INTRA-DAY TRADING DESIGN

Settlement and Credit Management - Summary

29 June 2011

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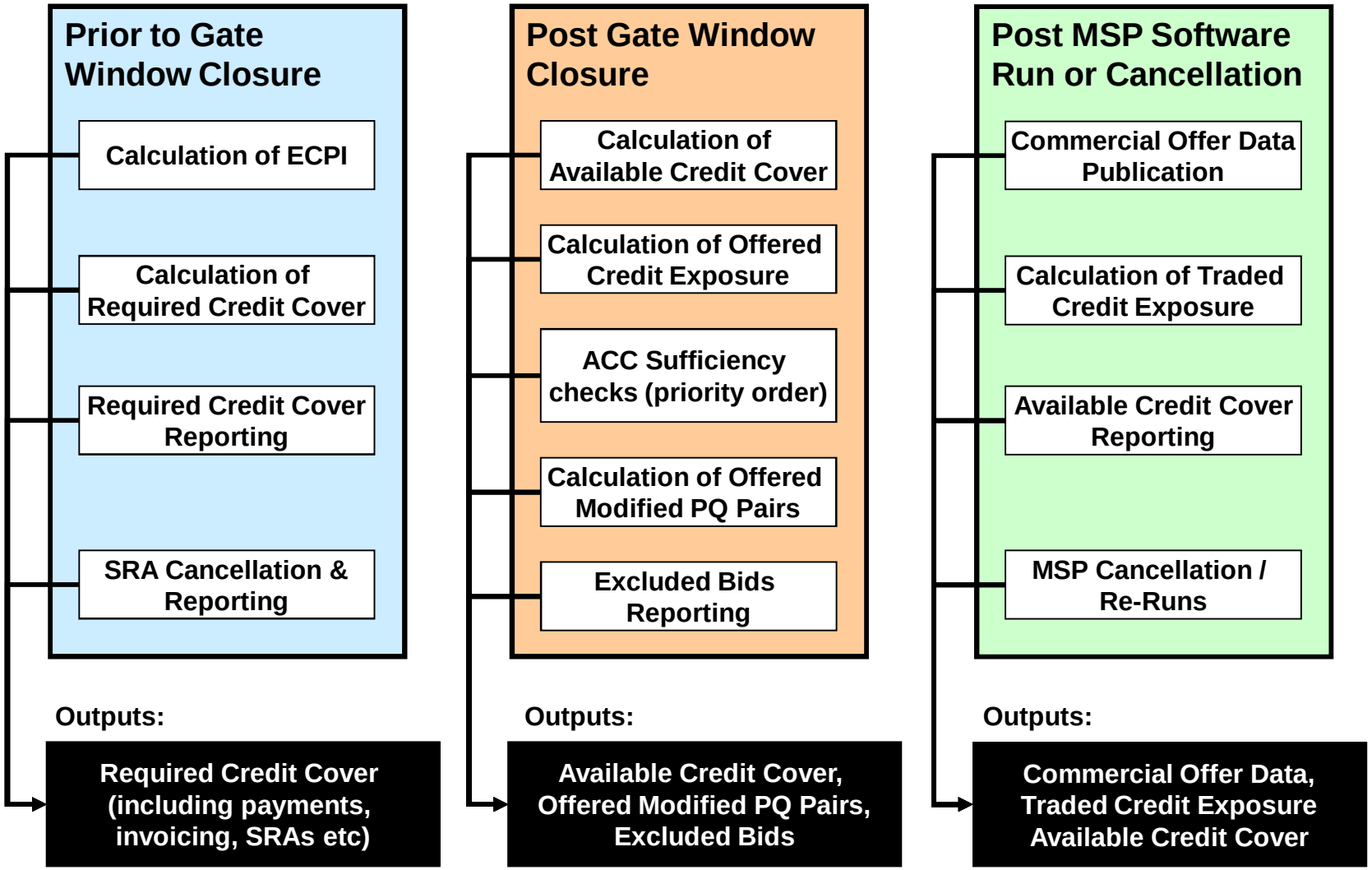
Interconnector Credit Cover - Introduction

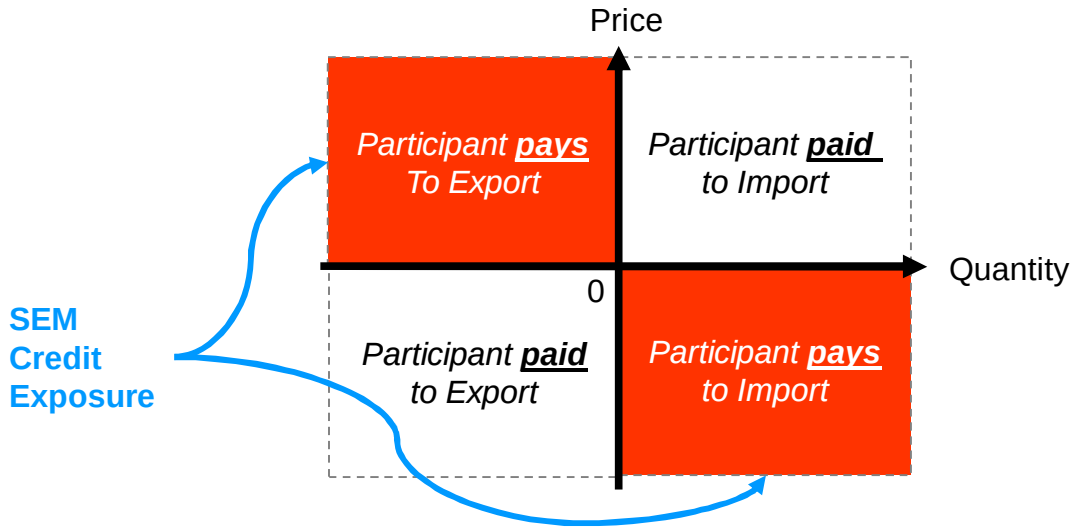
- The established High Level Design principle is that:
  - Interconnector Units will need to post sufficient Credit Cover to meet the credit risk exposure implied by Commercial Offer Data submitted.
  - If the Credit Cover available is insufficient (Interconnector Units for multiple Interconnectors considered in priority order), those elements of Commercial Offer Data submitted that imply credit exposure will be excluded after the relevant Gate Window Closure.
- Interconnector Units will therefore no longer be relevant in respect of the calculation of Undefined Exposure.

Interconnector Credit Cover - Summary



Interconnector Credit Cover - Introduction

- As Interconnector Units are not precluded from submitting negative prices or quantities, credit exposure can occur where the Commercial Offer Data includes:
  - Positive Prices and negative Quantities (i.e. offers to pay to Export).
  - Negative Prices and positive Quantities (i.e. offers to pay to Import).
- Bidding in the bottom right quadrant has not occurred often in the market to date, but could theoretically occur to trade out of a market position in the future.



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Interconnector Credit Cover - Introduction

- In line with the Intra-Day Trading High Level Design, the Detailed Design includes analysis of Commercial Offer Data after each Gate Window Closure to check that there is sufficient available Credit Cover to meet offered credit risk exposure:

1. Following each Gate Window Closure, the Offered Exposure (for Energy and Capacity) will be calculated.

2. Each Working Day, a Required Credit Cover Report for each Participant p. The calculation of Required Credit Cover determines the need for Credit Cover Increase Notices (CCINs) and provides inputs to the calculation of Available Credit Cover (ACC) Report.

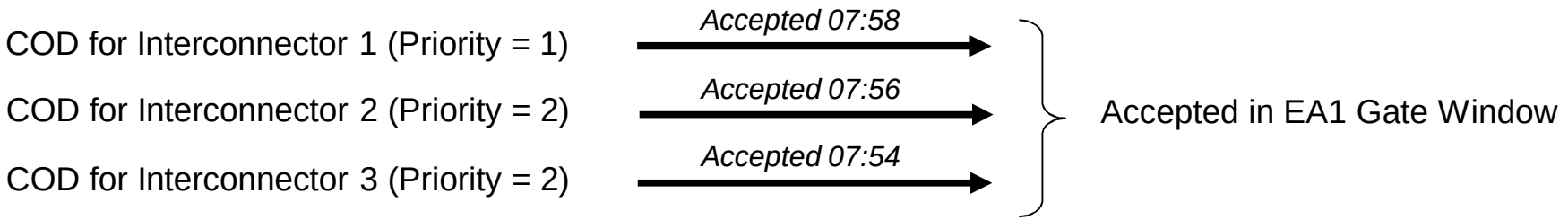
3. Following each Gate Window Closure, ACC will be calculated and compared against the Offered Exposure for each Interconnector Unit registered to the Participant (in priority order, as defined in the Commercial Offer Data for the Participant).

    - If sufficient ACC, PQ Pairs are included and ACC is reduced by the value of the credit exposure. In this case, Modified PQ Pairs = Accepted PQ Pairs.
    - If insufficient ACC (i.e. ACC<Offered Exposure), exclude or modify PQ Pairs where a credit exposure exists, to produce Modified PQ Pairs.

Prioritisation of Interconnector Units in Commercial Offer Data

- The Code requires a Participant to be registered in the Jurisdiction within which the relevant Interconnector is registered.
- If there are multiple Interconnectors registered in a jurisdiction (in the future), Commercial Offer Data will be considered in an order as defined by Participants.
- The Intra-Day design includes provision for multiple Interconnectors in a Jurisdiction, as follows:
  - Commercial Offer Data submissions will include a priority flag (nature to be confirmed) to indicate in which order the Interconnector Units should be considered.
  - Credit Cover will be assessed in the order defined by the priority flag within a Participant's submissions.
  - Where the priority level of Participant submissions is equal, assessment of Credit Cover will be conducted in the order in which the Commercial Offer Data was received/processed by the Central Market System.

Example of prioritisation



- Each set of COD is Accepted by the Central Market System.
- The order of consideration in respect of Available Credit Cover (ACC) and the analysis of whether sufficient Credit Cover is available to cover offered credit exposure is as follows:

  - Accepted COD for Interconnector 1 (highest priority, time not taken into account)
  - Accepted COD for Interconnector 3 (equal priority with IC2, but accepted first)
  - Accepted COD for Interconnector 2 (equal priority with IC2, but accepted later)

Contents

Introduction to Estimated Capacity Price for Interconnectors (ECPI)

- The High Level Design defines that a Forecast Capacity Payments Generation Price (CPGP) will be used to calculate the capacity offered exposure and Capacity Traded Exposure for Interconnector Units.
- As part of the design process, this has been given the name “Estimated Capacity Price for Interconnectors” - ECPI.
- ECPI is derived from Capacity Payments Generation Price (CPGP) over the Historical Assessment Period to be applied for the ECPI.
- ECPI is a statistical calculation, based on a percentile (approved by the RAs, currently 95th) of average daily CPGP in the Historical Assessment Period.
- Currently, the Code (*) contains the calculation of Estimated Capacity Price (ECP), which is used to calculate the Undefined Exposure of each Participant in respect of its Units.

