



Item 3: Committee Education on ERCOT Credit

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Finance & Audit Committee Meeting

ERCOT Public

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Committee Education on Market Credit

Topics

- Sources of credit risk
- ERCOT's framework for credit risk (Total Potential Exposure)
- Forward price adjustments
- Scope of risks covered, and not covered, by credit calculations
- Types of Financial Security
- Discretionary collateral
- Default processes
- Current stakeholder credit initiatives

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Sources of credit risk

Counter-Party credit risk arises from numerous factors.

Category	Risk Factors
Net Generators	Short positions from unplanned outages, weather events
Net Load	Un-hedged exposure to high prices and/or load, bilateral contract exposure, no Real-Time credit constraint, customer credit exposure
Day-Ahead / Real-Time Traders	Day-Ahead – Real-Time price spreads, no Real-Time credit constraint
CRR Account Holders	Spread on PTP obligations
All Counter-Parties	Counter-Party creditworthiness and reputation, insufficient capitalization, cash flow, credit exposure to other entities, fraud

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Total Potential Exposure

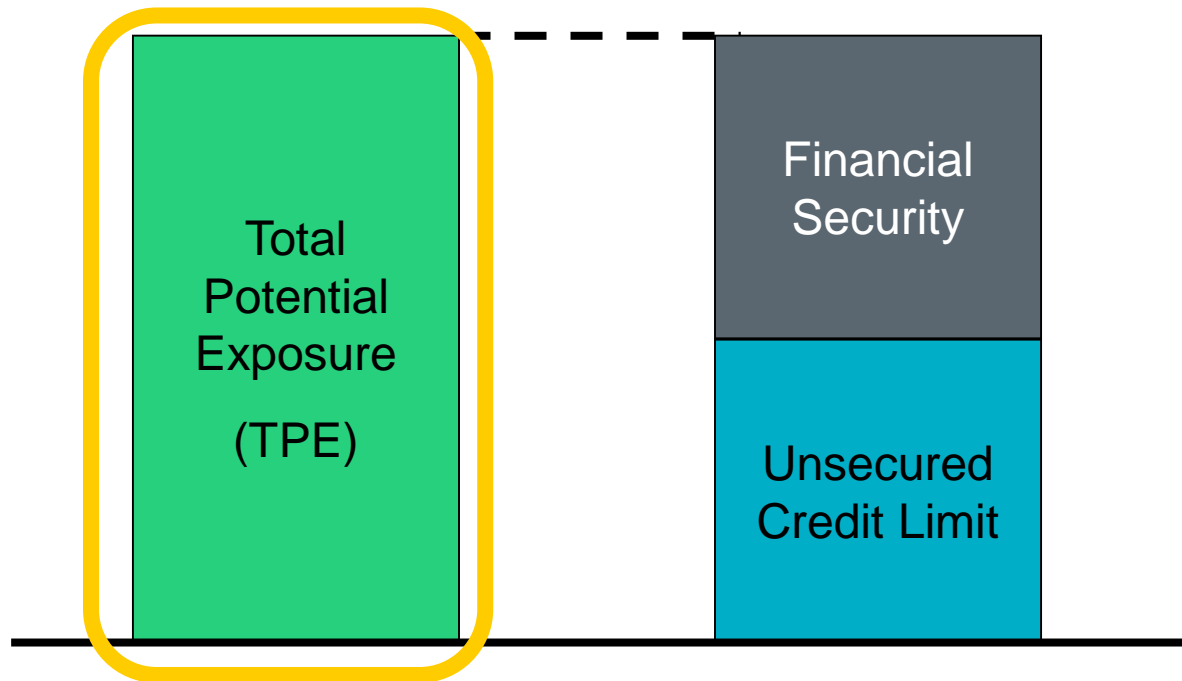
- The ERCOT credit calculation determines a minimum amount that a Counter-Party must post with ERCOT. The minimum amount is defined as Total Potential Exposure (TPE).
- TPE can be thought of as the amount per Counter-Party for which ERCOT is unwilling to accept losses (market uplift).
- A Counter-Party must maintain posted Financial Security at or above Total Potential Exposure minus Unsecured Credit Limit (if any)

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Total Potential Exposure

TPE includes:

- Estimated liabilities from various market activities
- Future Credit Exposure from Congestion Revenue Rights (CRRs)

