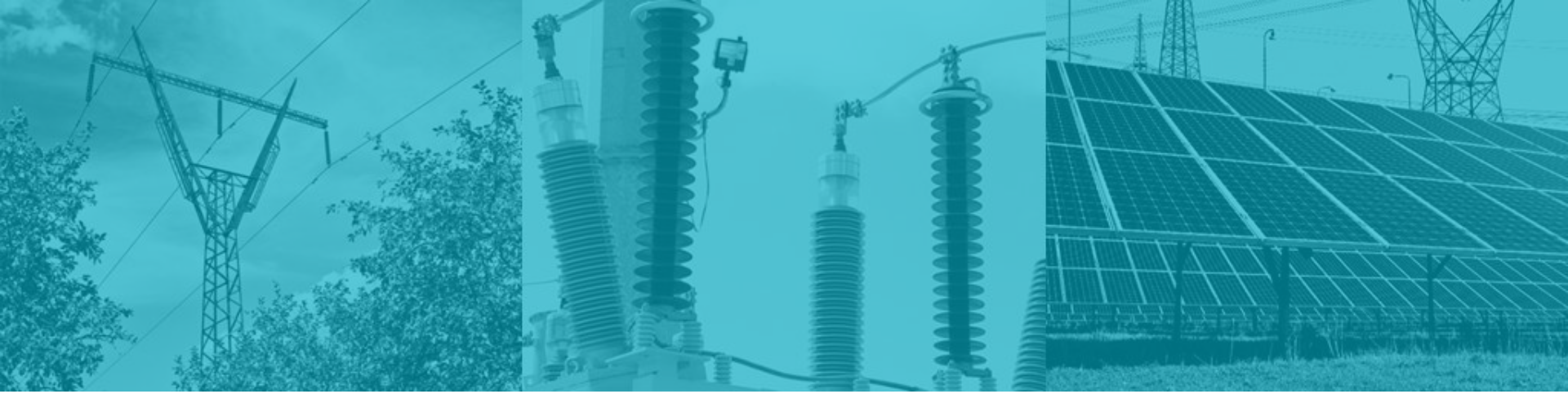


Credit Management

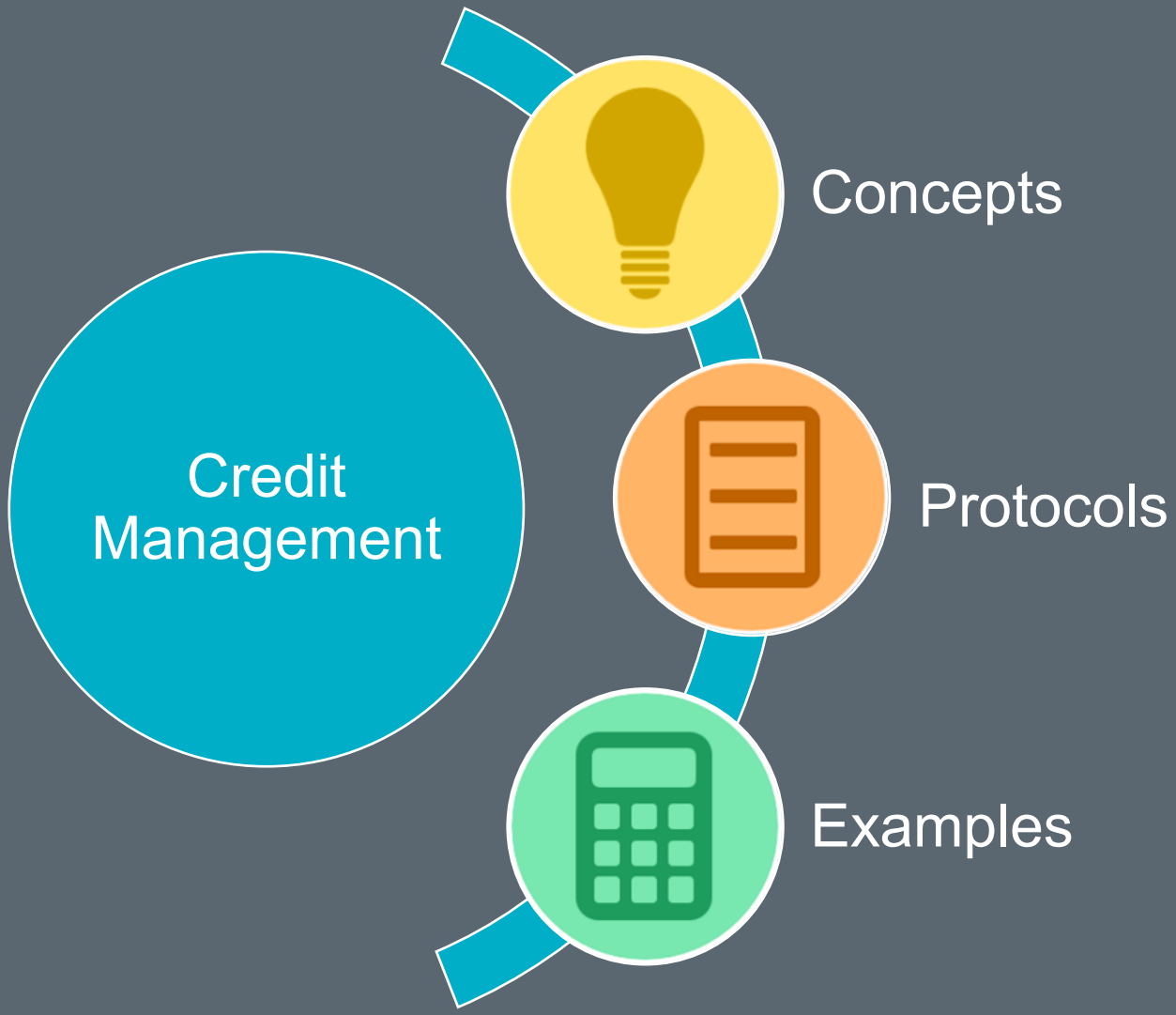
2025 Credit Management WBT

PROTOCOL DISCLAIMER

This presentation provides a general overview of the Texas Nodal Market and is not intended to be a substitute for the ERCOT Protocols, as amended from time to time. If any conflict exists between this presentation and the ERCOT Protocols, the ERCOT Protocols shall control in all respects.

For more information, please visit:

http://www.ercot.com/mktrules/nprotocols/

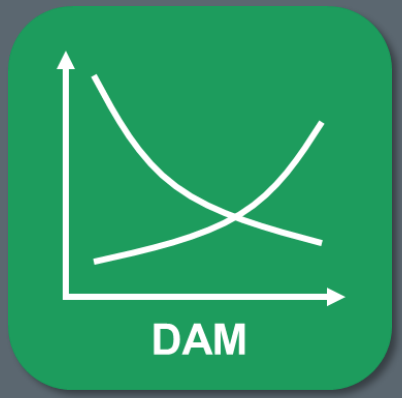

Credit Management
Concepts
Protocols
Examples

Topics in this course include:

1. Overview of Creditworthiness
2. Credit Exposure
3. Determining Available Credit Limits
4. Credit Monitoring

Overview of Creditworthiness

Which Market Participants need Credit?



Introducing … The Counter-Party

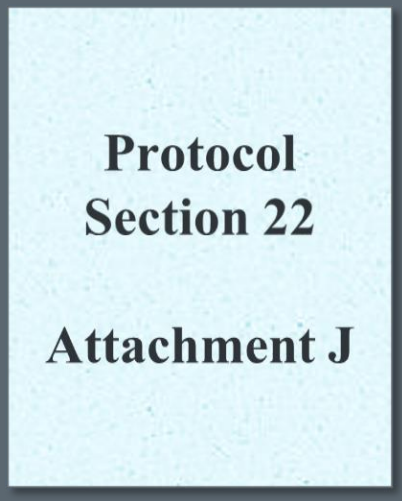
Responsible for creditworthiness requirements

Counter-Party Responsibilities

- Certify Minimum Participation Requirements
- Provide Financial Statements
- Monitor Credit Reports
- Maintain Creditworthiness

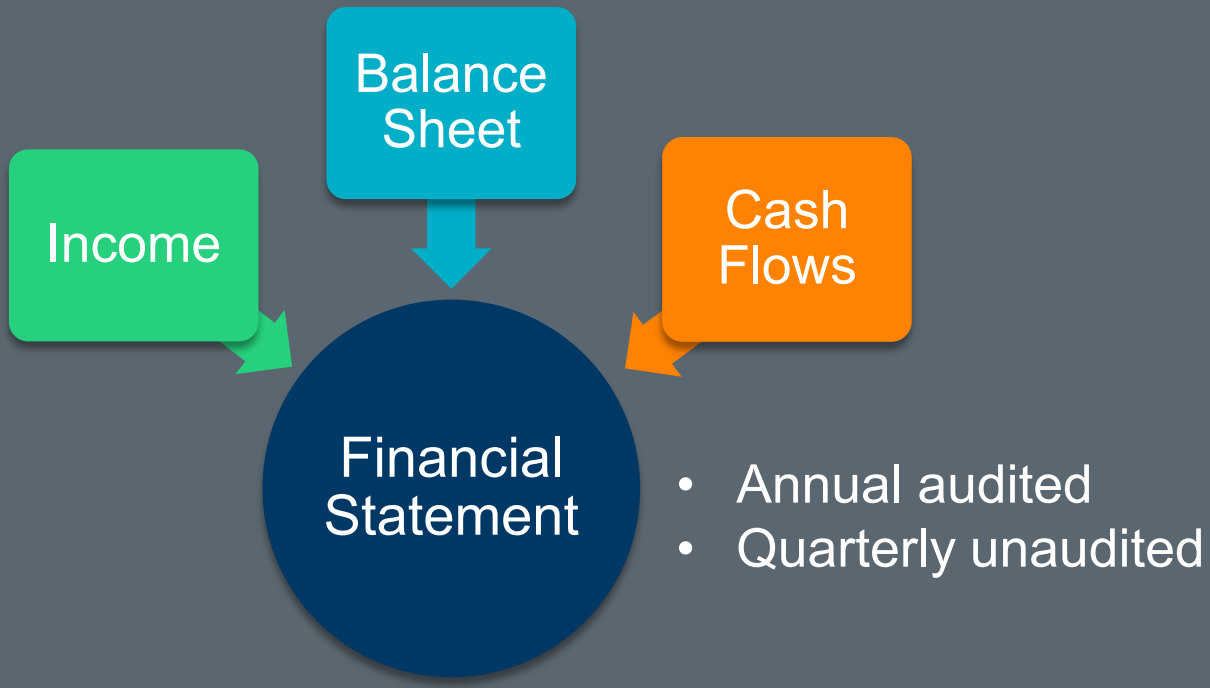
Counter-Party must certify compliance with the following CFTC requirements:

- Expertise in Markets
- Market Operational Capabilities
- Risk Management Capabilities
- Verification of Risk Management Framework
- Eligible Contract Participant



Must recertify annually

A Counter-Party's financial condition may change, so updates are necessary



- Annual audited
- Quarterly unaudited

Daily Report postings:

- Available Credit Limit (**ACL**)
- Total Potential Exposure (**TPE**)
- Minimum Current Exposure (**MCE**)
- Estimated Aggregate Liability (**EAL**)
  - Summary
  - Detail
- Future Credit Exposure for CRR PTP Obligations (**FCEOBL**)
- Future Credit Exposure for CRR PTP Options (**FCEOPT**)

Monitor Credit Reports

ercot | Market Information System

Data Products Applications Notices

Data Products > Services

Services

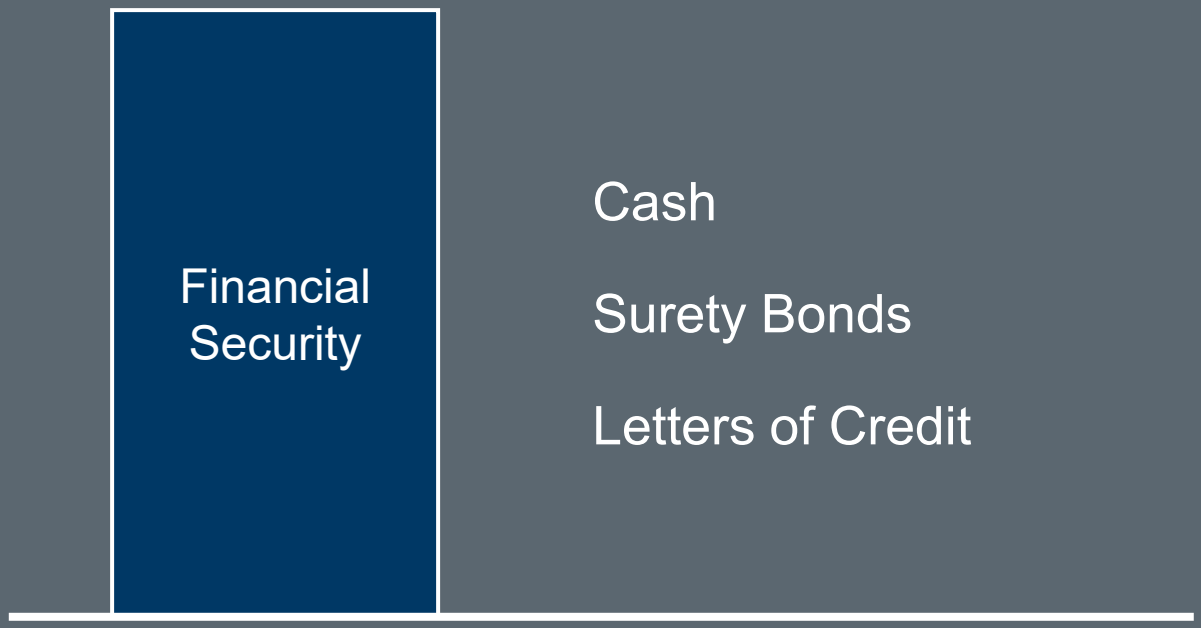
Reports & Extracts

Available Credit Limit (ACL) Summary Report	Certified
DAM Aggregate Credit Exposure	Certified
DAM Remaining Available Credit Limit by Counter Party	Certified
DAM eFactors Update	Certified
Default Uplift Supporting Data	Certified
Estimated Aggregate Liability (EAL) Detail Report	Certified
Estimated Aggregate Liability (EAL) Summary Report	Certified
Future Credit Exposure for CRR PTP Obligations (FCEOBL) Summary Report	Certified
Future Credit Exposure for CRR PTP Options (FCEOPT) Summary Report	Certified
Minimum Current Exposure (MCE) Summary Report	Certified
Securitization Default Charge Supporting Data	Certified
Total Potential Exposure (TPE) Summary Report	Certified

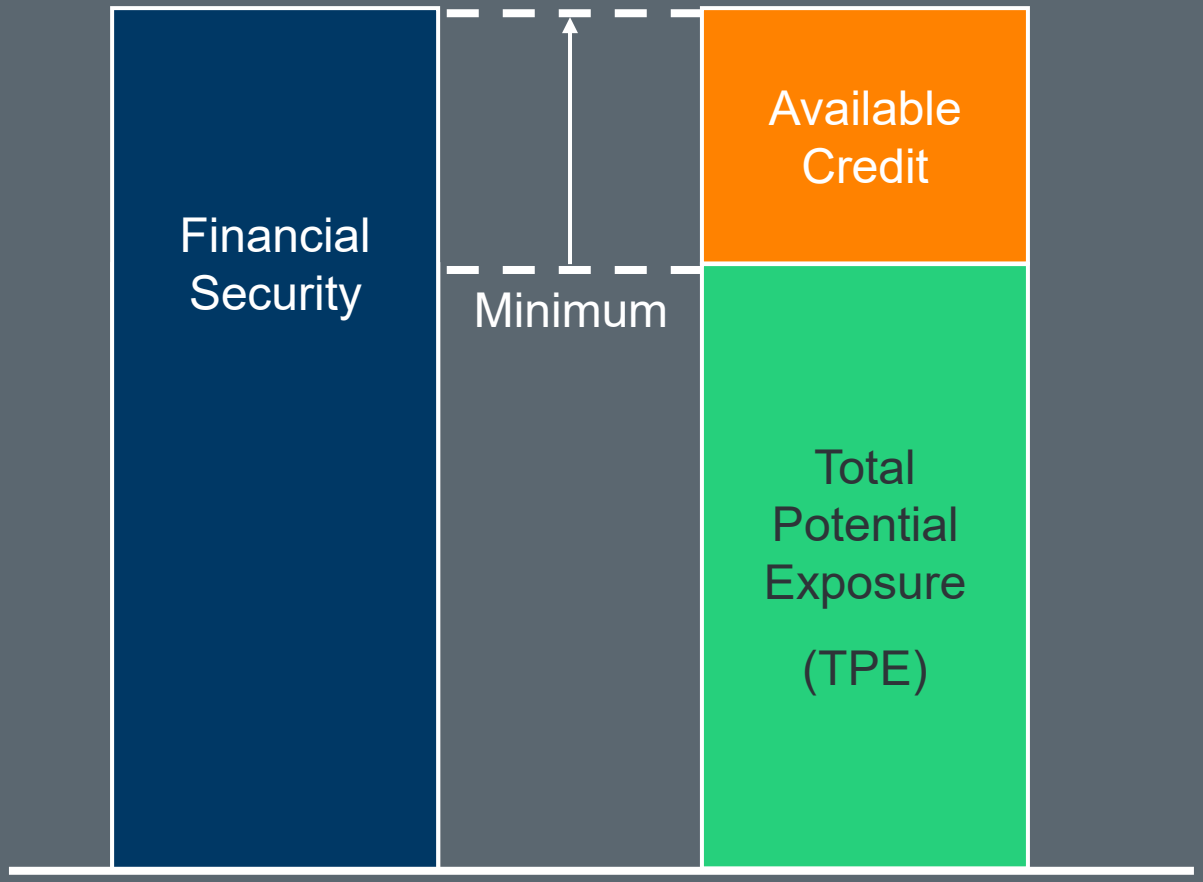
Minimum Credit Required

Estimated Liabilities from Market Activities

Acceptable forms of collateral



Available Credit for Market Activities



The Counter-Party and Available Credit

Maintains Financial Security with ERCOT

Available credit is shared

CRR Auction Credit Limit

Day-Ahead Market Credit Limit

Credit Application (and Attachment J)

- **Establish initial exposure values (TPE)**
- **Post sufficient Financial Security**

Financial Security

Protocol Section 22

Attachment J

Total Potential Exposure

(TPE)

Requires estimates to calculate TPE:

- **Load**
  - Daily average MWh
  - Percentage to be purchased in Real-Time
  - Estimated number of ESI IDs
- **Generation**
  - Daily average MWh
  - Percentage to be sold bilaterally

Total Potential Exposure (TPE)

