I-SEM Training
Instructor Led Training

Part 1: SEMOpx Settlements
Part 2: SEMOpx (ECC) Credit Risk

Version 1

Duration and Timing

The training session will run from 9AM to 3PM with the following breaks:

Break	10am-10:15am
Break	11am-11:15am
Lunch	12pm-12:45pm
Break	1:30pm-1:45pm

Part 1: SEMOpx Settlements will be delivered from 9AM to 12PM.

Part 2: SEMOpx (ECC) Credit Risk will be delivered from 12:45PM to 3PM.

Training Guidelines

Please ensure that you allow yourself enough time to arrive at the training room both at the start of the day and after each break so that the training can finish on time.

Please limit use of mobile phones throughout the day so as not to distract other trainees and ensure that mobile phones are kept on silent mode throughout the day.

Please ensure you have left the training room before answering a phone call.

The instructors will stop at various points throughout this presentation to deal with any questions that arise.

Please feel free to ask questions during the training session or alternatively please contact the Query Management Team through the mailbox: I-SEMproject@sem-o.com.

Agenda

Part 1: SEMOpx Settlements
Learning Objectives
Topic 1: Introduction to ECC daily processes
Topic 2: Formation of a contract
Topic 3: Physical Settlement of a contract
Topic 4: Financial Settlement of a contract
Topic 5: Course Summary

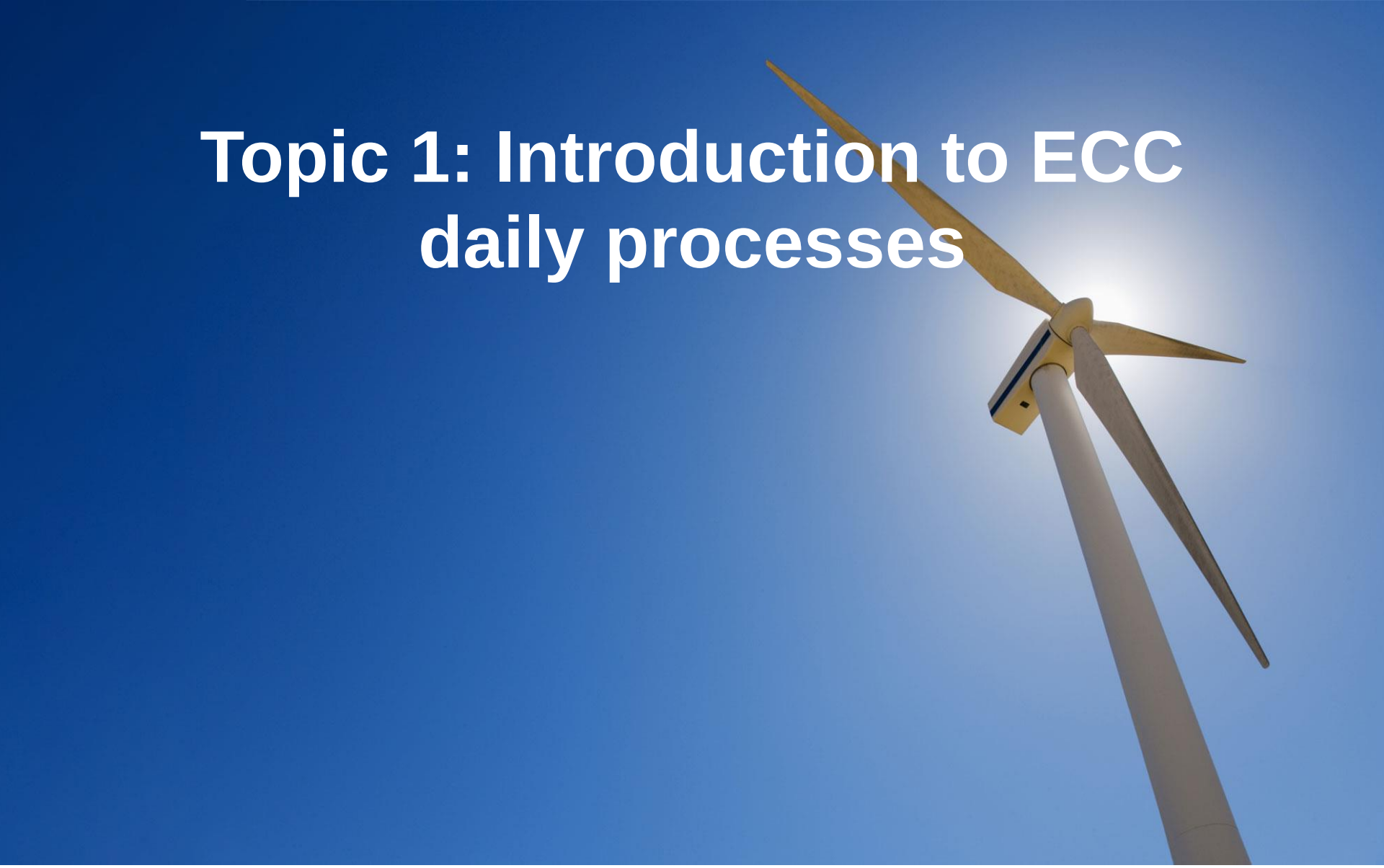
Part 2: SEMOpx Credit Risk
Learning Objectives
Topic 1: Introduction to SEMOpx clearing house model
Topic 2: Overview of banking options
Topic 3: Trading Limits
Topic 4: Collateral for clearing banks
Topic 5: Collateral for settlement banks
Topic 6: Course Summary

Part 1: SEMOpx Settlements

Learning Objectives

- After completing self-learning and instructor-led training for this course, you will have an understanding of:
  - The daily activities of ECC for settlement
  - How contracts are formed by ECC
  - How contracts are settled financially and physically by ECC

Topic 1: Introduction to ECC daily processes



SEMOpx and Central Clearing

- SEMOpx is a NEMO for Ireland and Northern Ireland:
  - Responsible for trades, market coupling etc.

- NEMOs act as central counter party (CCP) for all trades:
  - Buy from the sellers and sell to the buyers
  - If any shortfall by participant, CCP guarantees payment
  - This ensures all trades on the exchange are low risk

- SEMOpx have procured ECC as service provider:
  - Act as CCP on behalf of SEMOpx
  - Perform clearing, credit risk and settlement services
  - Act as guarantor for all payments

ECC Key Daily Processes

- Physical Settlement of contracts:
  - Automatic transfer of contract quantities to SEMO

- Financial Settlement:
  - Formation of binding contracts
  - Settlement of contracts into settlement amounts
  - Issuance of payment orders and invoices
  - Transfer of funds to and from the banks

- Credit risk management:
  - Calculation of credit risk exposures/margins
  - Management of trading limits

Topic 2: Formation of a contract

Trades in SEMOpx

- Trades may come from either:
  - SEMOpx auctions
  - SEMOpx continuous intraday trading

- Trades sent from SEMOpx to ECC:
  - Once an order is accepted it is sent to ECC for clearing
  - Once sent to ECC it becomes a contract

- All contracts are irrecoverable:
  - Payment is guaranteed and must be made
  - Volumes must be submitted to SEMO
  - SEMO will manage settlement of delivery of the energy