** Paragraphs 6.200 to 6.205 of the Code.*

Calculation of ECPI (1 of 2)

- **Step 1** – Calculate the average CPGP in each Settlement Day

$$DACPGPd = \frac{\sum_{hind} CPGPh}{Count\left(CPGPh : \forall_{hind}\right)}$$

- **Step 2** – Count the Settlement Days for Capacity for Generator Units in the Historical Assessment Period for Capacity Periods

$$CCGSDr = Count\left(DACPGPd : \forall_{din r}\right)$$

- **Step 3** – Calculate the Historical Assessment Average Capacity Payments Generation Price

$$HACPGPr = \frac{\sum_{din r} DACPGPd}{CCGSDr}$$

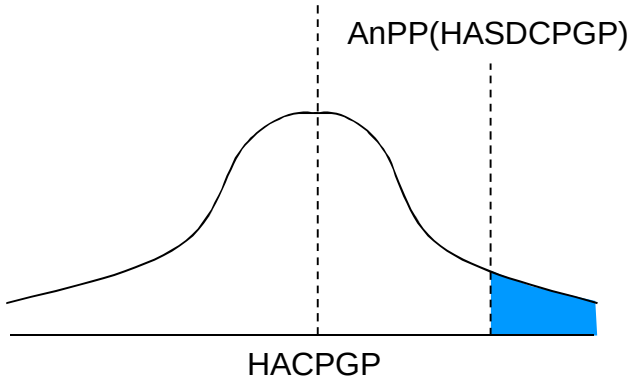
Calculation of ECPI (2 of 2)

- **Step 4** – Calculate the standard deviation of the daily average CPGP values

$$HASDCPGPg = \sqrt{\frac{CCGSDr \times \sum_{g\,in\,r}(DACPGPd)^2 - \left(\sum_{d\,in\,r} DACPGPd\right)^2}{CCGSDr \times (CCGSDr - 1)}}$$

- **Step 5** – Calculate ECPI, using the mean and standard deviation

$$ECPI = HACPGPr + AnPP(HASDCPGPr)$$



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Daily Calculation of Required Credit Cover

Each Working Day, by 14:30

- The daily calculation of Required Credit Cover identifies where a Credit Cover Increase Notice (CCIN) is required and determines various inputs to the calculation of Available Credit Cover.

- Available Credit Cover (ACCp) is calculated based on:
  - Posted Credit Cover — PCC_{pr}
  - Required Credit Cover for Generator Units — $RCCG_{pr}$
  - Required Credit Cover for Supplier Units — $RCCS_{pr}$
  - Sum of ETE values where Initial Energy Settlement not completed — ETE_{uph}
  - Sum of CTE values where Initial Capacity Settlement not completed — CTE_{uph}
  - Total Fixed Credit Requirement (Generator Units + Supplier Units) — TFCRpr

- The values of PCC, RCCG, RCCS and TFCR will be calculated once per Working Day (as part of the Required Credit Cover Report process).

- The ACC value will be recalculated following each MSP Software Run, updating Traded Exposure based on the outputs from the MSP Software Run (e.g. MIUNs, MSQs).

$$ACC_p = PCC_{pr} - \left(RCCS_{pr} + RCCG_{pr} + \underbrace{\sum_{\text{h in } l} ETE_{uph}}_{\substack{\textit{Trading Periods where Initial } \textbf{\textit{Energy}} \\ \textit{Settlement has not been completed}}} + \underbrace{\sum_{\text{h in } c} CTE_{uph}}_{\substack{\textit{Trading Periods where Initial } \textbf{\textit{Capacity}} \\ \textit{Settlement has not been completed}}} + TFCR_{pr} \right)$$

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Required Credit Cover Information Provision

- The Code will oblige SEMO to provide the Required Credit Cover Report by 14:30 each Working Day (currently this is provided by 17:00).

- In addition to the current information, the Required Credit Cover Report will contain a unique identifier for the credit report run that produced the report. This will support Participant queries as and when they occur.

- Communication of Credit Cover Increase Notices (CCINs) and Warning Notices (WNs) will be via the Required Credit Cover Report, which will be published by 14:30. A follow up Credit Cover Increase Notice email will be issued by the Market Operator by 17:00 on the same day.

Required Credit Cover Report – Content

- As per the current Credit Cover, the report will be available via Type 2 and Type 3 communication.

- In summary, the following information will be provided as part of an amended report as part of the Intra-Day Trading changes:
  - A unique identifier to the calculation performed to produce the Credit Cover Report
  - CRM Run Initiation Timestamp (i.e. time at which the credit report calculations were performed)
  - Available Credit Cover (positive if credit available, zero or negative if no credit available)
  - CCIN Breach flag (‘CCIN’ if RCC>Posted Credit Cover, ‘WARNING’ if Posted Credit Cover>=RCC>=Warning Limit Amount, or ‘NONE’ if RCC<Warning Limit)
  - Posted Credit Cover
  - Required Credit Cover
  - Fixed Credit Cover for each Generator Unit and Supplier Unit
  - Value of Invoices Not Paid for each Generator Unit and Supplier Unit
  - Value of Settlement Not Invoiced for each Generator Unit and Supplier Unit
  - Value of Undefined Exposure for each Generator Unit and Supplier Unit
  - Estimated Capacity Price
  - Estimated Capacity Price for Interconnectors
  - Credit Assessment Price for the Undefined Exposure Period (CAPB)
  - Undefined Exposure Period for Suppliers by Market
  - Undefined Exposure Period for Generators by Market
  - Interconnector Traded Exposure (by Market type) and Participant Account

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SRA Cancellation Report - Availability

- An SRA Cancellation Report shall be produced and will be available to each Participant as and when SRA cancellations occur following the production of a Credit Cover Report.
- In conjunction with Daily Credit Cover Reports, SRA Cancellation Reports will be provided each Working Day by 14:30.
- As SRAs involve two Participants, both debited and credited Participants affected by an SRA Cancellation will receive separate reports.
- SRA Cancellation Reports will be available for download in CSV format via Weblink (Type 2) or Type 3.
- Each SRA Cancellation report shall be Member Private (i.e. shall only be accessible by an Authorised User for the relevant Participant).
- The SRA Cancellation Report filename will include a Participant ID, the report title and the date/time the report was published
  - (e.g. ReportName_PT_ID_Date&Time.csv)

SRA Cancellation Report - Content

- The SRA Cancellation report shall include the following information:
  - Date and time at which the report was generated (as per filename)
  - SRAs shown in reverse chronological order, with details:
    - INTERVAL_SUBMIT_ID - reference for market systems
    - PARTICIPANT_NAME
    - CREDITED_PARTICIPANT_NAME
    - REALLOC_AGREEMENT_NAME – external reference for participant
    - REALLOC_TYPE
    - DELIVERY_DATE
    - DELIVERY_HOUR
    - DELIVERY_INTERVAL
    - MONETARY_VALUE
    - CANCEL_FLAG

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Recap of High Level Design: Offered Exposure

Following each Gate Window Closure

- *Interconnector traders to have sufficient Credit Cover in place (to cover both Energy and Capacity exposure), otherwise bids implying a credit risk exposure will be rejected following the relevant Gate Window Closure.*

- **Offered Energy Exposure**
  - Maximum Energy Market potential exposure is the area under the PQ curve for all values where the calculated area is negative, taking the higher and lower volume limits for the relevant MSP Software Run into account.

- **Offered Capacity Exposure**
  - The maximum Capacity Market potential exposure is the maximum quantity taking the lower volume limits into account for the relevant MSP Software Run, multiplied by the ECPI.

Calculation of Offered Credit Cover

- **Step 1** – Take Accepted PQ Pairs (as passed in MI validations). Offered Modified Set = Accepted Set.

- **Step 2** – Add up to four additional (temporary) PQ Pairs (Offered Modified Set = Accepted + 4 points, if required):

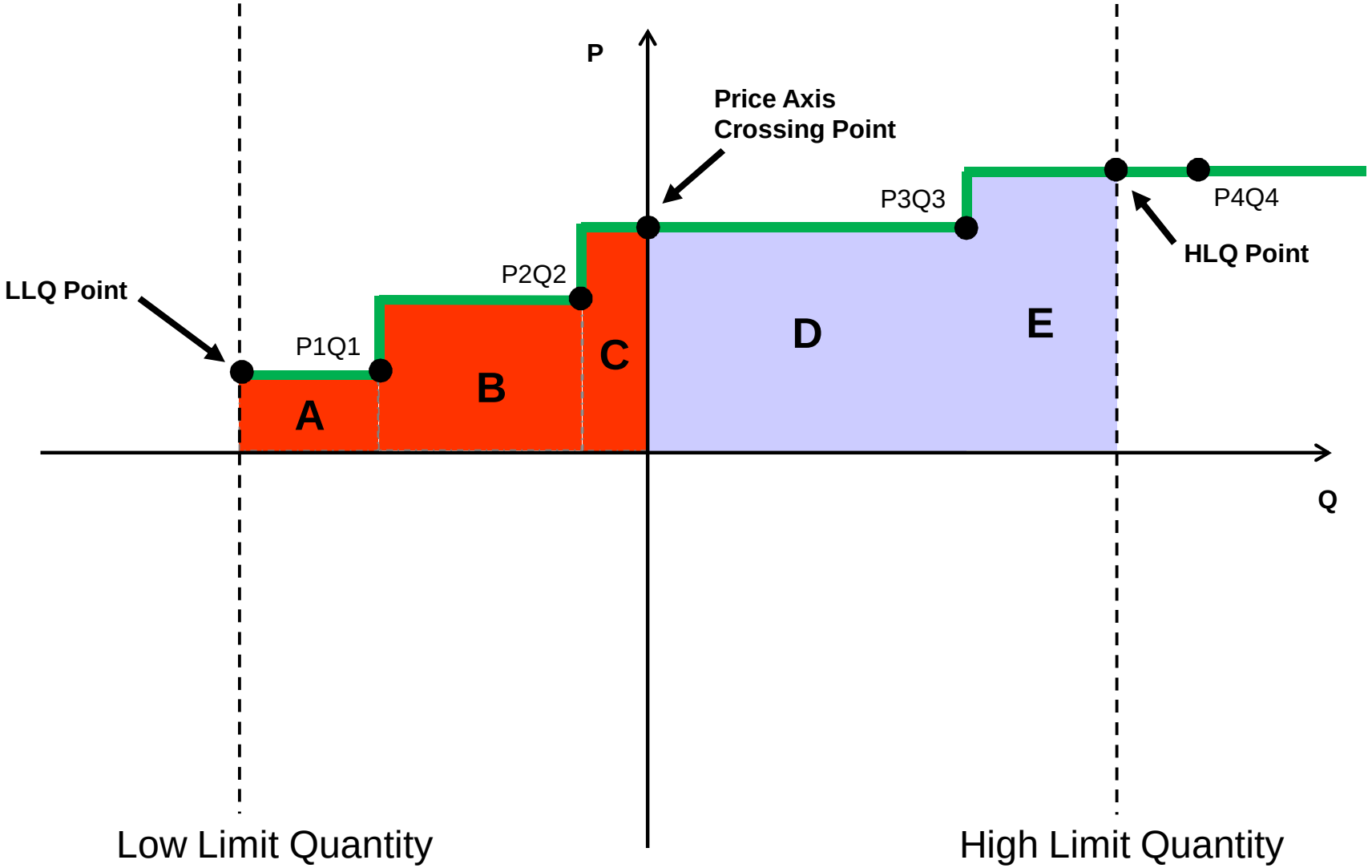
  - Price Axis Crossing Point (PACP), where curve crosses Price axis ($Q_{uhi}>0$ and $Q_{uhi-1}<0$)
  - Quantity Axis Crossing Point (QACP) , where curve crosses Quantity axis ($P_{uhi}>0$ and $P_{uhi-1}<0$)
  - LLQ Point (LLQ)
  - HLQ Point (HLQ)