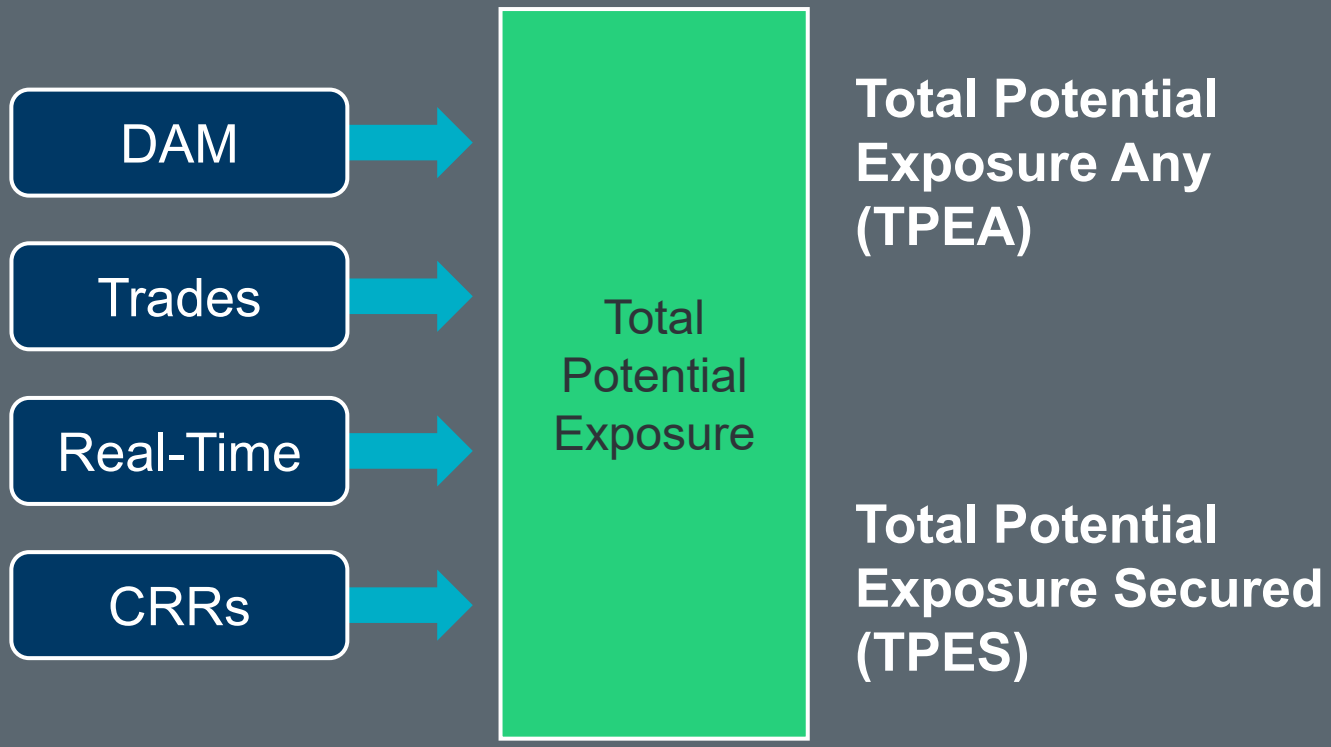
Types	Description	Limit
Cash	• Deposit with ERCOT • Interest paid monthly	None
Surety Bonds	• Insurance company issues • ERCOT named beneficiary	$10 Million per CP per issuer
Letters of Credit	• Unconditional, Irrevocable • ERCOT named beneficiary	Subject to credit rating of issuer

Financial Security

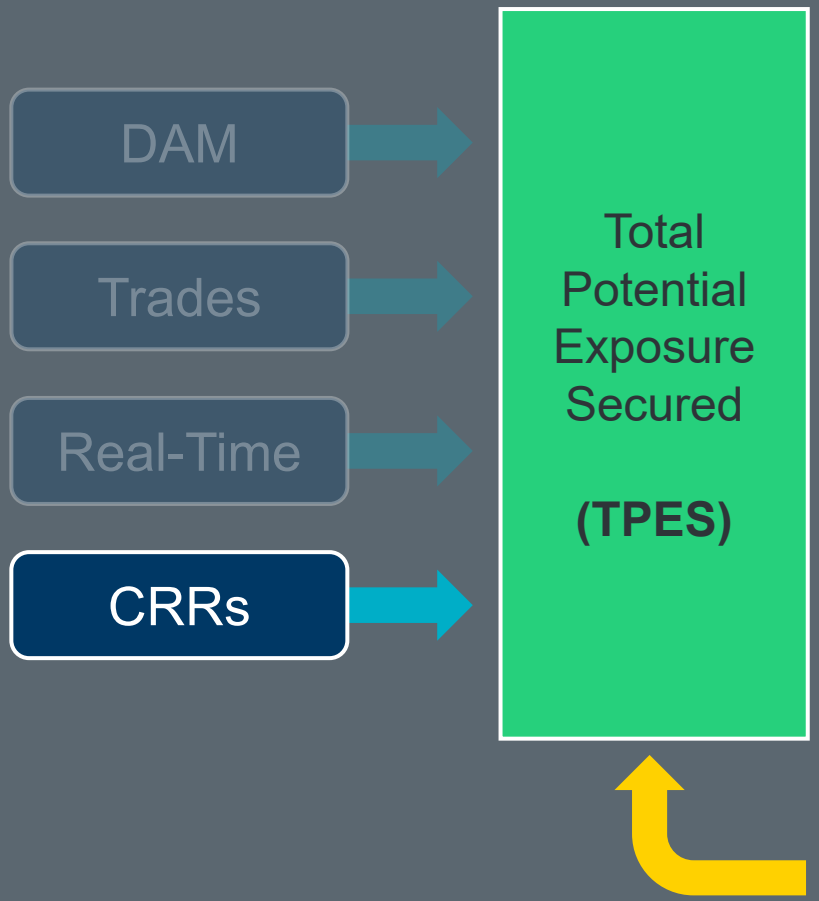
Overall Limits for Issuers
Surety Bonds: $100 Million
Letters of Credit: $750 Million

Credit Exposure

Total Potential Exposure changes with Market Activities



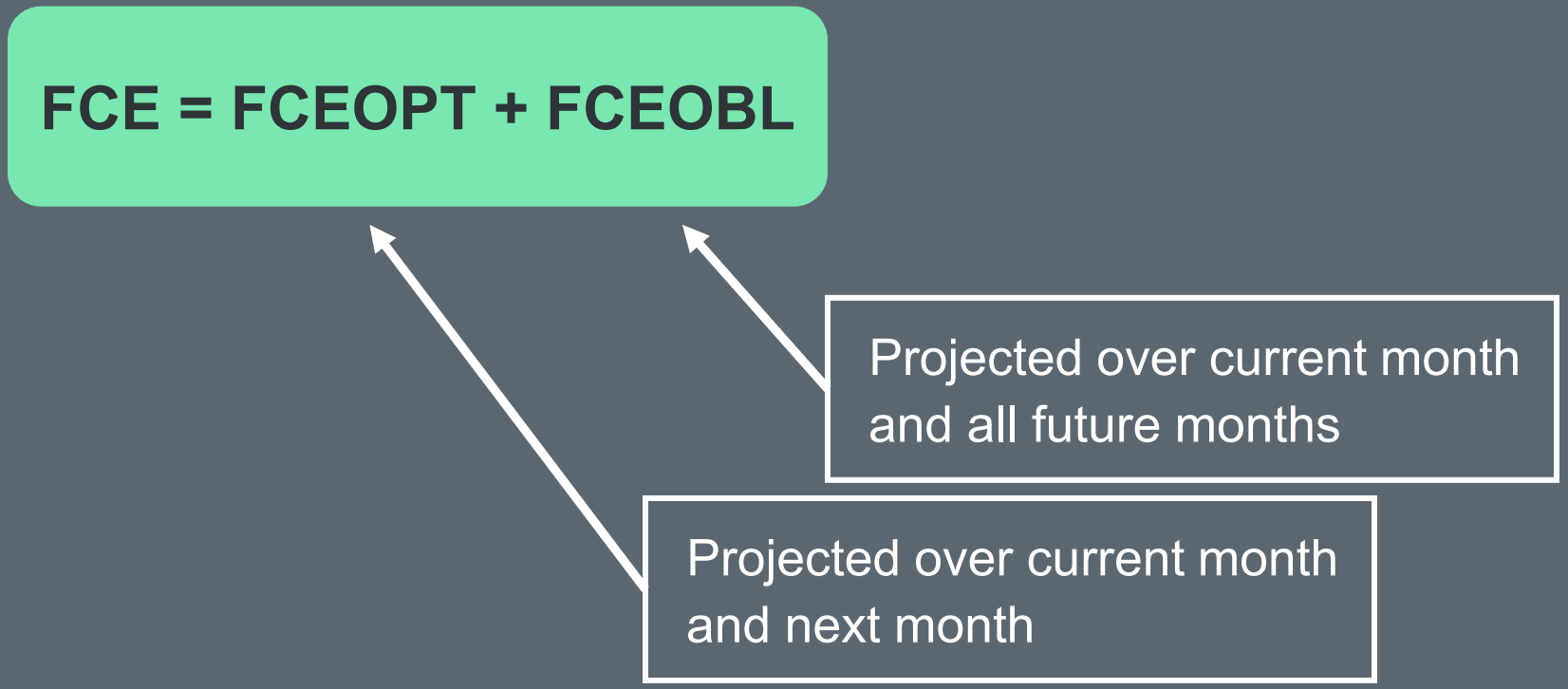
Total Potential Exposure Secured



TPES includes the Future Credit Exposure of Congestion Revenue Rights owned by a CRR Account Holder

Also includes an Independent Amount for capitalization

- Based on historical valuation
- Different methodology for options and obligations



- Based on historical average prices
- Each path has its own value

Value = NAOPTMW * A

Where:

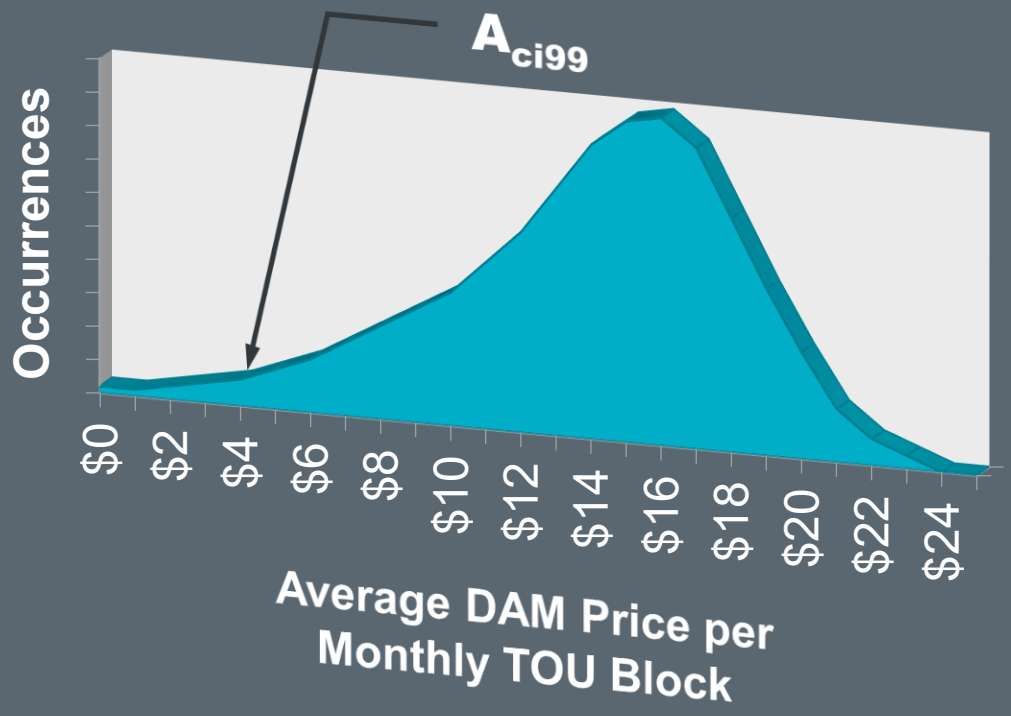
NAOPTMW = Net Awarded PTP Options for source-to-sink path

A = Path-Specific DAM-Based Adder (price)

Path-Specific Adder

- Calculated for each source/sink pair
- Three-year look-back

ci99 = 99th percentile Confidence Interval



$$FCEOPT = -\sum[NAOPTMW * Max(0, Aci_{99})]$$

Where: NAOPTMW = Net PTP Options (Awarded Portfolio)

Summed over:

- All source/sink pairs
- Remaining TOU hours of the current month
- TOU hours of the next month (Prompt Month)

Example 1: Future Credit Exposure for PTP Options

CP EZrisk owns PTP Options on two paths

- **Path P1:**
  - 40 MW Peak Weekday
  - Aci99 = $0.05/MWh
- **Path P2:**
  - 10 MW Peak Weekday
  - Aci99 = $0.10/MWh
- **Hours:**
  - Current Month = 80 Peak Weekday Hours remaining
  - Prompt Month = 320 Peak Weekday Hours total

What is EZrisk's FCEOPT?

Example 1: Future Credit Exposure for PTP Options

Answer:

Portfolio Weighted Adder (PWA)

- Volume-weighted average price
- Based on historical CRR path values

- OR -

Portfolio Weighted Auction Clearing Price (PWACP)

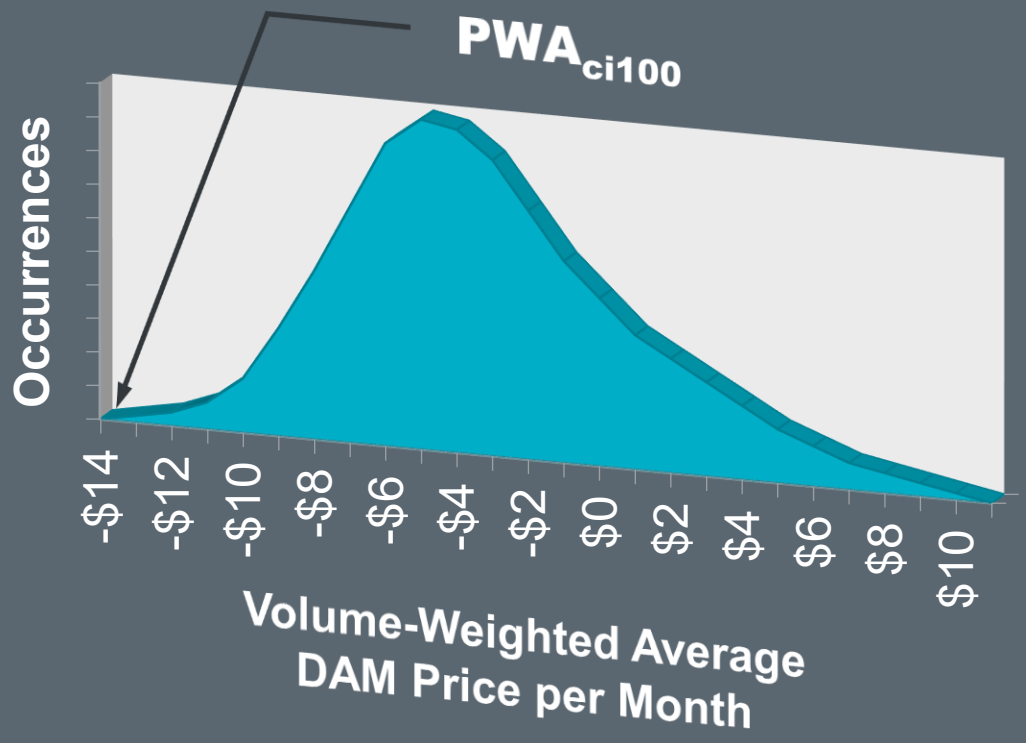
- Volume-weighted average price
- From most recent Auction

…whichever results in highest risk

Portfolio Weighted Adder (PWA)

- Monthly average price
- Three-year look-back

ci100 = 100th percentile Confidence Interval



$$FCEOBL = \sum[NAOBLMW * (-Min(0, PWA_{ci100,} PWACP))]$$

Where: NAOBLMW = Net PTP Obligations (Awarded Portfolio)

Summed over:

- All hours of current month
- All hours of next month (Prompt Month)
- All hours of Forward Months

CP EZrisk owns a PTP Obligation

- **Time: Current and upcoming months**
  NAOBLMW = 10MW * 2,000h = 20,000MWh
- **This PTP Obligation has had a positive value for the past three years**
  PWA_{ci100} = $0.09/MWh
- **In the most recent monthly auction, the PTP Obligation cleared at a slightly negative price**
  PWACP = ($0.10)/MWh

What is EZrisk's FCEOBL?

Example 2: Future Credit Exposure for PTP Obligations

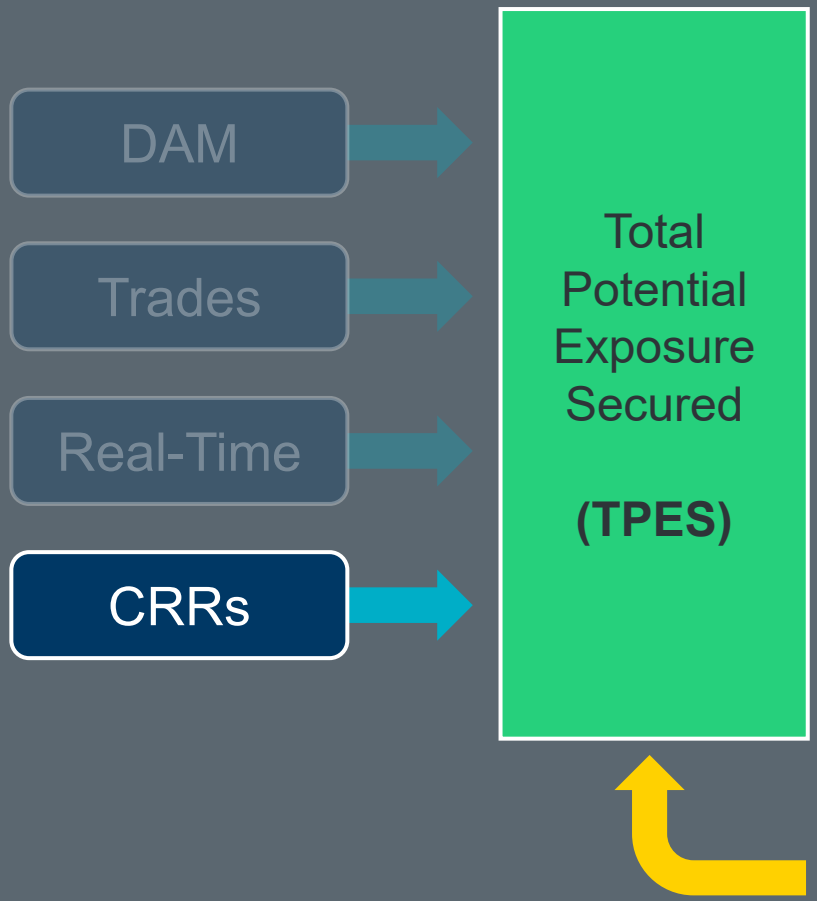
Answer:

Putting it all together:

FCE = FCEOPT + FCEOBL

Credit for PTP Options offsets the exposure of PTP Obligations

Total Potential Exposure Secured



TPES = Max [0, FCE] + IA

Also includes an Independent Amount for capitalization

All Counter-Parties must post an Independent Amount

- **$500,000 for participation in all markets**
- **$200,000 for participation in everything but CRRs**

When a Counter-Party has only QSEs, then TPES is $200,000

TPES = Max [0, 0] + $200,000

Example 3: Total Potential Exposure Secured

CP EZrisk owns both PTP Obligations and PTP Options

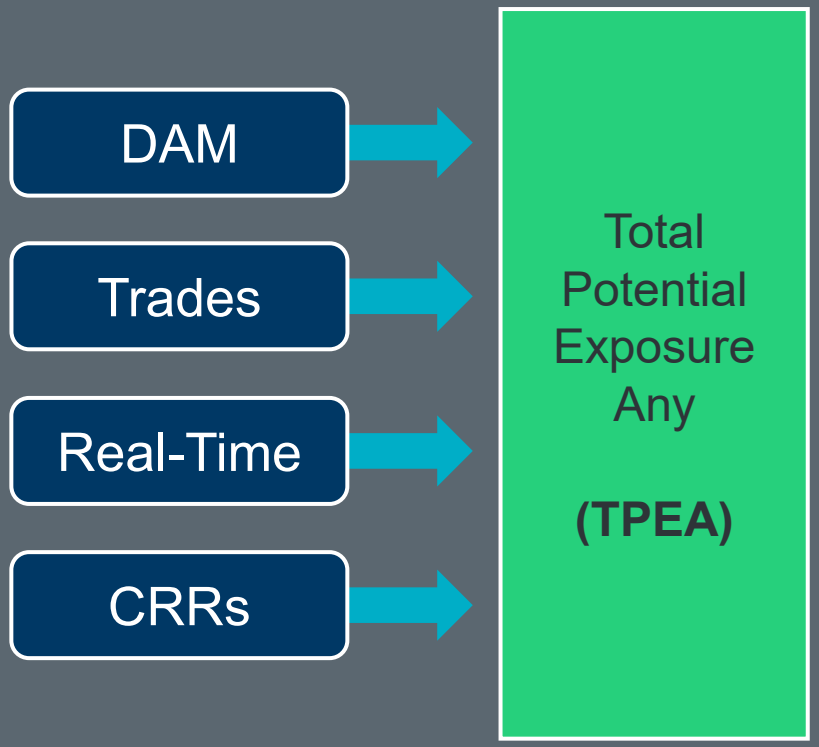
- **At close of business today:**
  - FCEOPT = - $1,200
  - FCEOBL = $2,000
- **Don't forget to include the Independent Amount**

What is EZrisk's TPES?