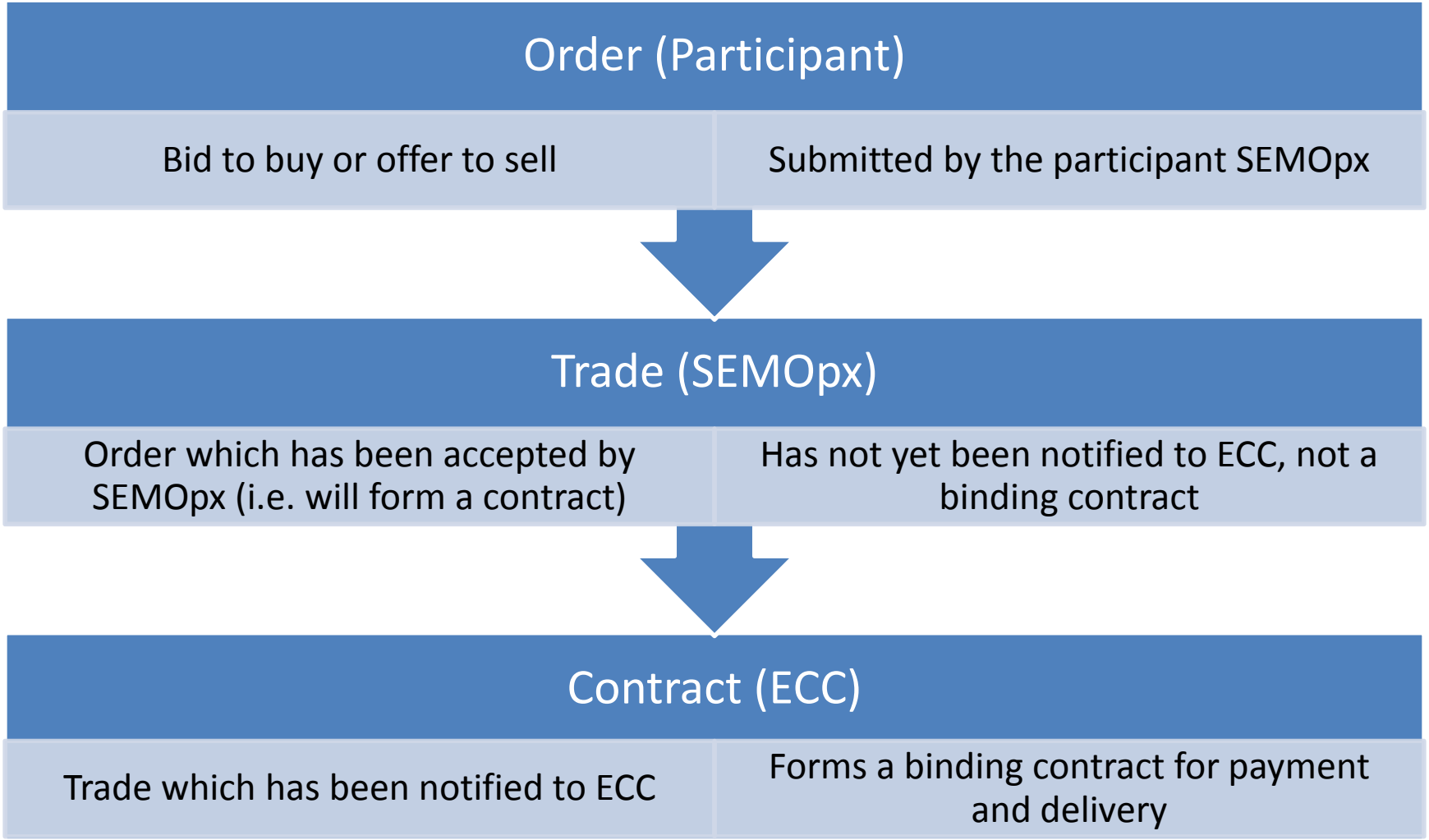
Timing of trades

- Auction trades will be sent at set times:
  - Will be sent following each auction
  - Approximately 30 minutes after publication of results

- Continuous trades will be sent every 15 minutes:
  - Continuous trades bundled every 15 minutes
  - After trade is matched, it will be sent at next available window

- Trades will be sent automatically:
  - Includes outside of working hours and non-working days
  - Trades will still become binding contracts automatically
  - Settlement of contracts will still only take place on working days

Flow of a trade



Formation of a contract

- Once a trade is sent to ECC it becomes a contract

- Contracts go through two processes:
  - Physical settlement
  - Financial settlement

- Both processes run in parallel:
  - Kicked off automatically when contract is formed
  - No need for participant interaction
  - Cannot be stopped or delayed once contract is formed

Topic 3: Physical Settlement of a contract

Physical Settlement Overview

- ECC as the central counter party has role in physical settlement:
  - Covered by notifying SEMO of contracted quantity
  - Meets definition of physical settlement under CACM

- ECC notifies all contracts to SEMO:
  - Will be notified against the designated balancing market unit
  - This unit is responsible for delivery of energy
  - This unit is responsible for payment for non-delivery

- Settlement for imbalances handled by SEMO

Physical Settlement versus Delivery

- Physical settlement is done by notifying the CQ to SEMO

- This creates a responsibility on the participant to deliver the energy
  - Produce for sales or off-take for purchases
  - Where energy is not delivered, imbalance settlement applies

- SEMOpx and ECC have no role in delivery:
  - Participant is responsible under the T&SC
  - SEMO in charge of imbalance settlement

Physical Settlement - Diagram

1. ECC sends contract quantity to SEMO
2. There is a direct mapping of values based on unit ID:
   - different companies may be responsible in each market segment
   - unit mapping is always the same one-for-one mapping
3. Any required imbalance settlement is done by SEMO

Physical Settlement – Cross border values

- ECC also act as shipper for the I-SEM:
  - Body that is responsible for cross border flows from coupling
  - Will cover the day-ahead and intraday markets

- Submit cross border values for interconnectors:
  - Values submitted to the balancing market operator
  - Similar to values submitted for participants

- Ensures cross border trading is facilitated:
  - Important part of the coupling process
  - Facilitates the arrangements needed for European coupling

Physical Delivery – Trading Halts

- SEMO imbalance arrangements create delivery risk:
  - The risk that someone does not deliver on their ex-ante trades
  - SEMO may refuse contracts if collateral is insufficient
  - This means ECC may incur an imbalance due to a refusal

- ECC must manage the exposure due to delivery risk:
  - Decided not to cover this with further margining (extra cost)

- Risk managed through trading halts:
  - SEMO notifies NEMOs of credit cover breaches
  - SEMOpx temporarily puts a halt on trading until issue is resolved

Trading Halt Process Overview

SEMO Credit Check (3x Daily)

Assess credit status	Determines if a PT is in breach

Participant Enters Breach Status

5 consecutive working hours to resolve	If unresolved, NEMOs are notified

SEMOpx notified of breach

SEMOpx notified of all units affected by breach	SEMOpx places trading halt on all members with units in breach

Trading Halt – Entity Model Mapping

- Mapping between segments done on a unit basis:
  - Unit will be same in SEMOpx and SEMO
  - SEMOpx member may not match SEMO participant
  - Unit may be traded in SEMOpx by a third party

- Credit information sent to SEMOpx on unit basis:
  - Only direct mapping between market segments

- Trading halt applied on member level:
  - Applied to member where any unit is notified as being in breach
  - Halt will apply to all of the units of that member

- Halt is lifted once breach status is remedied

Topic 4: Financial Settlement of a contract

Financial Settlement

- Trade values determined by SEMOpx:
  - Part of the auction process
  - Part of the continuous trading process

- All trade values are firm:
  - Once contract is struck values must be delivered
  - Price determined before contract is formed
  - No additional settlement variables are required

- ECC process trades sent by SEMOpx:
  - FX conversions and rounding performed by SEMOpx
  - ECC do not alter trade values to form a contract