- **Step 3** – Calculate Exposure for each “block” (exposure between two quantities) for Energy (IUEOE) and Capacity (IUCOE), using either the Accepted Price (Energy) or ECPI (Capacity). Credit exposure is where the area in the “block” is negative.

Calculate Offered Exposure (Energy) – Example 1

*Offered Exposure (IUEOE) = -1*TPD*(A+B+C)*(1+VAT/100)*

(Credit exposure where Quantity negative and Price positive)



Low Limit Quantity

(different for each MSP Software Run)

High Limit Quantity

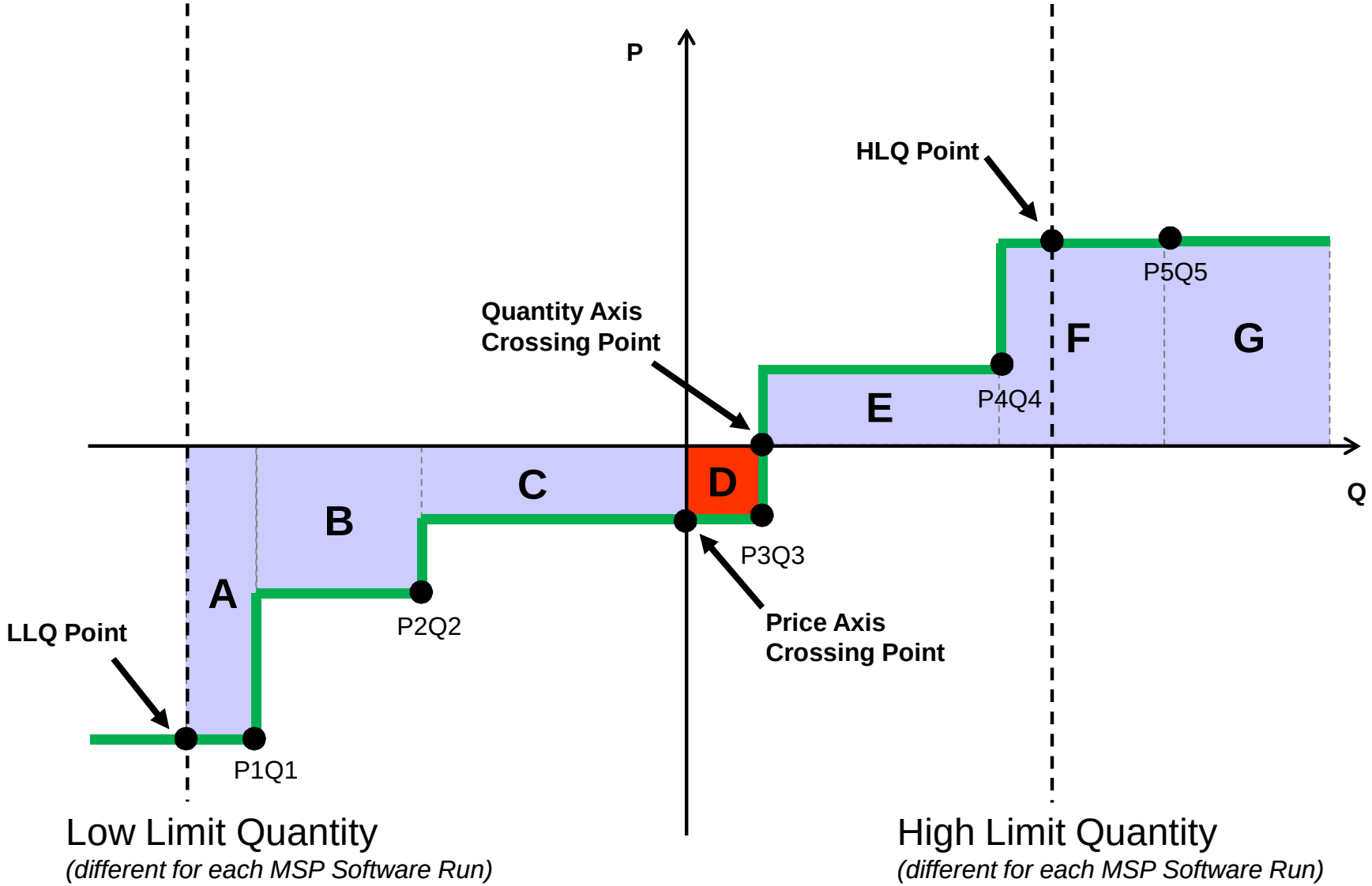
(different for each MSP Software Run)

TPD = Trading Period Duration, VAT = prevailing VAT rate

Calculate Offered Exposure (Energy) – Example 2

*Offered Exposure (IUEOE) = -1*TPD*D*(1+VAT/100)*

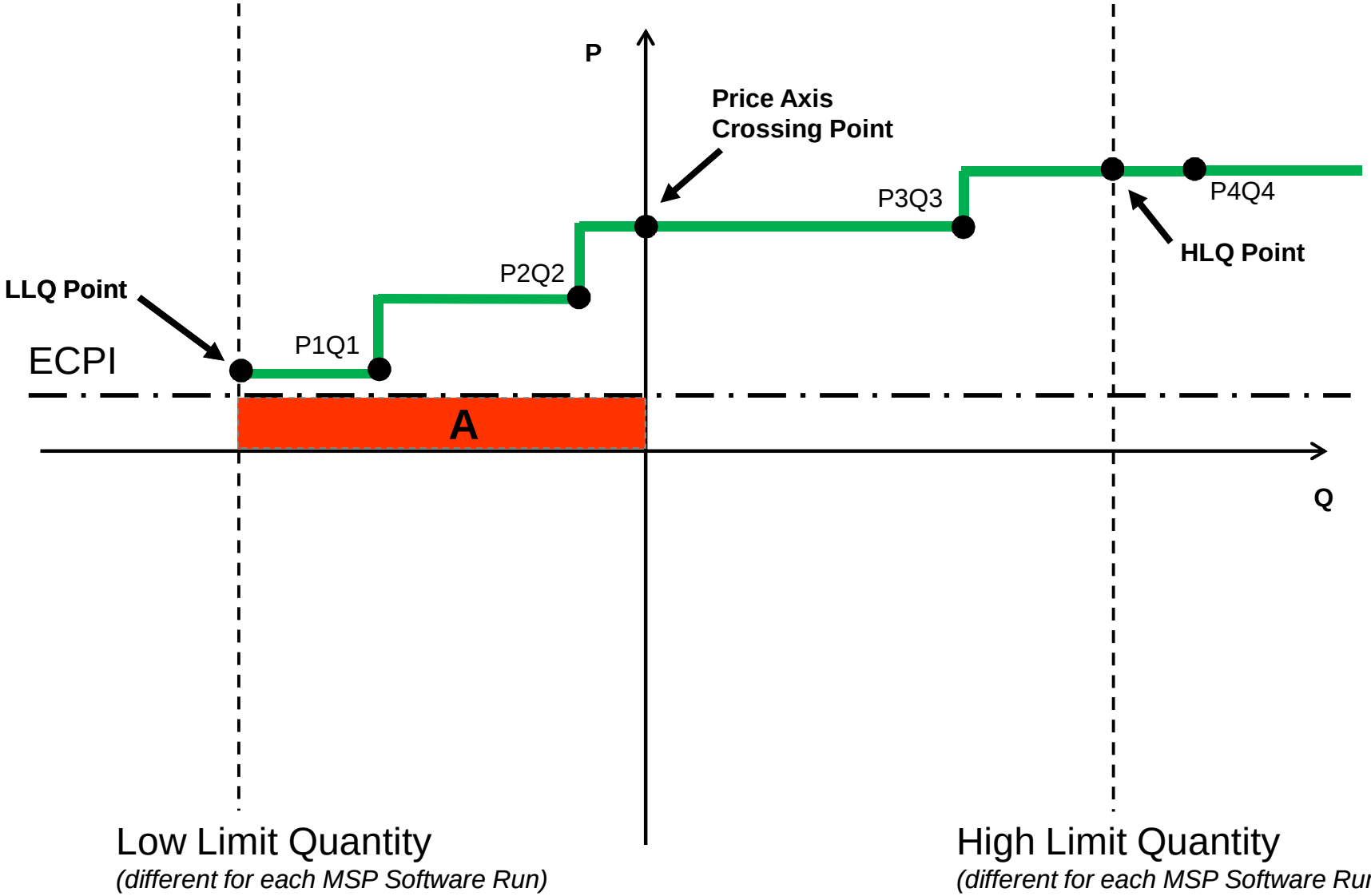
(Credit exposure where Quantity positive and Price negative)



