnet websites:

a) *Powernext (http://www.powernext.fr)*

http://www.lchclearnet.com/markets_and_services/exchange_and_commodity_derivatives/powernext/default.asp

In particular reference was made to

- "User Guide for the Day Ahead Market": http://www.powernext.fr/modules/PwnDl/download/files/eng/DAM_userguide_clearing_JAN2008.pdf
- For the futures market, the "Back Office User Guide": http://www.powernext.fr/modules/PwnDl/download/files/eng/powernext_futures_BO_userguide_v1.pdf

b) *LCH.Clearnet (www.lchclearnet.com)*

- Operating Rules for Derivatives Transactions on Powernext: http://www.lchclearnet.com/Images/Powernext%20Operating%20Rules_tcm6-40948.pdf
- LCH.Clearnet SA, Clearing Rule Book (English Version), April 18, 2008: http://www.lchclearnet.com/Images/Clearing%20Rule%20Book%20updated%2018%20April%202008_tcm6-26662.pdf

Credit Profile – Single Electricity Market Operator (SEMO), Ireland & Northern Ireland

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

The Single Electricity Market Operator (SEMO) operates a day-ahead half-hourly energy market. The market trades day-ahead for each half hour of the following day. Prices are determined ex-post, and settlement is based upon actual quantities, with an uplift mechanism based upon market-scheduled quantities, and penalties for uninstructed imbalances.

There is also a capacity incentive to generators based on available capacity in each half-hour. This involves reasonable quantities of money and complicated settlement rules, but is not a market.

2) Which forward markets are operated? How frequently do they transact?

None.

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

SEMO carries out these functions itself, through its Market Operations department.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No. SEMO does not take any title, and is not the central counter-party to trade. SEMO is identified as “trustee and agent” for all participants.

c) Is unsecured credit provided? If so, on what basis?

The policy is that the market should be fully collaterialised, and hence unsecured credit is not provided. However, the assessment of potential liabilities (derived from a statistical assessment of past liabilities) might not cover all eventualities. In this case, the rules provide for socialization of any uncovered liabilities.

d) Is there a minimum credit requirement for participation in the market?

Yes. €30,000 euro per supplier unit, and €5,000 euro per generator unit.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

The calculation of required credit cover reflects an aggregation across the energy market and capacity charges/payments.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

The energy market is billed weekly. Invoices are issued five working days after the end of the weekly billing period; payments are due from suppliers at noon on the third working day after invoices are issued. i.e. total payment lag is eight (8) working days, generally equaling ten (10) calendar days.

Capacity charges/payments are billed monthly. Invoices are issued seven working days after the end of the monthly capacity period. Payments are due from suppliers at noon on the third working day after invoices are issued. i.e. ten (10) working days, or 14 calendar days.

b) If payment is not made when due, is there a time-to-remedy and how long is it?

If an invoice is not paid, the market operator is empowered to call on a participant's credit cover immediately. If this is not replenished within two (2) working days the participant is placed in default.

Non-payment of an amount due may also be deemed a material breach of the provisions of the Trading and Settlement Code, regardless of whether adequate collateral is available to cover the shortfall. The market operator is empowered to issue a default notice in these circumstances.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

Yes. The next step after the issuing of a Default Notice is the issuing of a Suspension Notice. This suspends the participation of identified units in the pool. A Suspension Notice may be issued concurrently with a Default Notice if a participant has not restored their credit cover to required levels. For supplier units, the Suspension Notice cannot take effect until 14 calendar days after it is issued, to allow time for customers to be transferred to other suppliers.

d) How are a participant's credit limit and collateral requirements determined?

A participant must post collateral so that:

$$\text{Collateral Posted} \geq \text{Actual Exposure} + \text{Potential Exposure}$$

Where

Actual Exposure is the sum of outstanding invoices and settlement amounts calculated but not yet billed.

Potential Exposure is the liability that the participant might incur in the period from the last settled day to the day on which it could be prevented from incurring any further liabilities (in particular, for a supplier, when all its customers had been transferred to other suppliers). This is estimated by a statistical analysis of historical exposures. The estimate is set such that there is 95% confidence that it will be equal to a greater than the eventual outturn.

Both Actual and Potential Exposures encompass energy and capacity liabilities, as well as market operator charges.

e) How frequently are credit limits and collateral requirements reviewed?

Exposures are recalculated, and collateral requirements reassessed, each working day.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

A participant's exposures and required credit cover are calculated at the end of each working every day.

For energy charges/payment, 'indicative' settlement statements – produced specifically for credit management purposes – lag one working day behind the day being settled.

For capacity charges/payments, indicative settlement statements are published 3 working days after the end of the monthly capacity period, giving a lag of between 3 and 36[20] calendar days for actual exposures to be known. This delay is driven by the capacity calculation itself, that requires the entire month of information before amounts can be calculated. In the meantime, capacity charges (but not payments) can be reasonably well estimated, and these estimates are used in credit calculations.