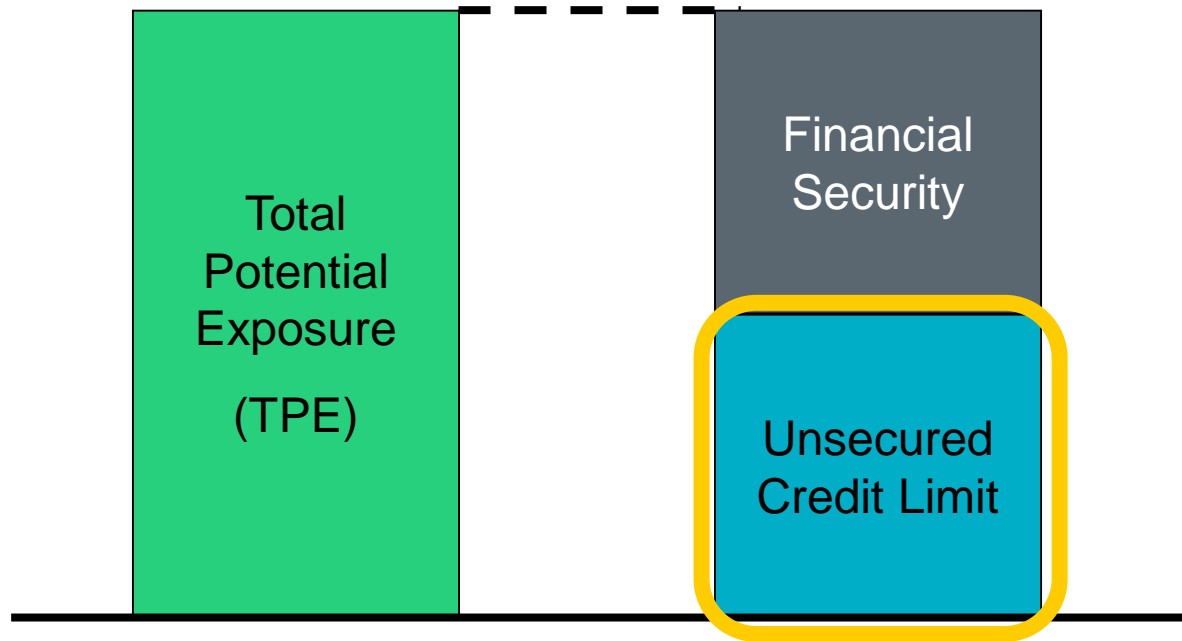


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Total Potential Exposure

Unsecured Credit Limit:

- Based on ERCOT Creditworthiness Standards
- Determined from Counter-Party financial statements and credit ratings
- Updated periodically by ERCOT

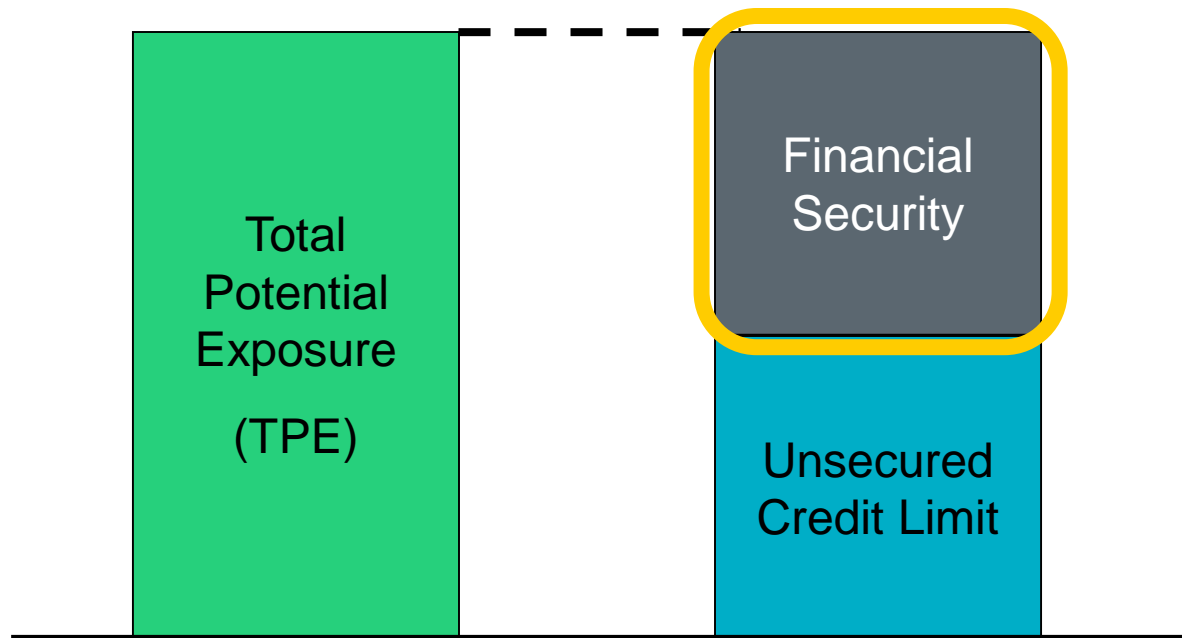


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Total Potential Exposure

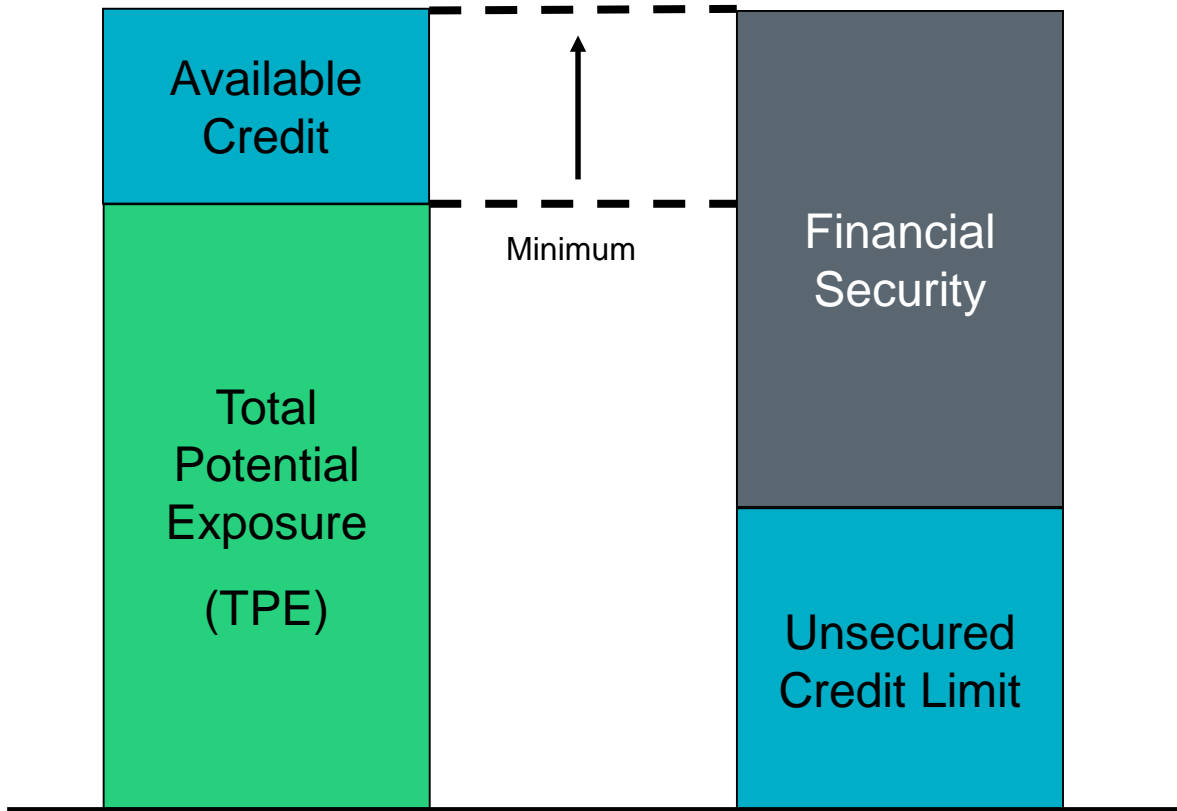
Financial Security:

- Collateral posted by Counter-Party
- ERCOT Protocols define acceptable forms



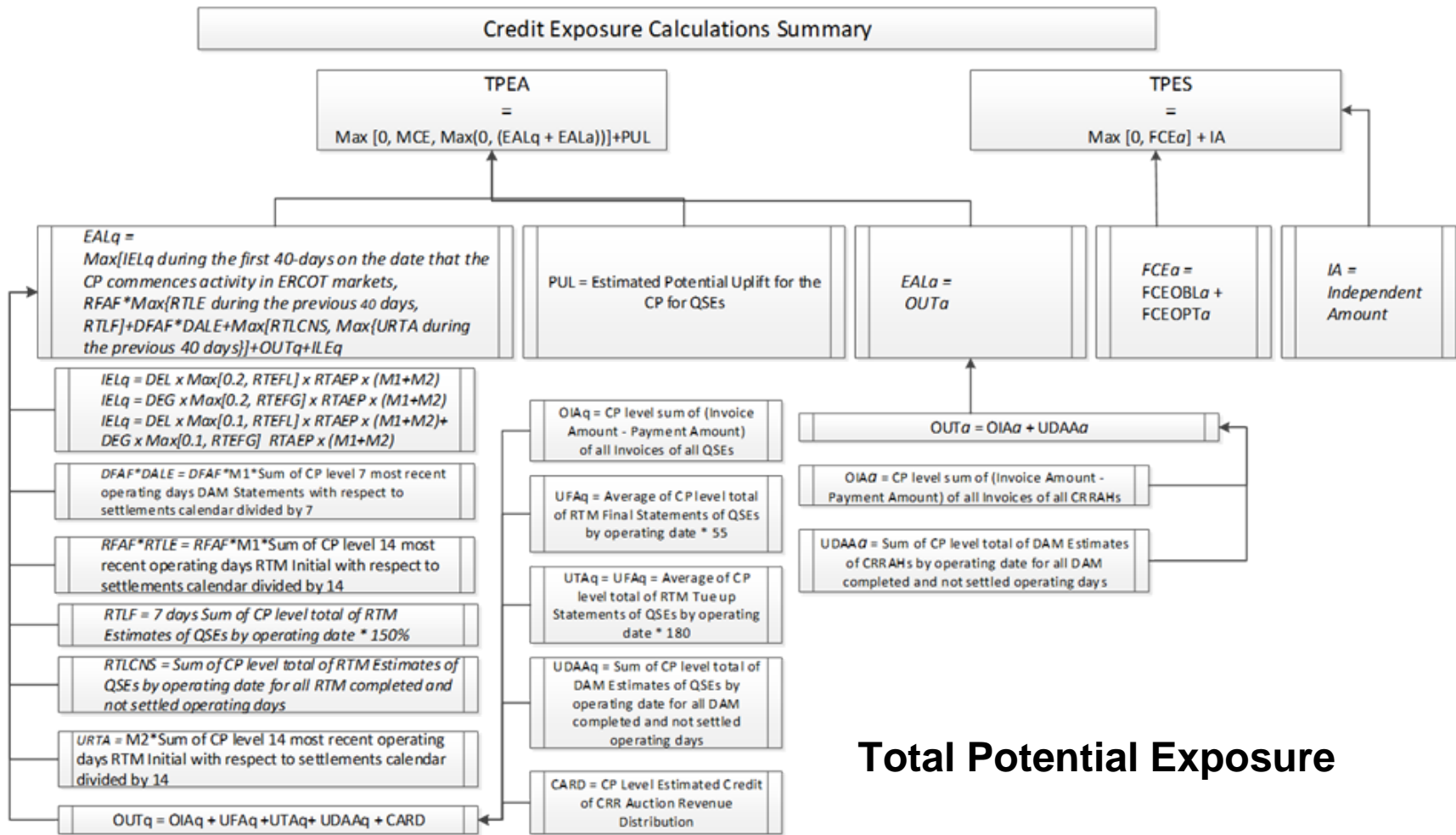
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Total Potential Exposure



Financial Security beyond the required minimum provides available credit for ERCOT market activities, primarily DAM and CRR auction participation.