TPD = Trading Period Duration, VAT = prevailing VAT rate

Calculate Offered Exposure (Capacity) – Example 1

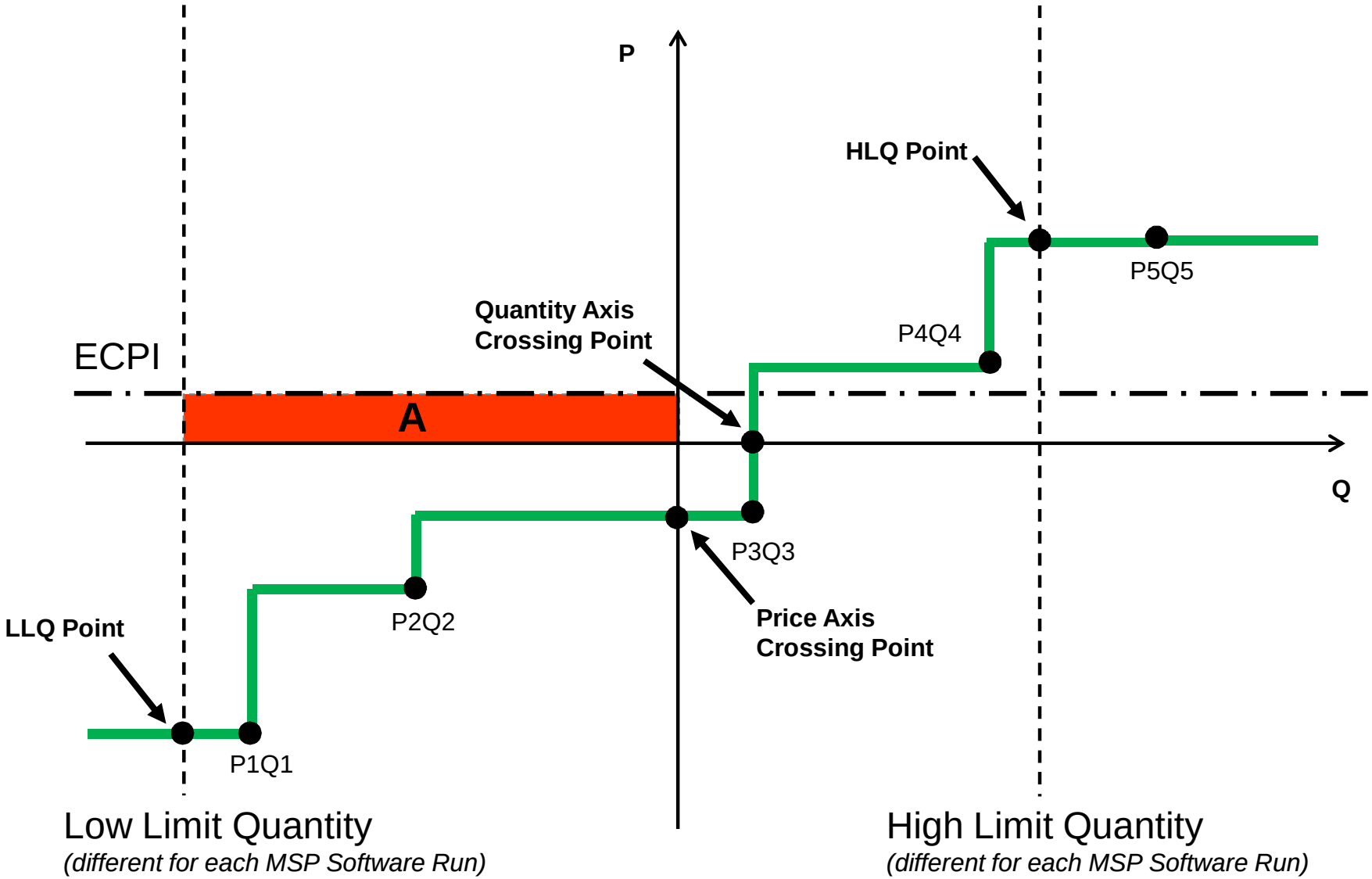
*Offered Exposure (IUCOE) = -1*TPD*A*(1+VAT/100)*



TPD = Trading Period Duration, VAT = prevailing VAT rate

Calculate Offered Exposure (Capacity) – Example 2

*Offered Exposure (IUCOE) = -1*TPD*A*(1+VAT/100)*



TPD = Trading Period Duration, VAT = prevailing VAT rate

Low Limit Quantity and High Limit Quantity

(only used to set upper and lower bounds as part of calculation of Offered Exposure)

Instance	Low Limit Quantity	High Limit Quantity
Prior to each EA1 MSP Software Run	max($MIUEC_{uh}$,$AECH_{uh}$)	min($MIUIC_{uh}$,$AICH_{uh}$)
Prior to each EA2 MSP Software Run and WD1 MSP Software Run	$MIUEC_{uh}$	$MIUIC_{uh}$

Where:

AECH	*Active Export Capacity Holding*
AICH	*Active Import Capacity Holding*
MIUEC	*Maximum Interconnector Unit Export Capacity*
MIUIC	*Maximum Interconnector Unit Import Capacity*

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Calculation of Available Credit Cover

Following each Gate Window Closure and each MSP Software Run

- The Available Credit Cover (ACCp) calculation utilises the latest information on the following items, as calculated for the latest Required Credit Cover Report (each Working Day):
  - Posted Credit Cover — PCC_{pr}
  - Required Credit Cover for Generator Units — $RCCG_{pr}$
  - Required Credit Cover for Supplier Units — $RCCS_{pr}$
  - Total Fixed Credit Requirement (Generator Units + Supplier Units) — $TFCR_{pr}$
- The ACC value will be recalculated following each MSP Software Run, updating Traded Exposure based on the outputs from the MSP Software Run (e.g. MIUNs, MSQs).
  - Sum of ETE values where Initial Energy Settlement not completed — ETE_{uph}
  - Sum of CTE values where Initial Capacity Settlement not completed — CTE_{uph}

$$ACC_p = PCC_{pr} - \left(RCCS_{pr} + RCCG_{pr} + \underbrace{\sum_{\text{h in } l} ETE_{uph}}_{\substack{\text{Trading Periods where Initial } \textbf{\underline{Energy}} \\ \text{Settlement has not been completed}}} + \underbrace{\sum_{\text{h in } c} CTE_{uph}}_{\substack{\text{Trading Periods where Initial } \textbf{\underline{Capacity}} \\ \text{Settlement has not been completed}}} + TFCR_{pr} \right)$$

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Credit Cover Sufficiency Check

Following each Gate Window Closure

- The High Level Design principle is that Participants must have sufficient Credit Cover to meet exposure implied by offered Interconnector Unit trades derived from Commercial Offer Data submitted to each Gate Window Closure.

- As a result, Available Credit Cover (ACC) is:

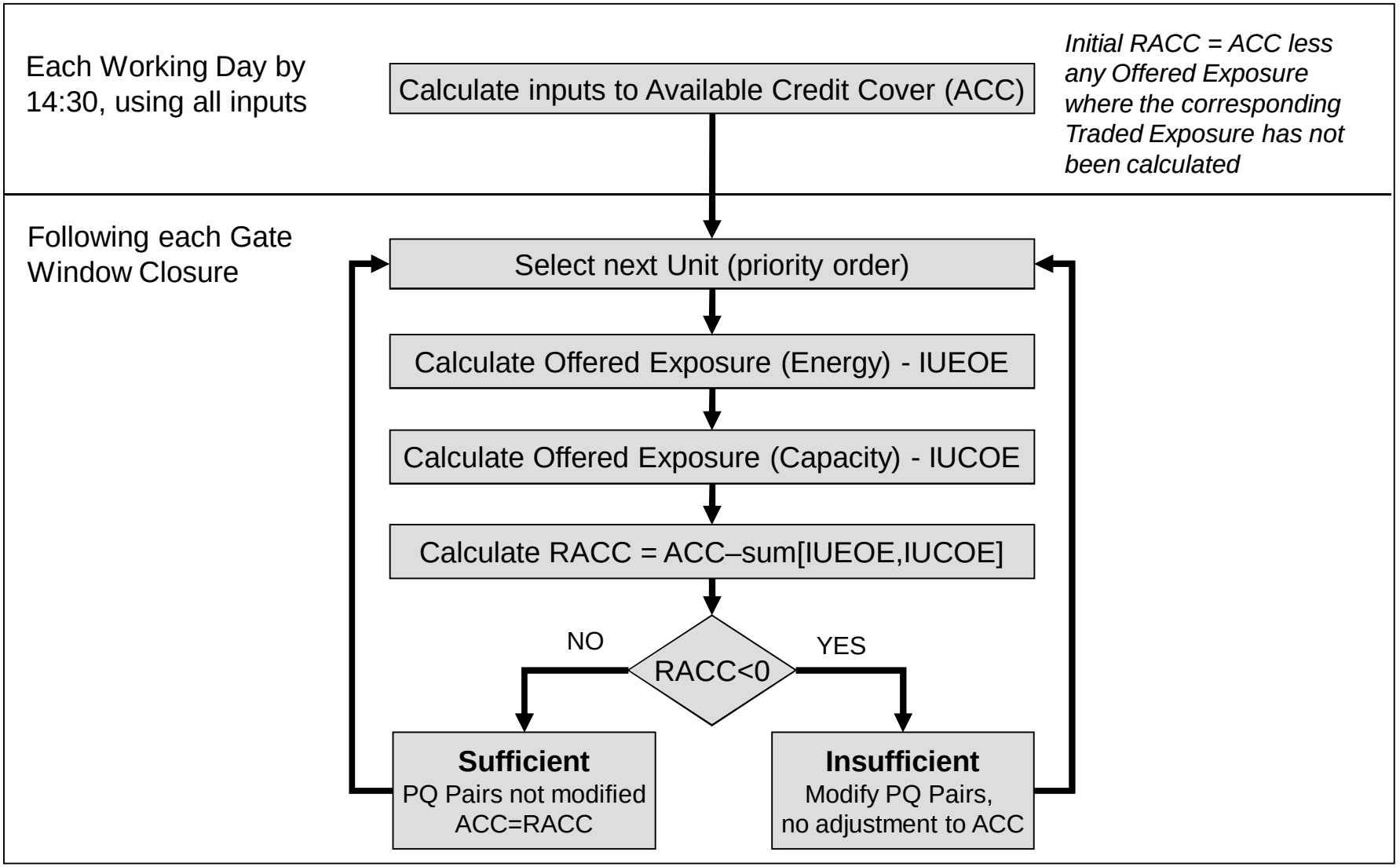
  - Based on inputs from the Required Credit Cover Report, calculated each Working Day.

  - Updated following each Gate Window Closure, if there is sufficient Credit Cover in place to cover Offered Exposure as implied by Accepted Commercial Offer Data.

  - Updated following each completed MSP Software Run, reflecting the Traded Exposure for Interconnector Units based on:
    - traded quantity (MIUN and/or MSQ, as appropriate); and
    - traded price (derived from submitted COD or ECPI, as appropriate).

- As the Required Credit Cover Report is produced each Working Day, the value of ACC will reduce to reflect Offered or Traded Exposure until a new Required Credit Cover Report is produced.