Example 3: Total Potential Exposure Secured

Answer:

Total Potential Exposure Any



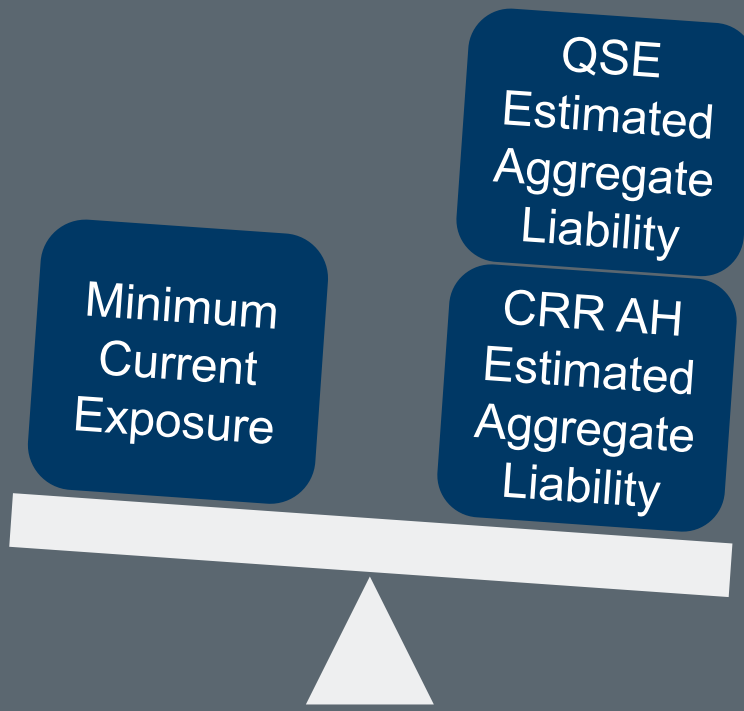
TPEA is based on the settlement impact from various market activities

Total Potential Exposure Any

Total Potential Exposure Any

(TPEA)

=



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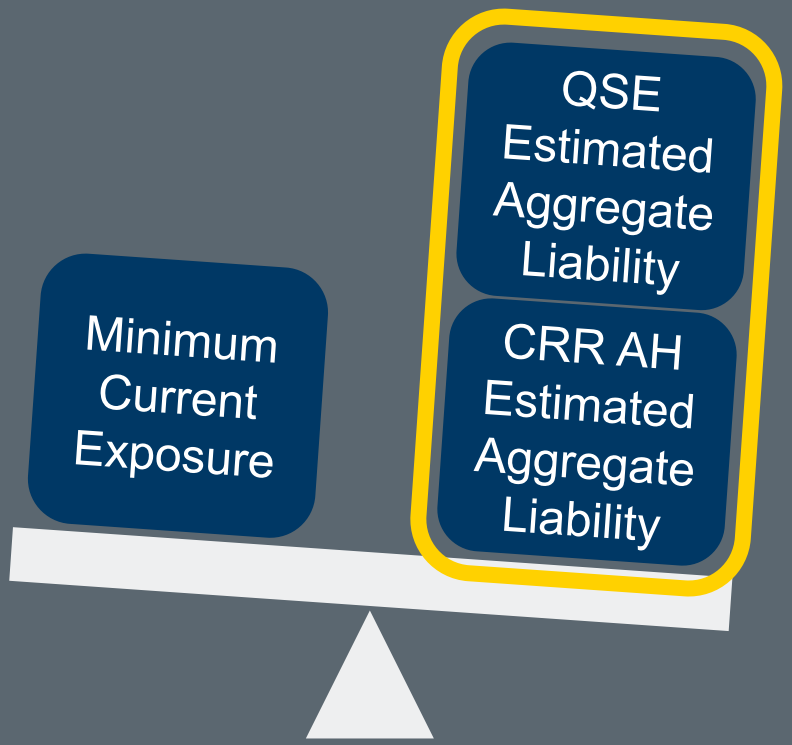
Potential Uplift

Total Potential Exposure Any

Total Potential Exposure Any

(TPEA)

=



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Potential Uplift

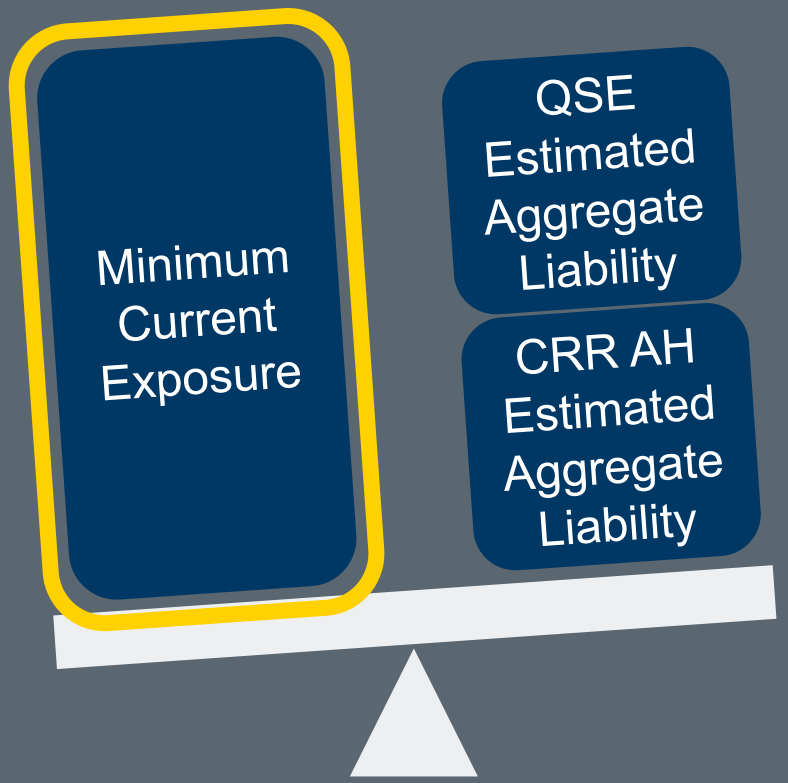
Estimated Aggregate Liability **(EAL)** is based on historical market behaviors

Total Potential Exposure Any

Total Potential Exposure Any

(TPEA)

=



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Potential Uplift

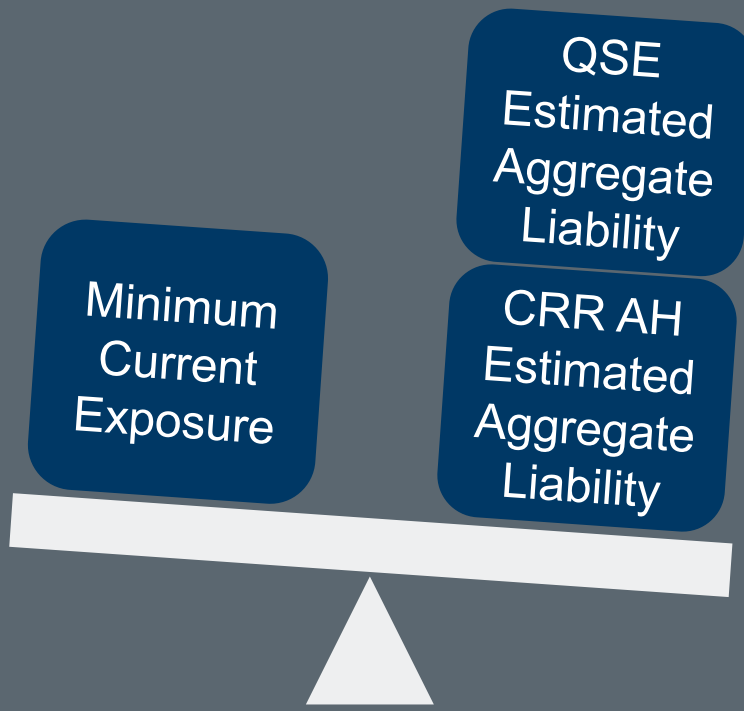
Minimum Current Exposure **(MCE)** creates a floor for credit exposure

Total Potential Exposure Any

Total Potential Exposure Any

(TPEA)

=



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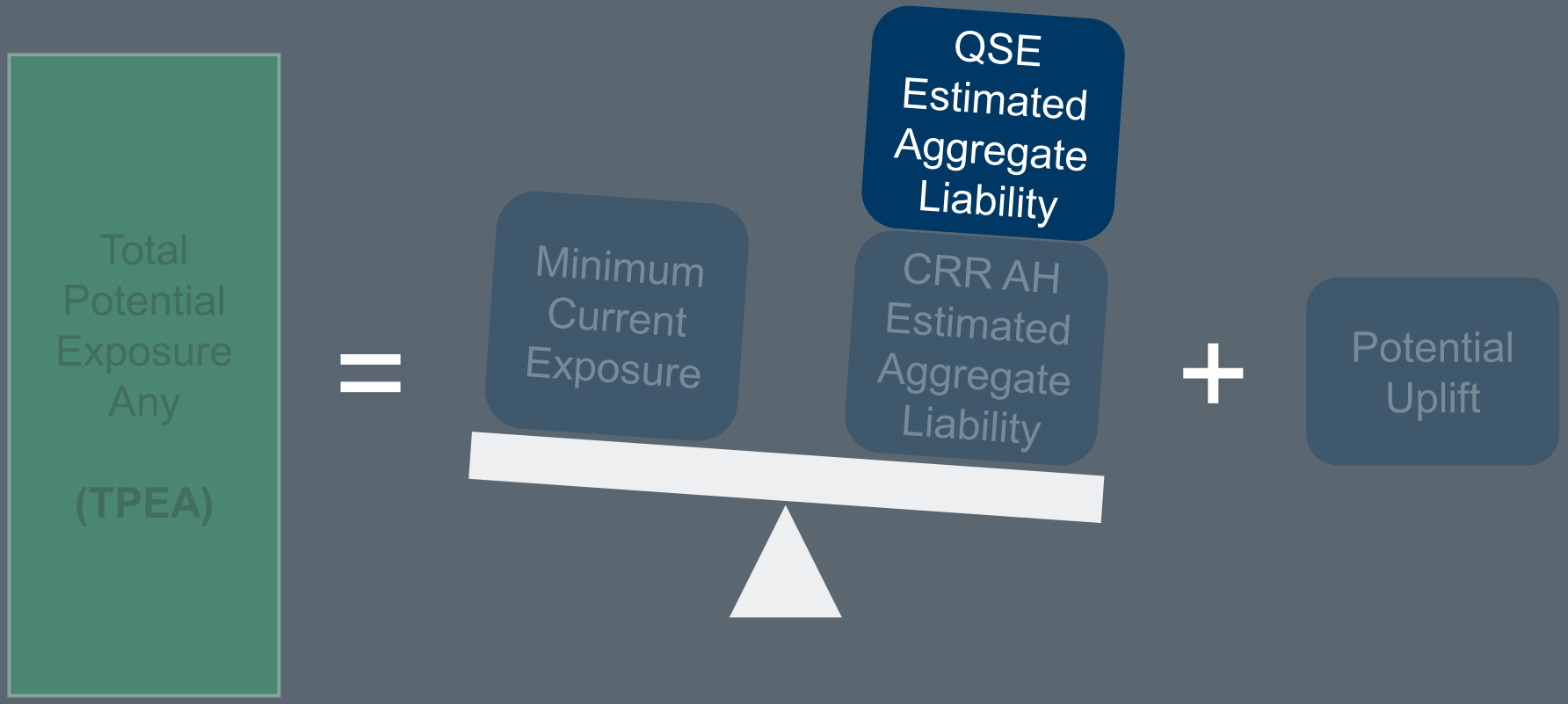
Potential Uplift

Potential Uplift **(PUL)** captures risk of market uplifts from short payments

Total Potential Exposure Any

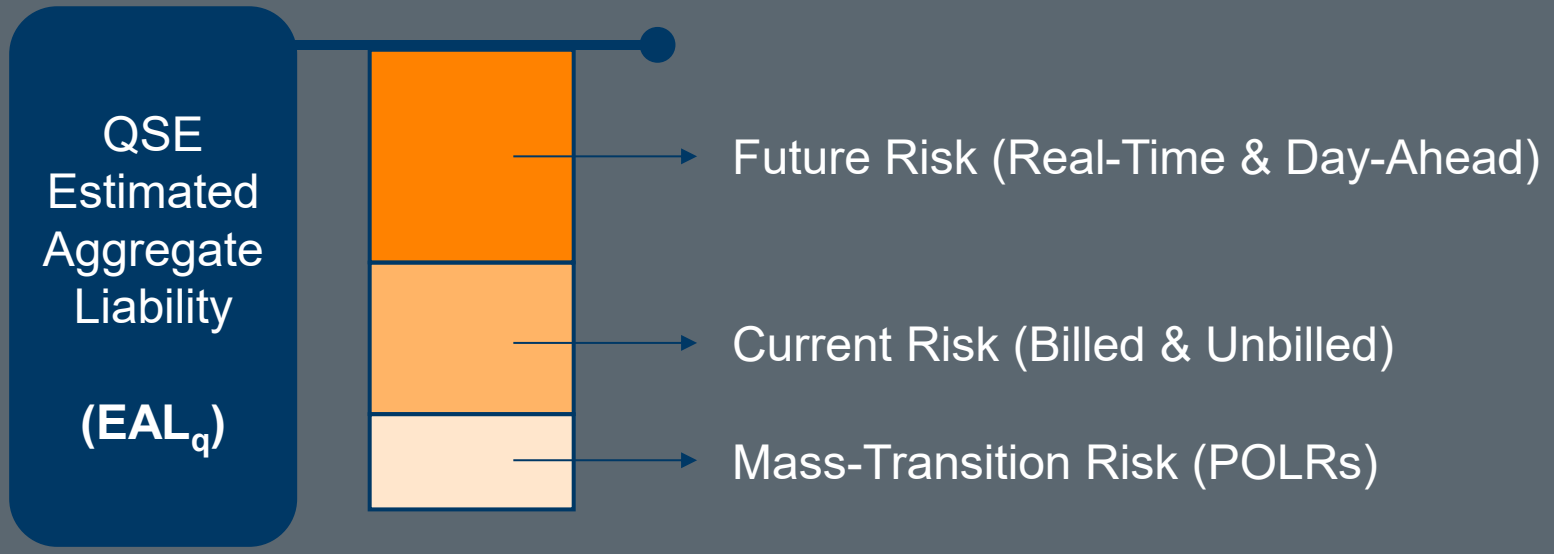


Two categories of QSE Estimated Aggregate Liability

QSE Estimated Aggregate Liability **(EAL_q)**	Counter-Parties with Load and/or Gen QSEs
QSE Estimated Aggregate Liability **(EAL_t)**	Counter-Parties with no Load and no Gen QSEs (Trade-Only)

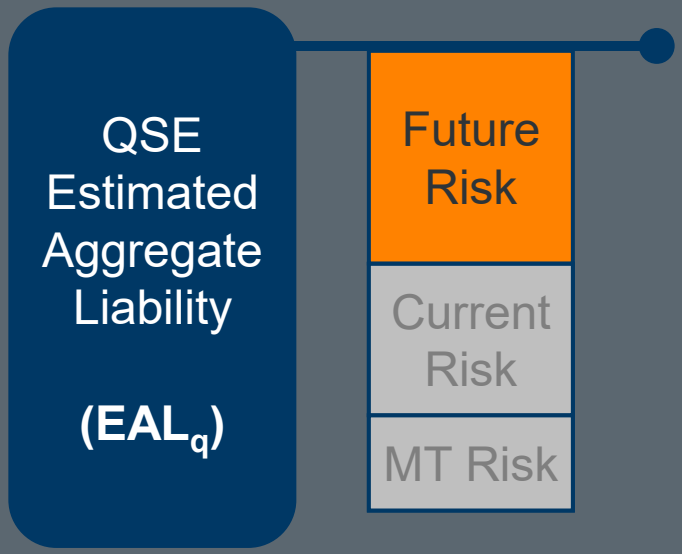
Estimated Aggregate Liability for QSEs (EAL_q)

- Calculated for all Load and/or Gen QSEs
- Addresses multiple types of risk



A Couple of Multipliers

Factors	Purpose	Value
M1	Projecting Future Risk	M1 = M1a + M1b M1a = Termination time upon default = 10 to 13 Days M1b = Mass Transition time for QSEs with Load = 3 to 8 Days
M2	Estimating Current Risk	M2 = Maximum Operating Days complete, but unbilled = 9 Days



- Operating Days yet to come
- Historical behaviors
- Historical and forward prices

