SEMOpx IDM Continuous

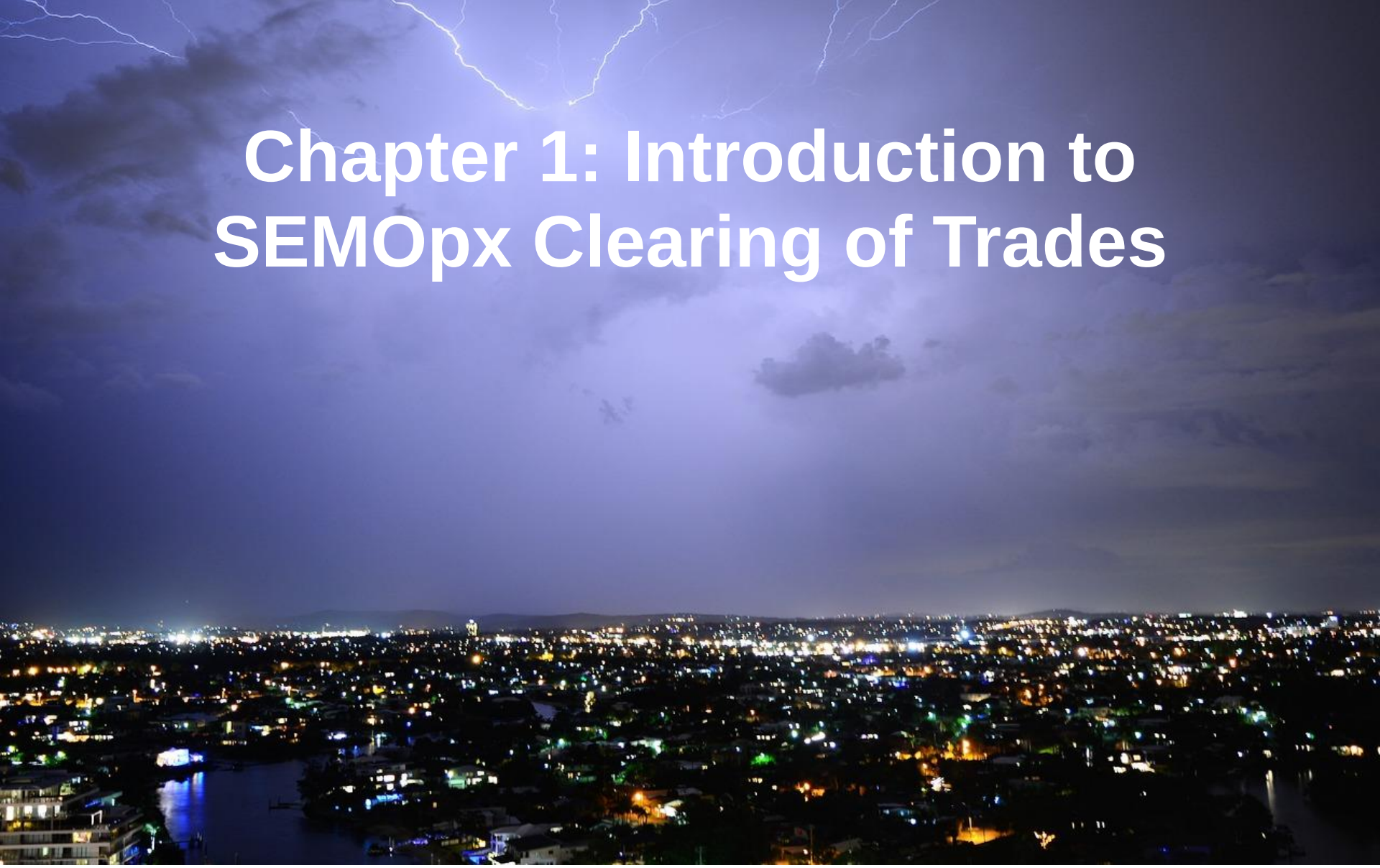
March 2021
Version 2

Contents

Learning Outcomes

This document will provide you with an understanding of:

- The process for trading in SEMOpx Intraday continuous market
- How each order clears in the SEMOpx Intraday continuous market
- Overall process from bidding to nomination



Chapter 1: Introduction to SEMOpx Clearing of Trades

SEMOpx Trading

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

- Provides trading services to the SEM ex-ante markets:
  - Day-ahead auction
  - Intraday auctions
  - Intraday continuous trading

- SEMOpx have procured EPEX as service provider for these services:
  - Operate the trading systems for auctions and continuous trading
  - Perform auctions and other operations
  - Provide reporting services related to trading (e.g. REMIT)