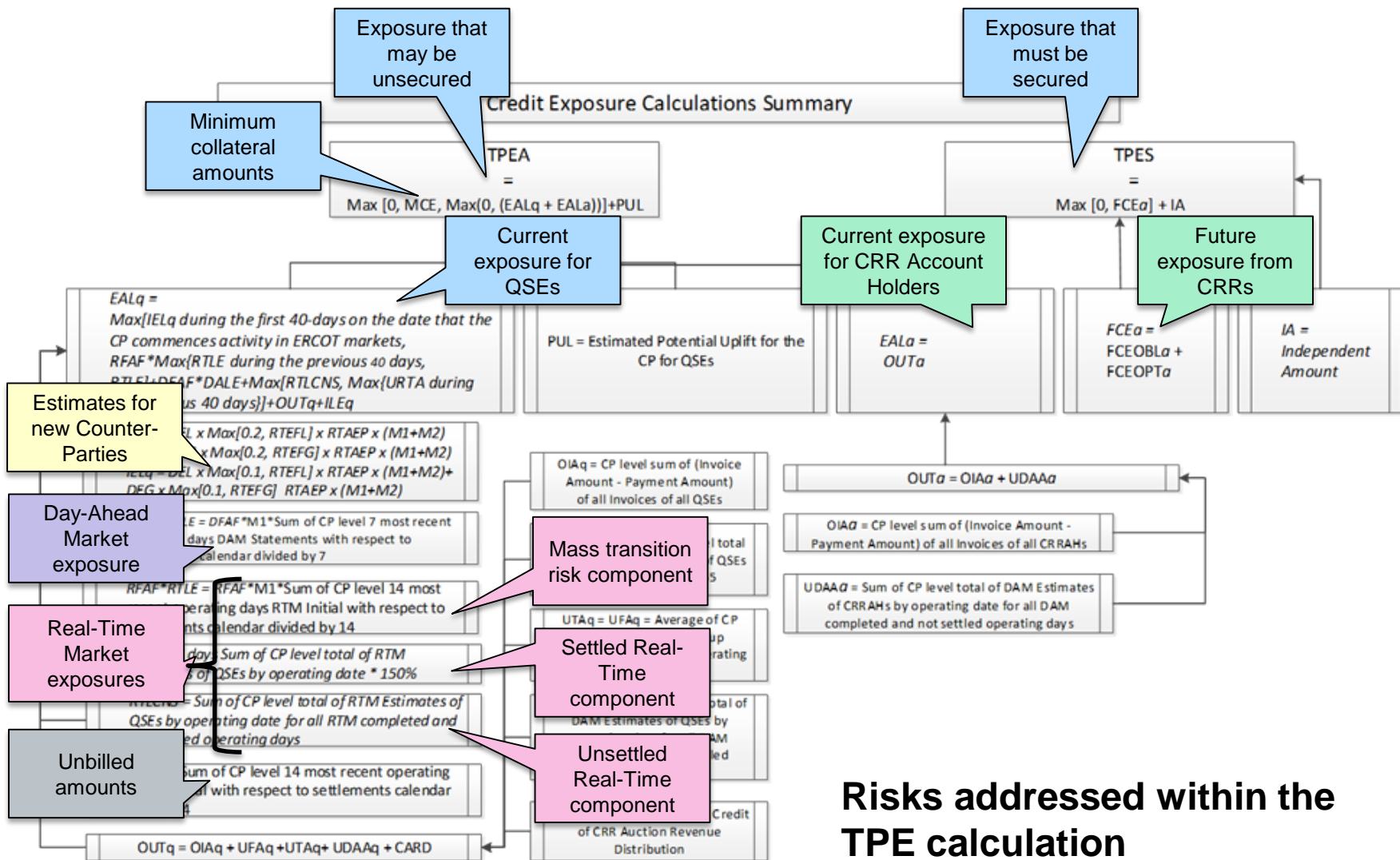
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Total Potential Exposure



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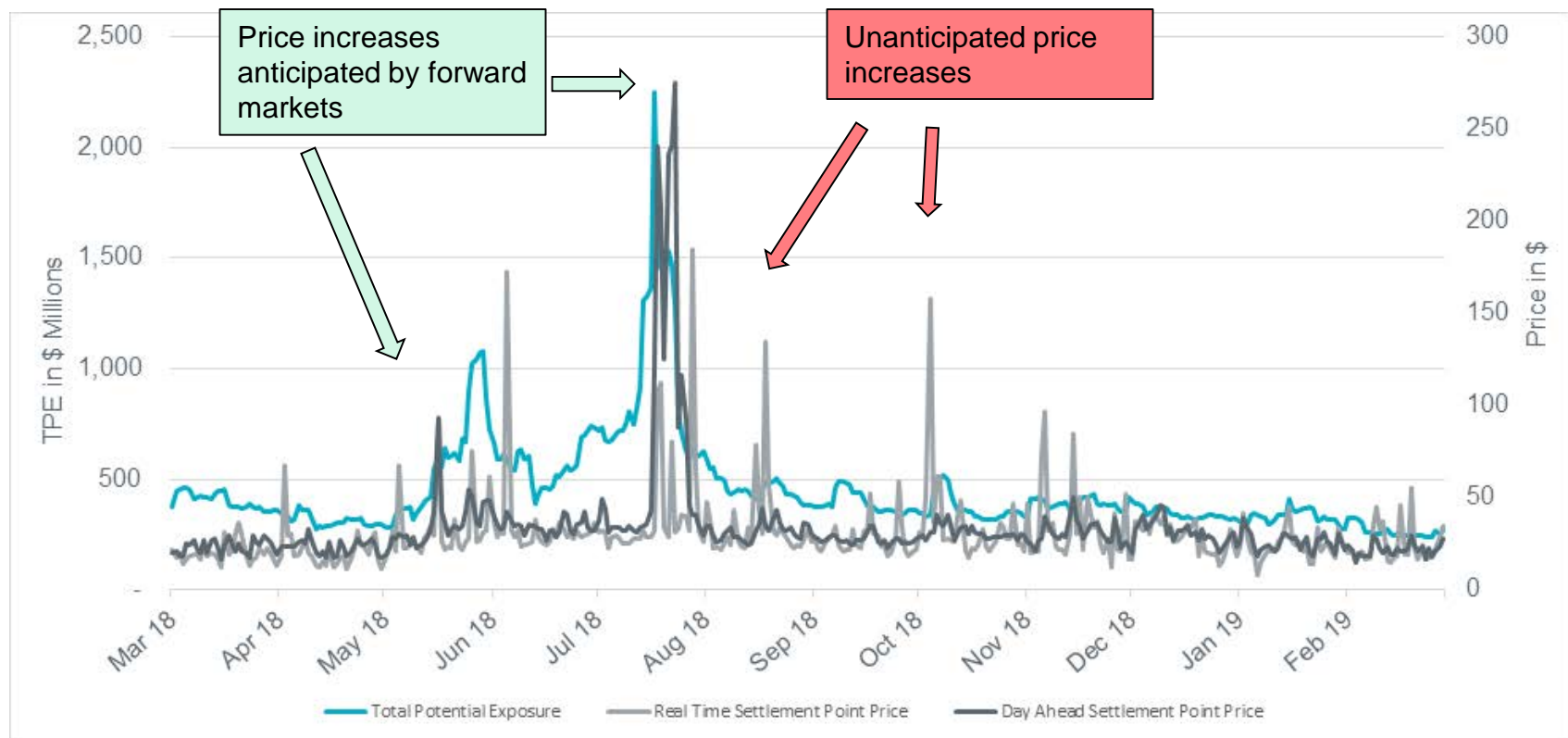
Forward Price Adjustments