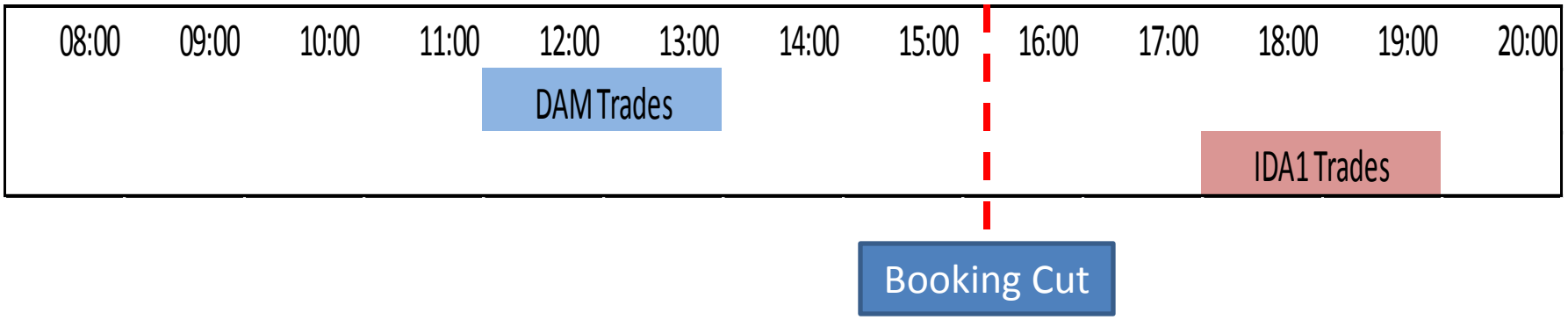
Daily Booking Cut

- Booking cut determines when trades are settled:
  - Trades before the booking cut are settled that day
  - Trades after the booking cut are settled the following working day

- Booking cut occurs at 15:00 each working day
  - All contracts prior to the cut then entered into payment reports
  - Delivery date of the contract does not affect settlement
  - Multiple delivery dates may be covered by one cut (e.g. D and D+1)

- Payment reports issued following booking cut:
  - Outlines the payments for the following working day
  - Transfer of funds will occur each working morning

Booking Cut Example



- The DAM trades are sent to ECC before the cut:
  - Included in that days payment report
- IDA1 trades are sent to ECC after the cut:
  - Included in the next payment report
- Trades included in different reports for the same delivery date:
  - Operational time of booking determines time of settlement

Daily Payments

- Payments made each working day based on payment reports:
  - Data in each report determined by most recent booking cut

- Payments between ECC and banks:
  - No direct transfers between ECC and participants
  - Transfer of funds between participants and banks

- Payment occurs for EUR and GBP on same day:
  - EUR payments are made at 07:00
  - GBP payments are made at 08:00
  - Buy and sell contracts settled on the same day

Payment Reports and Invoicing

- Payment reports create obligation to pay:
  - Issued on each working day by ECC
  - Used for energy payments/charges
  - Instruction to banks to transfer funds
  - Allow for working day settlement
  - Apply obligation before official invoice is issued

- Invoices form record of payments/balances:
  - Invoices are issued monthly by ECC
  - Give record of energy payments/charges in for the month
  - Outline the fees outstanding for the participant
  - Creates obligation to pay fee amounts

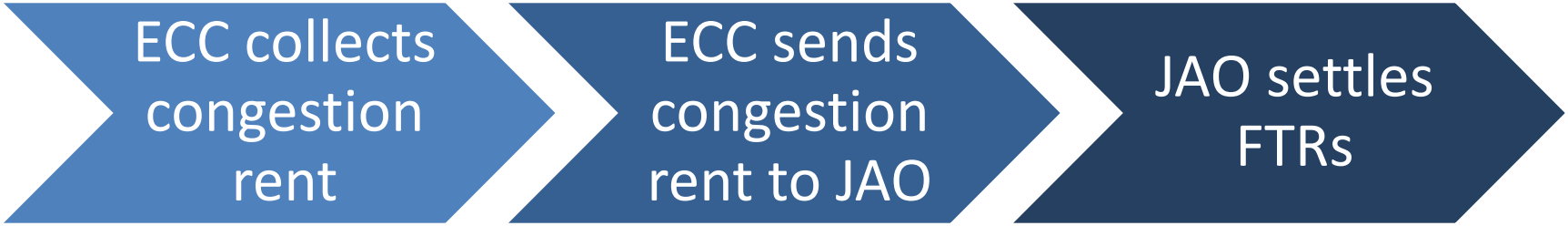
Financial Settlement – Cross Border Values

- ECC perform cross border financial settlement:
  - In role as the shipper

- Transfers of money between NEMOs from coupling:
  - E.g. transfer from SEMOpx to Nord Pool UK
  - Transfers dictated by cross border flows from coupling
  - Relevant to DAM, IDA1 and IDA2
  - Ensures NEMOs always have sufficient funds to pay customers

- Required to facilitate coupling:
  - Action only between NEMOs
  - Background action for market participants

Congestion Rent – ECC's role



- Cross border trading results in congestion rent:
  - Revenue created by transferring energy between markets when there's a price spread
  - ECC collects these amounts on behalf of interconnectors
  - ECC sends this money to JAO
  - **All settlement of FTRs happens outside of SEMOpx/ECC**

Topic 5: Course Summary

Useful Links

- ECC Clearing House Conditions
  - https://www.ecc.de/ecc-en/about-ecc/rules/clearing-conditions

- SEMOpx rules and operating procedures:
  - http://www.sem-o.com/ISEM/Pages/SEMOpxrulesandprocedures.aspx

- ECC webpage for invoicing:
  - https://www.ecc.de/ecc-en/operations/invoicing

Review of Learning Objectives

After completing self-learning and instructor-led training for this course, you should understand:

The daily activities of ECC for settlement ✓

How contracts are formed by ECC ✓

How contracts are settled financially and physically by ECC ✓

Part 2: SEMOpx (ECC) Credit Risk

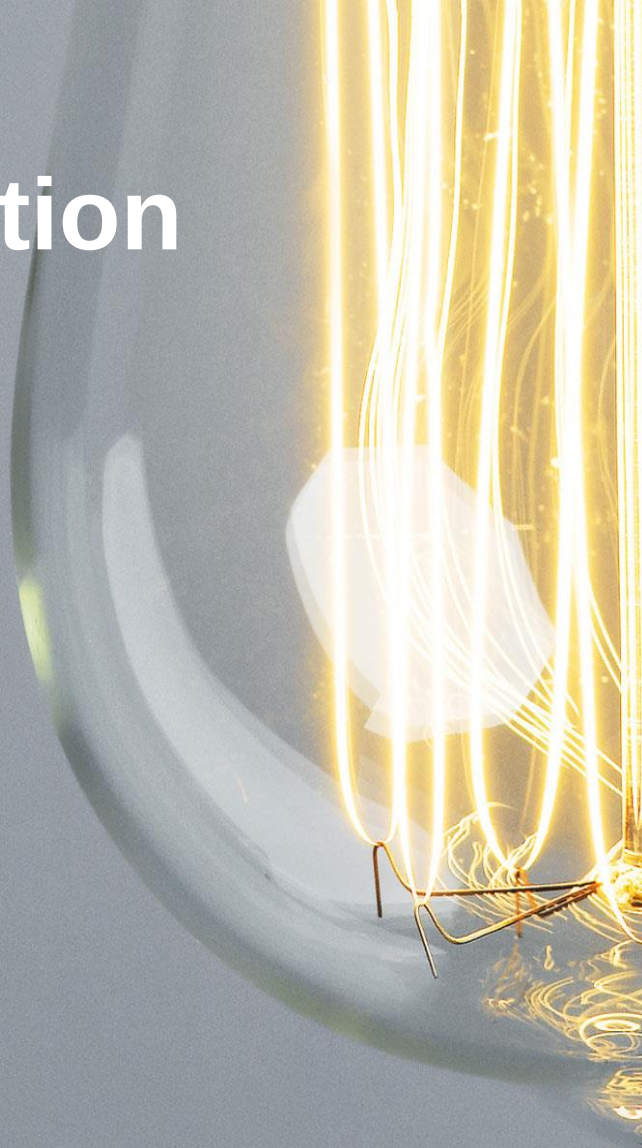
SEMOpx (ECC) Credit Risk Agenda

Training Topic
Learning Objectives
Topic 1: Introduction to SEMOpx clearing house model
Topic 2: Overview of banking options
Topic 3: Trading Limits
Topic 4: Collateral for clearing banks
Topic 5: Collateral for settlement banks
Topic 6: Course Summary

Learning Objectives

- After completing self-learning and instructor-led training for this course, you will have an understanding of:
  - The banking options available to SEMOpx members
  - The credit cover arrangements required for SEMOpx participation
  - The effect of the choice of banking option on credit cover

Topic 1: Introduction



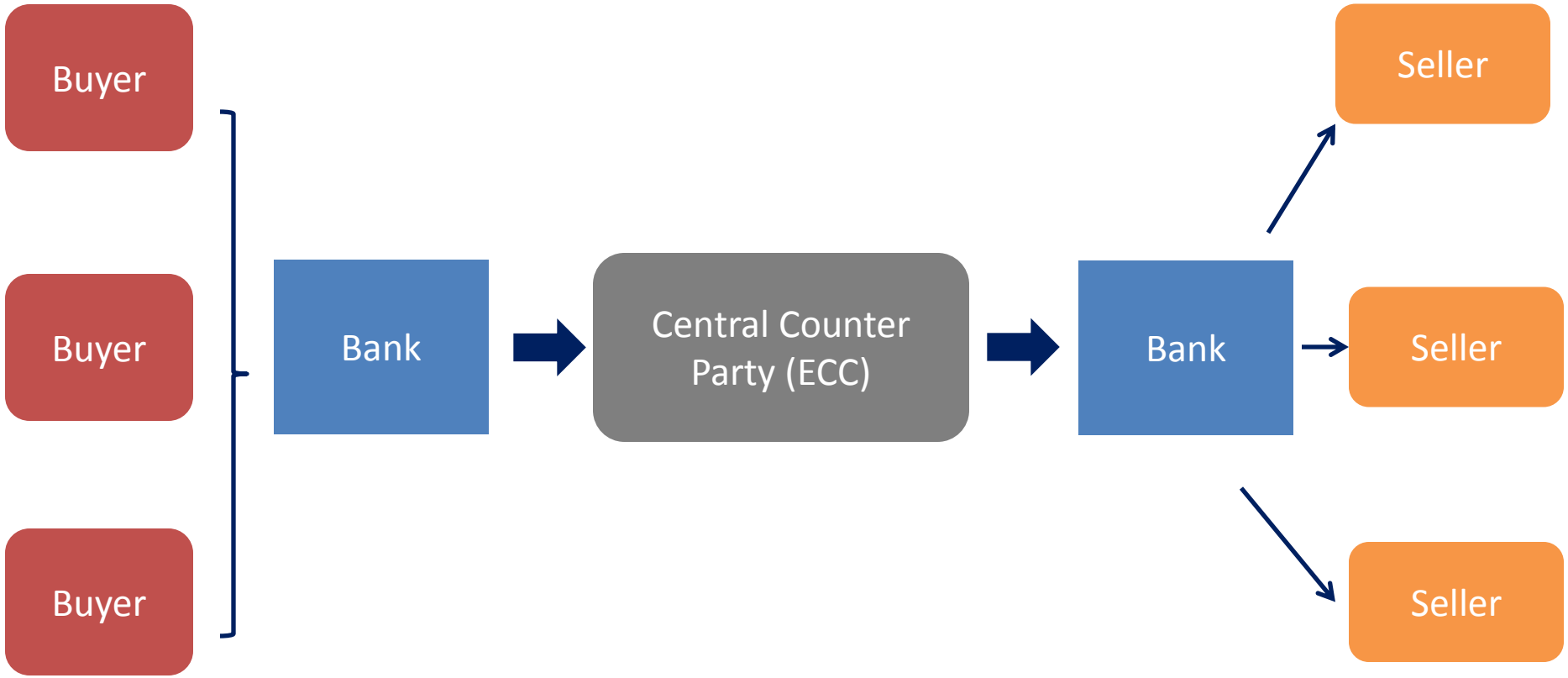
SEMOpx and Central Clearing

- SEMOpx is a NEMO for Ireland and Northern Ireland:
  - Responsible for trades, market coupling etc.

- NEMOs act as central counter party (CCP) for all trades:
  - Buy from the sellers and sell to the buyers
  - If any shortfall by participant, CCP guarantees payment
  - This ensures all trades on the exchange are low risk

- SEMOpx have procured ECC as service provider:
  - Act as CCP on behalf of SEMOpx
  - Perform clearing, credit risk and settlement services
  - Act as guarantor for all payments

Central Counter Party Model – Banks



Topic 2: Overview of banking options

SEMOpx Banking Options

- In order to trade in SEMOpx participants must:
  - Register with SEMOpx
  - Register with ECC
  - Register with a bank