Interaction of Available Credit Cover (ACC) and Remaining Available Credit Cover (RACC)



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Interconnector Credit Cover – Avoiding Exposure

- The High Level Design principle is that:
  - Interconnector Units will need to post sufficient Credit Cover to meet the credit risk exposure implied by Commercial Offer Data submitted.
  - If the Credit Cover available is insufficient (Interconnector Units for multiple Interconnectors considered in priority order), those elements of Commercial Offer Data submitted that imply credit exposure will be excluded after the relevant Gate Window Closure.
- In instances where Available Credit Cover is insufficient to cover offered exposure for Interconnector Units, Commercial Offer Data will be excluded to prevent unsecured credit exposure in the SEM.
- This process derives:
  - Offered Modified PQ Pairs, based on Accepted PQ Pairs; and
  - In certain cases, sets a zero Lower Operating Limit (LOL) for use in the relevant MSP Software Run.

When there is Insufficient Credit Cover

- **Step 1** – Take set of Offered Modified PQ Pairs (Accepted + 4 additional points as defined for calculation of offered exposure - PACP, QACP, LLQ and HLQ, as required).

- **Step 2** – Find the indices of the set of blocks with negative exposure (including Q>0).

- **Step 3** – Find the maximum of the indices (LCEQI).

- **Step 4** – Calculate the set of Excluded Interconnector Unit Offers Indices (EIUOI):
  - All PQ Pairs where J ≤ LCEQI, plus
  - Any of the points PACP, QACP, LLQ, HLQ not already excluded

- **Step 5** – Calculate the set of Included Interconnector Unit Offers Indices (IIUOI):
  - All PQ Pairs where J > LCEQI, plus
  - If Price associated with J=LCEQI is less than or equal to zero and there is no other Offered Modified PQ Pair with P=0, add an additional Offered Modified PQ Pair with P=0 and Q as the Quantity of the Excluded PQ Pair with J=LCEQI, ensuring that the Offered Modified PQ Pairs are monotonically increasing.

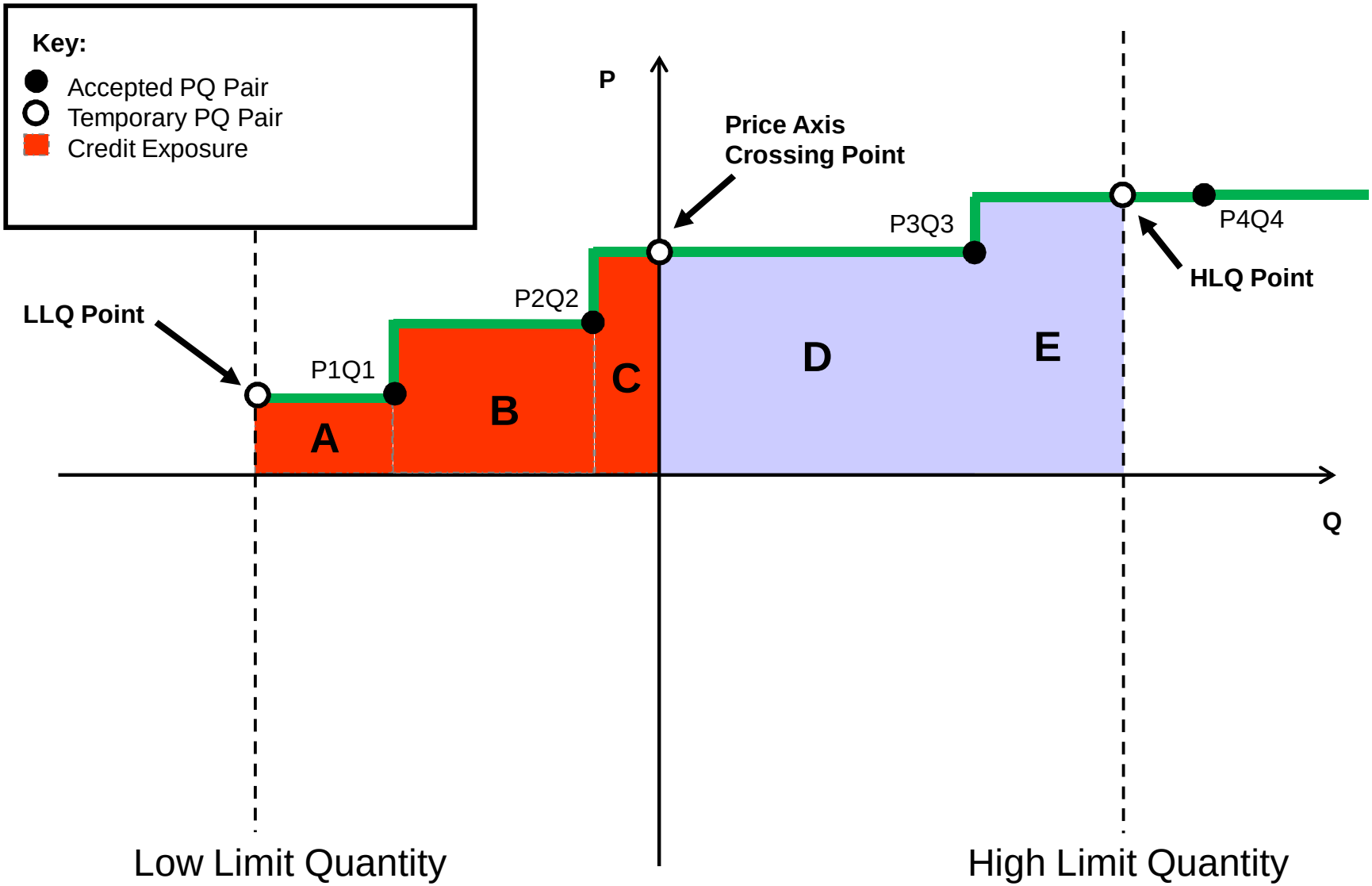
- **Step 6** – Renumber the Offered Modified PQ Pairs to start at P1,Q1 etc (to be confirmed).

- **Step 7** – Set the Lower Operating Limit (LOL)=0 for all MSP Software Runs m for the associated Trading Day.

Note: Always results in <=10 Offered Modified PQ Pairs.

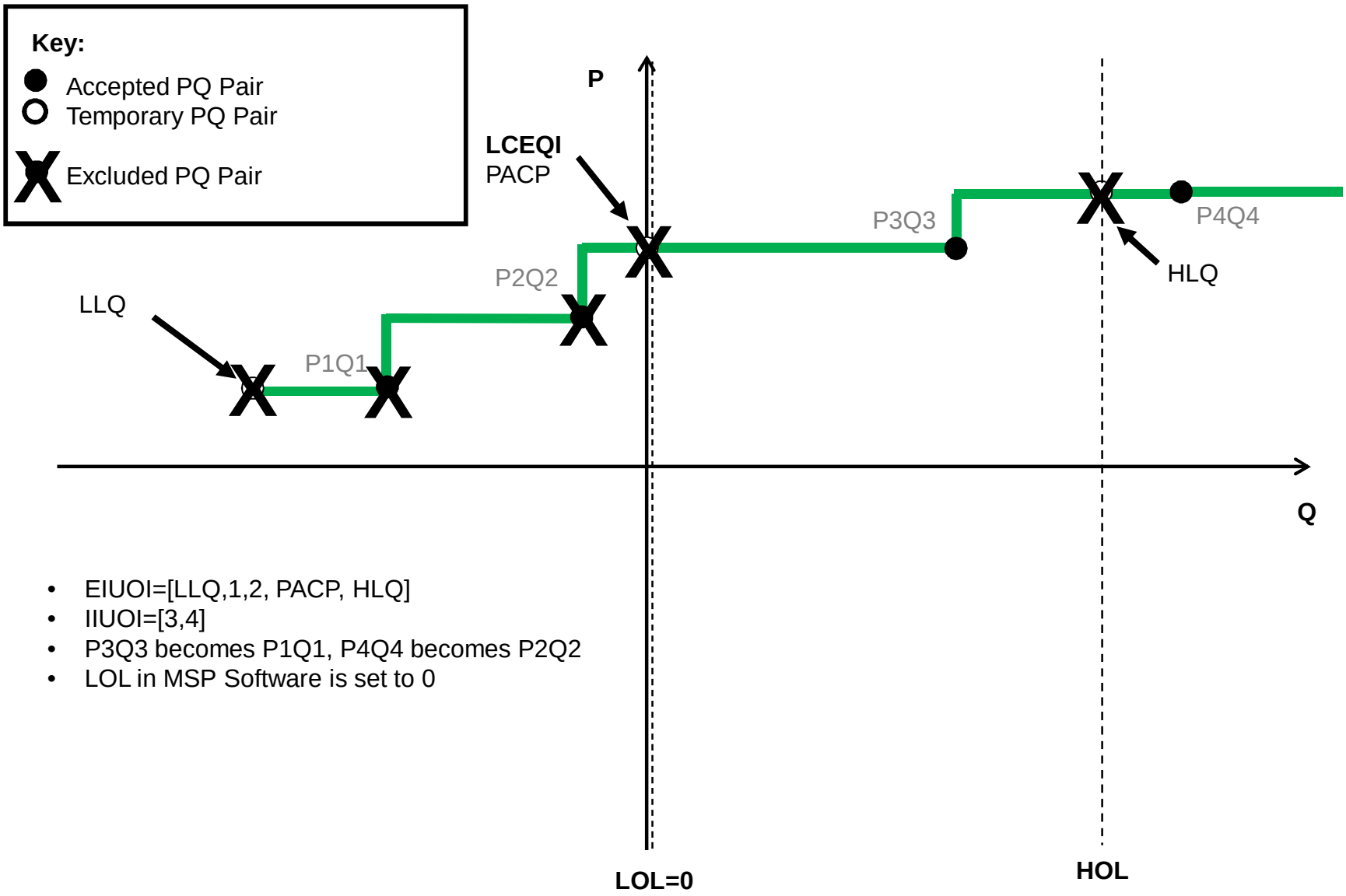
Where: LCEQI = Largest Credit Exposure Quantity Index

