SEMOpx Auctions Clearing

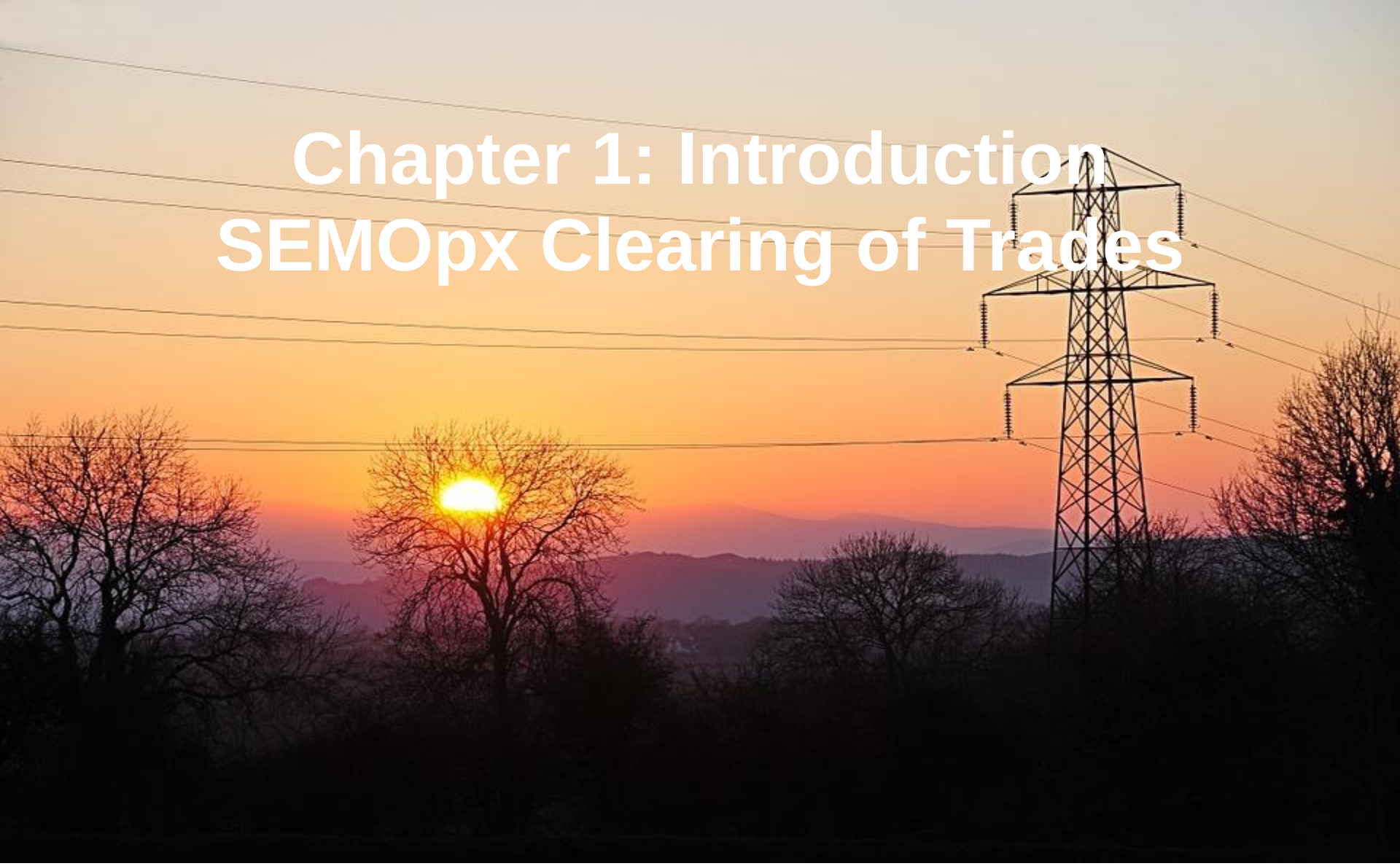
Version 2
March 2021

Contents

Learning Outcomes

This document will give you an understanding of:

- The clearing process for SEMOpx trades
- How each order clears in the auctions
- Overall process from bidding to nomination



Chapter 1: Introduction SEMOpx Clearing of Trades

SEMOpx Trading

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

- SEMOpx provides trading services to the following 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
Transaction	• 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