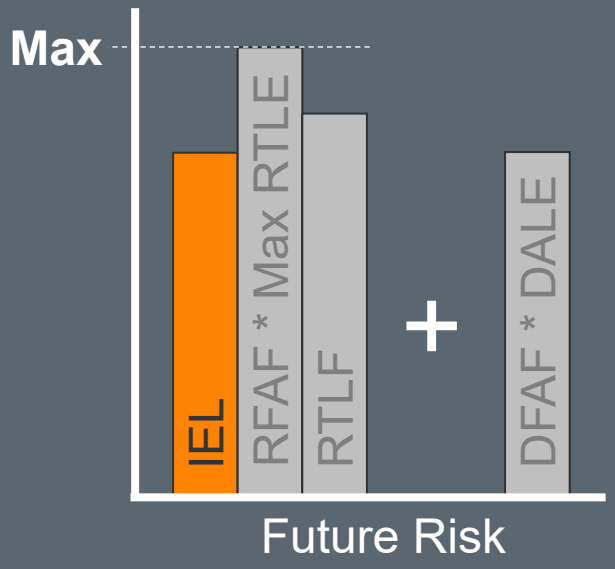
$$\text{Max}\left[\begin{array}{c}\text{Initial Estimated Liability (New CPs)}\\ \text{-or-}\\ \text{RFAF * Max Real-Time Liability Extrapolated}\\ \text{-or-}\\ \text{Real-Time Liability Forward}\end{array}\right] + \begin{array}{c}\text{DFAF *}\\ \text{Day-Ahead}\\ \text{Liability}\\ \text{Extrapolated}\end{array}$$

Initial Estimated Liability (IEL)

Based on estimates from Credit Application

- Daily Estimated Load (MWhs)
- Percentage to be purchased in Real-Time
- Daily Estimated Generation (MWhs)
- Percentage to be sold bilaterally

Used during first 40 days of activity in ERCOT



QSE Type	Initial Estimated Liability (IEL)
Load	IEL = DEL * Max [0.2, RTEFL] * RTAEP * (M1 + M2)
Resource	IEL = DEG * Max [0.2, RTEFG] * RTAEP * (M1 + M2)
Load & Resource	IEL = DEL * Max [0.1, RTEFL] * RTAEP * (M1 + M2) + DEG * Max [0.1, RTEFG] * RTAEP * (M1 + M2)

DEL	Daily Estimated Load
RTEFL	Real-Time Energy Factor for Load
DEG	Daily Estimated Generation
RTEFG	Real-Time Energy Factor for Generation
RTAEP	Real-Time Average Energy Price (HB_HUBAVG)

CP EZrisk just entered the market

- **From their Credit Application:**
  - Daily Estimated Load = 12,000MWh
  - Percentage Purchased in Real-Time = 50%
  - Daily Estimated Generation = 12,000MWh
  - Percentage sold Bilaterally = 50%
- **Other information**
  - M1 = 16
  - M2 = 9
  - RTAEP = $40/MWh

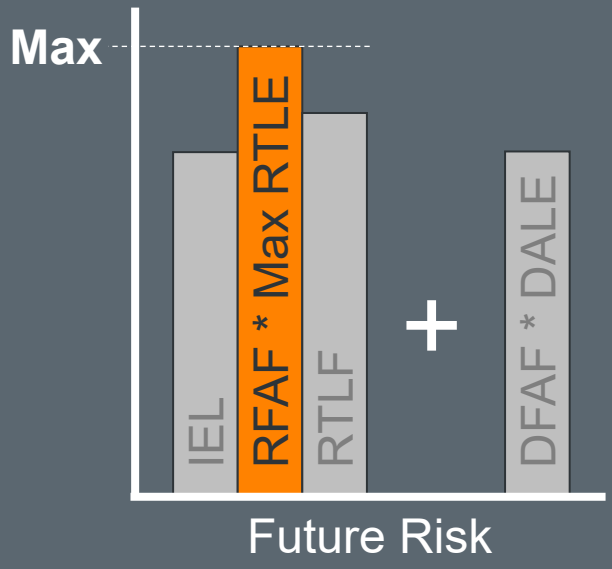
What is EZrisk's Initial Estimated Liability?

Example 4: Initial Estimated Liability (IEL)

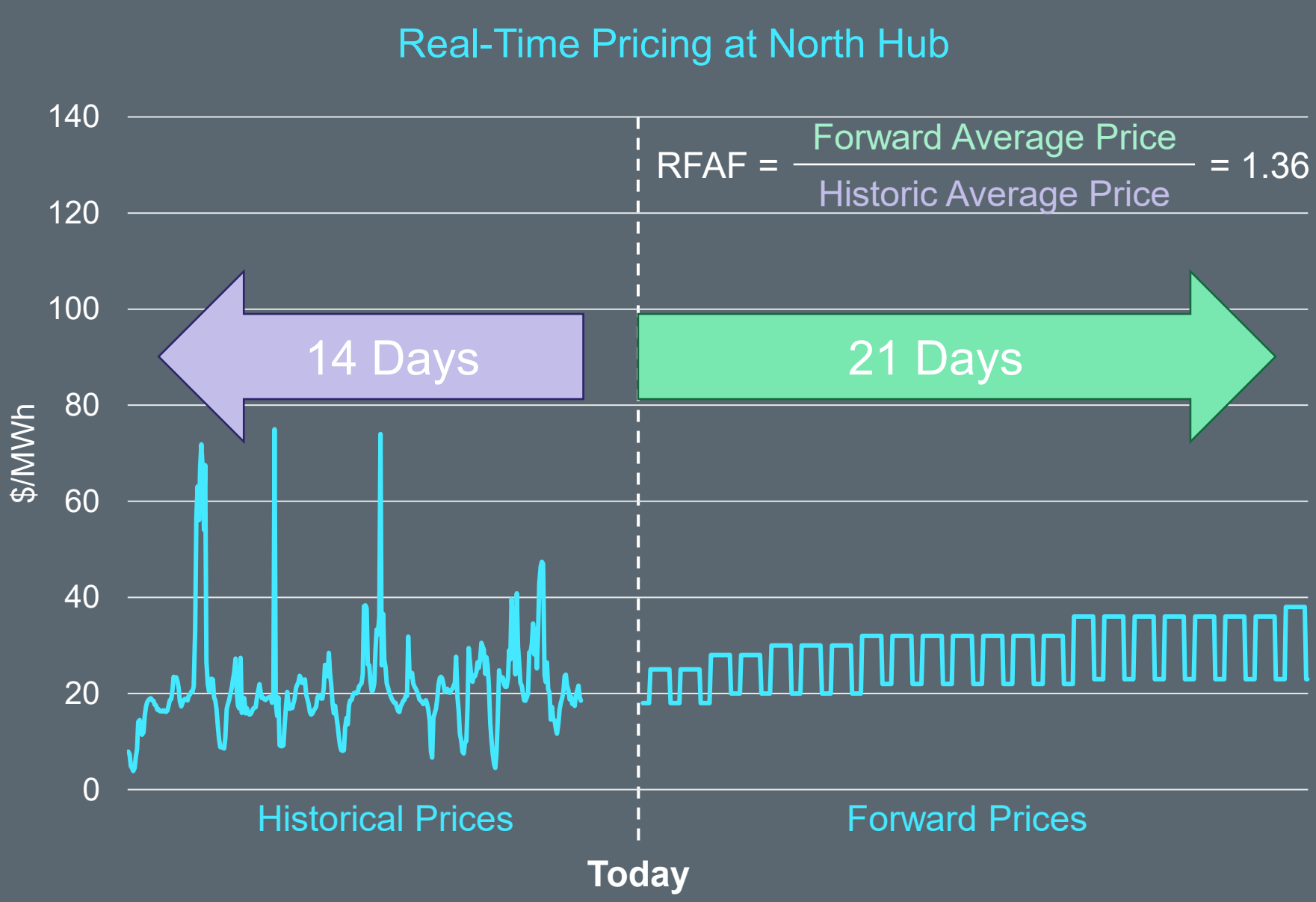
Answer:

Max Real-Time Liability Extrapolated (Max RTLE)

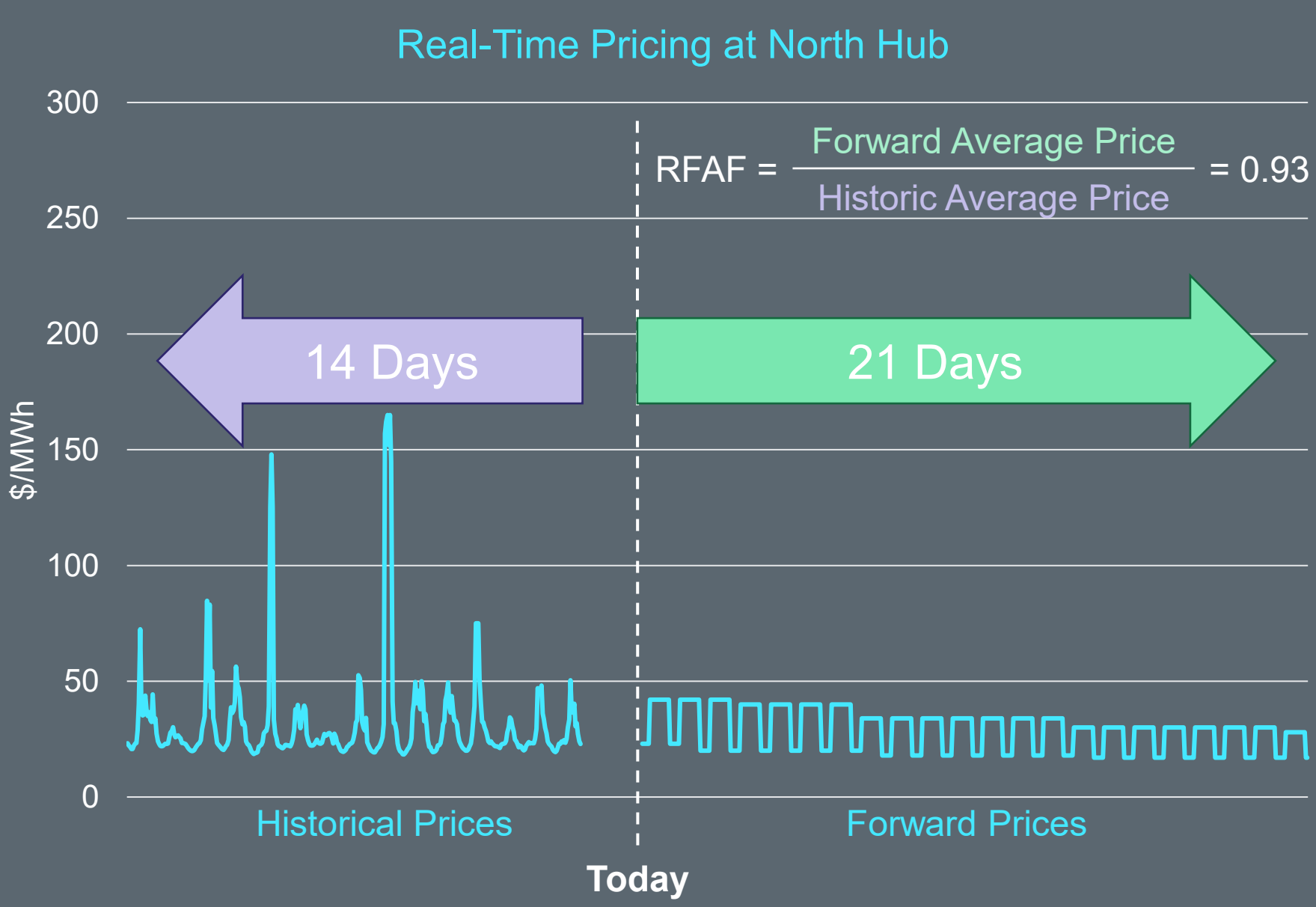
- Based on actual Real-Time Settlements
  - Average Initial Settlement
  - 14 calendar day lookback
  - Projected over M1 days
- Maximum risk over the previous 40 days



Real-Time Forward Adjustment Factor (RFAF)



Real-Time Forward Adjustment Factor (RFAF)

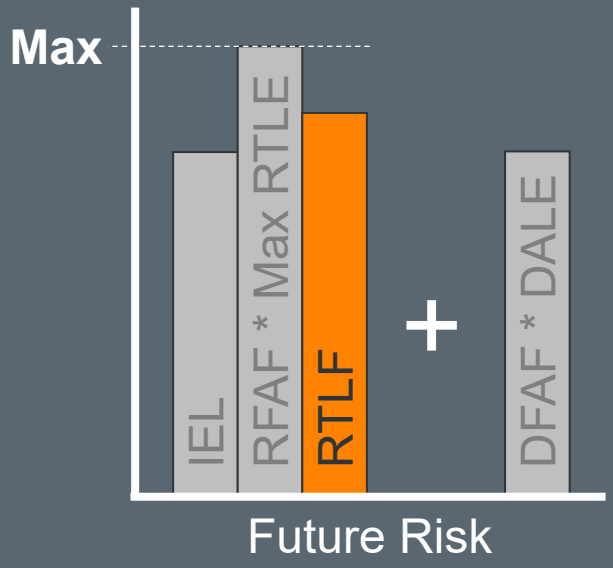


Real-Time Liability Forward (RTLF)

Based on estimated Real-Time Settlements

- Net amount for most recent 7 Operating Days
  - Actual for some days
  - Estimates[1] for others
- Adjusted by 150%

Captures recent trends that diverge from historical results

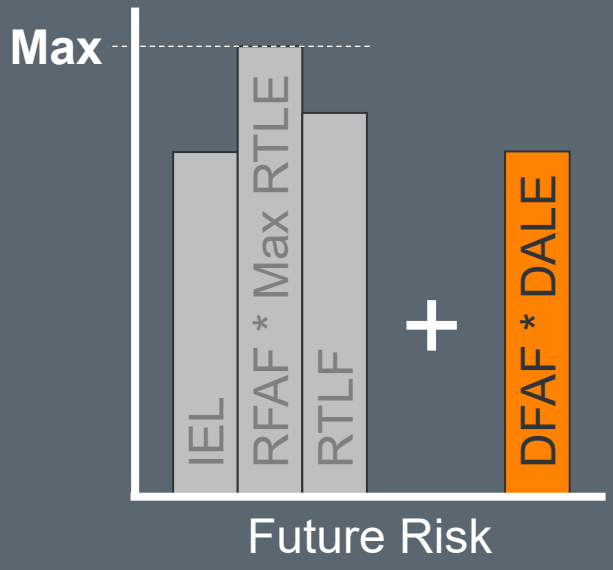


[1] See Protocol Section 16.11.4.3.2 for details

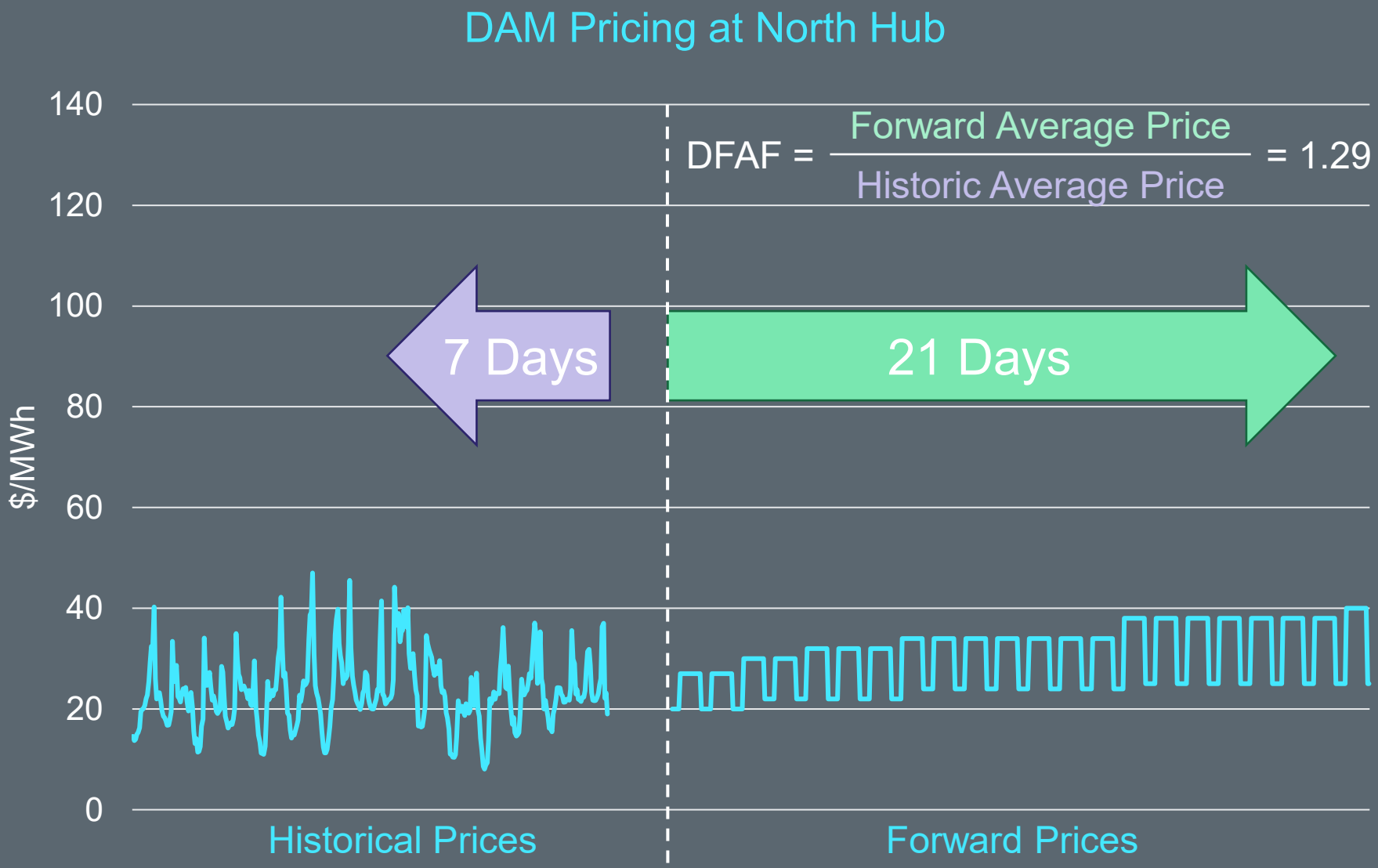
Day-Ahead Liability Extrapolated (DALE)