- Two banking options are available:
  - Clearing bank
  - Settlement bank

- Participants choose their bank and option as part of registration

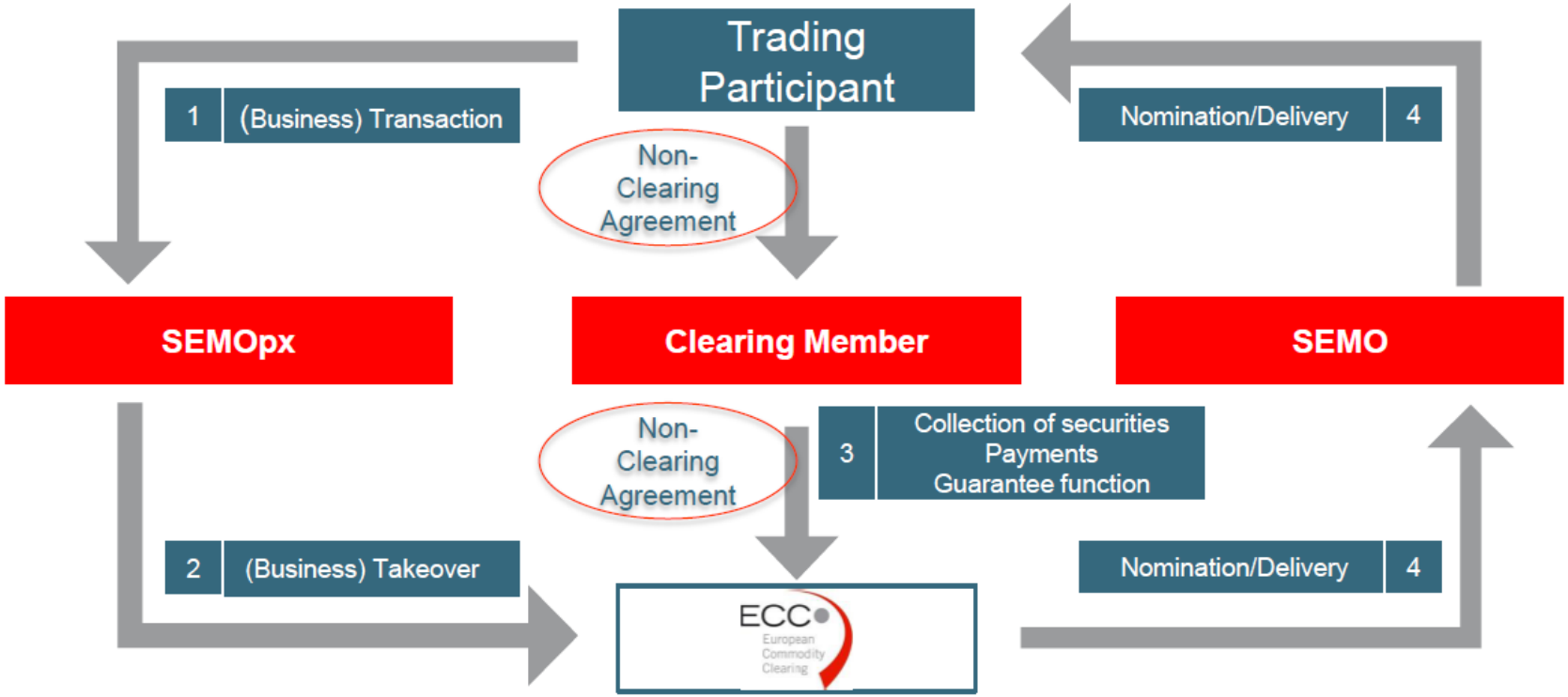
Banking Options – Clearing Bank

- Clearing banks act as an intermediary between ECC and the member:
  - Guarantee the payment from member
  - Handle funds transfers to and from ECC

- Direct relationship between member and clearing bank:
  - Bank pass through the costs of dealing with ECC
  - Bank pass through the requirement for credit cover from ECC
  - Terms of this pass through are determined between the bank and the member

- Member enter trilateral arrangement for clearing:
  - Parties are the member, bank and ECC
  - Covers all the required clearing arrangements

Banking Options – Clearing Bank Diagram



Irish Power Market (Spot Only at the moment):

Clearing Members act as guarantor and payment agent for all trades concluded on the Spot Market. They collect margins and all payments from their clients (trading participants).

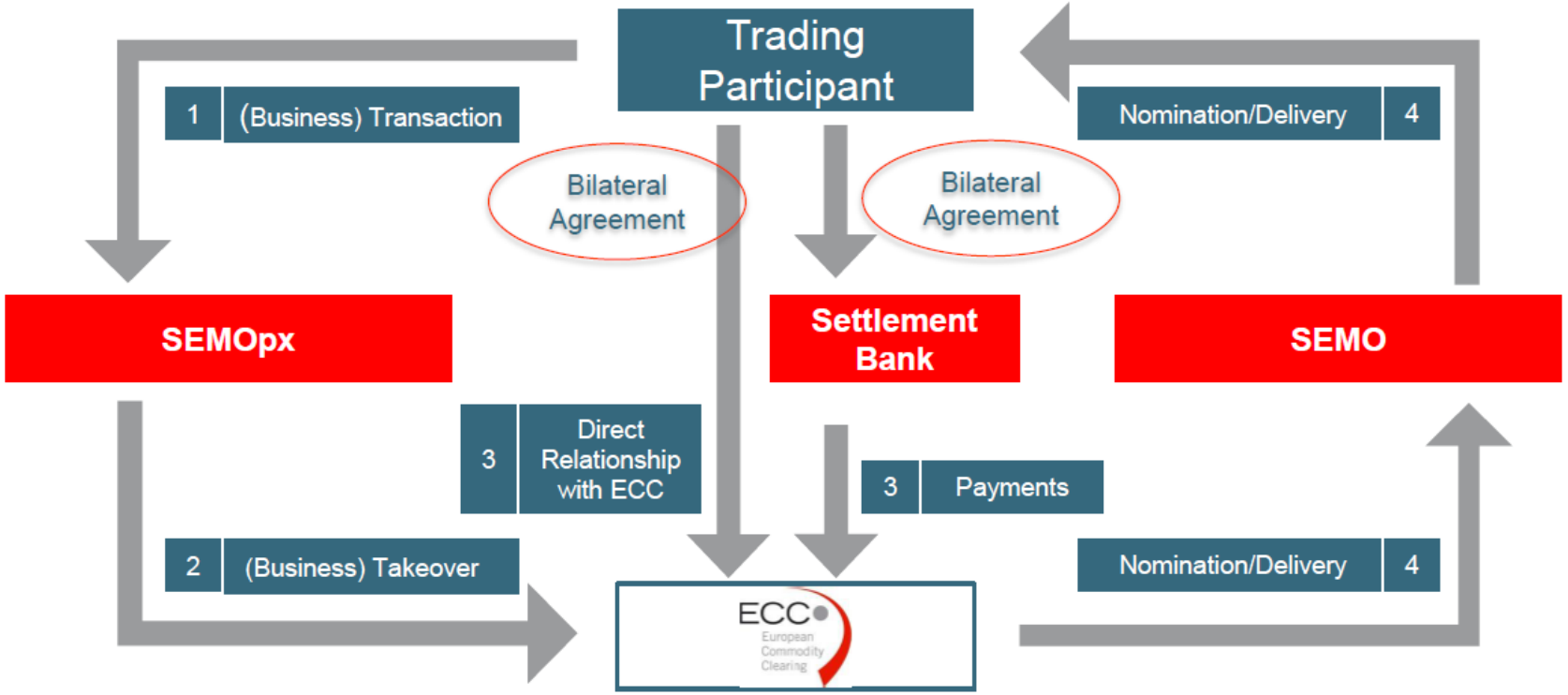
Banking Options – Settlement Bank

- Settlement bank acts as payment agent only:
  - No direct guarantee of member payments
  - Provide funds transfer facility for members to and from ECC

- Collateral requirements directly determined by ECC:
  - Amounts to be held are directly decided by ECC
  - Amounts based on bids to ECC

- Pre-funding of trading is used:
  - Covers the fact that no guarantee is in place
  - Trading is limited to the amount held in collateral accounts

Banking Options – Settlement Bank Diagram



Irish Power Market (Spot Only at the moment):

Settlement Banks act as payment agents for all trades on the Spot Markets, e.g. provide accounts which can be used for all payments necessary for buying/selling power at the spot market. All trades of the Trading Participant need to be prefunded.