- The 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

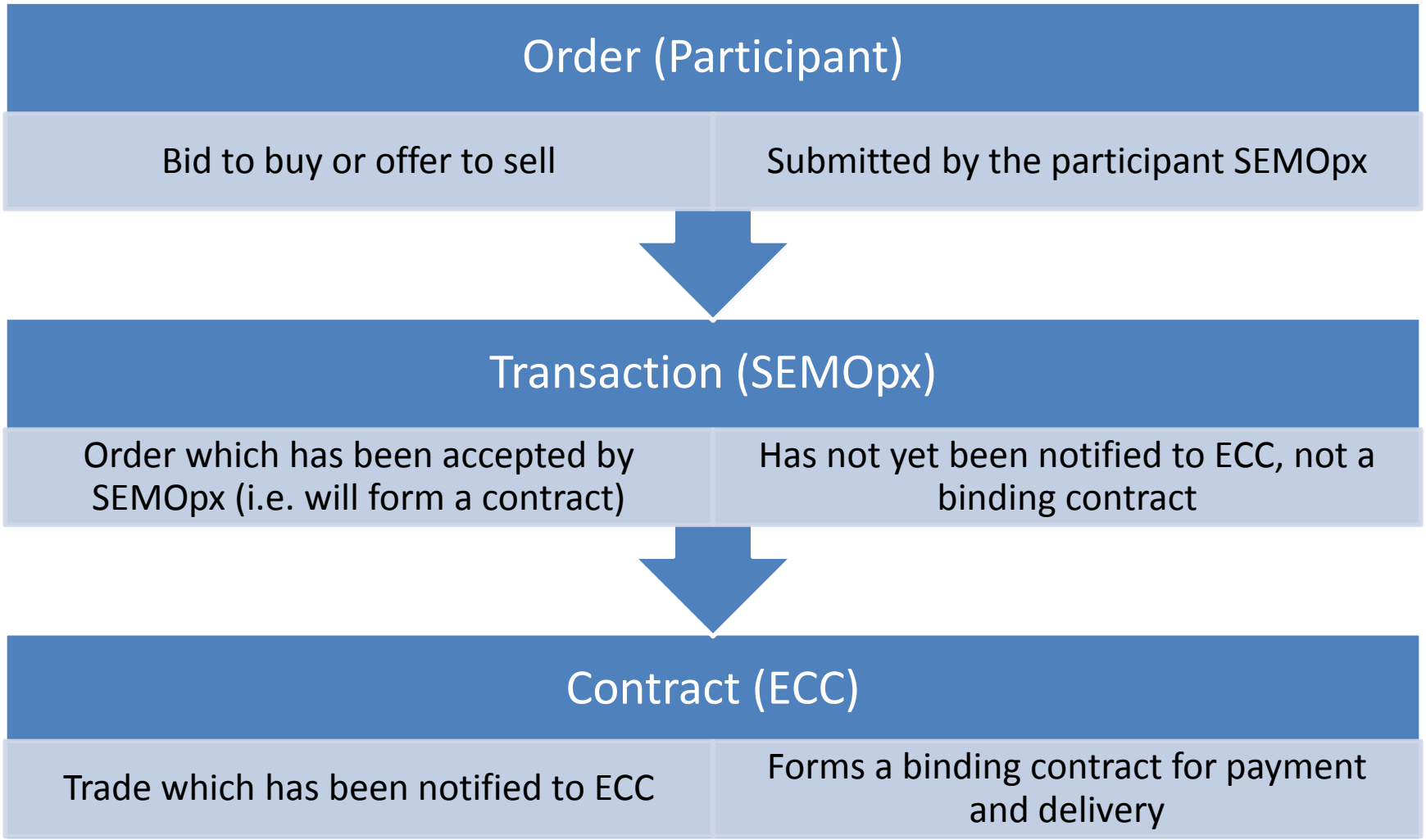
- SEMOpx performs a matching process:
  - Process to determine if an order is cleared or not
  - Different process for auction and continuous trading