- Real-Time and Day-Ahead components of TPE are adjusted to reflect forward prices for ERCOT North power quoted on the ICE exchange.
- The adjustment is the ratio of three-week average ICE forward prices to historic average settled prices over the most recent seven days (for DAM) or 14 days (for Real-Time).
- The forward price adjustment will therefore increase credit exposure when forward prices are trending higher than historic prices (and *vice versa*).

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Forward Price Adjustments

The forward price adjustments are intended to increase exposure before market prices increase. However, they do not reflect unforeseen price spikes.



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Forward Price Adjustments

This chart shows how TPE tracks the Real-Time and Day-Ahead Forward Adjustment Factors. Note the spike in January.



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TPE and Credit Risk

TPE defines credit exposure formulaically as a fixed point estimate of credit risk. A shortfall of this approach is that there are no means to specify how conservative the calculation is – i.e., the relative risk appetite that is embedded in it.

By way of comparison, trading desks estimate or simulate their potential range of risk outcomes, allowing “P99” estimates via Value-at-Risk methodology.

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TPE and Credit Risk

TPE credit risk appetite is embedded in numerous parameters in the formula that help determine the results.

- Lookback periods

- Default timeline

- Look-forward periods

- Forward period weighting

- Mass Transition rate

- Mass Transition timelines

- “Worst case” percentiles

- Averaging days

Credit parameters are periodically reviewed by CWG/MCWG.

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TPE and Credit Risk

TPE parameters are set conservatively overall.

- Minimum 12 days to terminate a defaulting Counter-Party. Additional days are scaled to the number of Counter-Party ESI IDs.
- Both Real-Time and Day-Ahead exposures are extrapolated over the termination period.
- Real-Time initial settlement days assumed at 9.
- Minimum collateral requirements applicable to all Counter-Parties
- CRR obligations are collateralized based on the most conservative of:
 - the P100 portfolio price over the last three years, or
 - the most recent weight auction clearing price for the portfolio
- Real-Time Market exposure in TPE takes the highest of maximum activity over the past 40 days or 150% of Real-Time liability over the past seven days.

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A number of potential risks are not addressed in TPE

- Market tail events (prices and/or volumes) that create exposure in excess of the assumptions embedded in TPE:
 - The TPE impact of tail events can be estimated by stress-testing.
 - TPE may not be the appropriate mechanism to cover tail events.
 - Market Restart Protocols address tail events to some extent.

- Non-market risks not addressed in TPE:
 - Individual credit quality of the Counter-Party, except to the extent that it is eligible for unsecured credit.
 - Exposure that could arise from failed bilateral contracts or hedges.
 - Insufficient Counter-Party liquidity or capital (mitigated by Independent Amount).
 - Market sector and concentration risks.
 - Market manipulation.
 - Regulatory and political risks.

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TPE and Credit Risk

Summary

- TPE is only an approximation of credit exposure based on numerous assumptions. As such, it cannot always reflect actual Counter-Party circumstances so ERCOT will always be exposed to residual risk.

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Financial Security

ERCOT accepts four forms of Financial Security.

- Guarantee Agreement
- Letter of Credit
- Surety Bond
- Cash

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Financial Security

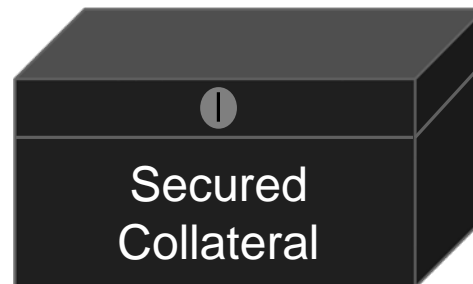
- Provided from another entity
- Based on their Unsecured Credit Limit
 - Guarantee Agreement
 - Letter of Credit
 - Surety Bond
 - Cash