Glossary of trading terms

Term	Description
Order	• Bid to buy or offer to sell • Submitted by participants to SEMOpx for auctions and continuous
Product	• A pre-defined way of inputting orders to SEMOpx • Multiple products exist, each offering a different way to bid • Different set of products for different market segments
Trade	• Order which has been accepted • Not yet a contract; not binding on the participant

Clearing Definition

Term	Definition
Clearing	The process of equalling supply (in this case, generation of electricity) and demand (in this case, consumption of electricity) in a market. In electricity markets, clearing depends on the prices – the cheapest generation will be accepted to match the consumption willing to pay the highest prices, until these are equal.
Clearing Price	The price determined from the highest accepted offer to sell and the lowest accepted bid to buy, the price which causes quantities of supply and demand in a market to be equal.
Clearing Volume	The volume at which offers to sell (ordered from cheapest to most expensive) and bids to buy (ordered from highest price willing to purchase to lowest), are equal. Beyond this volume, participants offered too expensive a price to sell, or too low a price to buy, which were not accepted (not “cleared”) by the market.

Trading Steps – Basic Steps

- Same high level steps apply to auctions and continuous trading

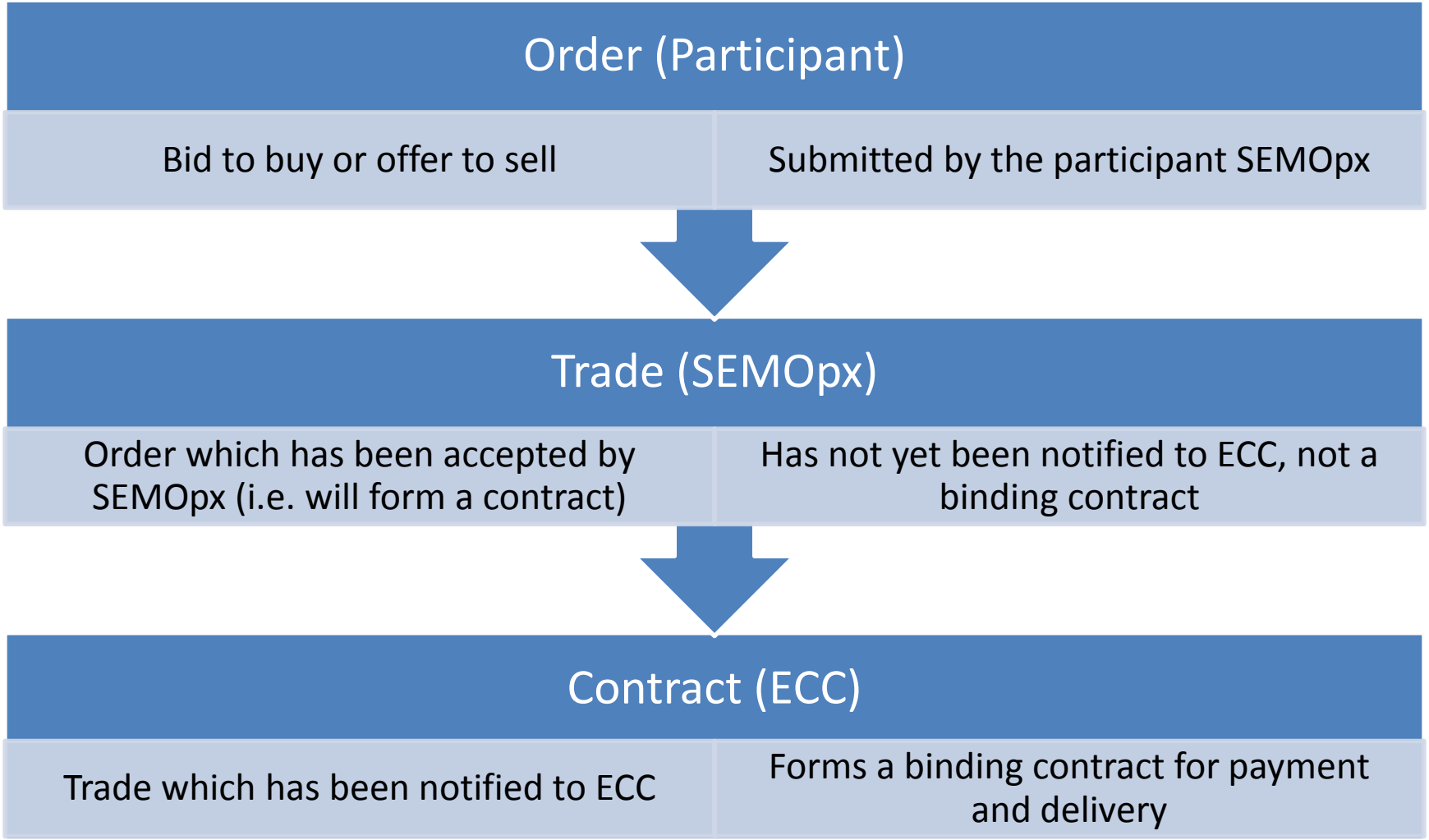
- Participant submits their order:
  - Bid to buy or offer to sell
  - Orders must use a pre-defined set of products