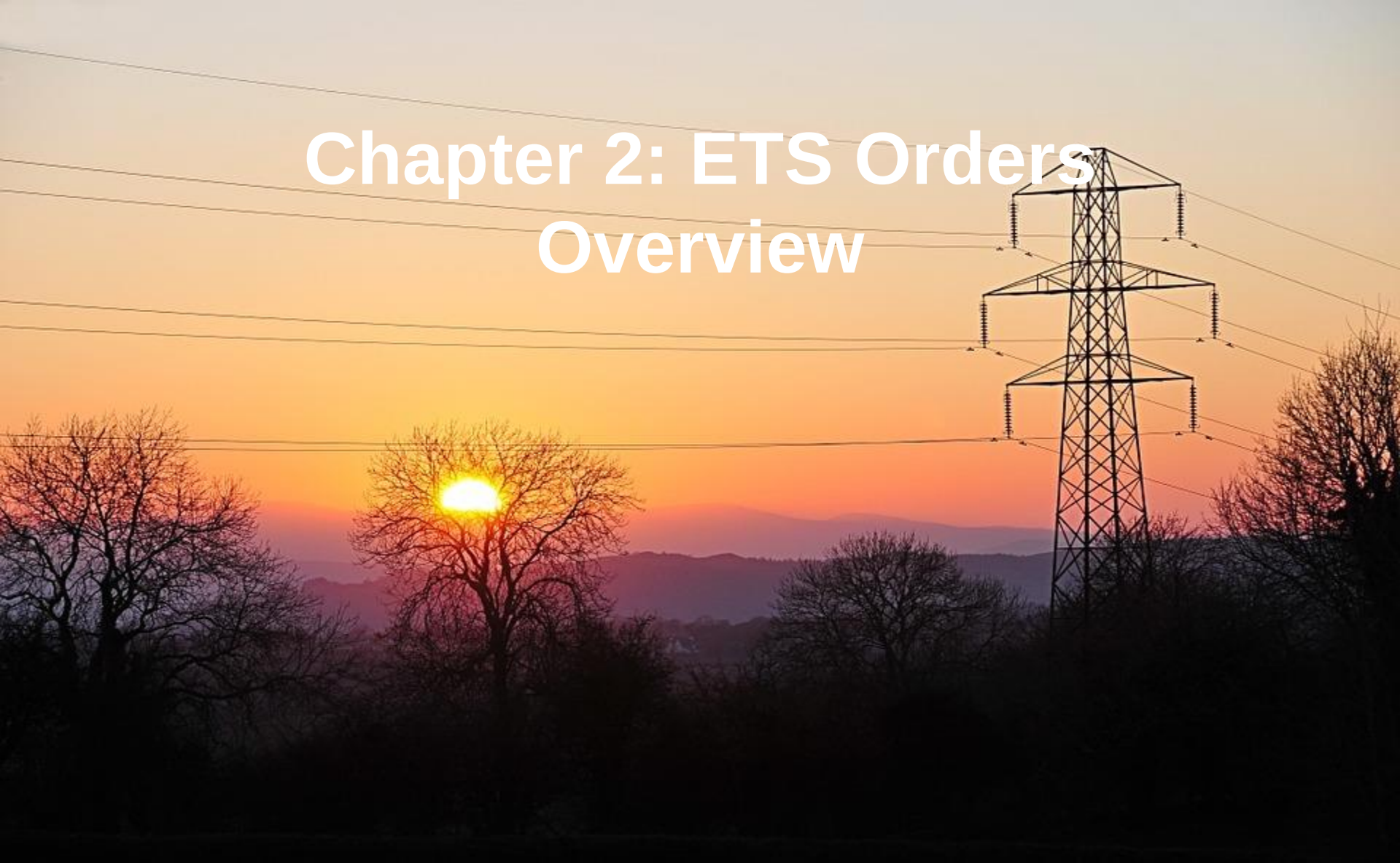
- SEMOpx determines the set of cleared orders

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

- This flow is illustrated in the diagram on the next slide.