Exclusion of PQ Pairs (Insufficient Credit Cover) Example 1



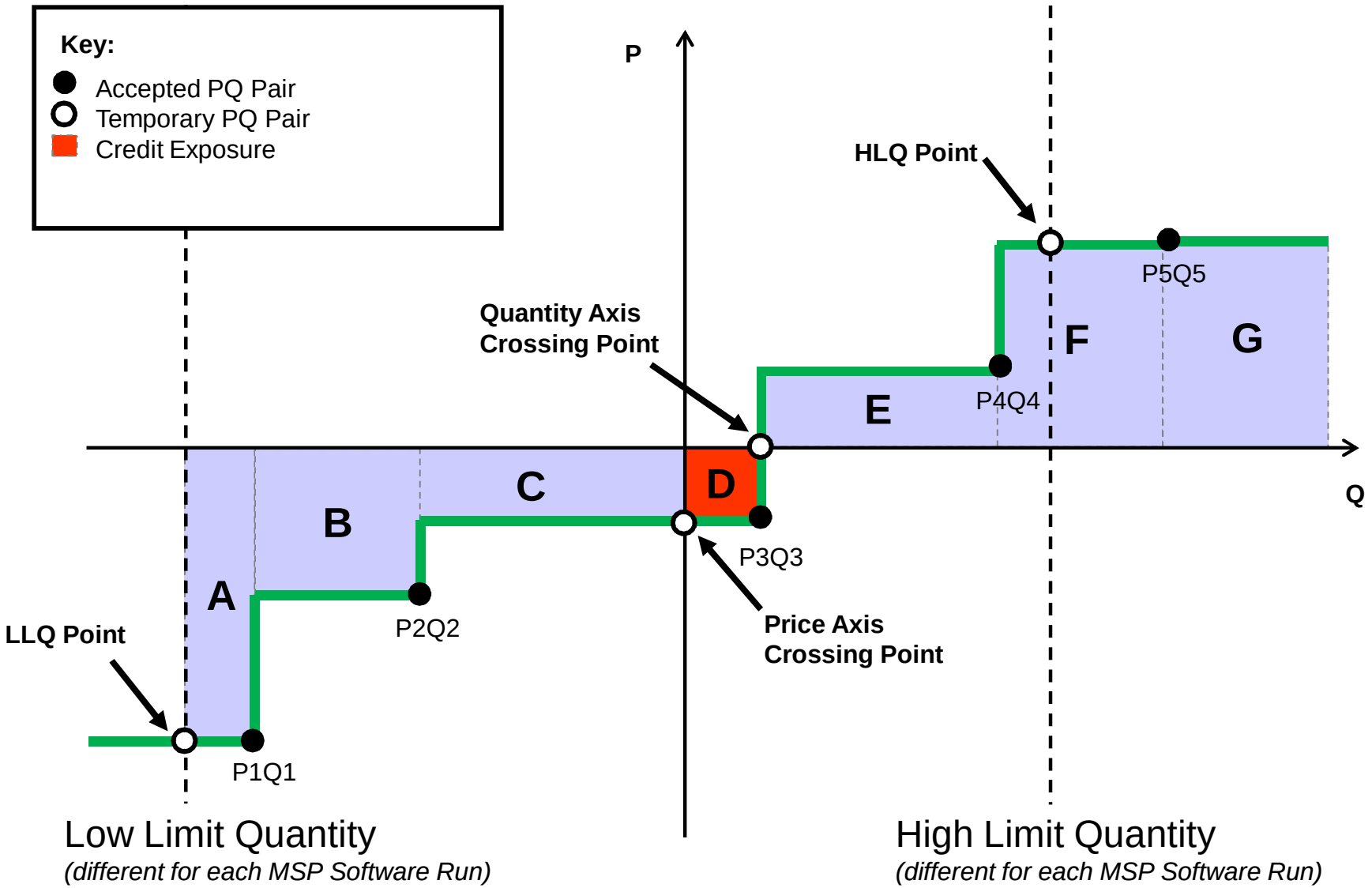
TPD = Trading Period Duration, VAT = prevailing VAT rate

Offered Modified PQ Pairs – Example 1



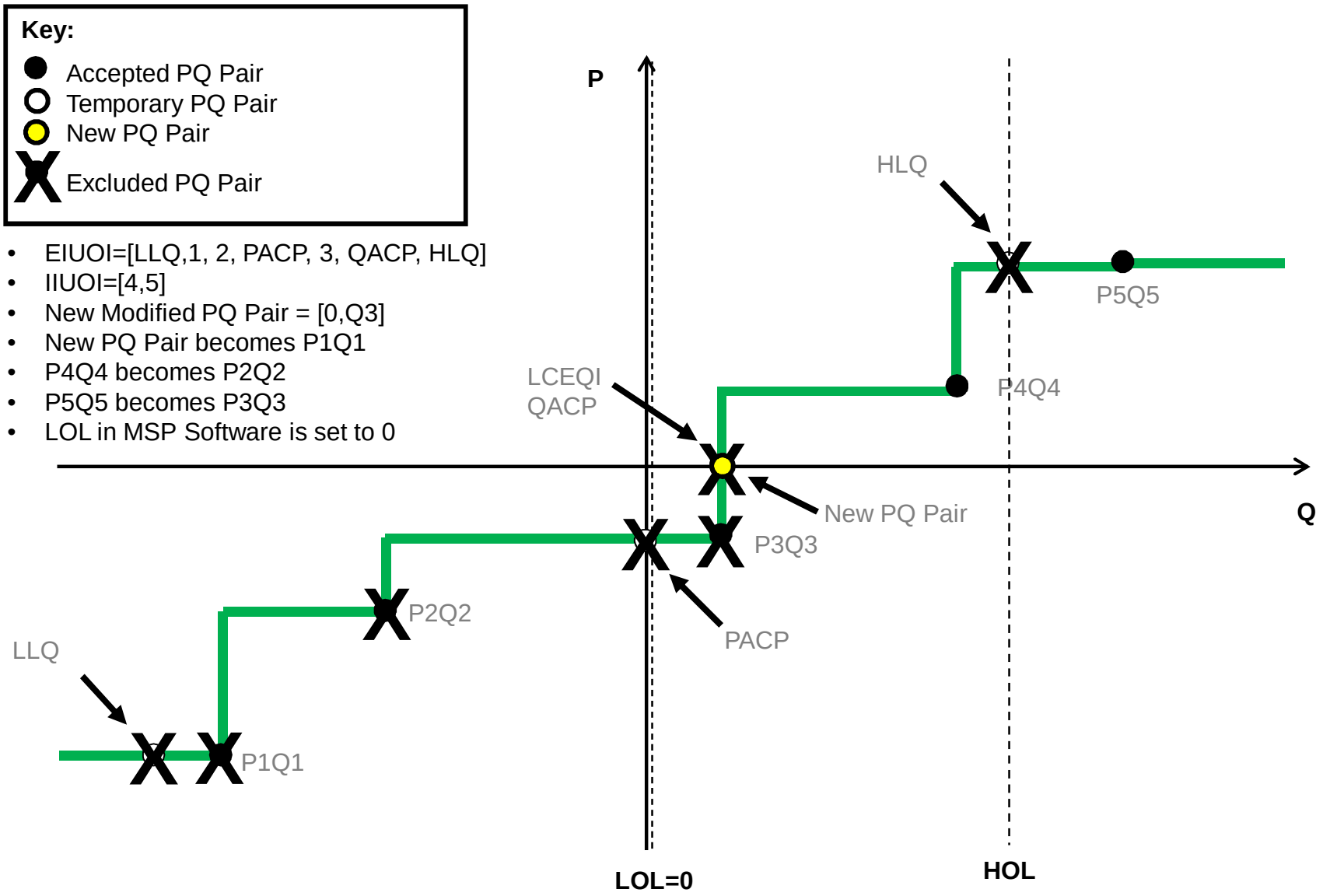
- EIUOI=[LLQ,1,2, PACP, HLQ]
- IIUOI=[3,4]
- P3Q3 becomes P1Q1, P4Q4 becomes P2Q2
- LOL in MSP Software is set to 0

Exclusion of PQ Pairs (Insufficient Credit Cover) Example 2



TPD = Trading Period Duration, VAT = prevailing VAT rate

Offered Modified PQ Pairs – Example 2



Note: QACP is removed, then new PQ Pair is added at [Q3,0]

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Excluded Bids Report – Production / Availability

- Where the Available Credit Cover is insufficient to cover offered exposure for Interconnector Units, bids may be excluded.
- The report will include all Accepted bids and flag those that have been excluded (and will not include Price Axis Crossing Points, Quantity Axis Crossing Points, LLQ Points and HLQ Points).
- The Excluded Bids Report in respect of all registered Interconnector Units will be published to each Participant, immediately following validation of Commercial Offer Data / Available Credit Cover after each EA1, EA2 or WD1 Gate Window Closure.
- Each Excluded Bids Report is Member Private (i.e. available only to the affected Participant).
- Each Excluded Bids Report will be available via both Type 2 and Type 3 interface.

Excluded Bids Report - Availability

- The Excluded Bids Report will contain:

Field	Example
Trading Day	*02/01/2011*
Participant Name	*PT_567567*
Resource Name	*NIMOYLE*
Resource Type	*I*
Run Type	*EA2*
Interconnector Unit Gate ID	*EA2*
Delivery Date	*01/01/2011*
Delivery Hour	*12*
Delivery Interval	*2*
Price Quantity Pair Index	*2*
Price Value	*24.85*
Quantity Value	*-100.000*
Excluded Flag	*Y*
Maximum Interconnector Unit Import Capacity	*100.000*
Maximum Interconnector Unit Export Capacity	*-150.000*

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Publication of Commercial Offer Data for Interconnector Units

- Following each MSP Software Run, the Commercial Offer Data for Interconnector Units will be published. The data published will be as utilised (i.e. Offered Modified PQ Pairs, Lower Operating Limit) and will be the outcome of the Available Credit Cover sufficiency checks.

- As a result of the ACC sufficiency check, Accepted PQ Pairs may not be equal to Offered Modified PQ Pairs.

- Commercial Offer Data for Interconnector Units is amended to ensure no unsecured credit exposure in respect of possible trades, hence Offered Modified PQ Pairs are used in all downstream processing (e.g. MSP Software, settlement).

- Commercial Offer Data utilised (including Offered Modified PQ Pairs) will be published:
  - Accepted PQ Pairs and Excluded Bids will be provided in a Member Private Report, published immediately following the relevant Gate Window Closure.
  - Commercial Offer Data (as utilised) is published following the relevant MSP Software Run (aligned with publication of Commercial Offer Data for all Generator Units).