Limited to \$50 Million
per Counter-Party
per Guarantor

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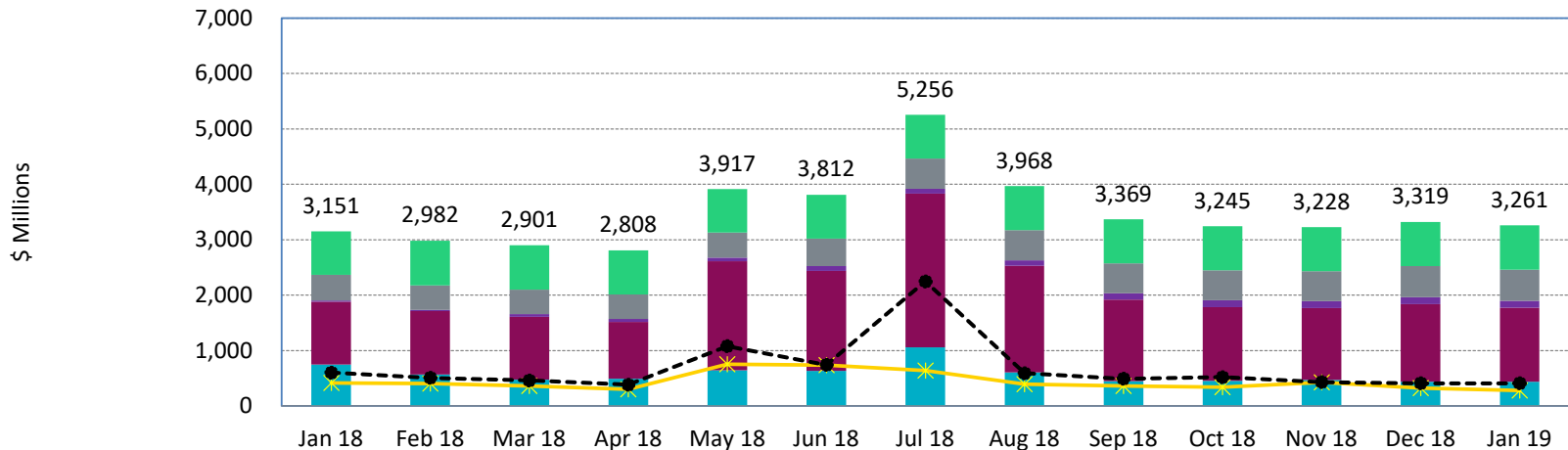
Secured Collateral	Description	Limit
Letter of Credit	<ul style="list-style-type: none">• Unconditional• Irrevocable• Names ERCOT as beneficiary	Subject to credit rating of issuer
Surety Bond	<ul style="list-style-type: none">• Issued by insurance company• Names ERCOT as beneficiary	\$10 Million per Counter-Party per issuer
Cash Deposit	<ul style="list-style-type: none">• Deposited in account designated by ERCOT• May bear interest payable to Counter-Party	None



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Financial Security

In the aggregate, financial security exceeds TPE by a wide margin.



	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19
Total Credit Limit	3,151	2,982	2,901	2,808	3,917	3,812	5,256	3,968	3,369	3,245	3,228	3,319	3,261
Unsecured Credit	786	808	800	799	786	792	790	794	794	796	795	798	803
Guarantees	464	442	442	441	455	495	544	544	544	544	541	561	561
Surety Bonds	21	21	51	51	66	91	92	102	112	122	125	125	125
Letters of Credit	1,135	1,146	1,133	1,026	1,964	1,801	2,771	1,921	1,474	1,332	1,298	1,398	1,336
Cash	745	567	475	491	646	633	1,059	606	446	452	468	437	436
✱ TPE	416	401	357	301	750	737	639	390	360	340	425	324	279
●- - Max TPE	602	506	459	383	1,077	741	2,247	590	489	518	430	407	407

Available Credit by Type



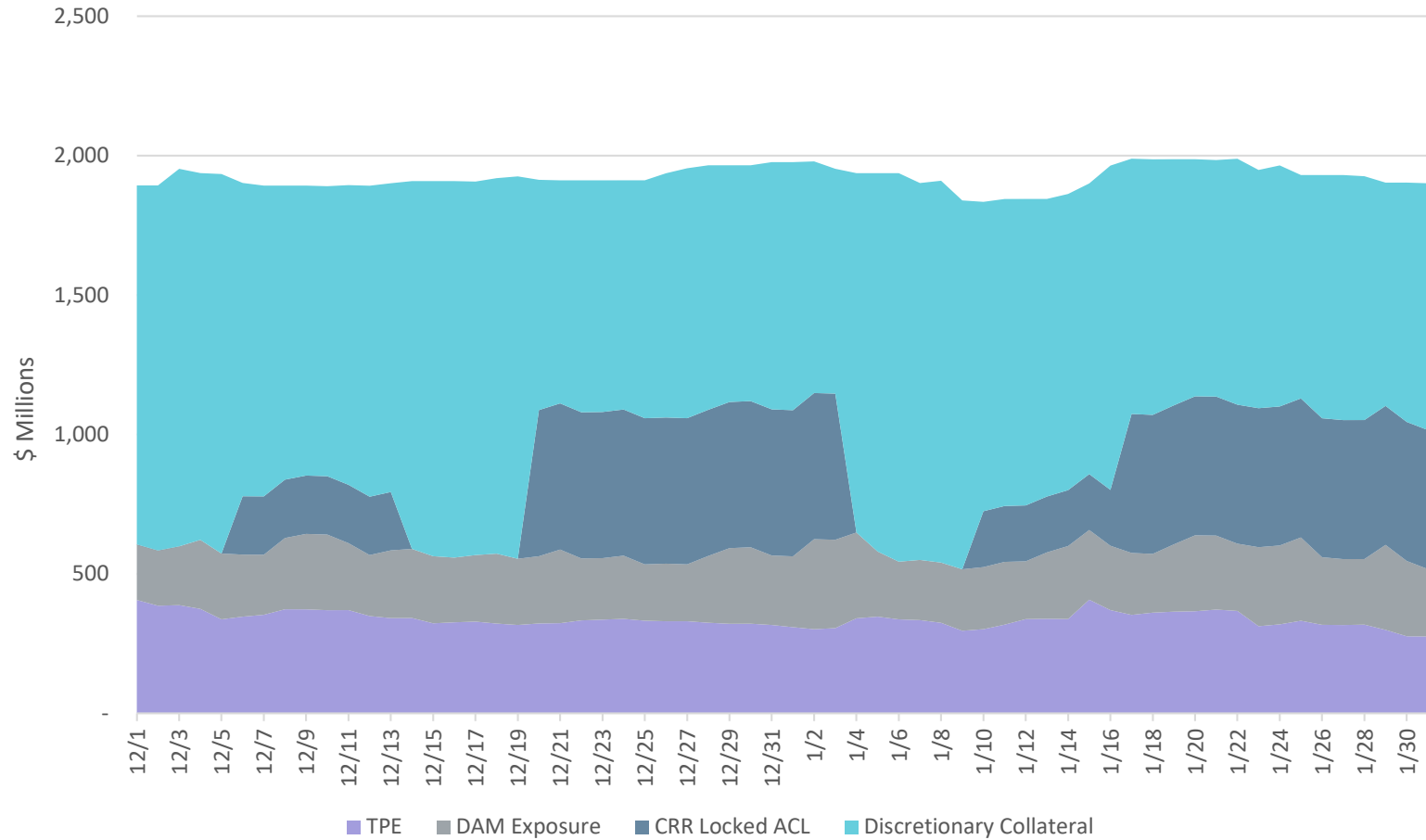
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Financial Security