Flow of a trade - Diagram





Chapter 2: ETS Orders Overview

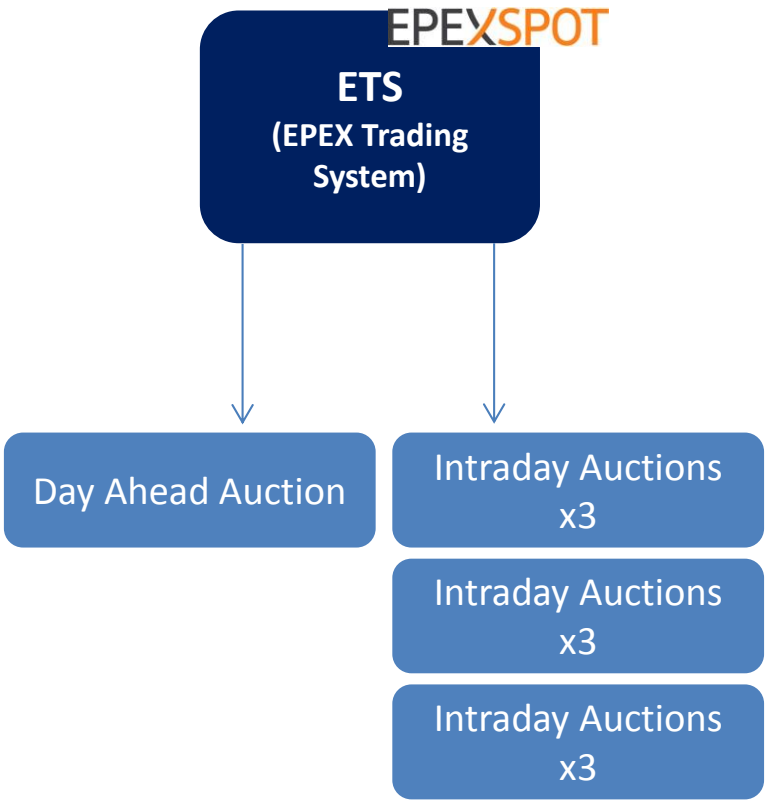
Recap of Auction Timings

The table below summarises the SEMOpx auctions:

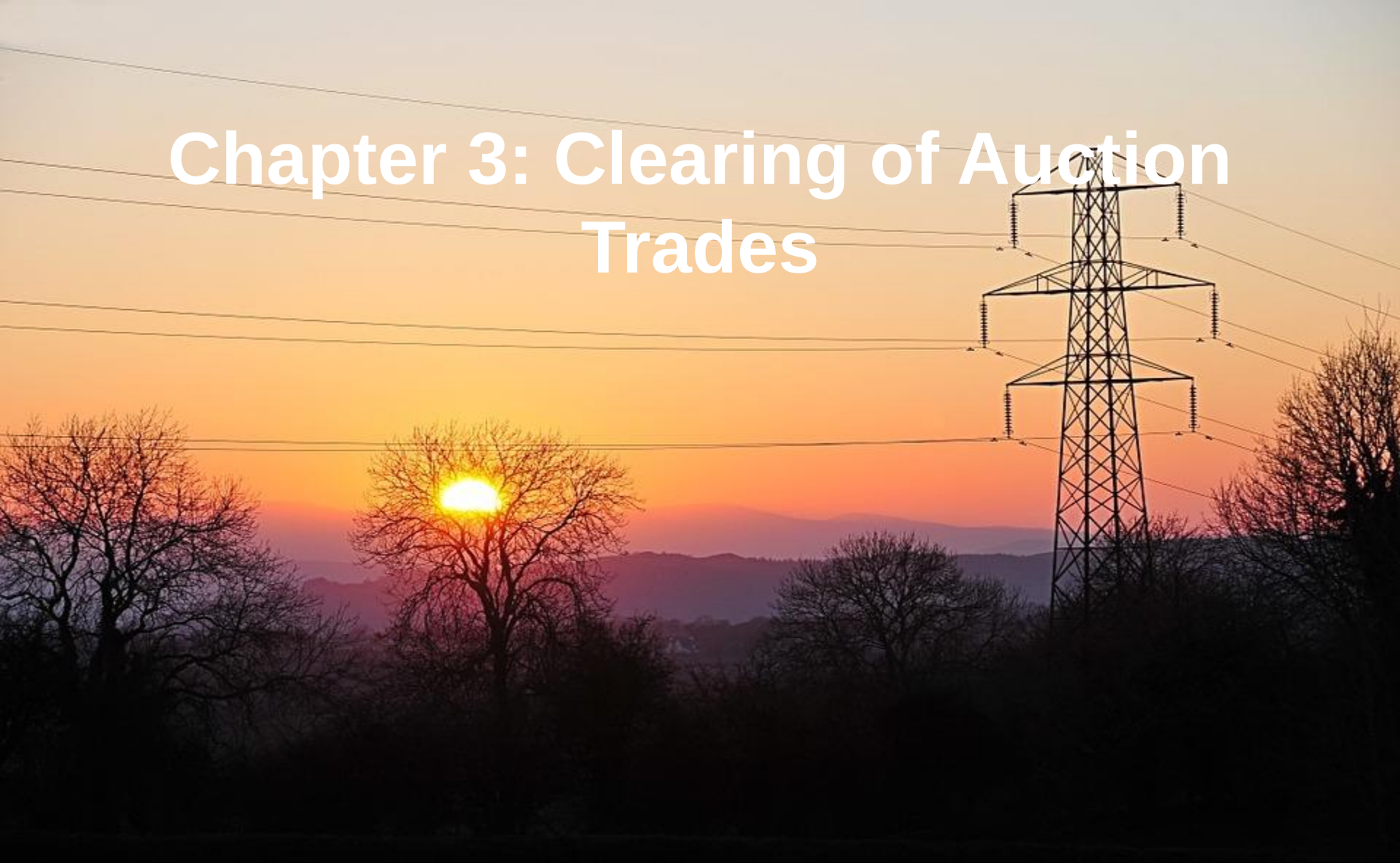
Market Name	Trading System	Gate Window Closure	Delivery Periods	Market Coupling
DAM	ETS	11:00 (D-1)	23:00 – 23:00 (24 * 1 hour)	Local trading only
IDA – 1	ETS	17:30 (D-1)	23:00 – 23:00 (48 * ½ hour)	Coupled with GB
IDA – 2	ETS	08:00 (D)	11:00 – 23:00 (24 * ½ hour)	Coupled with GB
IDA – 3	ETS	14:00 (D)	17:00 – 23:00 (12 * ½ hour)	Local trading only