Based on actual Day-Ahead Market Settlements

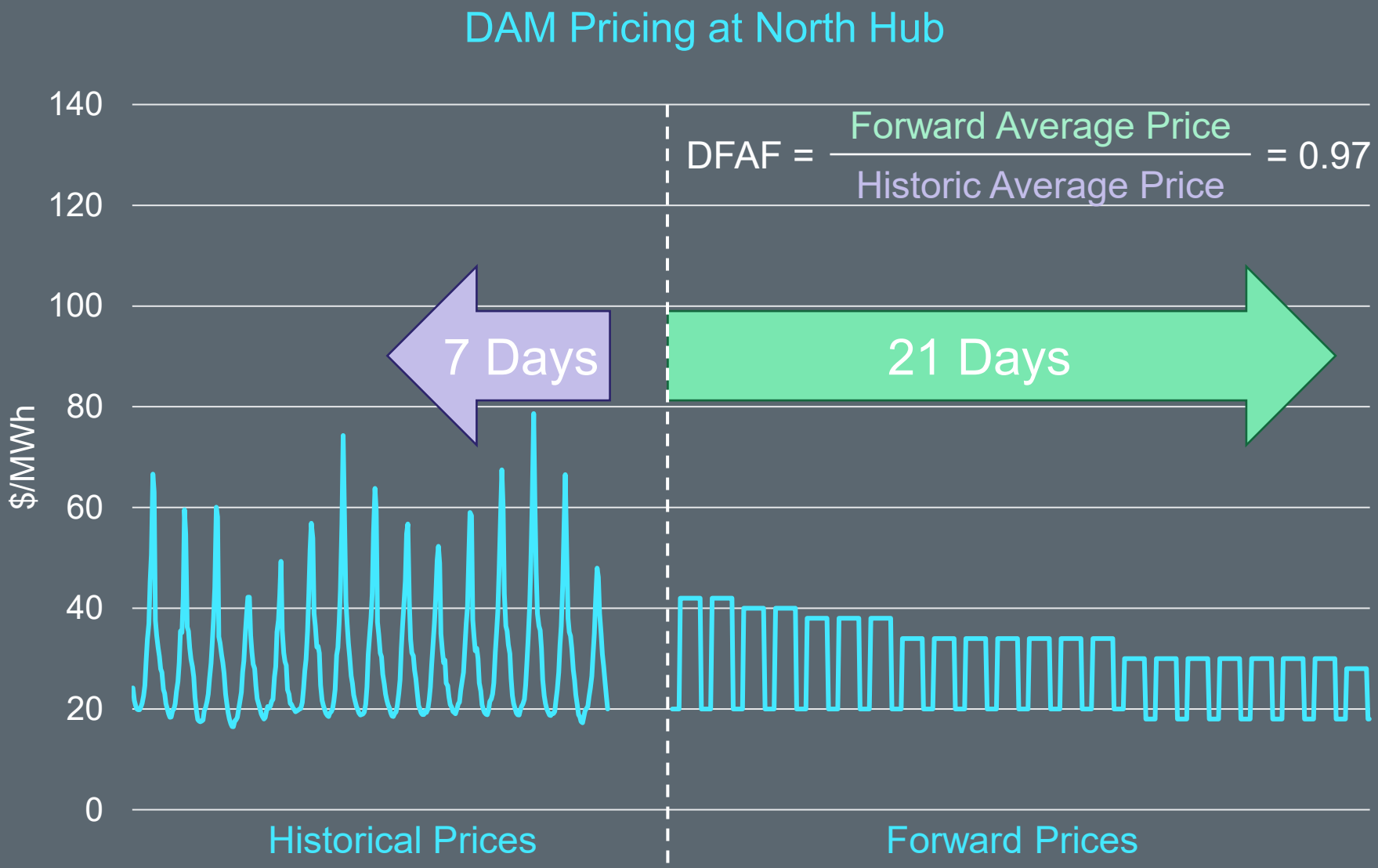
- Average Day-Ahead Market Settlement
- 7 calendar day lookback
- Projected over M1 days



DAM Forward Adjustment Factor (DFAF)



DAM Forward Adjustment Factor (DFAF)



Example 5: Future Risk Portion of EAL for QSEs

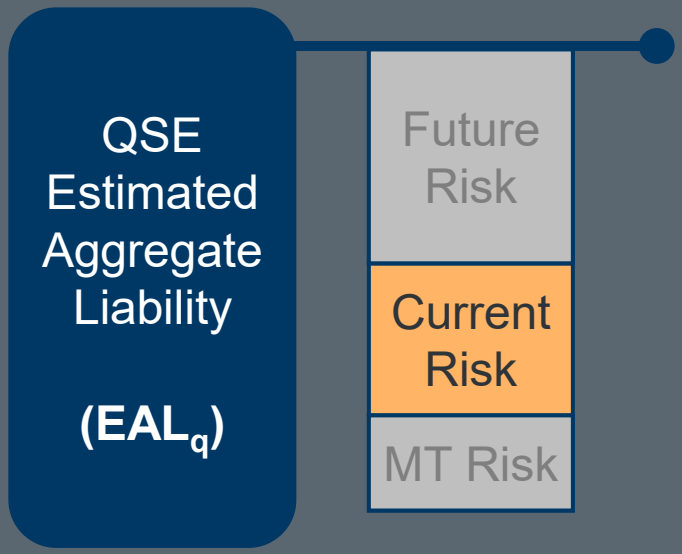
CP EZrisk has been in the market for 5 months

- Initial Estimated Liability = $12 Million
- Real-Time Liability Extrapolated peaked at $3 Million twenty days ago
- Real-Time Liability Forward = $1 Million
- Day-Ahead Liability Extrapolated = ($500,000)
- Real-Time Forward Adjustment Factor = 1.05
- Day-Ahead Forward Adjustment Factor = 1.10

What is EZrisk's future risk in the EAL calculation?

Example 5: Future Risk Portion of EAL for QSEs

Answer:

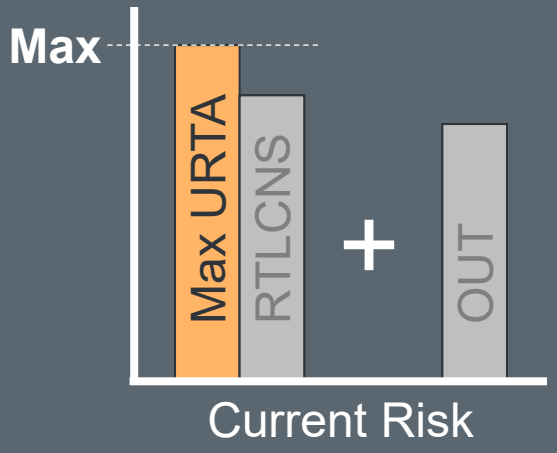


- Estimates risk of completed Operating Days where settlement is not complete
  - Unbilled
  - Billed but unpaid
- Based on historical behaviors

$$\text{Max}\left[\begin{array}{c}\text{Max Unbilled Real-Time Amount} \\ \text{-or-} \\ \text{Real-Time Liability Completed and Not Settled}\end{array}\right] + \begin{array}{c}\text{Outstanding} \\ \text{Unpaid} \\ \text{Transactions}\end{array}$$

Max Unbilled Real-Time Amount (Max URTA)

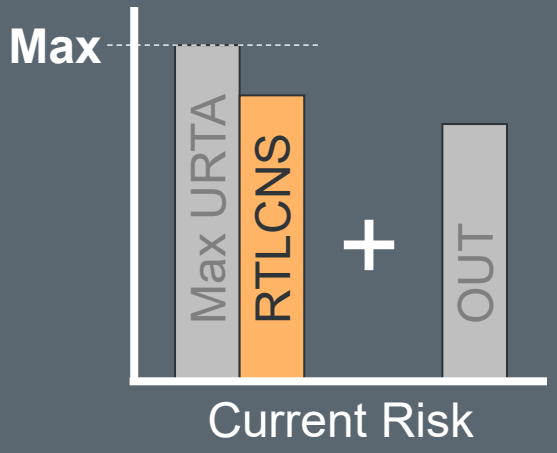
- Based on actual Real-Time Settlements
  - Average Initial Settlement
  - 14 calendar day lookback
  - Projected over M2 days
- Maximum risk over the previous 40 days



Real-Time Liability Completed and Not Settled (RTLCNS)

- Based on estimated Real-Time Settlements
- Sum of net amounts for all Operating Days Completed but not Settled

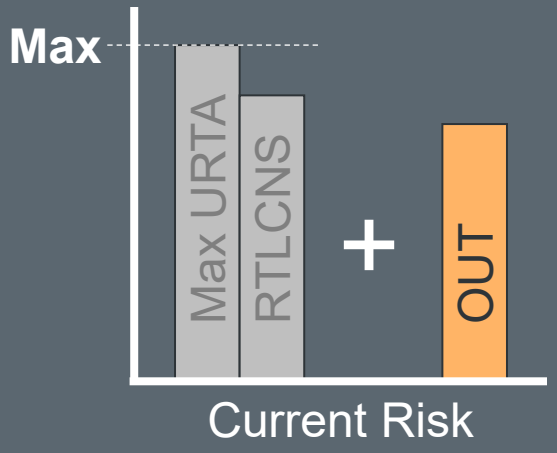
Captures recent trends that diverge from historical results



Outstanding Unpaid Transactions (OUT)

$$OUT_q = OIA_q + UDAA_q + UFA_q + UTA_q + CARD$$

OIA	Outstanding Invoice Amounts
UDAA	Unbilled Day-Ahead Amounts
UFA	Unbilled Final Amounts
UTA	Unbilled True-up Amounts
CARD	CRR Auction Revenue Distribution



Outstanding Unpaid Transactions (OUT)

Component	Description
OIA	Includes outstanding invoices of all types
UDAA	Estimates[1] for all Day-Ahead Markets that have not settled
UFA	• Average RTM Final Settlement • 21-day lookback • Projected over 55 days
UTA	• Average RTM True-up Settlement • 21-day lookback • Projected over 180 days
CARD	Estimate of Counter-Party's share of CRR Auction Revenues already collected, but not paid out

[1] See Protocol Section 16.11.4.3.1 for details

Example 6: Current Risk Portion of EAL for QSEs

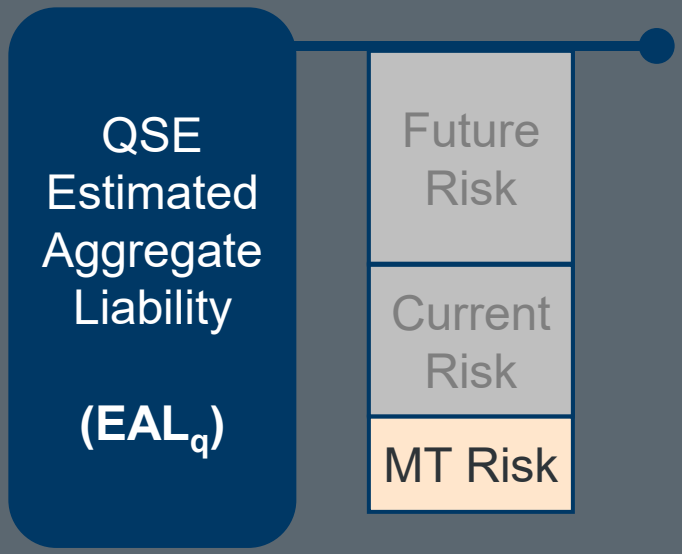
CP EZrisk has been in the market for 5 months

- **Unbilled Real-Time Amount peaked at $1.7 Million twenty days ago**
- **Real-Time Liability Completed and Not Settled = $1.5 Million**
- **Outstanding Unpaid Transactions:**
  - Outstanding Invoice Amounts = $130,000
  - Unbilled Day-Ahead Amounts = ($29,000)
  - Unbilled Final Amounts = ($1,000)
  - CRR Auction Revenue Distribution = ($200,000)

What is EZrisk's current risk in the EAL calculation?

Example 6: Current Risk Portion of EAL for QSEs

Answer:



This adjustment remains in place only until the Mass Transition is complete

- Captures Incremental Load Exposure for Provider of Last Resort (POLR) in the event of a Mass Transition
- Based on
  - Number of ESI IDs transitioned
  - Pro-rata share of defaulting Counter-Party's RTLE

Two categories of QSE Estimated Aggregate Liability

QSE Estimated Aggregate Liability

(EAL_q)

Counter-Parties with Load and/or Gen QSEs

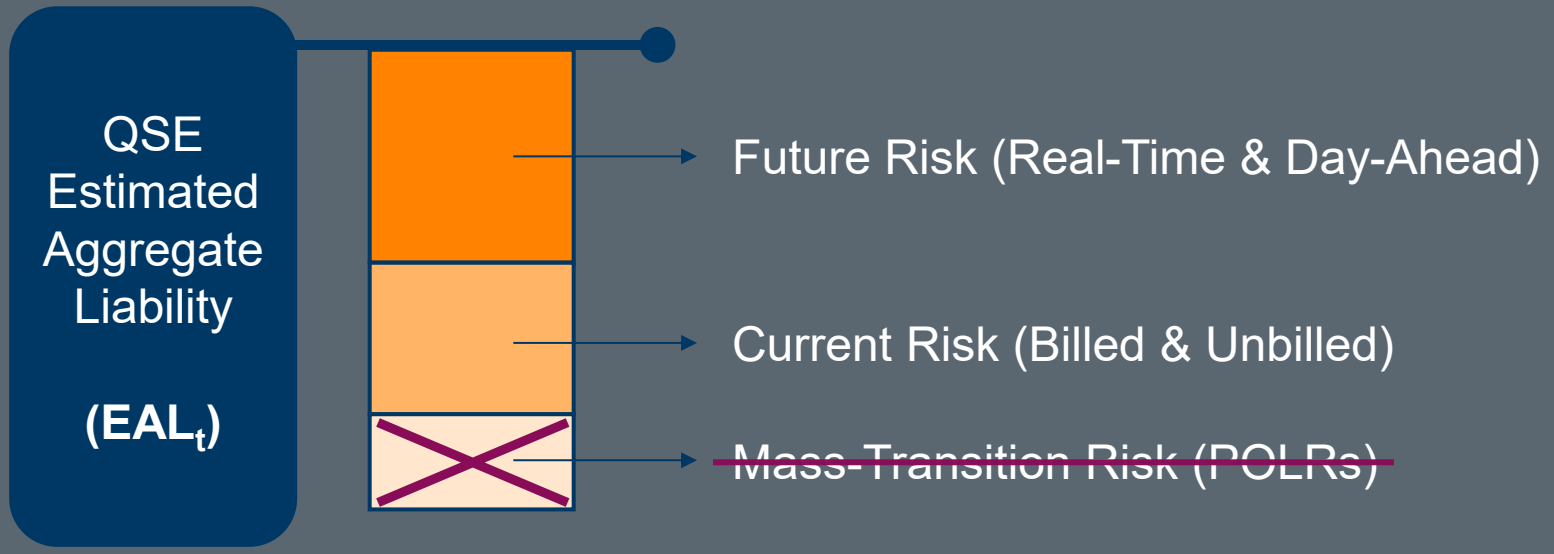
QSE Estimated Aggregate Liability

(EAL_t)

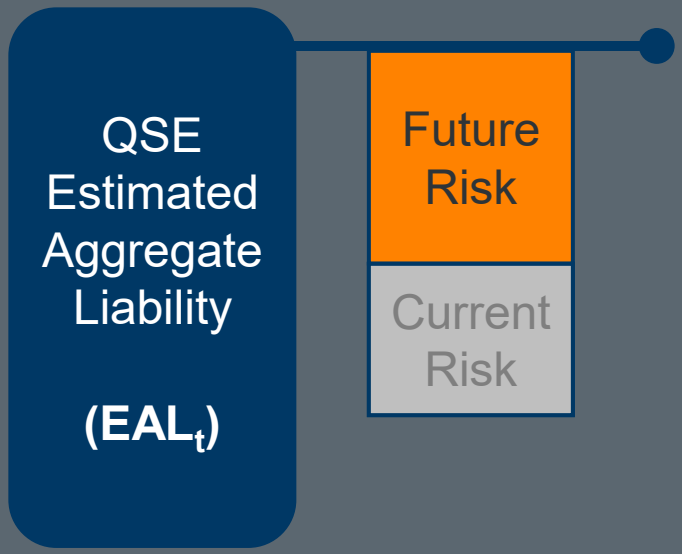
Counter-Parties with no Load and no Gen QSEs (Trade-Only)

Estimated Aggregate Liability for Trade-Only QSEs (EAL_t)

- Calculated for all QSEs represented by Counter-Party
- Addresses multiple types of risk



Future Risk for Trade-Only QSEs

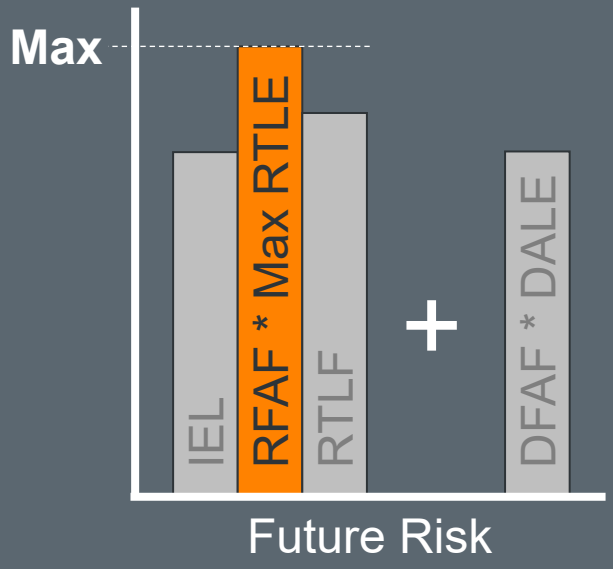


- Operating Days yet to come
- Historical behaviors
- Historical and forward prices

$$\text{Max}\left[\begin{array}{c}\cancel{\text{Initial Estimated Liability (New CPs)}}\\ \cancel{\text{-or-}}\\ \text{RFAF * Max Real-Time Liability Extrapolated}\\ \text{-or-}\\ \text{Real-Time Liability Forward}\end{array}\right] + \begin{array}{c}\text{DFAF *}\\ \text{Day-Ahead}\\ \text{Liability}\\ \text{Extrapolated}\end{array}$$

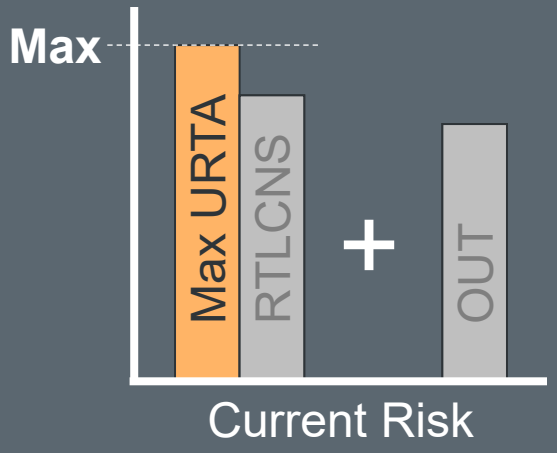
Max Real-Time Liability Extrapolated (Max RTLE)

- Based on actual Real-Time Settlements
  - Average Initial Settlement
  - 14 calendar day lookback
  - Projected over M1 days
- Maximum risk over the previous ~~40 days~~ 20 days



Max Unbilled Real-Time Amount (Max URTA)

- Based on actual Real-Time Settlements
  - Average Initial Settlement
  - 14 calendar day lookback
  - Projected over M2 days
- Maximum risk over the previous ~~40 days~~ 20 days

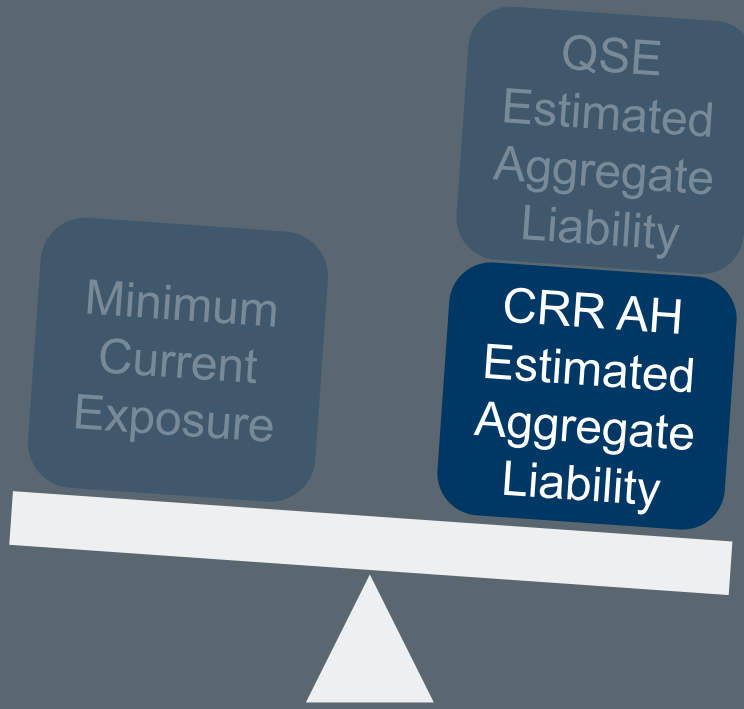


Total Potential Exposure Any

Total Potential Exposure Any

(TPEA)