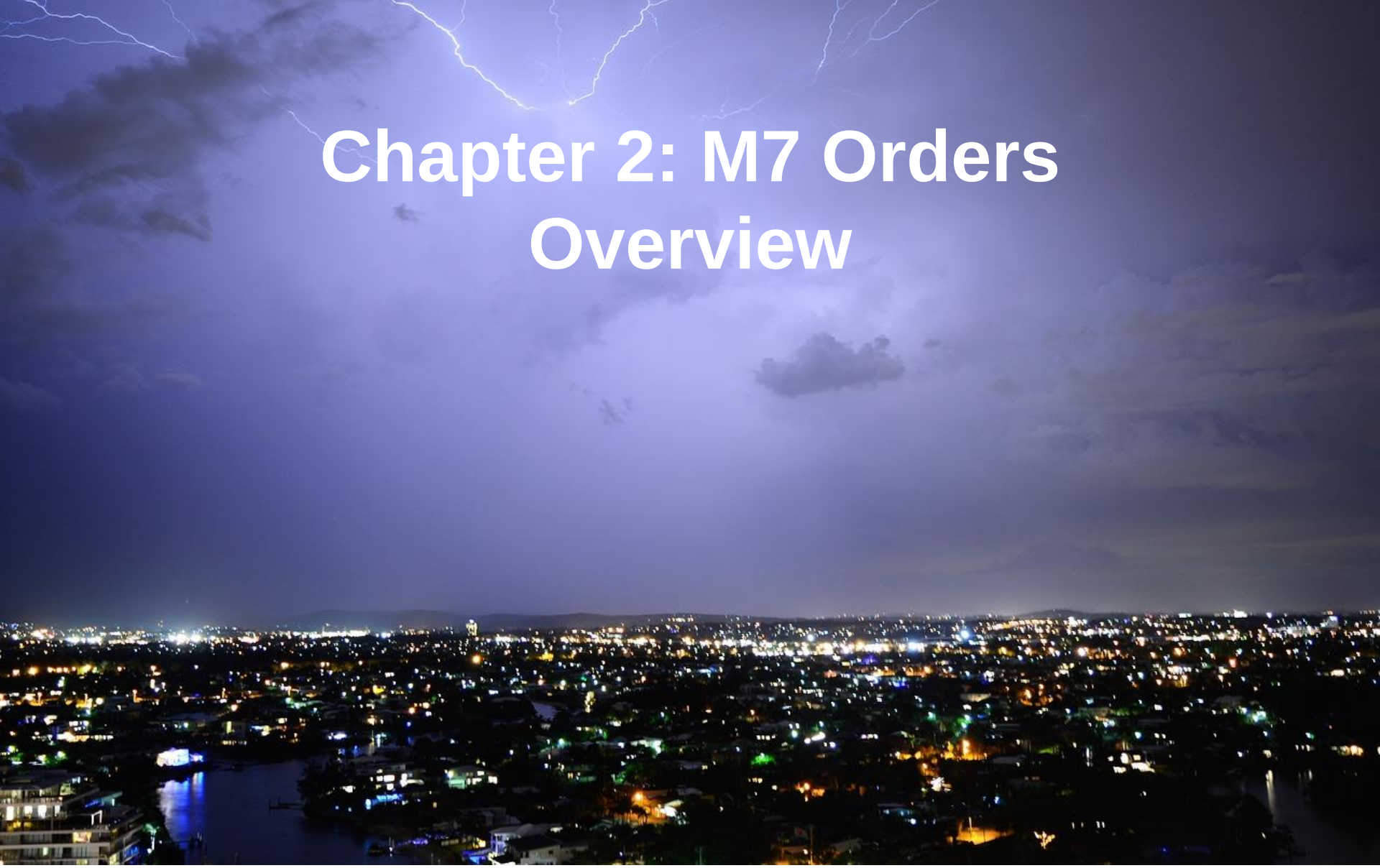
- SEMOpx performs a matching process:
  - Process to determine if an order is cleared or not
  - Different process for auction and continuous trading

- SEMOpx determines the set of cleared orders

- SEMOpx sends cleared orders to ECC for settlement:
  - On sending to ECC, the cleared trades become contracts