ETS Orders

- As illustrated below, orders are submitted through ETS for auctions:



Chapter 3: Clearing of Auction Trades



Auction Clearing

- In the day-ahead and intraday auctions, market participants submit orders (bids to buy, offers to sell) to their respective Market Operator. After auction gate closure, all bids and offers are aggregated into two curves for each delivery hour; an aggregate demand curve and an aggregate supply curve.

- The goal of the centralised price coupling platform is to decide which orders to execute and which to reject and publish prices such that:

- The social welfare (consumer surplus + producer surplus) generated by the executed orders is maximised.

- The flows resulting from the executed orders do not exceed the capacity of the relevant network.

- The price for each hour is determined by the intersection of the aggregate supply and demand curves which are representing all bids and offers for the entire price coupling region. All producers that are cleared to produce, and all consumers that are cleared to consume, in a specific hour are paid/pay according to the market price.

- This is a marginal pricing approach, where the price received and paid by all cleared participants in an hour represents the price of activating the last MW of power.

Auction Clearing

- The diagram below illustrates Auction Clearing supply and demand curves:

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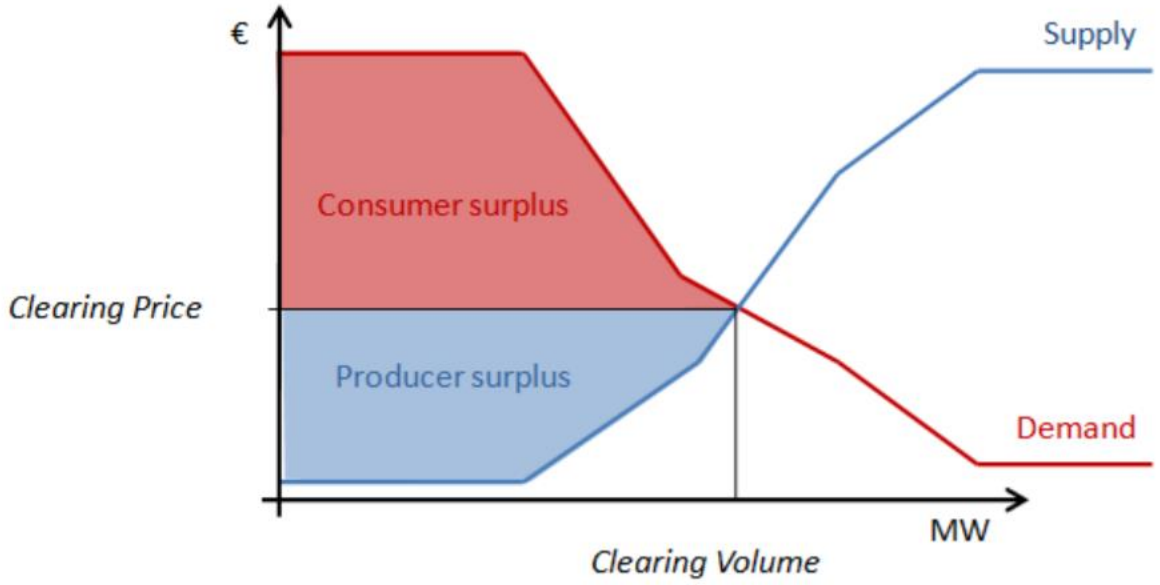
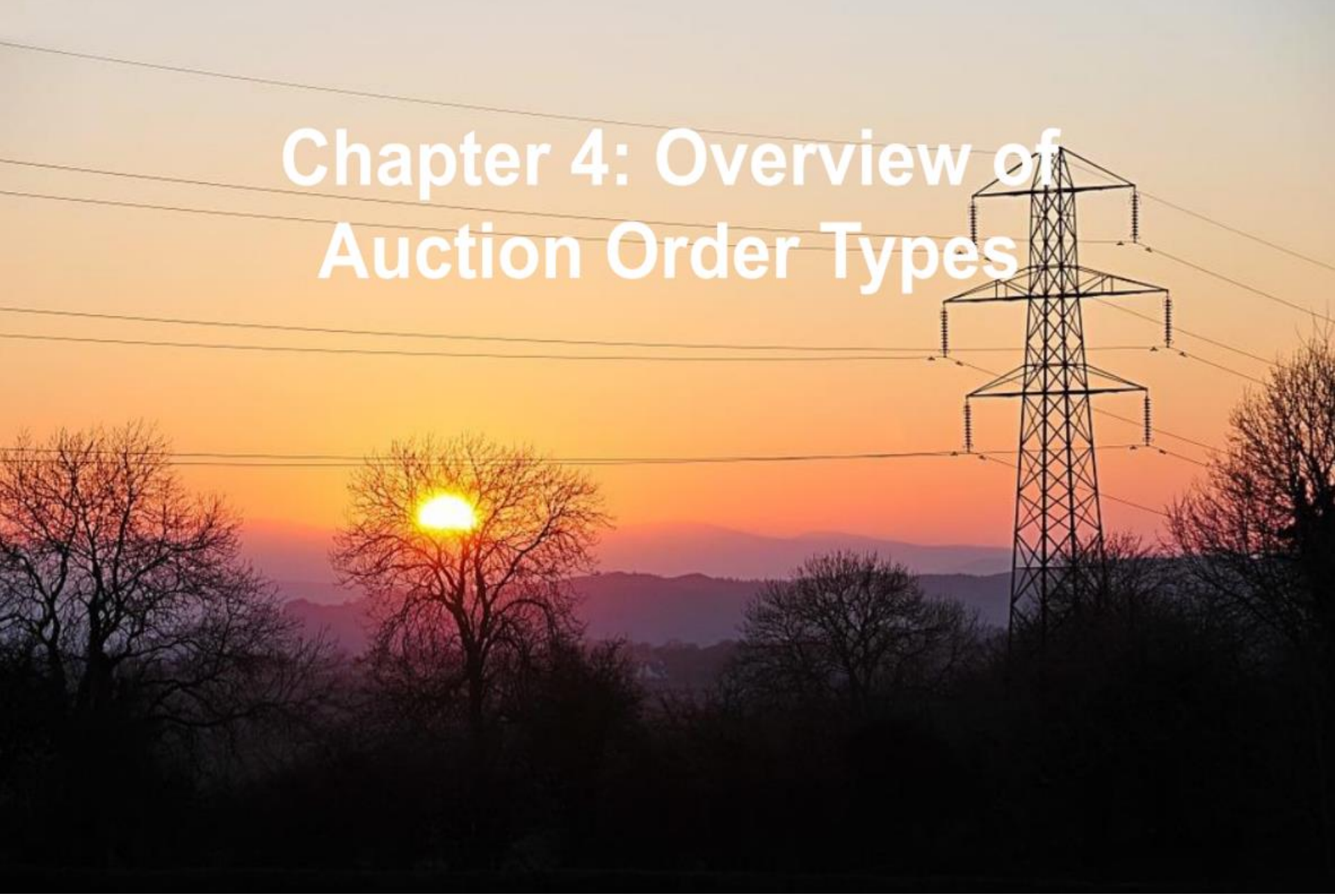


The price for each hour is determined by the intersection of the aggregate supply and demand curves which are representing all bids and offers for the entire price coupling region

Auction Clearing – Market Coupling

- System of linking markets together:
  - Local trading for DAM; with GB for IDA1 and IDA2
  - Central body produces single set of results across all markets
  - Single set of market prices, volumes and interconnector flows

- Coupling solution provides a global solution:
  - Transfers social welfare (i.e. consumer or producer surplus) between markets
  - Arrives at the solution with highest welfare across all markets
  - This includes scheduling the interconnectors to transfer energy
  - Typically means export from cheap market to more expensive market


Chapter 4: Overview of
Auction Order Types

Appendix – Auction Order Type Overview

- The products available in EUPHEMIA, i.e. the algorithm to be used for the DAM and IDAs for SEMOpx are shown below.