=



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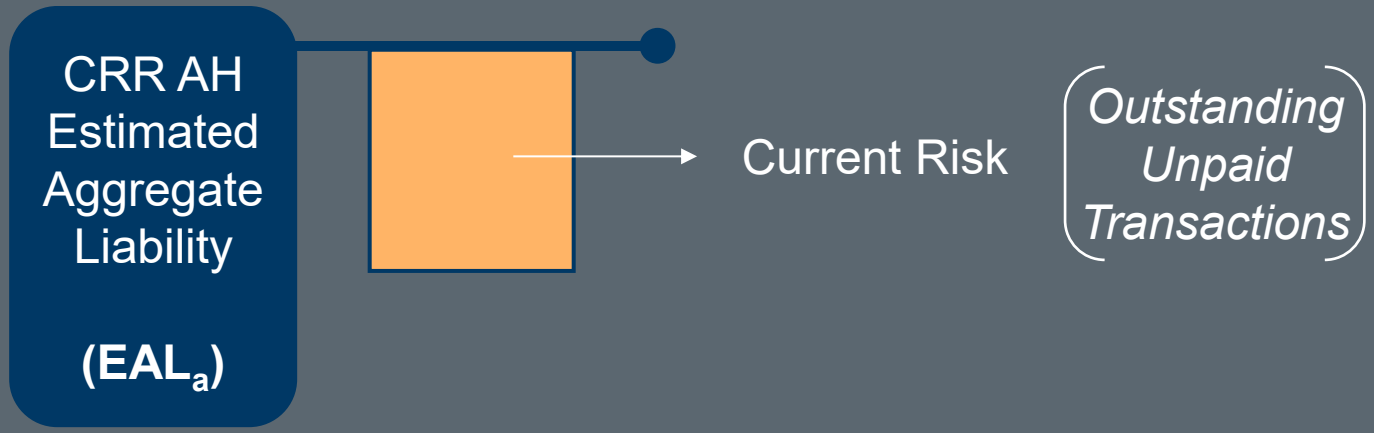
Potential Uplift

Estimated Aggregate Liability for CRR AHs (EAL_a)

- Calculated for all CRR Account Holders represented by Counter-Party
- Only one type of risk



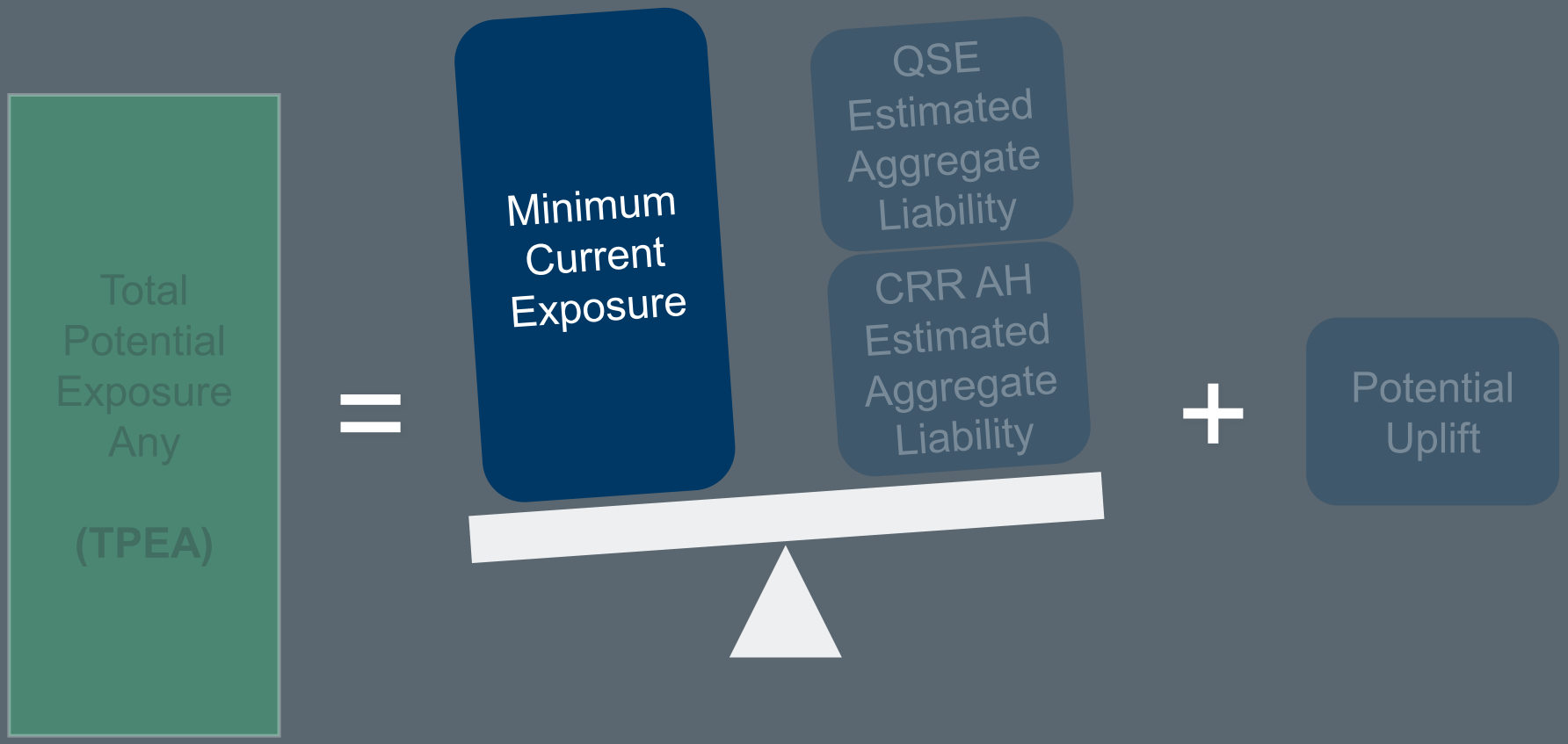
Outstanding Unpaid Transactions (OUT)

$$OUT_a = OIA_a + UDAA_a$$

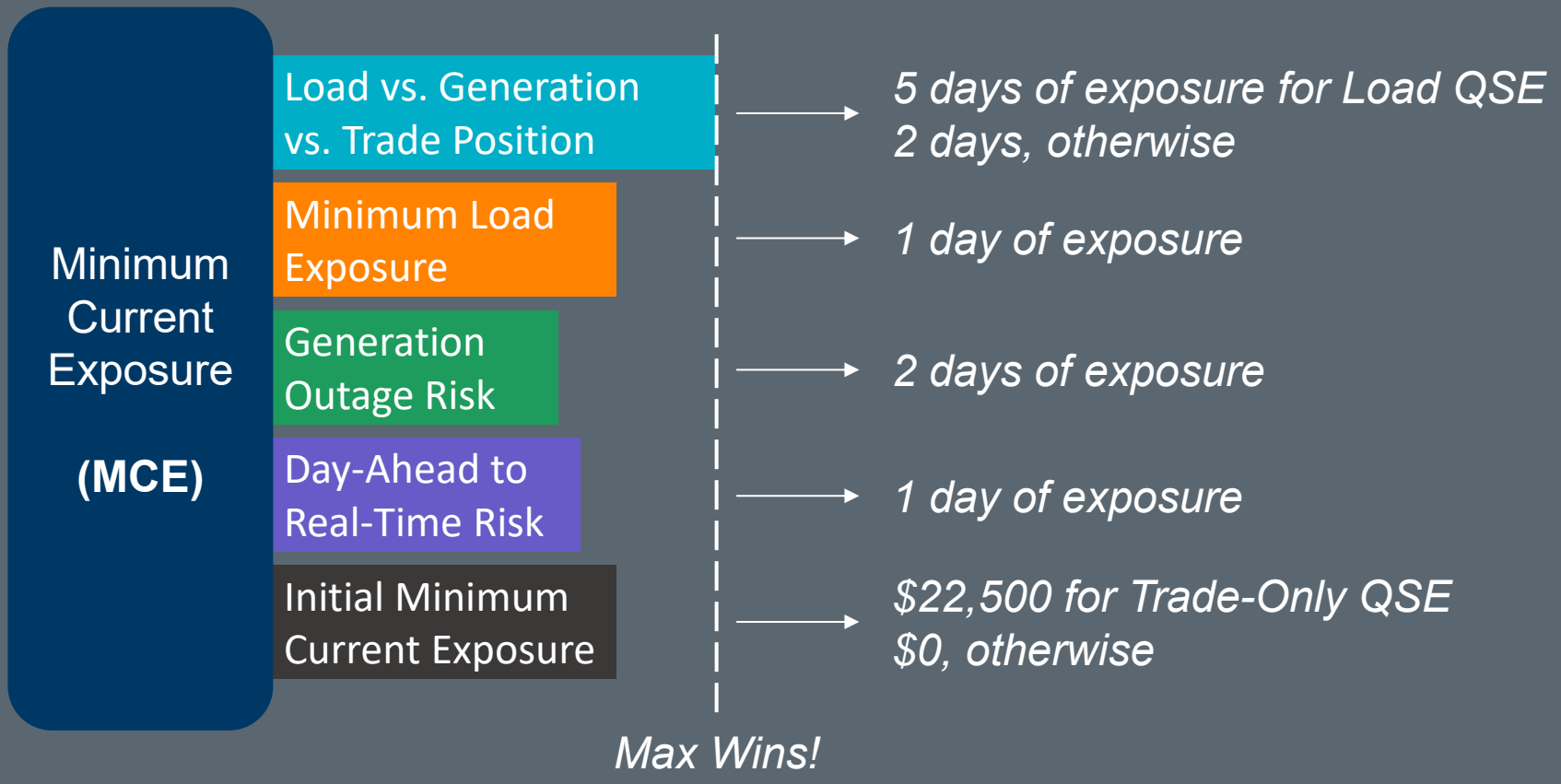
Component	Description
OIA	Outstanding Invoice Amounts
UDAA	Unbilled Day-Ahead Amounts – Estimates[1] for all Day-Ahead Markets that have not settled

[1] See Protocol Section 16.11.4.3.1 for details

Total Potential Exposure Any



Minimum Current Exposure



14-day lookback for Historic Data.

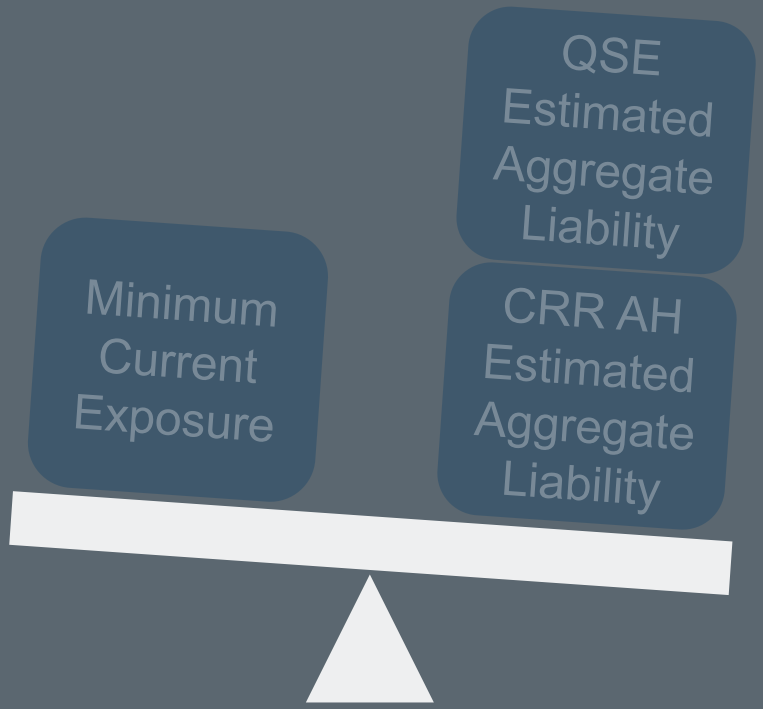
Generation discounted by 20%.

Total Potential Exposure Any

Total Potential Exposure Any

(TPEA)

=



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Potential Uplift

ERCOT may have to uplift short paid amounts owed by other Counter-Parties

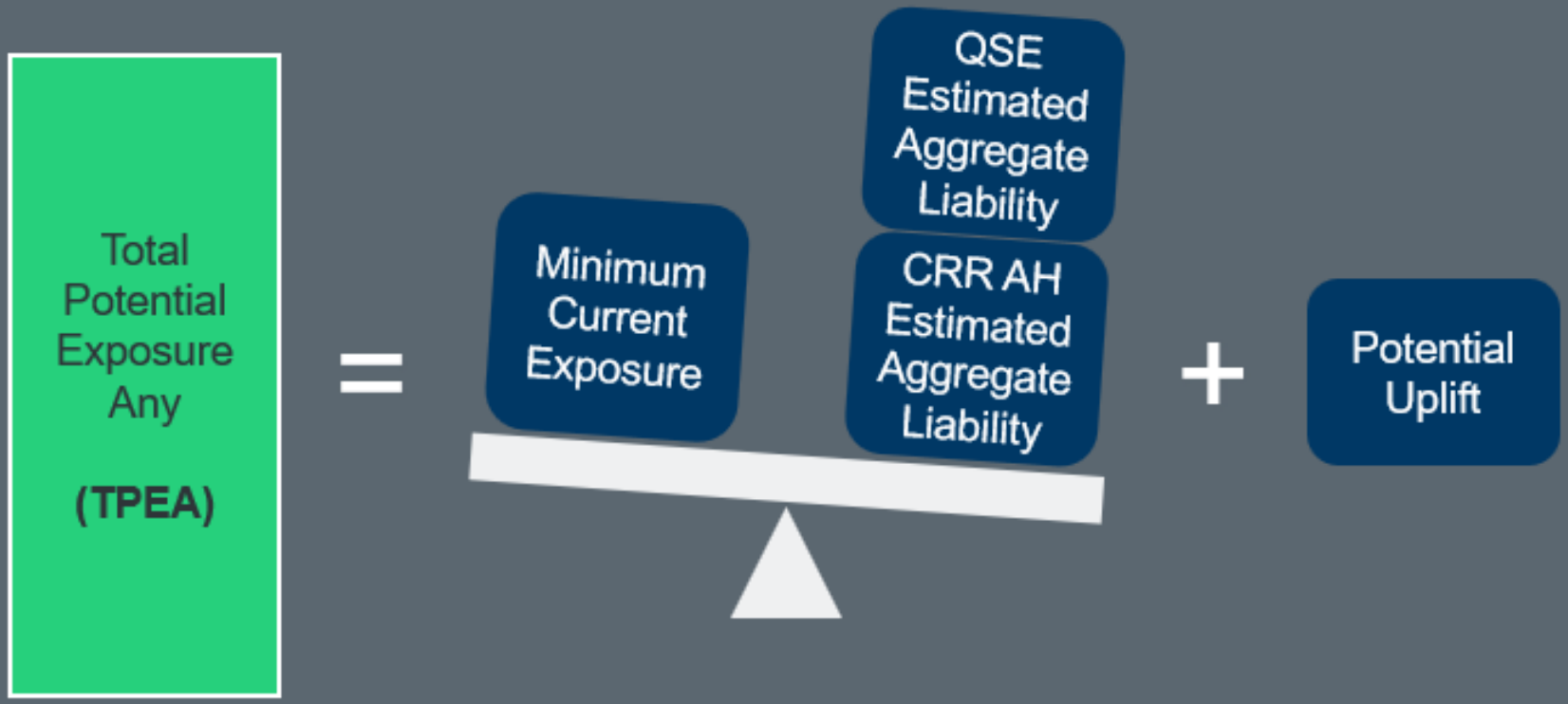
Potential Uplift

(PUL)

Potential Uplift includes proportional amounts based on Counter-Party activities

- Amount to be uplifted within one year
- Minimum of the following
  - 25% of amount on a payment plan due to be repaid beyond one year
  - 5 years' worth of uplift charges

Putting TPEA back together



$$TPEA = Max[0, MCE, Max[0, ((1-TOA)EAL_q + (TOA)EAL_t + EAL_a)]] + PUL$$

Trade-Only Activity flag

Example 7: Total Potential Exposure Any

CP EZrisk has been in the market for 5 months

- QSE Estimated Aggregated Liability = $4.2 Million
- CRR AH Estimated Aggregated Liability = ($10,000)
- Minimum Current Exposure = $940,000
- ERCOT has no outstanding short paid amounts

What is EZrisk's TPEA?