- Collateral in excess of TPE is used to cover market activity (DAM and CRR auctions), both of which are collateralized independently.
- Most Counter-Parties hold collateral in excess of both TPE and what is needed for market activity. This is referred to as “discretionary collateral”. Discretionary collateral:
 - Is determined solely by the Counter-Party, and
 - Provides a buffer against events such as unexpectedly high prices, outages or errors.

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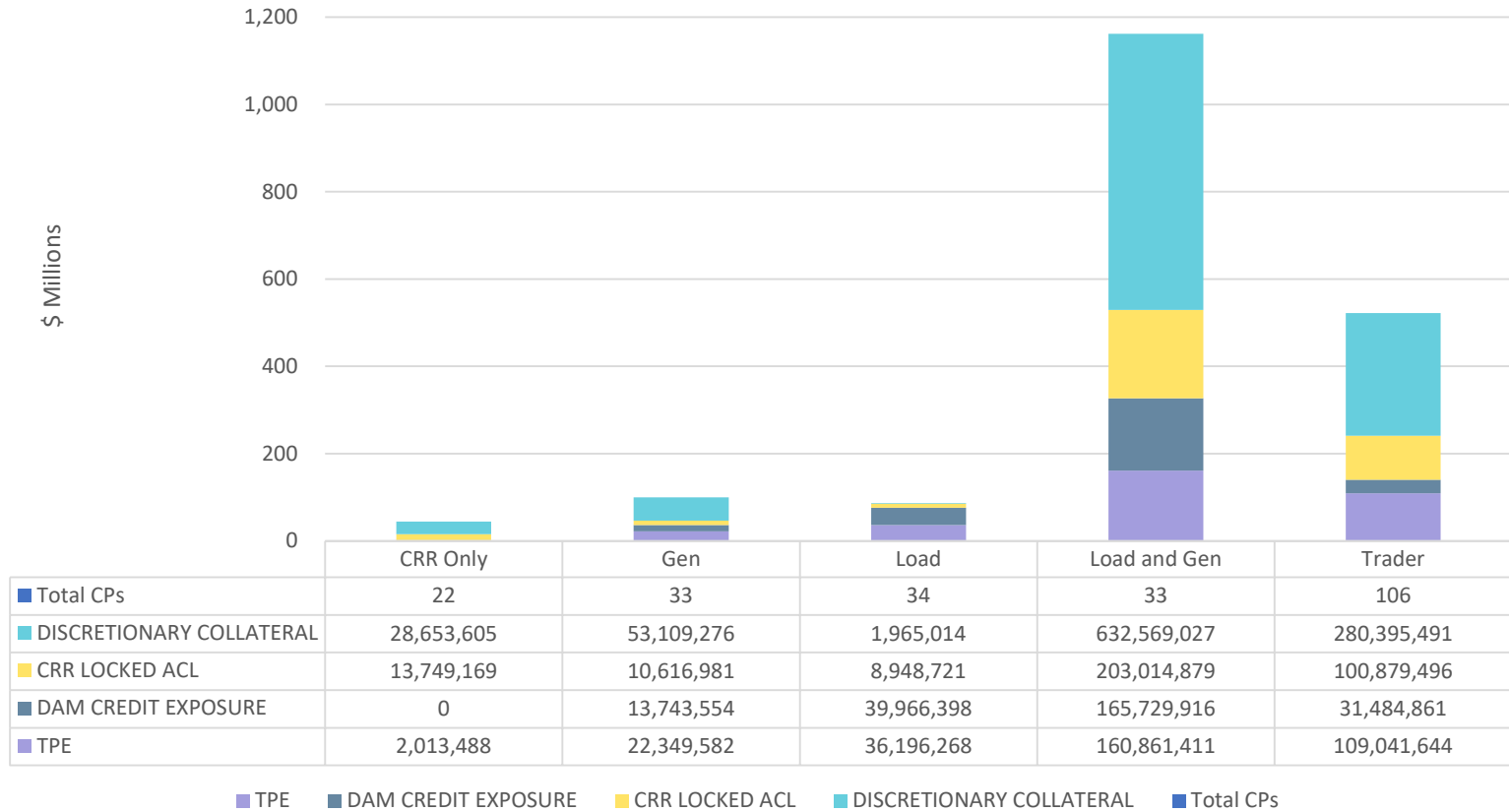
Discretionary Collateral