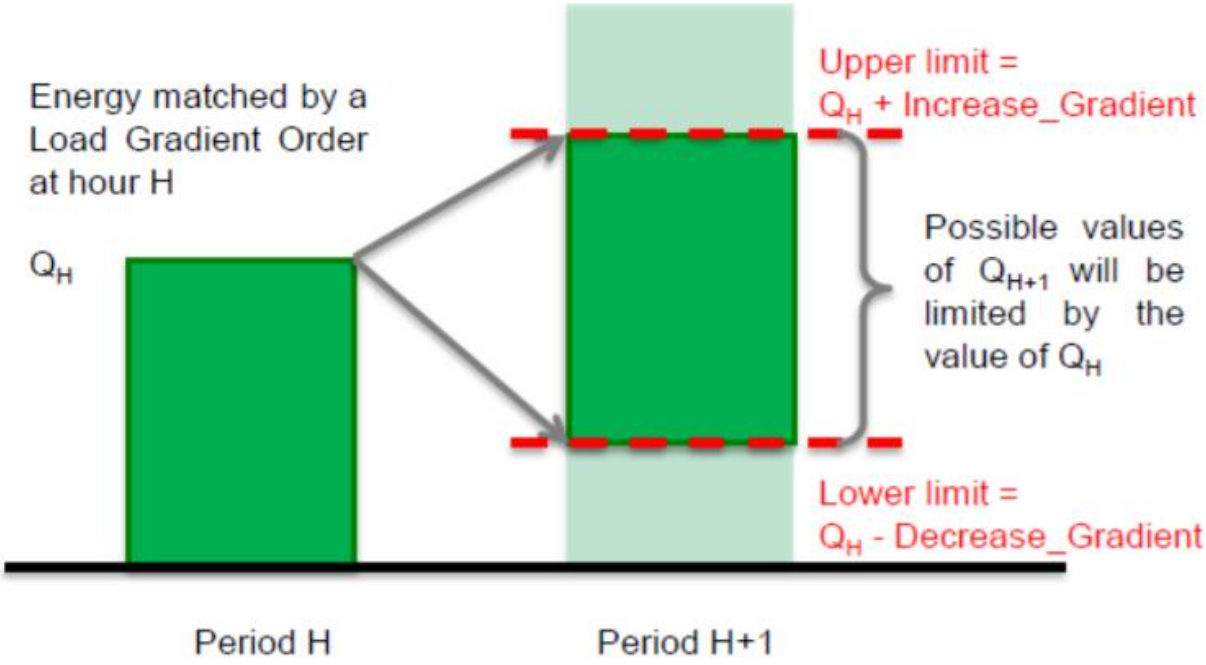
Simple Orders and Complex Orders

- Simple orders are price quantity pair(s) (PQ pair(s)) orders for supply or demand (buy or sell). The rules that apply for the acceptance of simple orders are the following:
  - Any order in-the-money (in merit) must be fully accepted.
  - Any order out-of-the money (out of merit) must be rejected.
  - Orders at-the-money (marginal) can be either accepted (fully or partially) or rejected.

- A complex order is a simple order (PQ pair or set of PQ pairs) submitted on behalf of a unit or trading portfolio, covering one or more trading periods which is subject to a complex condition. Complex conditions are of two types:
  - Minimum Income Condition (with or without scheduled stop), and
  - Load Gradient.
  - Participants may submit as many or as few conditions as they want
  - At least one condition must be set for the complex order to be accepted

Complex Orders – Load Gradient Condition

- Load gradient limits movement in volume between hours:
  - Single load gradient (ramp rate) applied to all hours
  - Load gradient defined separately in up and down direction
  - Change between hours cannot exceed the load gradient



Complex Order – Minimum Income Condition (MIC)