Example 7: Total Potential Exposure Any

Answer:

Determining Available Credit Limits

The Counter-Party and Available Credit

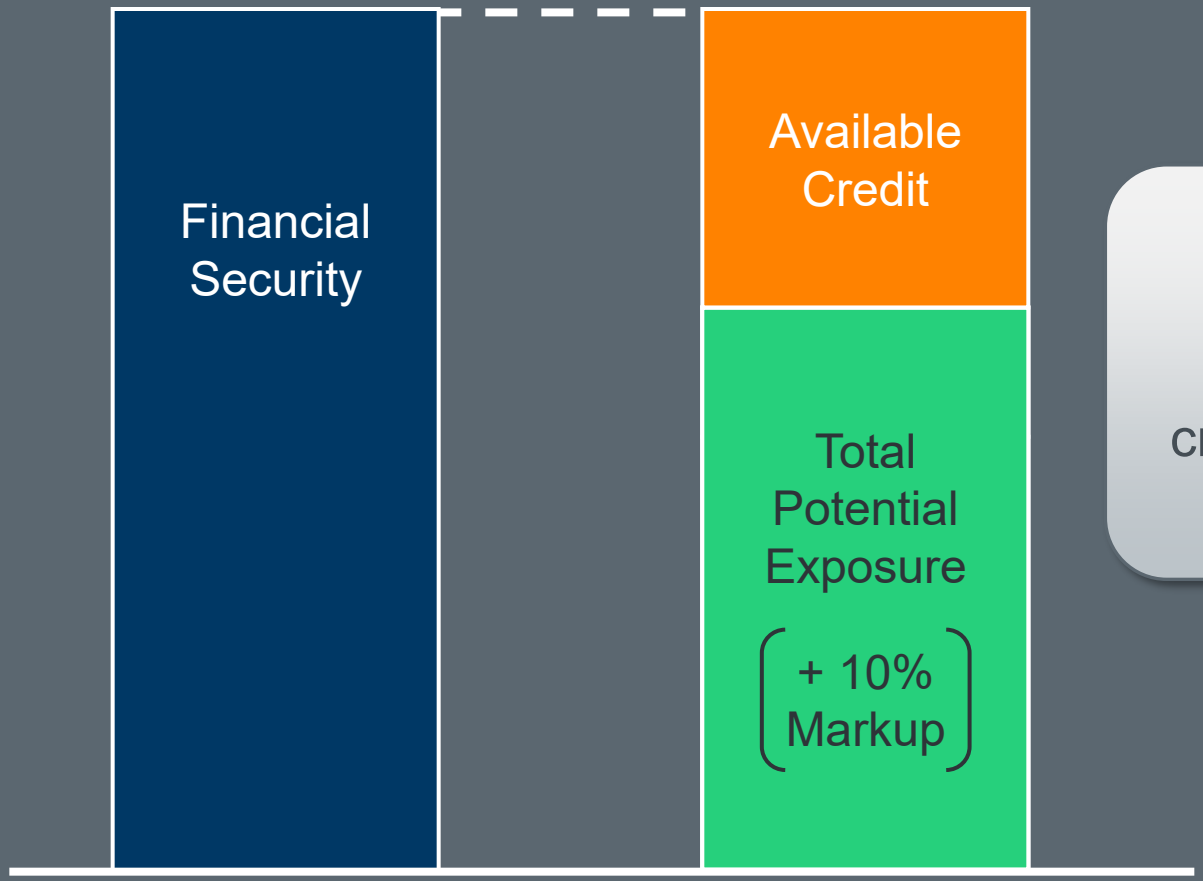
Posts Financial Security with ERCOT

Available credit is shared

CRR Auction Credit Limit

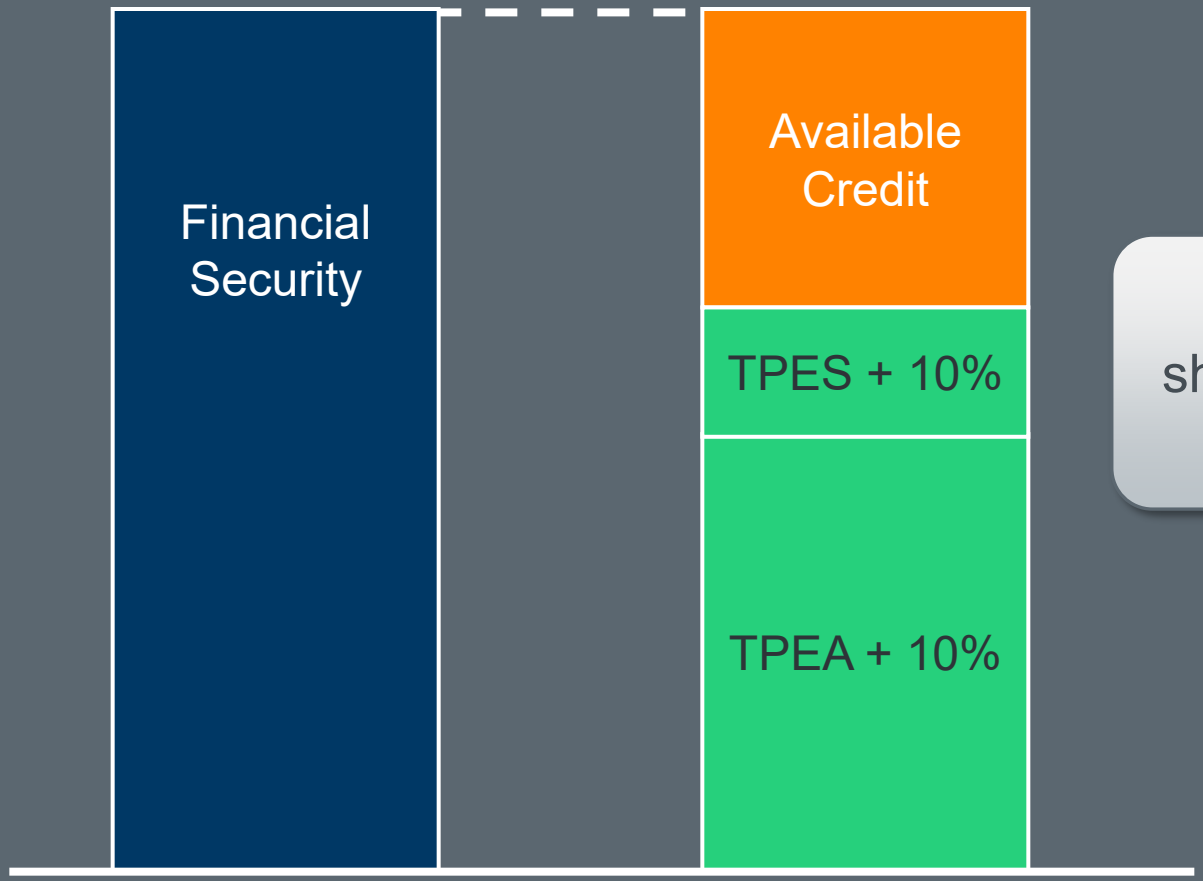
Day-Ahead Market Credit Limit

Available Credit



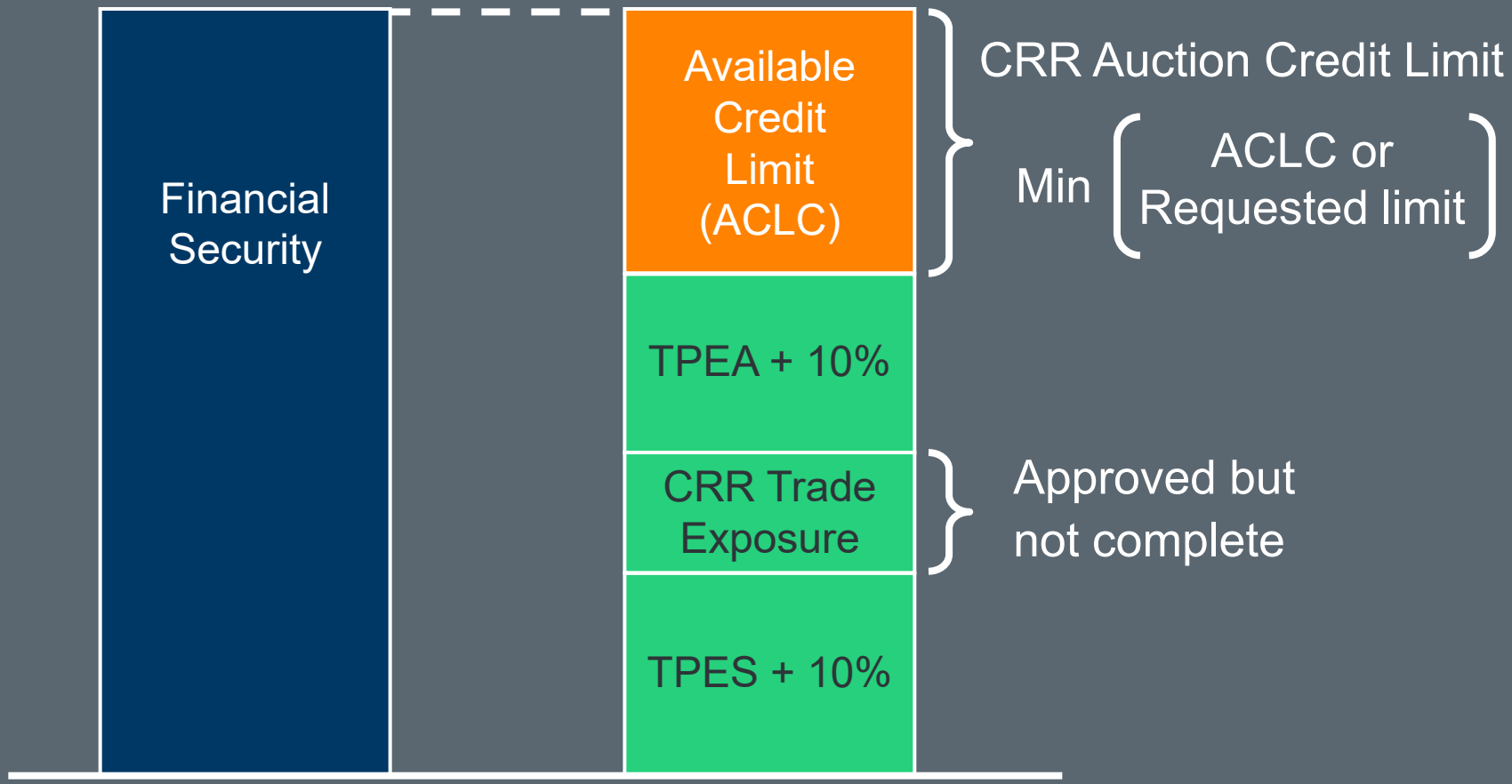
Financial Security beyond minimum provides available credit for daily ERCOT market activities

Available Credit

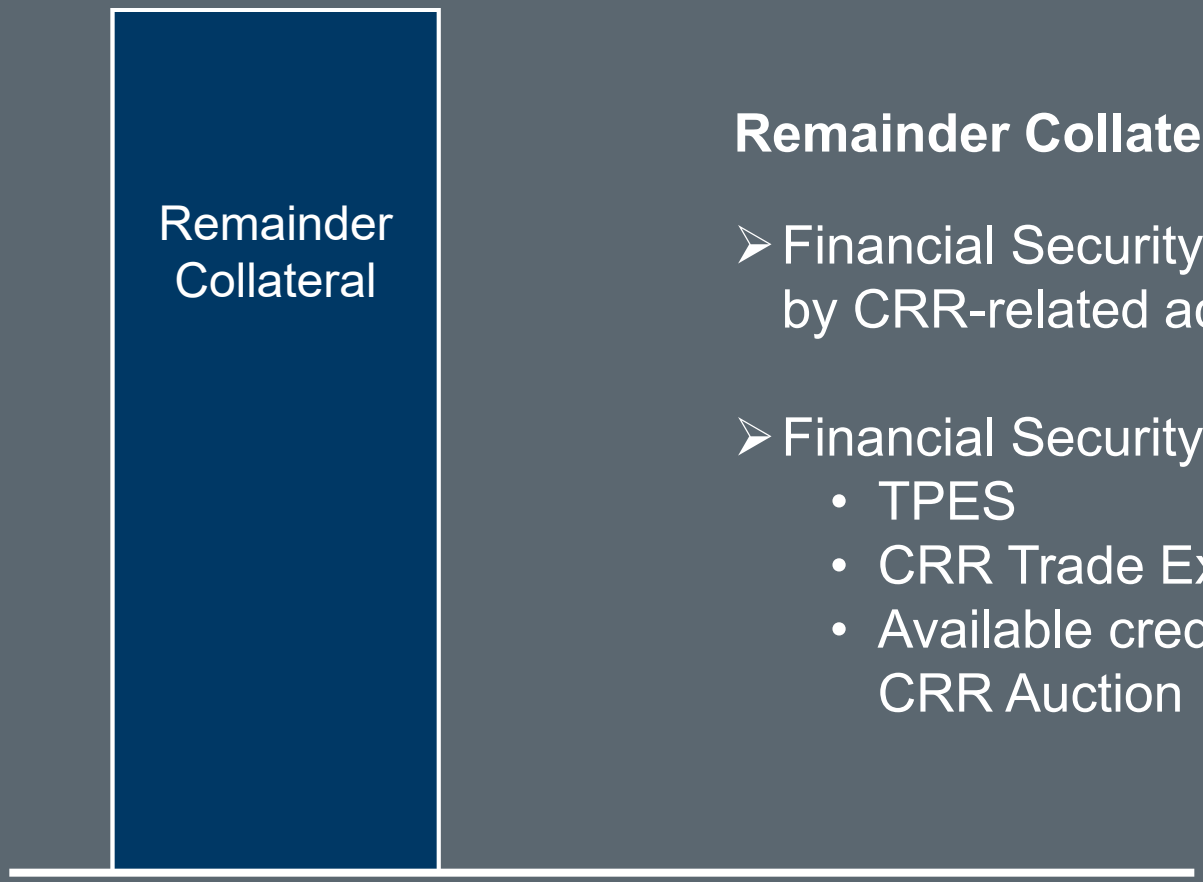


Available credit is shared by CRR Account Holders and QSEs

Available Credit Limit for the CRR Auction (ACLC)



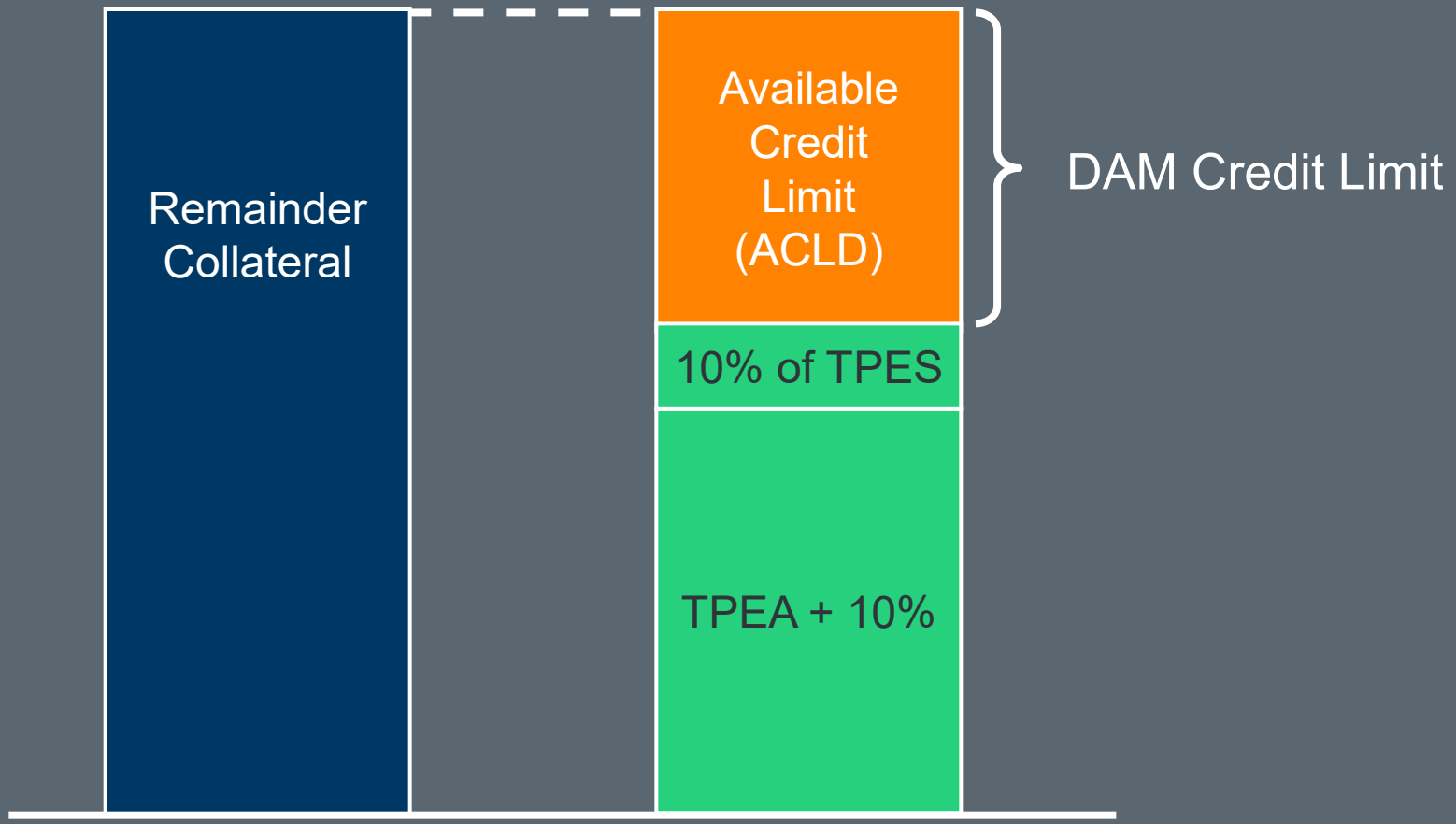
Available Credit Limit for the DAM (ACLD)



Remainder Collateral:

- Financial Security not consumed by CRR-related activities
- Financial Security, minus
  - TPES
  - CRR Trade Exposure
  - Available credit locked for CRR Auction

Available Credit Limit for the DAM (ACLD)



Example 8: Available Credit Limit for Day-Ahead Market

CP EZrisk has one CRR Account Holder and one QSE. These are their credit stats

- Posted Financial Security = $7 Million
- Total Potential Exposure Secured = $500,800
- Total Potential Exposure Any = $4.19 Million
- No CRR Trades outstanding

EZrisk locks $900,000 for the CRR Auction starting tomorrow

What is EZrisk's ACLD for the next Day-Ahead Market?