Banking Options – Overview

Item	Clearing Bank	Settlement Bank
Markets	Spot & derivatives	Spot only
Guarantee Function	Yes, trades guaranteed by clearing bank	No, trades limited to the amount of collateral held
Trading Limit	Voluntary; Set by bank	Mandatory; Set by ECC
Pre-funding	Determined by the bank	Collateral funds must be held at settlement bank to trade
Collateral Type Accepted	Determined by the bank	EUR/GBP cash or bank guarantee only
Default Fund Contribution	Obligation on bank; may pass through cost	Obligation directly on participant
Exposure Type	Margining based on trades	Pre-funding of trades
Exposure Based On	Net trading at the clearing price	Gross trading at the bid price

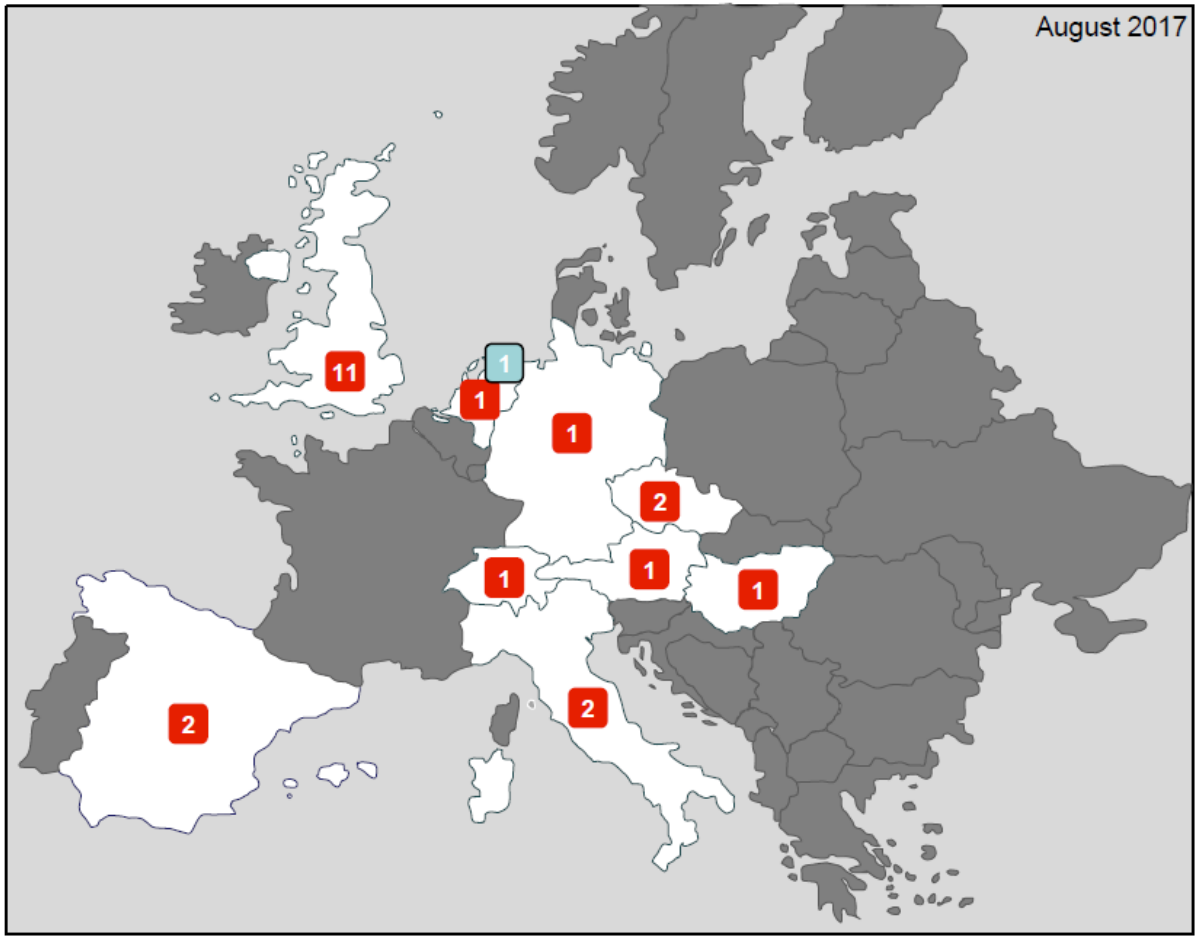
Clearing and Settlement Banks

22 Clearing Member

ABN AMRO Clearing Bank N.V.
Banca Akros SpA
Banca Popolare di Sondrio SCPA
Banco Santander, S.A.
Bayerische Landesbank
BNP Paribas Commodity Futures Ltd.
Citigroup Global Markets
ED&F Man Capital Markets Limited
Goldman Sachs International
INTL FCStone LTD
J.P. Morgan Securities plc.
KELER CCP Ltd.
Macquarie Bank International
Marex Financial Limited
Merrill Lynch International
Morgan Stanley & Co. International plc
Oesterreichische Kontrollbank AG
Raiffeisenbank a.s.
Renta 4 Banco
Societe Generale Newedge UK Limited
UBS AG
UniCredit Bank Czech Republic and Slovakia, a.s.

1 Settlement Bank

ABN Amro Bank N.V.



Topic 3: Trading Limits

SEMOpx Collateral Overview

- Collateral needs to be held to cover SEMOpx trades:
  - Risk that buyers do not pay sellers
- Setup determines collateral requirement
- Clearing banks using margining:
  - Exposure based on current and predicted trading patterns
- Settlement banks use pre-funding:
  - Amounts must be held based on trading activity
  - Trading is limited based on the pre-funded amounts

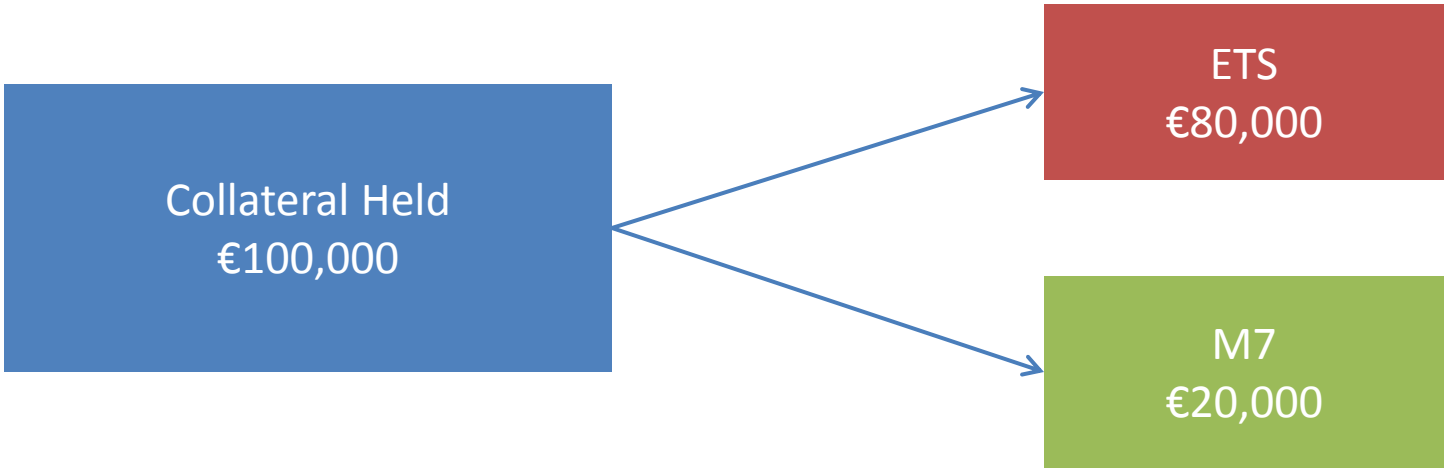
Trading Limits

- Limit to the amount of trading in SEMOpx
  - Prevent trades which would cause too much exposure
  - Trades checked as they're entered
  - Trades breaching the limit are prevented

- Based on banking option:
  - Clearing bank decides on limit for its members based on margin requirements (at discretion of the bank)
  - ECC determines limits for members using settlement bank equal to the pre-funded collateral (mandatory limit)

- One limit for each SEMOpx system:
  - ETS covering all auctions
  - M7 covering continuous intraday trading
  - Each limit separate from the other