- Minimum Income Condition defines the minimum revenue required for the order

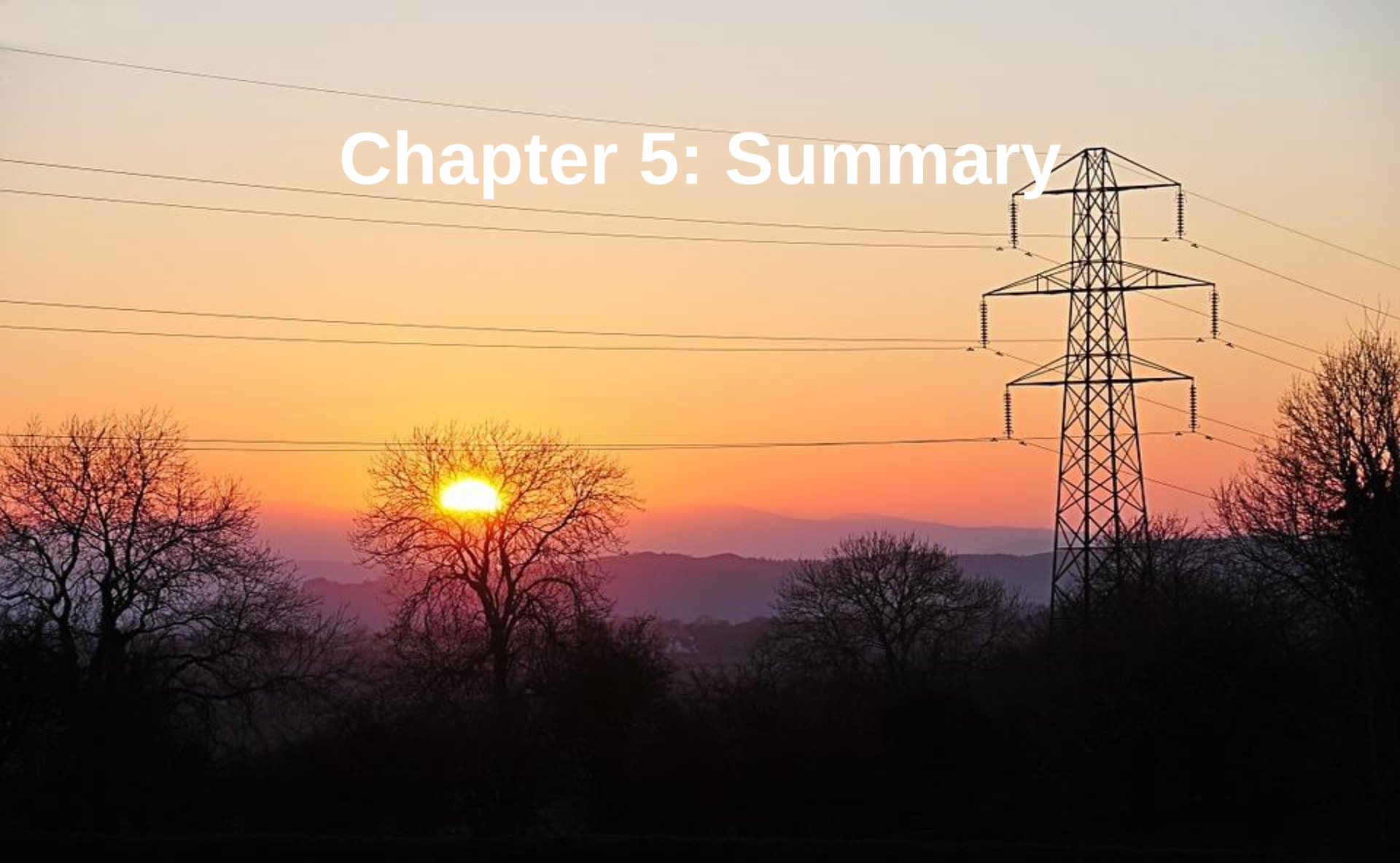
- Two MIC variables can be defined:
  - Fixed term (FT) MIC
  - Variable term (VT) MIC

- FT provides a fixed bundle of cost to recover

- VT is a per MWh cost:
  - Volume of the schedule is multiplied by the VT

- Order can only be accepted if total MIC (FT + VT) is met

Chapter 5: Summary



Review of Learning Outcomes

After reviewing this training material you should understand:

The clearing process for SEMOpx trades 

How each order clears in the auctions 

Overall process from bidding to nomination 

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