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Discretionary Collateral

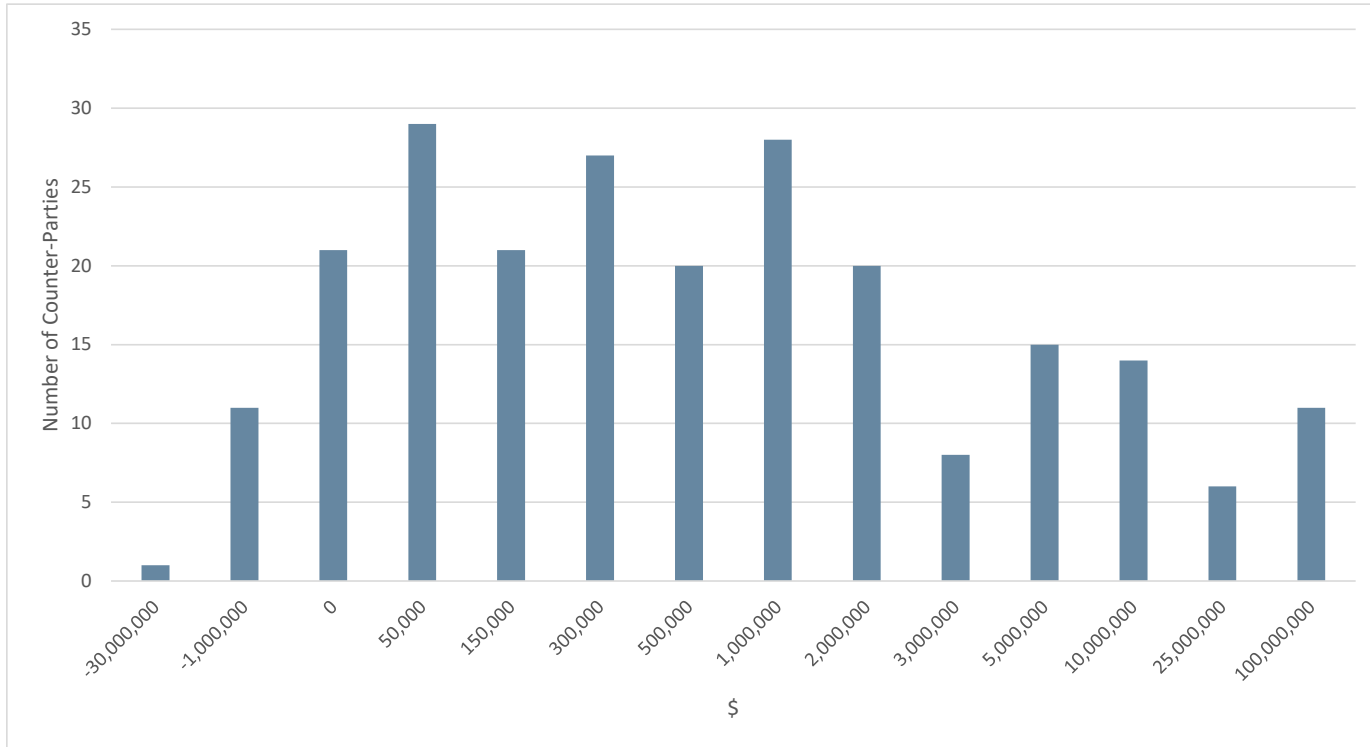
Load and Generation entities account for the largest portion of discretionary collateral.



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Discretionary Collateral

Distribution of discretionary collateral by amount.



Note: Negative values represent Counter-Parties that cover TPE with unsecured credit or parent company guarantees.



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Default Processes

Failure to pay an obligation when due is a Payment Breach.

- Settlement Invoice
- Collateral Request (due after two Bank Business Days)
- Other ERCOT Invoices

ERCOT shall immediately attempt to contact the Market Participant telephonically and by email.

Upon non-payment of an Invoice ERCOT will first look to any available excess cash collateral.

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Default Processes

If a Payment Breach is cured within one Business day it becomes a Late Payment.

Excessive Late Payments lead to enforcement actions by ERCOT, up to and including termination of the Counter-Party.

If a Payment Breach is not cured within one Bank Business Day it becomes a Default.

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Default Processes

ERCOT may take several actions to remedy Defaults.

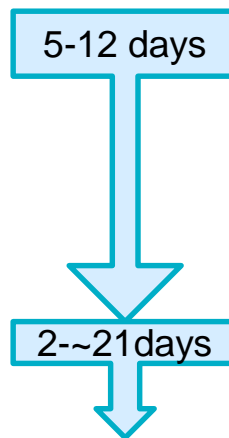
- Hold any payments due to Counter-Party
- Draw on Financial Security
- Forfeit awarded CRRs
- Repossess CRRs
- Revoke Market Participant's rights
- Terminate Market Participant's Standard Form Agreement
- Mass Transition of Competitive Retailer accounts

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Default Processes

TPE includes components for the minimum default timeline as well as a variable timeline for Mass Transitions.

Initial Operating Day
Collateral call issuance
Collateral call cure (2 Bank Business Days)
Breach notice issuance
Breach cure (1 Bank Business Day)
Default and Termination
Mass Transition
Mass Transition complete (min two days)



NPRR 907, Revise Definition of M1a to Reflect Actual Calendar Days, makes the minimum default timeline variable.

RMGRR 159, Revisions to Mass Transition Processes, facilitates shortening the Mass Transition timeline.

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Market Initiatives

ERCOT stakeholders are considering a number of credit initiatives.

- Evaluation of market entrance requirements
- Means of improving the effectiveness of liquidation of a repossessed CRR portfolio
- Clarifying the market's risk tolerance/appetite level
- Examining current Protocol language to determine if current credit calculations effectively capture credit risk

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Questions?