Flow of a trade - Diagram

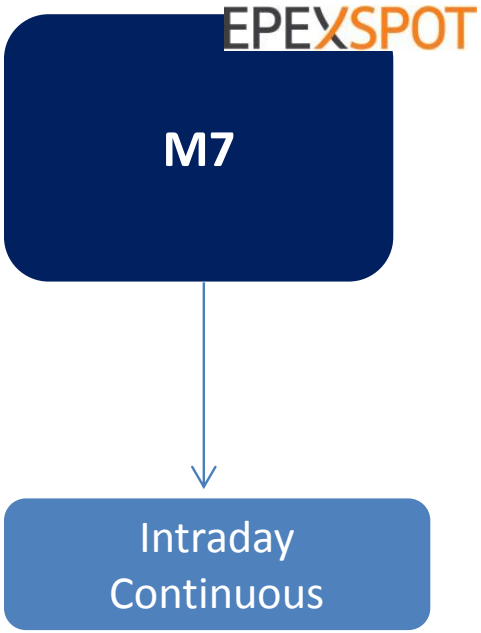




Chapter 2: M7 Orders Overview

M7 Orders

- M7 is the trading system used by SEMOpx for the Intraday Continuous market
- All continuous market orders are submitted through M7



Chapter 3: Clearing of trades

SEMOpx Intraday Continuous Trading

- The SEMOpx Intraday Continuous Market trading day is divided into 48 (30 minute) trading periods, compared with 1-hour periods in the Day Ahead Market. D-1 and D are the day D and the day before D. Both days start at 23:00. The market opens after the Day Ahead Auction Closure, D-1, runs continuously and closes 60 minutes ahead of every 30 minute trading period. The trading day starts at 23:00 D-1 and lasts until 23:00 D.

- The SEMOpx Intraday Continuous Market allows market Participants to adjust their physical positions closer to real time. The need to do so can arise for a number of reasons, including orders failing to clear in the Day Ahead Market, new information becoming available (for example plant failures and forecast changes), and congestion on interconnectors driving price differentials between zones, and assetless traders wishing to exit their positions. This market offers a huge amount of flexibility as Participants can trade themselves out of their contracted positions 24/7.

- Trading in the SEMOpx continuous market is local only (i.e. trades in the SEM only with no cross border trades).

Continuous Clearing of Trades

- Within-zone bids and offers for each 30-minute trading period (t to t+0.5) are matched continuously and paid-as-bid.
- Orders are stored in order books, which are visible to all traders. Orders are matched on a first-come-first-served basis (no social welfare optimisation is performed) using the time stamp of the order when entered into the order book.

For example, if the order book contains two offers:

Order 1 – 16:00:00 Sell 10 MWh @ €50

Order 2 – 16:00:01 Sell 30 MWh @ €40

And a bid is received:

Order 3 – 16:01:00 Buy 20 MWh @ €80

Order 3 is executed in the following order:

1. 10 MWh @ €50 from order 1
2. 10 MWh @ €40 from order 2 (if not restricted from partial execution)

- As indicated in this example, offer and bid quantities may be partially executed and, depending on the restrictions attached to the order, any residual quantity is either retained in the order book for further matching or cancelled. Any bids and offers, whole or partial, that cannot be matched when the submission gate closes at t-1 are cancelled

Continuous Clearing of Trades

To be immediately executable in the Price-time matcher, an order must be:

- An order, where opposite side already exists in the Order book;
- An order to buy at a price at or above the lowest offer in the Order book;
- An order to sell at a price at or below the highest bid in the book

If however that fails and the order is not matched immediately upon instruction, it is entered into an order book then following matching rules will apply:

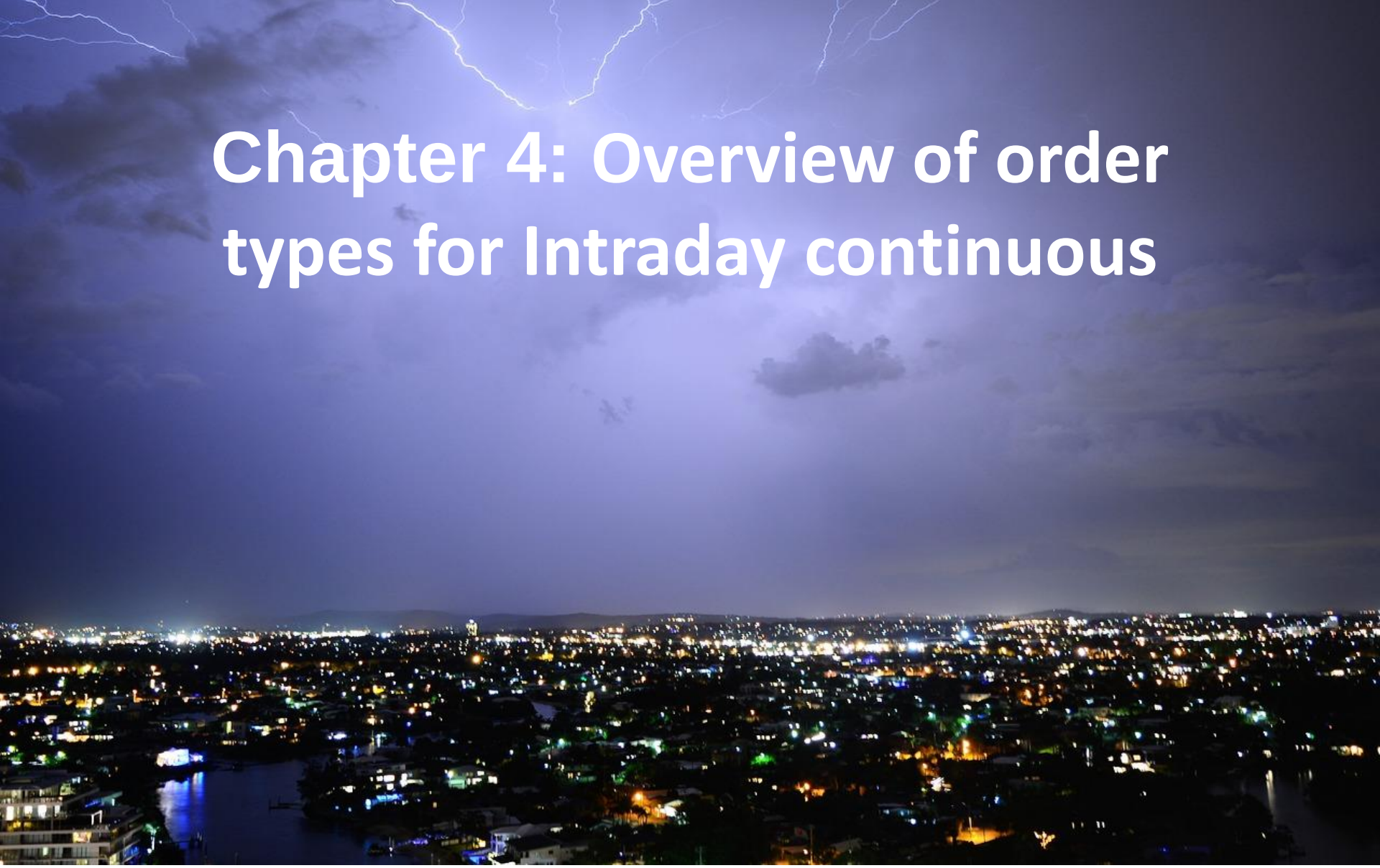
- order with the best price will be selected for execution.
- If there is more than one order with the best available price then the order with the older time stamp will be executed first.

In the example above, order 2 is the best price order on sell side and stays in the order book on the top (before order 1) as best ask order. Order 3 which has been entered as aggressor order later on will match against the best sell order 2 and thus:

- Trade will be between order 2 and order 3 (20 MWh @ €40) and the price of order 2 will be taken into account.
- Order 2 with 10 MWh @40 will remain completely in the order book.

In case order 3 would have 35 MWh @ €80 then the execution plan would be the following:

- 1. Execution of 30 MWh @ €40 from order 2
- 2. Execution of 5 MWh @ €50 from order 1
- 3. In that case 5 MWh @ €50 from order 1 remain in the order book.