Trading Limit Example



- Member X has €100,000 in collateral:
  - Must split this between ETS and M7 systems
  - ETS limit covers all auction trading; M7 limit covers all continuous
  - Expected split is 80% auction, 20% continuous trading
  - Member X splits the €100,000 total on an 80/20 basis

SEMOpx Trading – Price Taking Orders

- All orders in SEMOpx are price affecting:
  - Strictly speaking no price takers
  - Price takers are bidding to accept any price up to the limit

- Price limit for selling includes a negative price:
  - Cap of €3,000 and Floor of -€500
  - Selling energy as a price taker will mean your price is -€500

- Credit exposure and required funds depend on price of sale:
  - Sales for €0 or positive prices create no credit exposure
  - Sales at negative prices do create a credit exposure

- Negative priced sales are similar to purchases

Topic 4: Collateral for clearing banks

Clearing Bank Collateral Cover

- ECC determines margins for clearing banks:
  - Banks then pass these costs onto their clients
  - How this is passed on is determined between bank and client
  - Bank may allow arrangements ECC would not

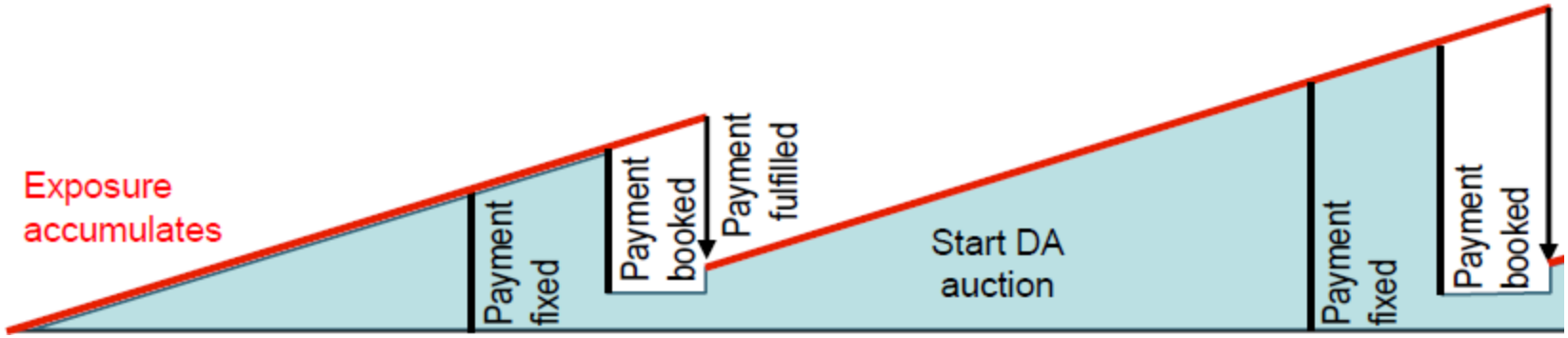
- Margins are calculated based on historical performance:
  - Net market position (i.e. sales are netted off purchases)
  - Historical clearing price (i.e. bid price is ignored)

- Two daily margins in place:
  - Current exposure (i.e. trades which have settled but not paid for)
  - Initial margin (i.e. to cover trading while banks are closed)

- Bank determines the trading limit which applies:
  - At the banks discretion, most likely related to collateral amounts

Clearing Bank – Current Exposure Margin

- Covers purchases which have not been paid for yet:
  - Accumulates over the trading day, overnight or at weekends
  - Is valued at the price of the purchases (i.e. actual volume x price)
  - Is cleared when payments are made



- In this example:
  - Purchases increase the exposure during the day
  - Payment the following morning reduces exposure back down
  - Overnight purchases means morning payment does not reduce exposure to 0

Current Exposure Example

- Company X purchases 50 MWh @ €50 in the DAM on D-1:
  - This purchase creates an exposure
  - Exposure is 50 MWh * €50 = **€2,500**

- At COB on D-1Company X gets an invoice payable on D:
  - 50 MWh * €50 = **€2,500** (invoice amount)

- Company X purchases 50 MWh @ €40 overnight:
  - Exposure becomes 2500 + (50*40) = **€4,500**

- Company X pays their invoice in full on D:
  - Exposure becomes €4,500 - €2,500 = **€2,000**

Clearing Bank – Initial Margin for Spot Market

- Covers trading while banks are closed:
  - Overnight, weekends, bank holidays etc.

- Predicts behaviour based on past performance:
  - Uses 1 year look back period
  - Uses highest exposure in the last 20 days

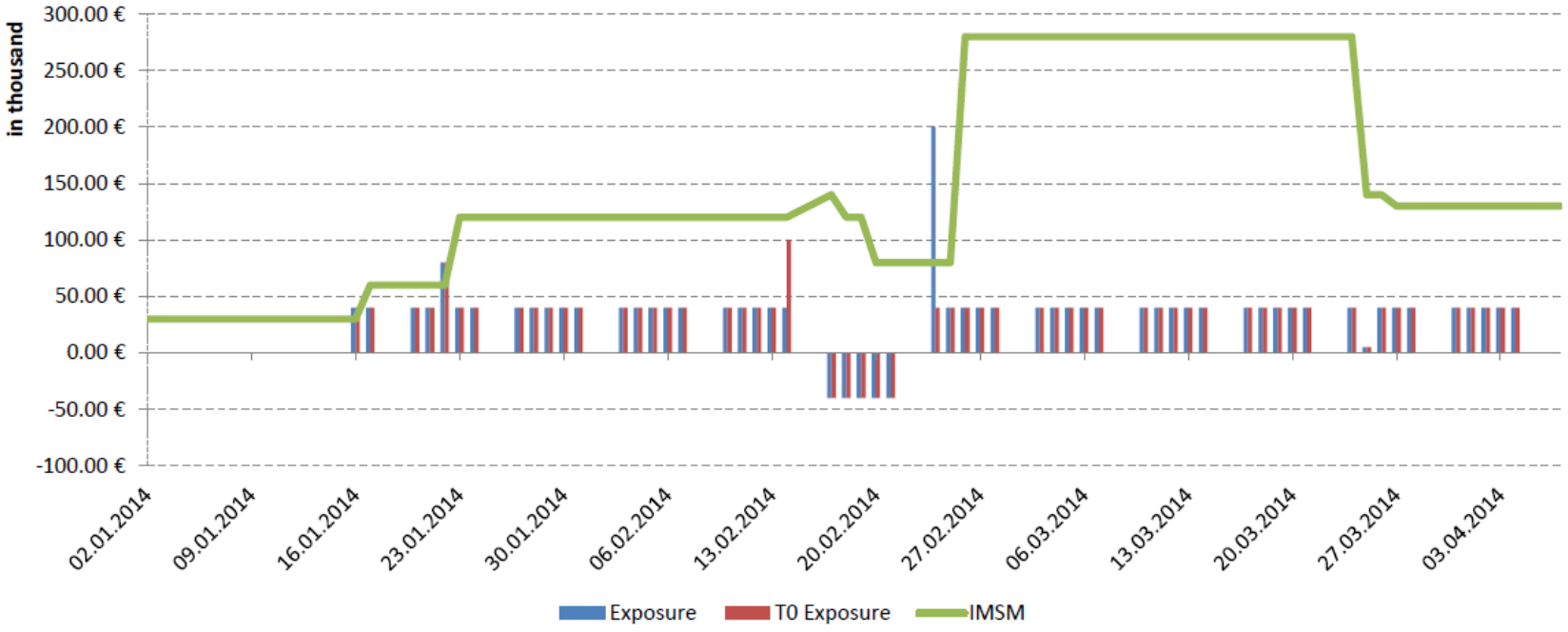
- Is based on net exposure position:
  - Purchases increase the exposure
  - Sales (at positive prices) decrease the exposure
  - When you buy and sell, the net figure is used for your exposure