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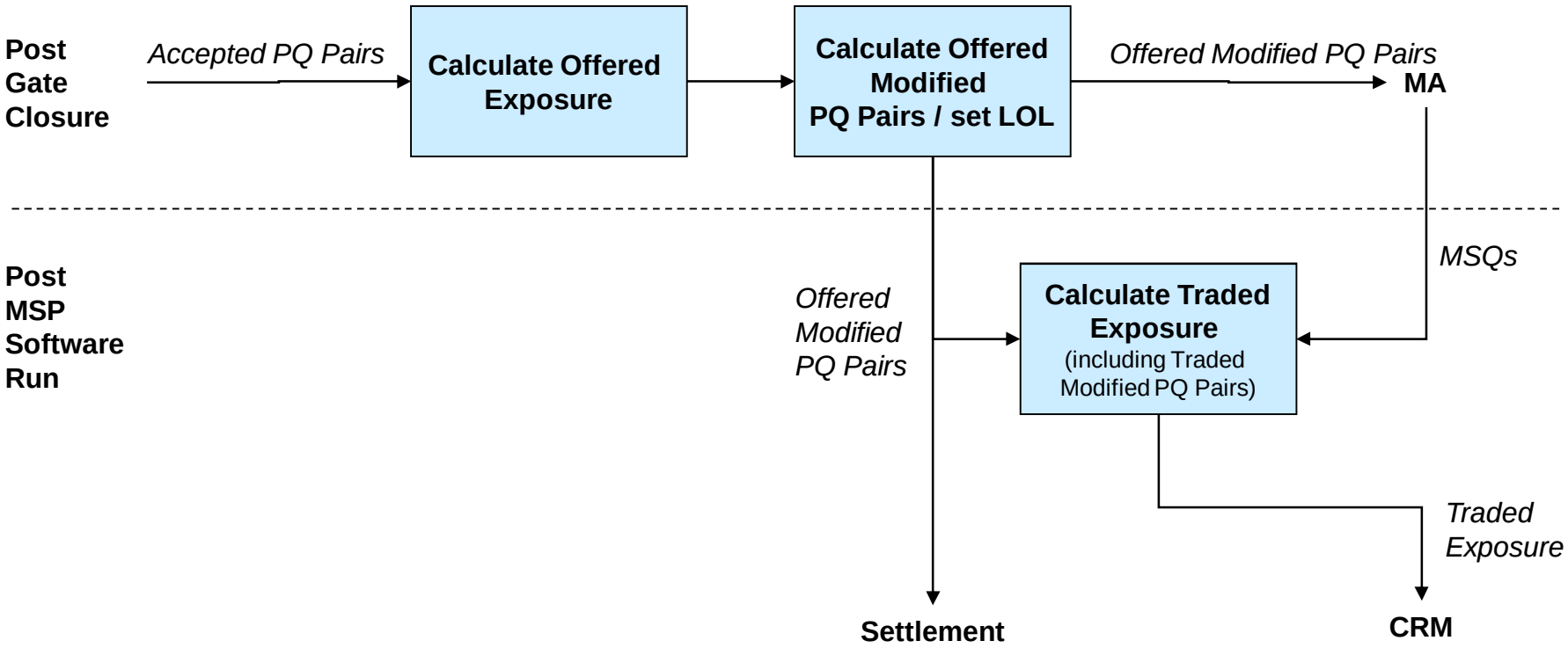
Calculation of Interconnector Unit Traded Exposure

- Following each MSP Software Run, the **Traded** Exposure for Interconnector Units can be calculated.

- Following each EA1, EA2, WD1 or EP1 MSP Software Run:
  - the traded energy exposure is a function of the Traded Modified PQ Pairs and the MIUN calculated following the relevant MSP Software Run
  - the traded capacity exposure is a function of the Estimated Capacity Price for Interconnectors (ECPI) and the MIUN calculated following the relevant MSP Software Run.
  - Traded exposure **cannot** be netted as the final exposure (based on the final MSQ) is not known.

- Following each EP2 MSP Software Run:
  - the traded energy exposure is a function of the Traded Modified PQ Pairs and the MSQ calculated following the EP2 MSP Software Run
  - the traded capacity exposure is a function of the Estimated Capacity Price for Interconnectors (ECPI) and the MSQ calculated following the EP2 MSP Software Run.
  - Traded exposure **can** be netted as the final MSQ has been determined.

Calculation of Traded Credit Cover



Calculation of Traded Credit Cover

- **Step 1** – Set the initial set of **Traded Modified** PQ Pairs equal to the **Offered Modified** PQ Pairs (as calculated following Gate Window Closure).

- **Step 2** – Add to the **Traded Modified** PQ Pairs up to four additional (temporary) PQ Pairs (Offered Modified + 4 points, if required), maintaining a set that is monotonically increasing:

  - Price Axis Crossing Point (PACP), where curve crosses Price axis.
  - Quantity Axis Crossing Point (QACP) , where curve crosses Quantity axis.
  - LLQ Point (LLQ)
  - HLQ Point (HLQ)

- **Step 3** – The **Traded Modified** PQ Pairs, including the 4 additional points, should be used to calculate Traded Exposure for each “block”, using the LLQ and HLQ values for the relevant run for Energy (Interconnector Unit Traded Exposure, IUETE) and Capacity (Interconnector Unit Capacity Traded Exposure, IUCTE). The associated price is either the Accepted Price for Energy or the Estimated Capacity Price for Interconnectors (ECPI) for Capacity. The additional four points from step 2 are not used in any other downstream processing (i.e. can be discarded once Traded Exposure has been calculated).

Low Limit Quantity and High Limit Quantity

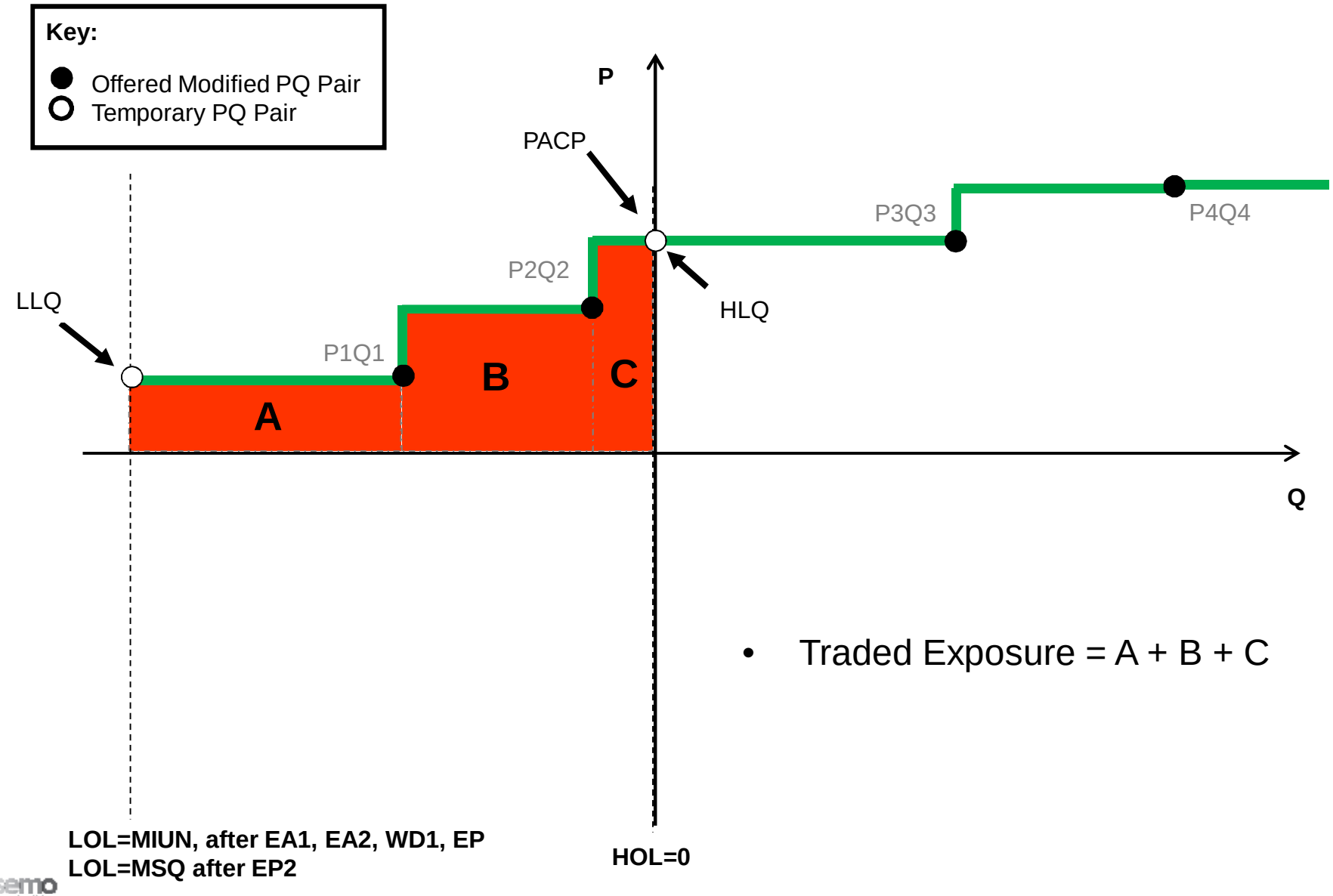
(only used to set upper and lower bounds as part of calculation of Traded Exposure)

Instance	Low Limit Quantity	High Limit Quantity
Following each EA1, EA2 WD[x] and EP1 MSP Software Run	Equals MIUN if MIUN <= 0 Equals 0 if MIUN > 0	Equals MIUN if MIUN >= 0 Equals 0 if MIUN < 0
Following each EP2 MSP Software Run	Equals MSQ if MSQ <= 0 Equals 0 if MSQ > 0	Equals MSQ if MSQ >= 0 Equals 0 if MSQ < 0

Where:

MIUN *Modified Interconnector Unit Nomination*
MSQ *Market Schedule Quantity*

Traded Modified PQ Pairs – Example



- Traded Exposure = A + B + C

Calculation of Interconnector Unit Traded Exposure (Energy) - IUETE

- Traded Exposure (Energy) will be calculated following each EA1, EA2, WD1 and EP1 MSP Software Run for every Trading Period in the relevant Trading Window.

$$IUETE_{uphm} = -TPD \times \sum_{J} \min(0, \left(\left(\left| Q_{uphmJ} \right| - \left| Q_{uphm(J-1)} \right| \right) \times \left(P_{uphmJ} \right) \times \left[1 + \frac{VAT_{uph}}{100} \right] \right))$$

- Traded Exposure (Energy) will be calculated following each EP2 MSP Software Run for every Trading Period in the relevant Trading Window (netted exposure).

$$IUETE_{uhm} = -1 \times TPD \times \sum_{i} \left(\left(\left| Q_{uhmi} \right| - \left| Q_{uhm(i-1)} \right| \right) \times \left(P_{uhmi} \right) \times \left[1 + \frac{VAT_{uh}}{100} \right] \right)$$

- TPD = Trading Period Duration
- Q = Quantity from the set of Modified PQ Pairs [+ up to 4 temporary points]
- P = Price from the set of Modified PQ Pairs [+ up to 4 temporary points]
- VAT = VAT Rate relevant for the Participant in the Trading Period

Note:
If not EP2, Low Limit Quantity = MIUN where MIUN<0, or 0 otherwise.
If EP2, Low Limit Quantity = MSQ where MSQ<0, or 0 otherwise.