Chapter 4: Overview of order types for Intraday continuous

*Trade Cancellation Process

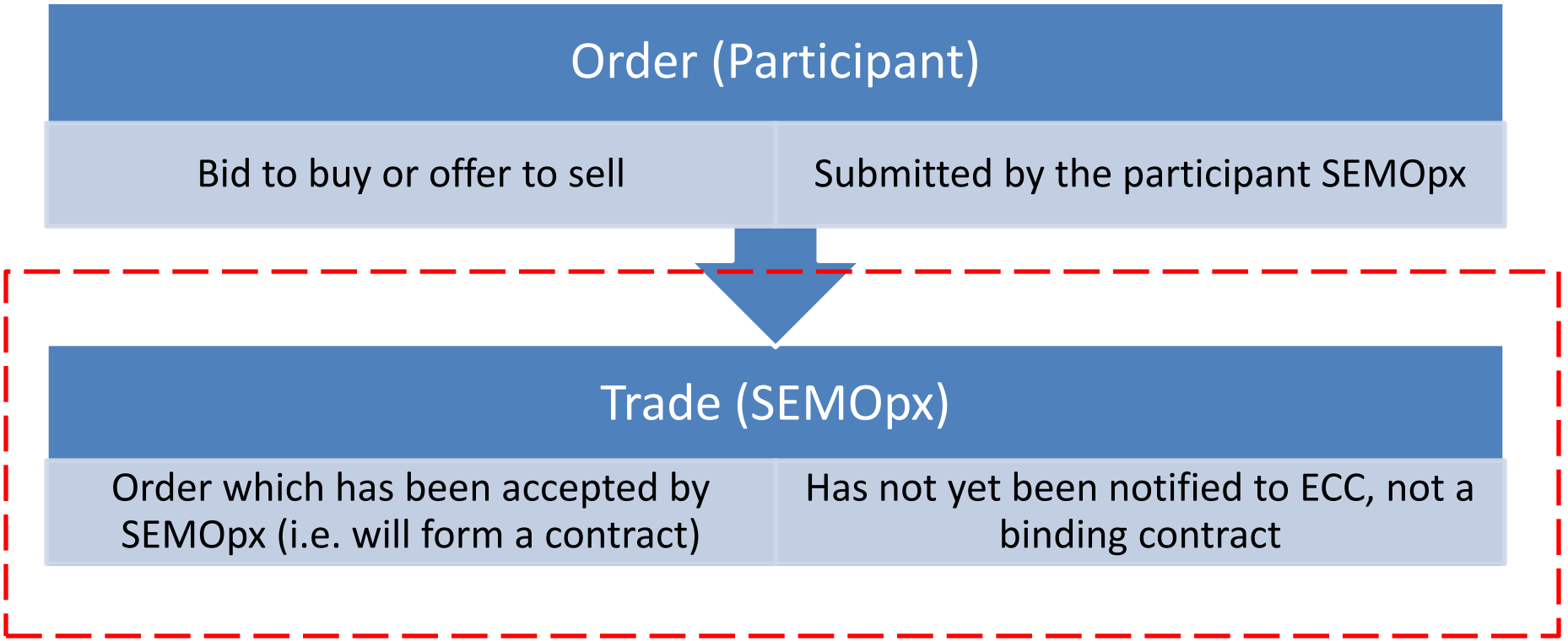
- Process to cancel trades before they become binding

- Used to cover cases of manifest error:
  - Error in submission of order

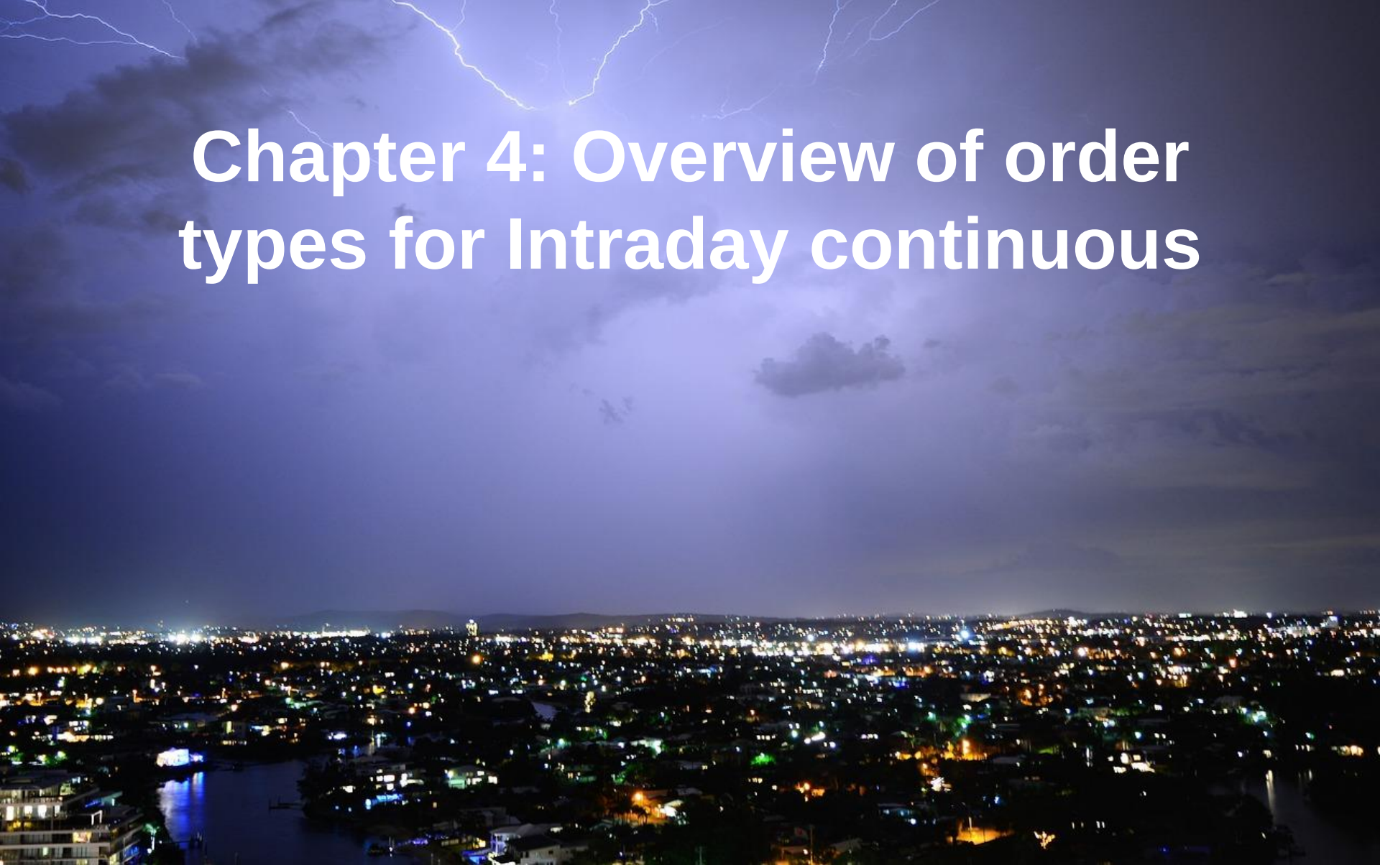
- Participant contacts EPEX operations:
  - EPEX assess if trade can be cancelled
  - Strict timeline – must be before trade is notified to ECC
  - Cancels the trade before being sent to ECC
  - Cancels both legs of the trade (i.e. buy and sell)