- ECC working on tool for participants to forecast this exposure

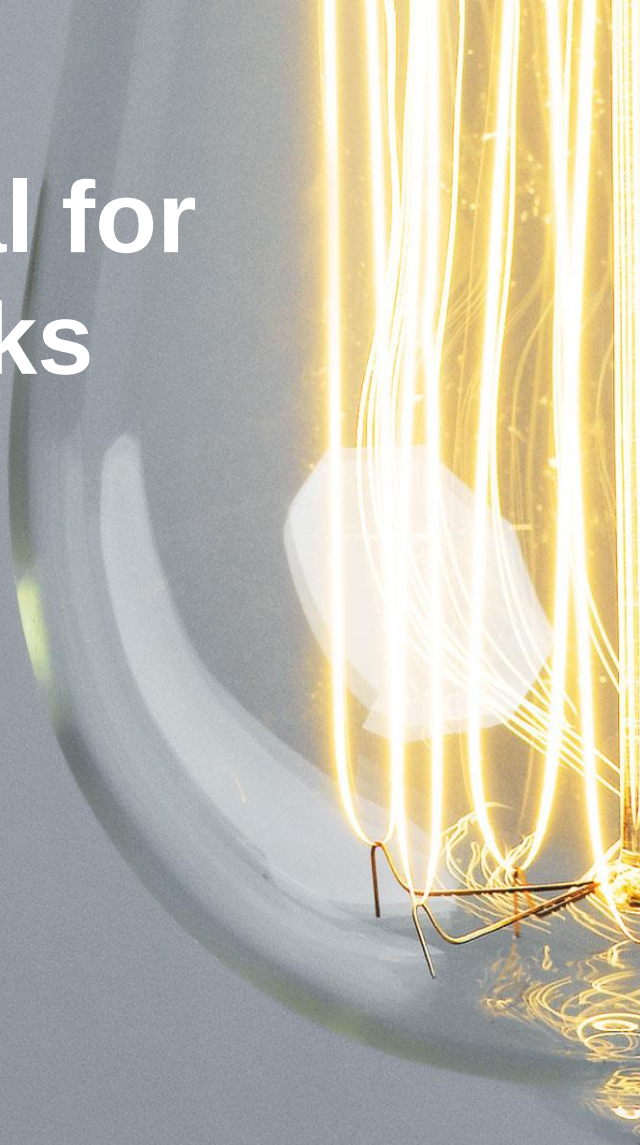
Clearing Bank – Initial Margin Example

Example setup:

- A trading participant buys frequently 1.000 MWh for 40€ per MWh with no weekend trading. This leads to a daily financial exposure 40.000 EUR per ECC business day
- Increased exposure of 80.000 EUR due to higher prices on 22th of January 2014
- Higher exposure due to trading behaviour: High buy volume in day ahead auction which was sold shortly afterwards (but after calculation cut off) for the 14th of February 2014
- Increased exposure due to trading on weekends for the 24th of February 2014



Topic 5: Collateral for settlement banks



Settlement Bank – Collateral

- Settlement banks do not use margins:
  - Margins are used where clearing banks gives a guarantee
  - Settlement banks do not provide this guarantee
  - Collateral is calculated on a different basis
  - Collateral must cover entire exposure of the bids

- Trading is strictly limited to the collateral held at the bank:
  - Cannot trade to an exposure beyond this limit
  - Always sufficient collateral funds to cover purchases

- Banks role is solely as a payment agent:
  - Collateral is used to guarantee the payment
  - Settlement bank does not take a role in risk management

Settlement Bank – Trading Limit

- Limit is set based on the funds held in collateral:
  - Trading is limited to the amount held
- Limit will need to cover non-working day trades:
  - Weekend trading; bank holidays; overnight
- As a general rule:
  - For the auctions 3 time daily exposure required to cover weekends
  - For intraday continuous 2 times daily exposure to cover nights and weekends
- Exposure is counted at the bid price not cleared price

Default Fund Contribution

- Default fund pays for defaults of banks:
  - Ensures payments are still made if a bank defaults

- Obligation is on clearing banks, where applicable:
  - Contribution is made by bank for all their clients
  - Cost of contribution may be passed to their clients

- Obligation is on participants for settlement bank users:
  - Must be included in collateral funds held at the banks
  - Required in addition to the collateral needed for the trade limit
  - 4% of collateral is required (i.e. total funds which need to be posted = collateral for desired trade limit * 104%)

Settlement Bank Example – Sell Order

- Sell 10 MW in all hours at minimum price of €0
  - Collateral for pre-trade limit = €0 (bid price) * 10 MW = **€0**
  - Default Fund = 4% * Collateral = **€0**
  - Total funds necessary = **€0**

- No exposure created by sell order:
  - Will only accept positive prices
  - No exposure to ECC; therefore, no collateral required
  - No default fund due to no collateral requirement

- Exposure would be created by a price taking order:
  - Bid price would be -€500
  - Collateral and default fund contribution would be required

Settlement Bank Example – Negative Price

- Sell 10 MW in all hours at minimum price of -€500
  - Collateral for pre-trade limit = -€500 (bid price) * 10 MW * 24 hours
  - Collateral required = **€120,000**
  - Default Fund = 4% * Collateral = **€4,800**
  - Total funds necessary = **€124,800**

- Exposure created by negative price:
  - Bid price is used for exposure
  - Negative price could lead to participant owing ECC money
  - Collateral required for trading limit to enter these bids
  - Collateral required even if clearing price if positive

- **Note: this would also apply to a purchase**

Settlement Bank Example – Buy and Sell

- Sell 10 MW in all hours at min price of €0
- Buy back 5 MW in 5 hours at maximum price of €50

- No exposure on sell order; exposure on buy order
  - No netting occurs, exposure is calculated on a gross basis

- Collateral requirement determined by buy order:
  - Collateral for pre-trade limit = €50(bid price) * 5 MW * 5 hours
  - Collateral required = **€1,250**
  - Default Fund = 4% * Collateral = **€50**
  - Total funds necessary = **€1,300**

Topic 6: Course Summary

Useful Links

- ECC Clearing House Conditions
  - https://www.ecc.de/ecc-en/about-ecc/rules/clearing-conditions
- SEMOpx rules and operating procedures:
  - http://www.sem-o.com/ISEM/Pages/SEMOpxrulesandprocedures.aspx
- ECC webpage for invoicing:
  - https://www.ecc.de/ecc-en/operations/invoicing

Review of Learning Objectives

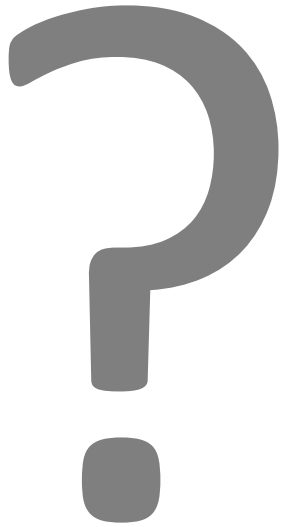
After completing self-learning and instructor-led training for this course, you should understand:

The banking options available to SEMOpx members 

The credit cover arrangements required for SEMOpx participation 

The effect of the choice of banking option on credit cover 

Questions



Thank You!

Thank you for your time and engagement during this session.

Please take the time to share your feedback with us by completing the short feedback survey before you leave.