[20] Based on a 31-day month, and assuming there is a weekend in the 3 working day lag, giving 5 calendar days.

g) Are bidding/ trading limits imposed for credit purposes?

No. In the case of a participant being suspended, however, they will be barred from trading altogether.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market?

Not applicable.

b) When a position goes to 'delivery', what is the billing period and payment lag?

Not applicable.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

Not applicable.

d) If a participant is in default, does the market operator liquidate its open positions?

Not applicable.

e) How are a participant's credit limit and collateral requirements determined?

Not applicable.

f) How frequently are credit limits and collateral requirements reviewed?

Not applicable.

g) Are bidding/ trading limits imposed for credit purposes?

Not applicable.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

Yes. Participants can reallocate the settlement responsibility for a mutually-agreed financial sum.

b) Is there any credit validation on submission of a settlement reallocation?

Yes. The settlement reallocation is reviewed to determine whether it causes the debited participant's required credit cover to exceed its posted credit cover.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

Yes. The market operator may cancel a current settlement reallocation agreement if the credit validation criteria are not met at any time before the invoice is issued, and may cancel any reallocation agreement in the future if validation criteria are not met.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

Two working days.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Not applicable.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Required credit cover is assessed at the level of participant.

d) What forms of collateral are acceptable?

Cash and letters-of-credit (which must be capable of being paid on the same day if called before 14:00)

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No.

f) To whom are any residual default amounts socialized?

In the event a default exceeds collateral held, any residual will be socialized to all generators, on the basis of their payments due in the period in which the default occurred.

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- The Single Electricity Market (SEM) Trading and Settlement Code Version 4.2.
- The Single Electricity Market (SEM) Agreed Procedure 9 Management of Credit Cover and Credit Default.

Both the above documents can be accessed from the following website page:

http://www.allislandmarket.com/MarketRules/

This profile is also based in part on the personal knowledge of the author.

Credit Profile – Southwest Power Pool (SPP)

1) What spot/cash markets are operated? How frequently do they transact? Identify if they settle against traded quantity or actual (measured quantity).

SPP operates the following cash markets:

- **Real Time Market (a.k.a. Energy Imbalance Service Market)**: For balancing on the day; transacts every five minutes, with prices averaged out on an hourly basis; settles against participants' Imbalance Energy (actual minus scheduled)

2) Which forward markets are operated? How frequently do they transact?

None

3) Settlement/Credit Management High-Level Structure and Policy

a) Does the market operator carry out its own settlement and credit management, or use an external party?

SPP carries out these functions itself, through its Settlement Department and Credit Management Department respectively.

b) Does any entity serve as the legal central counter-party to all trade (i.e. buyer to all sellers, seller to all buyers)?

No.

c) Is unsecured credit provided? If so, on what basis?

Unsecured credit is based on the participant's Tangible Net Worth times a percentage factor as determined by the Composite Credit Score assigned by SPP. The Composite Credit Score is generated by SPP based on credit ratings, financial statements, and years in business.

Unsecured credit allowance for any one participant cannot be greater than $25 million. The unsecured credit minimum for Non-For-Profit Credit customers is $250,000.

d) Is there a minimum credit requirement for participation in the market?

No.

e) Is credit risk assessed separately by market, or is it assessed on an aggregate/portfolio basis?

Exposures are assessed separately by class of exposure (market exposure, transmission service potential exposure), as they are largely independent, and added. This aggregate is compared against the Total Credit Limit.

4) Credit Management – Cash Markets

a) What is the billing period and payment lag?

SPP invoices weekly (on Thursdays) based on Initial Settlement Statements, Final Settlement Statements, and Resettlement Statements produced in the last seven (7) days.

Payment lag is around 20-22 calendar days – consisting of :

- Seven (7) to nine (9) calendar days following the Operating Day to issue Initial Settlement Statement (Statements are only issued on Business days)
- Seven (7) calendar days to issue Invoices
- Three (4) business days (~6 calendar days) to receive payment

b) If payment is not made when due, is there a time-to-remedy and how long is it?

Participants have three (3) business days to remedy a failure to pay before the participant's rights are terminated.

Upon the second incident of late payment in a 12 month period, a participant's unsecured credit allowance will be suspended for 90 days.

c) If a participant is in default, is there a delay while its retail customers are moved to a new retailer?

No provision is made for transfer of retail customers and there is no Provider of Last Resort. Because there is still an 'obligation to serve' the retailer for those customers could still continue to amass liabilities until SPP obtains a ruling from FERC, meaning the time-to-transfer is undefined.

d) How are a participant's credit limit and collateral requirements determined?