*subject to confirmation with service provider

Flow of a trade - Diagram



- Process must take place after acceptance but before contract formation
- Only applies on an exceptional basis



Chapter 4: Overview of order types for Intraday continuous

Intraday Continuous Trading

- Allows for trading continuously:
  - Participants enter orders to buy or sell energy
  - SEMOpx displays the order book of active orders anonymously
  - Participants can match their order with ones they see in the order book on a continuous basis
  - Once an order is matched to another, a trade is created

- Trading is open up to one hour ahead:
  - Trading can take place at any time up to the close of trading
  - Trading available overnight

- Runs in parallel to the auctions:
  - Continuous trading is not suspended when auctions are occurring

Continuous Market Orders

- A summary of each of the order types available in the IDC trading system is presented in the following slides.

Simple Orders	• PQ pairs with execution conditions attached • Orders aggregated into hourly curve
* Block Orders	• Block of energy covering multiple trading periods • Only pre-defined blocks allowed

**** Subject to successful PCR testing***

Continuous Market Orders – Simple Orders

- Simple orders:
  - Price quantity pair(s)

- Fill-or-kill:
  - Order should be fully accepted or fully rejected immediately
  - Does not allow for partial acceptance

- Immediate or cancel:
  - Order should be accepted immediately or cancelled
  - Allows for partial acceptance of the order

- All or none:
  - Order must be matched for full amount, no time limit

Continuous Market Orders – Simple Orders

- Good for session:
  - Order is valid until trading is closed for the product
  - I.e. order is valid until 1 hour before delivery

- Good till Date:
  - Order is valid until a particular time
  - Time is set by the user when entering the order

- Iceberg order:
  - A larger order is displayed as a series of smaller orders
  - When one part of the order is accepted, the next becomes available
  - Allows users to hide the full extent of their buy/sell
  - E.g. a 100MW order may be broken into 4x25MW order

Iceberg Order - Example

- Generator X has 200 MWh to sell in hour 4

- Generator X feels that they can sell for the following prices:
  - 200 MWh @ €40; or
  - 50 MWh @ €50
  - Based on idea that if energy is more scarce, price will be higher

- Generator X uses an iceberg order to split generation:
  - Split 200 MWh into four parts of 50 MWh
  - Able to sell each 50 MWh piece at a higher price
  - As each 50 MWh piece sells the next one becomes available
  - No need to manually post each 50 MWh piece of the order

Iceberg Order - Example

Original → 200 MWh @ €40

Iceberg →

50 MWh @ €50	50 MWh @ €50	50 MWh @ €50	50 MWh @ €50
	Visible		Not Visible

- The original order if accepted at the bid price will net €8,000
- By splitting the order, the bid price can be increased to €50
- The iceberg order, if accepted at the bid price, will net €10,000

Continuous Market Orders – Block Orders

- Block order:
  - Block of energy with a single price
  - Price reflects per unit cost of the block
  - Block may span multiple trading periods
  - Entire block will be considered as one (unit price x volume)

- Pre-defined block:
  - Block for pre-defined time periods set by SEMOpx
  - Allows for ease of access to commonly traded periods
  - None defined for go-live due to lack of information on trading
  - Can be explored further in discussion with exchange committee