Example 8: Available Credit Limit for Day-Ahead Market

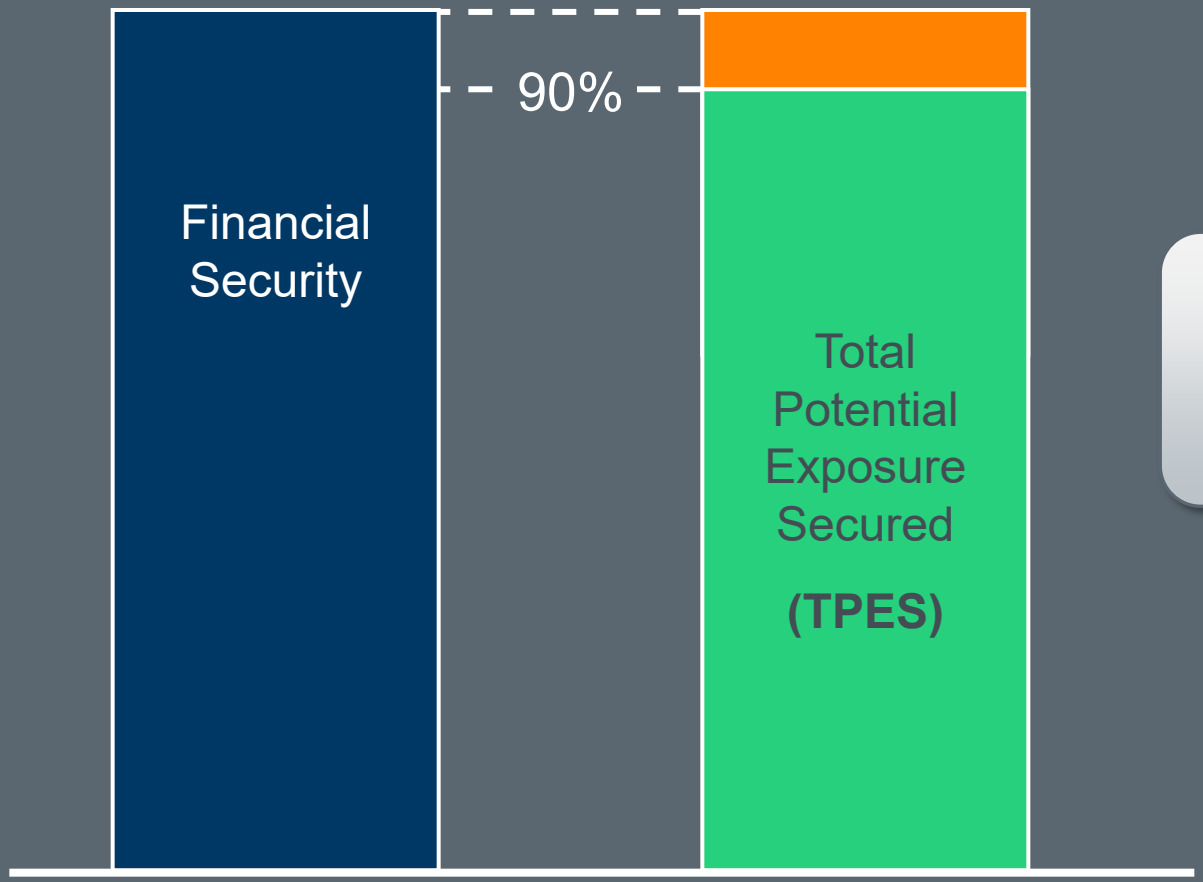
Answer:

Credit Monitoring

Additional Counter-Party Responsibilities

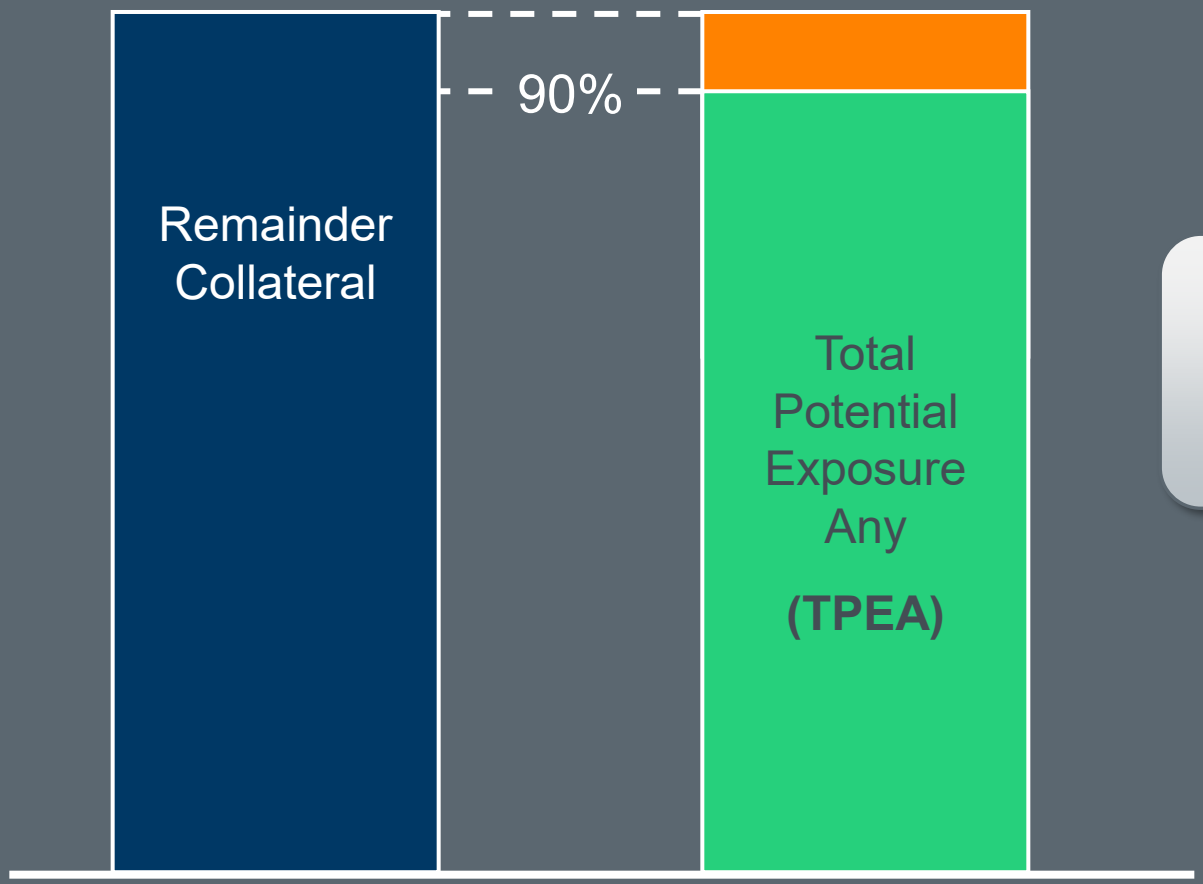
- TPE Notifications
- Collateral Requests
- Payment Breaches
- Debt Securitization Programs

90% TPE Notifications



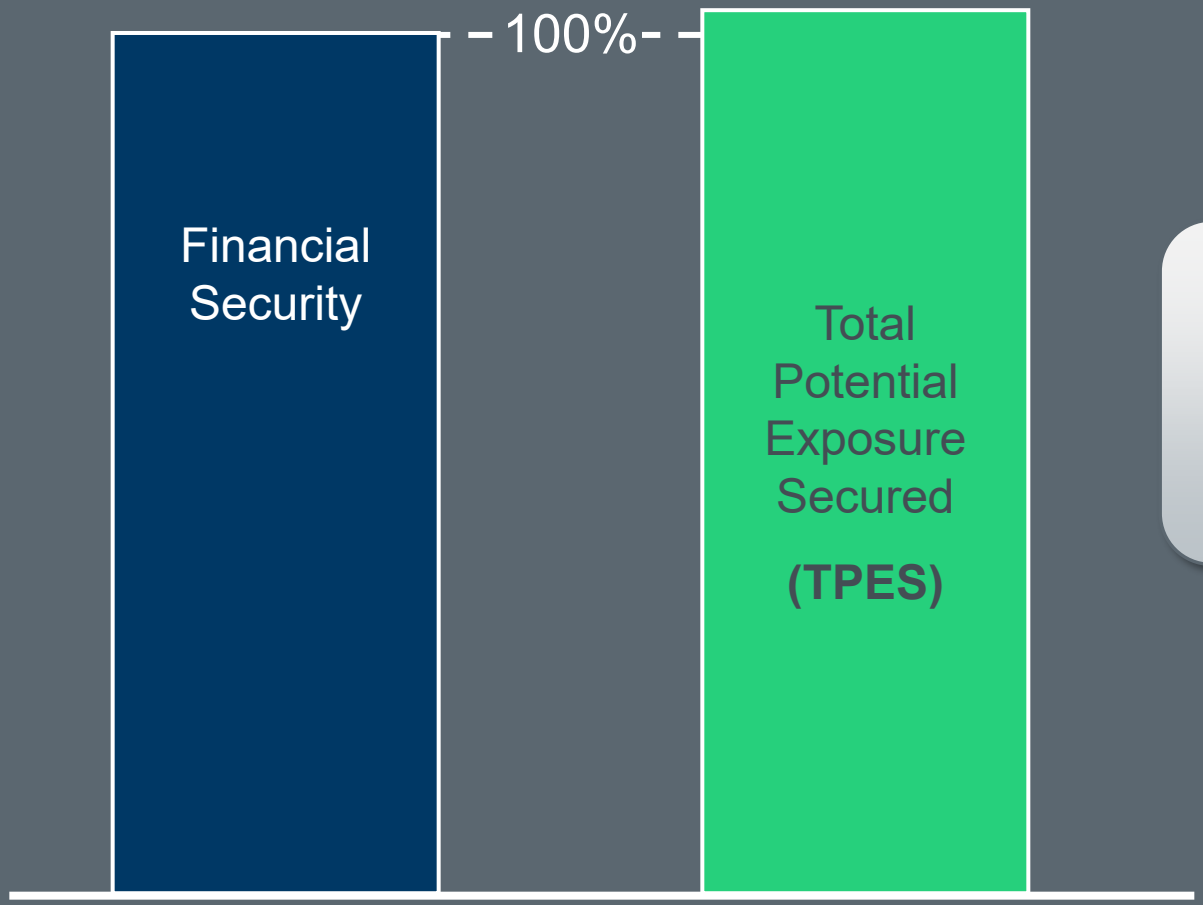
ERCOT will use reasonable efforts to advise Counter-Party

90% TPE Notifications



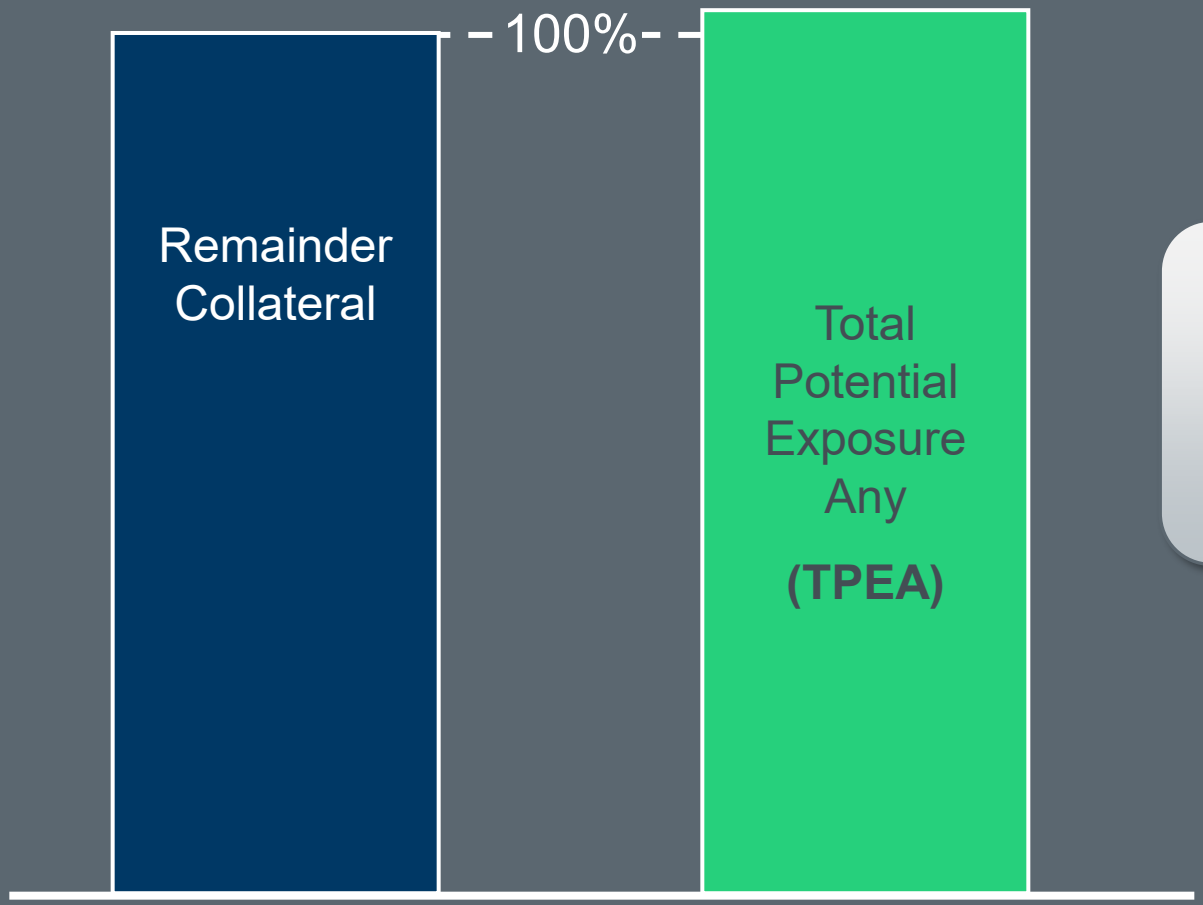
ERCOT will use reasonable efforts to advise Counter-Party

Collateral Request



ERCOT shall notify Counter-Party of additional Financial Security due

Collateral Request



ERCOT shall notify Counter-Party of additional Financial Security due

Counter-Party requirements after Collateral Request

- Post at least the required Financial Security
- ERCOT must receive by COB on the second Bank Business Day after notification

Failure to pay an obligation when due is a Payment Breach

- Settlement Invoice
- Collateral Request
- Other ERCOT Invoices

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

Becomes a Late Payment if cured within one Business Day of Notification

- Settlement Invoice
- Collateral Request
- Other ERCOT Invoices

ERCOT shall track the number of Late Payments in each rolling 12-month Period

Becomes a Default if not cured within one Business Day of Notification

- Settlement Invoice
- Collateral Request
- Other ERCOT Invoices

ERCOT may take several actions to remedy Defaults

- Hold any payments due
- Draw on Financial Security
- Forfeit awarded CRRs
- Repossess CRRs
- Revoke Market Participant's rights
- Terminate Market Participant's Standard Form Agreement

Remedies for Late Payments

Circumstance	Enforcement	Requirements
First Late Payment*	Level I Financial Security ≥ 110% TPE	60 day minimum
Second Late Payment*	Level II Financial Security ≥ 115% TPE	60 day minimum
Third Late Payment*	Level III Financial Security ≥ 120% TPE	90 day minimum & Cash for Extra 20%
Fourth Late Payment*	**Termination**	

* In any rolling 12-month period

Related to the February 2021 event

$2,500,000 limit per Default Uplift Invoice

Default Uplift Invoices issued at least 30 days apart

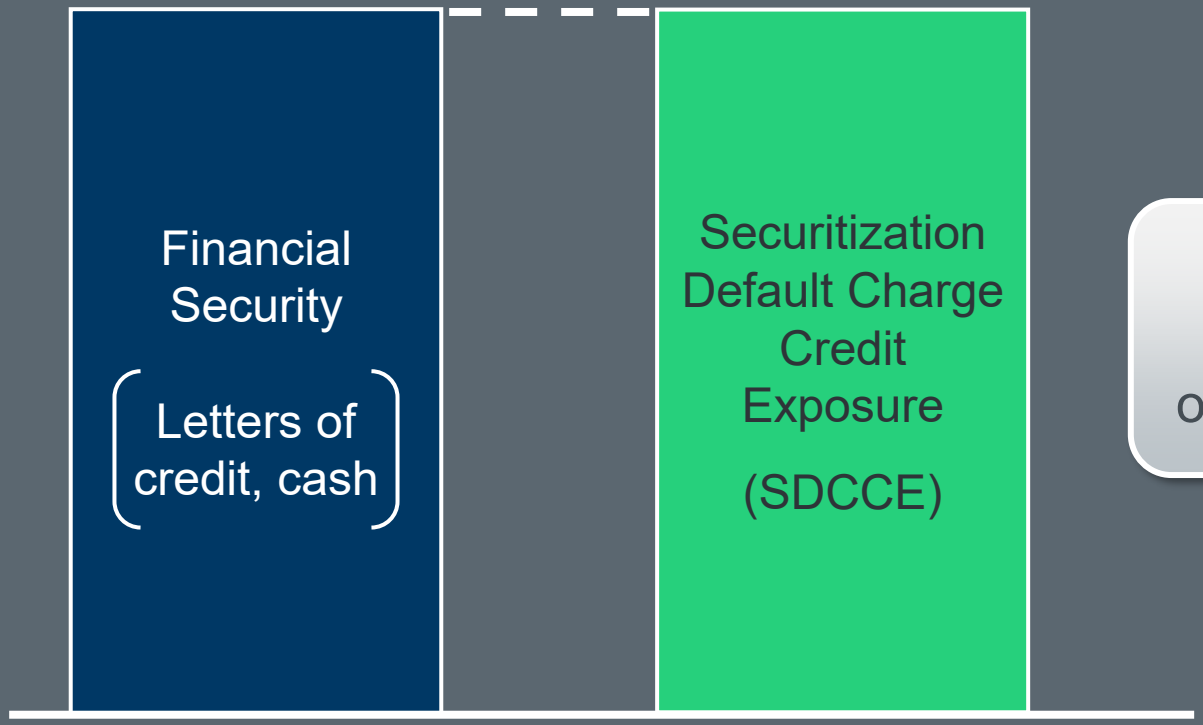
How long does it take to uplift $1,000,000,000?

Debt Securitization Programs from 2021 Legislature

	PURA 39, M (Maine)	PURA 39, N (Nebraska)
Protocol	Section 26	Section 27
Amount Financed	$800 Million	$2.1 Billion
Finance Period	30 years	30 years
Debt Holder	Texas Comptroller	Various
Receive Charges	Counter-Parties	QSEs with LSEs
Settlement Charge Type	Securitization Default Charge (SDCRSCP)	Load-Allocated Securitization Uplift Charge Amount (LASUCAMT)
Periodicity	Monthly	Daily

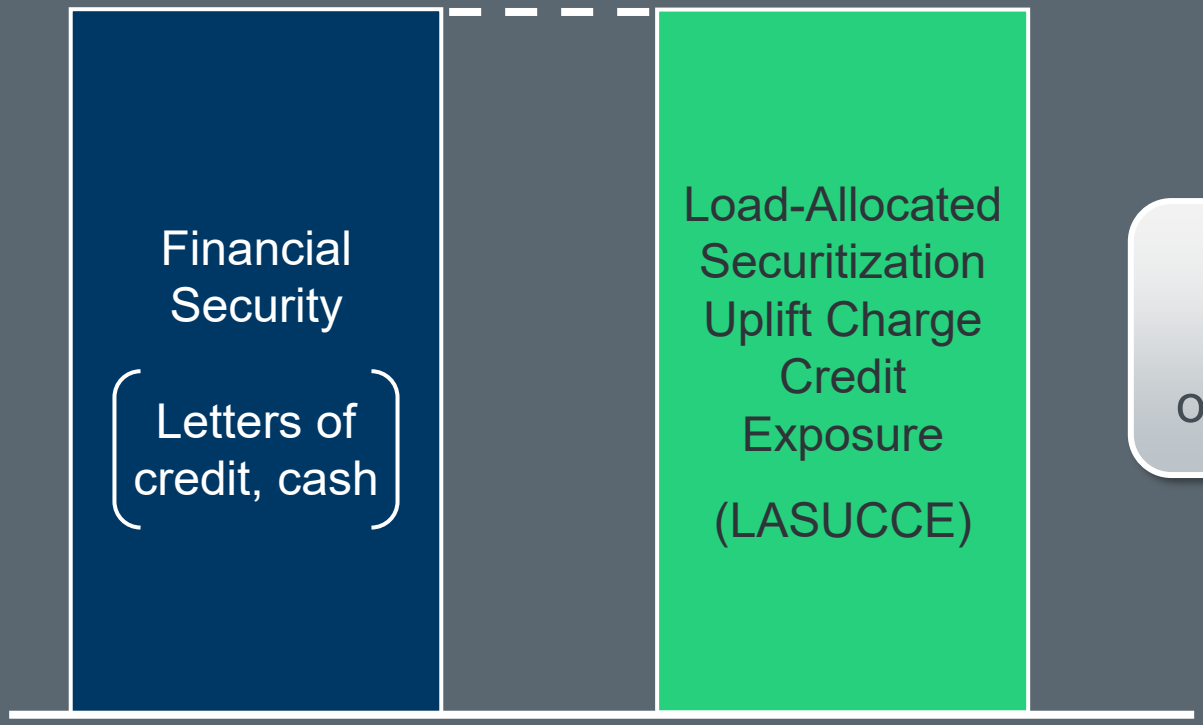
Each program has a separate escrow for credit exposures

Securitization Default Charge Escrow Deposits



Exposure is ***four months*** of estimated charges

Securitization Uplift Charge Escrow Deposits



Exposure is ***two months*** of estimated charges

Topics in this course include:

1. Overview of Creditworthiness
2. Credit Exposure
3. Determining Available Credit Limits
4. Credit Monitoring