A participant's total credit limit is equal to the sum of its unsecured credit allowance and any financial security provided. Total Potential Exposure must be less than the participant's Total Credit Limit. A participant's **Total Potential Exposure** is calculated based on the sum of each category of potential exposure (Market Exposure + Transmission Service Potential Exposure).

When a participant's Total Potential Exposure meets or exceeds 90% of its Total Credit Limit, a notice is sent to the participant.

When a participant's Total Potential Exposure meets or exceeds 100% of its Total Credit Limit, the participant is notified of the "Total Potential Exposure Violation" and has three (3) business days to cure the violation before default proceedings commence.

e) How frequently are credit limits and collateral requirements reviewed?

Unsecured credit is reviewed at least once annually. SPP may conduct additional reviews and updates to a participant's credit limit at its discretion.

f) How frequently is a participant's actual settlement exposure compared against its credit limit? How far behind the trading day does this assessment lag?

Total Potential Exposure is calculated daily and compared against Total Credit Limit. This assessment lags one day behind the trading day.

g) Are bidding/ trading limits imposed for credit purposes?

No bidding or trading limits are imposed in SPP's cash markets.

5) Credit Management – Forward Markets

a) Are forward positions marked-to-market[21]?

Not applicable.

b) When a position goes to 'delivery', what is the billing period and payment lag?

N/A.

c) If payment is not made when due, is there a time-to-remedy and how long is it?

N/A.

d) If a participant is in default, does the market operator liquidate its open positions?

N/A.

[21] An incremental settlement process, that marks all positions to the price of the most recent auction (or settlement price of the most recent trading session), realizing any gains or losses that have occurred since the last mark (the first mark is from the price at which the contract was initiated).

e) How are a participant's credit limit and collateral requirements determined?

N/A.

f) How frequently are credit limits and collateral requirements reviewed?

N/A.

g) Are bidding/ trading limits imposed for credit purposes?

N/A.

6) Credit Management – Settlement Reallocation

a) Does the market support settlement re-allocation between participants?

No.

b) Is there any credit validation on submission of a settlement reallocation?

N/A.

c) Is there any provision for cancellation, for credit reasons, of the outstanding/unsettled portion of a settlement reallocation?

N/A.

7) Credit Management – All Markets

a) If extra collateral is called for, how much time does a participant have to post it?

If SPP upwardly revised the amount of financial security due, participants have two (3) business days to provide the required financial security.

Participants have three (3) business days to secure additional collateral to cure credit defaults.

b) If unsecured credit is allowed, how is it assessed, and how frequently?

Unsecured credit is reviewed at least once annually on the basis of agency ratings, financial statements, disclosures, corporate guarantees, and additional information. SPP may conduct additional reviews and updates to a participant's credit limit at its discretion.

Information required for annual reviews of participants must be received no later than 120 days after the end of the participant's fiscal year.

c) If a parent company owns subsidiaries that participate in the market, is credit assessed at the parent or child level?

Unsecured credit is aggregated for affiliated participants and subject to the $25 million unsecured credit maximum. In the case of Corporate Guarantees, the child's unsecured credit will be the lesser of:

- The credit limit imposed by the Guarantor.
- The portion of the Unsecured Credit granted to the Guarantor and allocated to the participant at SPPs discretion.
- $25 million.

d) What forms of collateral are acceptable?

Cash and Letters of Credit.

If used to satisfy payment deficits, Participants must replenish cash deposits within three (3) business days before being considered in default.

Letters of credit must be issued by an institution rated A-/A3 or better. If the issuer no longer fulfils these criteria or if the letter of credit is drawn upon to satisfy payment deficits, the letter of credit must be replenished within three (3) business days before being considered in default.

e) In the event of default, is there any intermediate credit protection between collateral and socialization of the default to members? If so, what?

No.

f) To whom are any residual default amounts socialized?

Initially, default amounts will be socialized to net payees in the particular billing period that the default occurs. This is for the purposes of cashflow management and is later trued-up.

After 90 days, any amounts not collected are re-allocated, with the residual default amount socialized to all participants in the market on the particular week the default occurred.[22]

8) Other Questions

a) Is there a minimum knowledge/sophistication requirement for participation in the market? If so, how is this enforced?

No.

9) References and Acknowledgements

The following documents were referenced in compiling this profile:

- SPP Credit Policy; Appendix X of SPP Tariff
- Billing and Payment; Section 7 of SPP Tariff
- SPP Market Protocols; Revision 6.0
- Energy Imbalance Service Market; Attachment AE of SPP Tariff

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- Tom Fritsche, Credit Risk Specialist, SPP (comments provided June 4, 2008)

[22] See section five of Attachment L of SPP's tariff: http://www.spp.org/publications/CTFagd&bkg091505.pdf