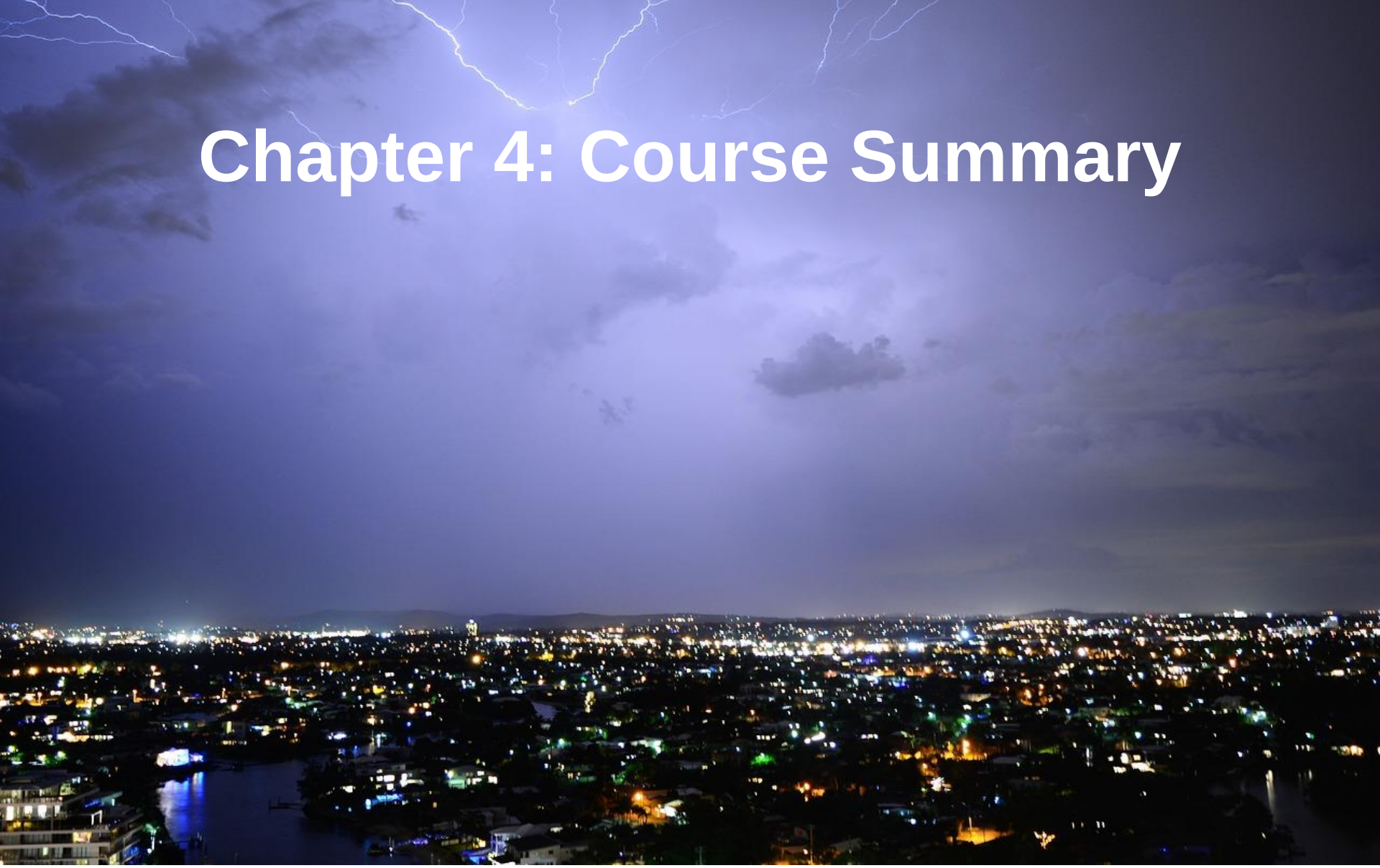
Pre-defined block orders

- Pre-defined blocks covering multiple trading period:
  - Range of blocks available
  - Attempt to cover most popular times (e.g. peak, baseload etc.)
  - List aligns with the pre-defined blocks of the auctions
  - List can be updated over time based on participant feedback

- Can be of use for generators:
  - Ensures a number of consecutive periods are offered
  - Can sell consecutive hours if not committed and need a long schedule
  - Can buy a number of hours to cover an outage
  - Allows more extensive volumes than small adjustments

Block order - example

- Generator X trips after the IDA1:
  - Needs to buy back 8 hours of production
  - First half of day will be unavailable in IDA2
- May not clear all simple orders:
  - Reliant on each buy going through individually
  - Reliant on finding 16 different sellers
- Block allows whole outage to be bought at once
  - May allow for other sellers (e.g. non-committed unit)
  - Note that pre-defined blocks may not cover time of outage perfectly



Chapter 4: Course Summary

Review of Learning Outcomes

This document should give you an understanding of:

The clearing process for SEMOpx trades ✓

How each order clears in the auctions ✓

Overall process from bidding to nomination ✓

If you do have any questions please do contact info@semopx.com