Calculation of Interconnector Unit Traded Exposure (Capacity) - IUCTE

- Traded Exposure (Capacity) will be calculated following each MSP Software Run for every Trading Period in the relevant Trading Window:

- For EA1, EA2, WD1 and EP1:

$$IUCTE_{uphm} = -TPD \times \min\left(0, \left(MIUN_{uhm} \times ECPI \times \left[1 + \frac{VAT_{uph}}{100}\right]\right)\right)$$

- For EP2:

$$IUCTE_{uphm} = -1 \times TPD \times MSQ_{uhm} \times ECPI_{h} \times \left[1 + \frac{VAT_{uph}}{100}\right]$$

- TPD = Trading Period Duration
- MSQ = Market Schedule Quantity from the MSP Software Run
- ECPI = Estimated Capacity Price for Interconnectors
- VAT = VAT Rate relevant for the Participant in the Trading Period

Calculation of Total Traded Exposure (Energy and Capacity)

- Total Traded Exposure (Energy) – ETE, will be calculated following each MSP Software Run for every Trading Period in the relevant Trading Window.
- The total is across IUETE values for the Participant (i.e. all Interconnector Units registered to the Participant).

$$ETE_{uph} = \sum_{\text{u in p for m}} IUETE_{uhm}$$

- Total Traded Exposure (Capacity) – CTE, will be calculated following each MSP Software Run for every Trading Period in the relevant Trading Window.
- The total is across IUCTE values for the Participant (i.e. all Interconnector Units registered to the Participant).

$$CTE_{uph} = \sum_{\text{u in p for m}} IUCTE_{uhm}$$

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Available Credit Cover Report - Availability

- Following the completion of each MSP Software Run, an Available Credit Cover Report shall be produced for each Account where the related Participant has Interconnector Units. Where there is more than one Account per Participant the same report shall be published for each Participant.

- Each Participant may access Available Credit Cover Reports only for registered Accounts for which they have an appropriate Digital Certificate (i.e. Member Private).

- An Available Credit Cover report shall also be produced following each MSP Software Rerun. In such instances, the Available Credit Cover will be adjusted only where the rerun forms part of the traded calculation period. If the rerun relates to a period that has already been settled or invoiced then the report will still publish, but there will be no adjustment to any values.

Available Credit Cover Report – Timing and Formats

- Each Available Credit Cover Report shall be automatically published by the systems immediately following the completion of the relevant MSP Software Run.

- Each Available Credit Cover Report will be available via both Type 2 and Type 3 interfaces.

- An XML and HTML version of the reports will be provided for each Account associated with a given Participant.

Available Credit Cover Report – Content (1)

- Each Available Credit Cover Report shall contain the following information:
  - Unique ID for ACC Report (should be different numbering to Required Credit Cover Reports)
  - Unique ID from RCC Report (to link back to relevant inputs from the CRM system)
  - ACC Report Timestamp (i.e. the point in time at which the MI ACC was published)
  - Participant ID (CP_XXXX)
  - Trading Day
  - Run Type (EA1, EA2, WD[x], EP1, EP2)
  - Closing Available Credit Cover Balance
  - Reason – 'RERUN' if due to a rerun, otherwise blank
  - Estimated Capacity Price for Interconnectors (ECPI) for the Trading Day
  - PCCcpr
  - RCCScpr
  - RCCGcpr
  - FCRcpr
  - Last Settled Date for Initial Energy
  - Last Settled Date for Initial Capacity
- Per Interconnector Users relating to a Participant:
  - Participant ID (e.g. CP_XXXX)
  - Participant Account (e.g. PT_YYYY)
  - Trading Day
  - Energy Traded Amounts (incl. VAT) (ETEuph) per h for the MSP Software run
  - Capacity Traded Amounts (incl VAT) (CTEuph) per h for for the MSP Software run

Available Credit Cover Report – Content (2)

- Each Available Credit Cover shall also contain :
  - Multiple entries for all Interconnector Unit relating to the Participant Account:
    - Participant Account ID (PT_XXXX)
    - Interconnector Unit
    - Sum ETEu*ph for Traded Not Settled Period
    - Sum CTEu*ph for Traded Not Settled Period

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Effects of MSP Software Run Cancellation

- *Note: only EA2 and WD1 MSP Software Runs may be cancelled.*
- If an MSP Software is cancelled, Traded Exposure will be calculated as zero in respect of the Interconnector Unit for which Commercial Offer Data was Accepted for the current MSP Software Run.
- If an MSP Software is cancelled, no Available Credit Cover Report will be issued.

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Effects of MSP Software Run re-runs

- If an MSP Software Run is re-run (e.g. EP2 re-pricing), the traded Credit Cover will be re-calculated:
    - For Trading Periods in the MSP Software Run that are in a period already invoiced, the updated traded Credit Cover values will not affect the Required Credit Cover calculations.
    - Otherwise, the updated Traded Credit Cover values will be used as part of the calculations supporting the next Required Cover Report (on a Working Day basis).
- The Available Credit Cover Report will be produced following each MSP Software Run for each Participant.

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Glossary (1)

	Acronym	Description
Available Credit Cover	ACC	means the amount by which the Posted Credit Cover exceeds the sum of the Required Credit Cover, Interconnector Unit Traded Exposure and Total Fixed Credit Requirement.
Capacity Traded Exposure	CTE	means the credit risk exposure, adjusted for VAT, in respect of Capacity Payments for a Participant, as calculated following each MSP Software Run.
Count of Capacity Demand Settlement Days	CCDSD	means an integer number of days within the Historical Assessment Period for Capacity Periods in respect of Supplier Units.
Count of Capacity Generation Settlement Days	CCGSD	means an integer number of days within the Historical Assessment Period for Capacity Periods in respect of Generator Units.
Daily Average Capacity Payments Demand Price	DACPDP	means the arithmetic average of the values of Capacity Payments Demand Price for a specific Settlement Day.
Daily Average Capacity Payments Generation Price	DACPGP	means the arithmetic average of the values of Capacity Payments Generation Price for a specific Settlement Day.
Daily Average System Marginal Price	DASMP	means the arithmetic average of the values of System Marginal Price for a specific Settlement Day.

Glossary (2)

	Acronym	Description
Energy Traded Exposure	ETE	means the credit risk exposure, adjusted for VAT, in respect of Energy Payments for a Participant, as calculated following each MSP Software Run.
Estimated Capacity Price	ECP	means the price determined by the Market Operator for use in the calculation of Undefined Potential Exposure in respect of capacity payments and charges.
Estimated Capacity Price for Interconnectors	ECPI	means the price determined by the Market Operator for use in the calculation of Interconnector Unit Capacity Offered Exposure and Interconnector Unit Capacity Traded Exposure for Interconnector Units.
Estimated Energy Price	EEP	means the price determined by the Market Operator for use in the calculation of Undefined Potential Exposure in respect of energy payments and charges.
Excluded Interconnector Unit Offers Indices	EIUOI	means a set of the indices associated with Accepted Price Quantity Pairs for Interconnector Units that are flagged to be excluded from the corresponding Modified Price Quantity Pairs.
High Limit Quantity	HLQ	means, in respect of an Interconnector Unit and for each Trading Period in the Trading Window for MSP Software Run m, the quantity as defined in Appendix P of the Code.
Historical Assessment Average System Marginal Price	HASMP	means the arithmetic average of the values of Daily Average System Marginal Price in the Historical Assessment Period for Billing Periods.
Historical Assessment Standard Deviation System Marginal Price	HASDSMP	means the standard deviation of the values of Daily Average System Marginal Price in the Historical Assessment Period for Billing Periods.

Glossary (2)

	Acronym	Description
Included Interconnector Unit Offers Indices	IIUOI	means a set of the indices associated with Accepted Price Quantity Pairs for Interconnector Units that are flagged to be included within the corresponding Modified Price Quantity Pairs.
Interconnector Unit Capacity Offered Exposure	IUCOE	means the credit risk exposure, adjusted for VAT, in respect of Capacity Payments for an Interconnector Unit as calculated following each Gate Window Closure.
Interconnector Unit Energy Offered Exposure	IUEOE	means the credit risk exposure, adjusted for VAT, in respect of Energy Payments for an Interconnector Unit, as calculated following each Gate Window Closure.
Interconnector Unit Capacity Traded Exposure	IUCTE	means the credit risk exposure, adjusted for VAT, in respect of Capacity Payments for an Interconnector Unit as calculated following each MSP Software Run.
Interconnector Unit Energy Traded Exposure	IUETE	means the credit risk exposure, adjusted for VAT, in respect of Energy Payments for an Interconnector Unit as calculated following each MSP Software Run.
Interconnector Unit Traded Exposure	IUTE	means the total credit risk exposure for a Participant in respect of its Interconnector Units, as calculated following each MSP Software Run.

Glossary (3)

	Acronym	Description
Largest Credit Exposure Quantity Index	LCEQI	means the maximum integer index value in respect of a set of Price Quantity Pairs for an Interconnector Unit in a Trading Period, where a negative exposure is calculated as part of the calculation of Offered Modified Price Quantity Pairs or Traded Modified Price Quantity Pairs.
Low Limit Quantity	LLQ	means in respect of an Interconnector Unit and for each Trading Period in the Trading Window for MSP Software Run m, the quantity as defined in Appendix P of the Code.
Price	P	means the price associated with a specified Quantity within a Price Quantity Pair, Offered Modified Price Quantity Pair or Traded Modified Price Quantity Pair .
Price Axis Crossing Point	PACP	means a temporary Price Quantity Pair used in the calculation of Offered Exposure or Traded Exposure, reflecting the point at which the Accepted Price Quantity Pairs or Offered Modified Price Quantity Pairs cross the Price axis.
Priority Flag		A flag submitted as part of Commercial Offer Data for Interconnector Units, indicating the order in which such Commercial Offer Data should be considered in respect of the Available Credit Cover for the Participant.
Quantity	Q	means the quantity of Output specified within a Price Quantity Pair, Offered Modified Price Quantity Pair or Traded Modified Price Quantity Pair.
Quantity Axis Crossing Point	QACP	means a temporary Price Quantity Pair used in the calculation of Offered Exposure or Traded Exposure, reflecting the point at which the Accepted Price Quantity Pairs or Offered Modified Price Quantity Pairs cross the Quantity axis.

Glossary (4)

	Acronym	Description
Remaining Available Credit Cover	RACC	means, in respect of a Participant, the amount of Available Credit Cover less the sum of the Interconnector Unit Energy Offered Exposure and the Interconnector Unit Capacity Offered Exposure for an Interconnector Unit registered to same Participant, as part of the calculation of Modified Price Quantity Pairs.
Total Fixed Credit Requirement	TFCR	means, in respect of a Participant, the total Fixed Credit Requirement in respect of its Generator Units and Supplier Units.
Traded Exposure		means, in respect of an Interconnector Unit, the potential or actual credit exposure as calculated following the completion of an MSP Software Run.
Traded Modified Price Quantity Pairs		means a set of Price Quantity Pairs for Interconnector Units as derived from Offered Modified Price Quantity Pairs, determined in accordance with Appendix P.