



SEM Integration Project  
November 21st 2011

# Timeframes of the Target Model

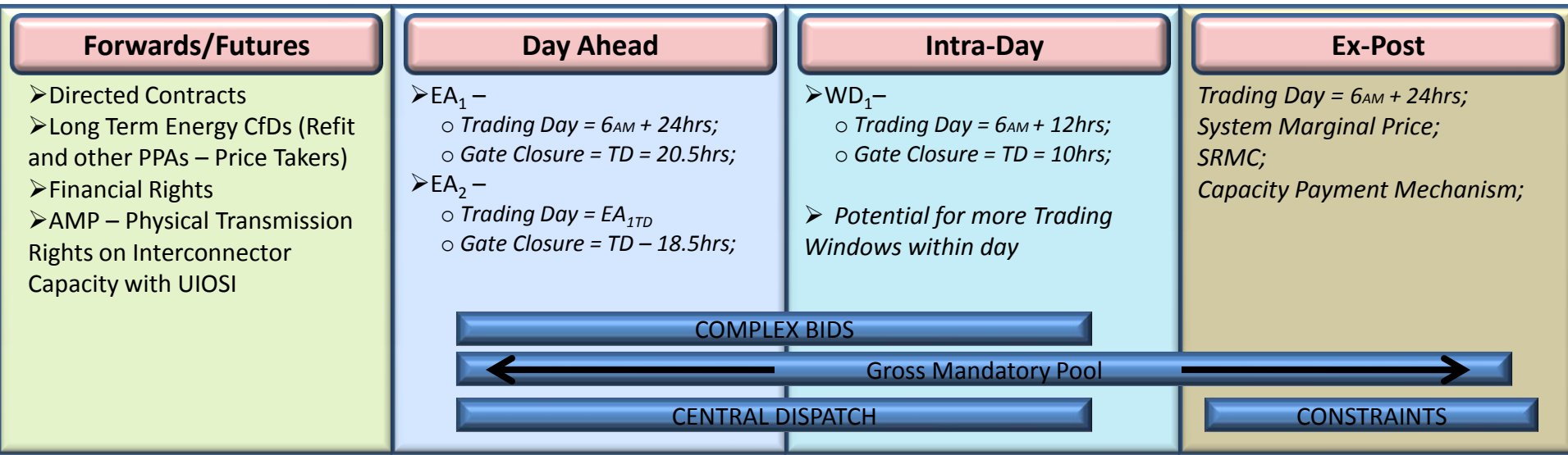
*As set out in the Framework Guidelines*

- Forward Timeframe (From years in advance up to 11:00 Day Ahead)
  - Financial or Physical Transmission Rights;
  - Pan European platform;
  
- Day Ahead Timeframe (Gate Closure At 11:00, Trading Day 23:00-23:00)
  - Implicit auctions via single price coupling algorithm;
  - Firm prices and quantities based on the marginal pricing principle;
  
- Intraday Timeframe (harmonised across EU)
  - Continuous implicit trading via SOBF and CMM;
  - Regional auctions may complement where sufficient liquidity;
  
- Balancing Timeframe (From 1hr before each hour to real-time)
  - Separate Network Code;



# SEM Evolutionary Options

## Current SEM (with IDT)



# SEM Evolutionary Options

Current SEM (with IDT)

Forwards/Futures

Trading arrangements ahead of Day Ahead?

Day Ahead

Single Price Coupling

Intra-Day

Implicit Continuous Trading

Ex-Post

Some form of balancing market required



# SEM Evolutionary Options

- Trading ahead of the Day Ahead -
  - Provides value to capacity rights;
  - With no arrangements before Day Ahead, first energy auction is implicit;
  - Forwards market allows use of IC capacity – either as nomination or bid;
  
- Options for a forward market –
  - Bilateral
    - *Parties contract with each other directly or through a central counterparty*
  - Pool arrangements
    - *All parties accede to one Code that outlines all parties obligations to each other*
  
- Starting position then leads through approach for coupling and balancing;



# SEM Evolutionary Options

## SEM - Options

Forwards/Futures

Firm Forwards Pool

Day Ahead

Couple on EA2

Intra-Day

Implicit Continuous

Ex-Post

Balancing markets



# Forwards Pool, Couple on EA2

## ➤ In the Forwards Timeframe

- Participants bid in complex commercial and technical offer data to the SEM;
- Both Generators and Suppliers actively participate;
- Suppliers either bid in or nominate;
- IC users with firm capacity bid in or nominate;
- MO completes run of MSP software – results are firm;
- Forwards Pool = EA1 with firm SMPs and MSQs;
- Enables use of long term/forward capacity rights;
- Retains more of high level design of the SEM;
  - Central Commitment with Complex Offers
  - Market schedule closer to Operational Schedule
  - Transparent Pricing
- Option to retain the gas Trading Day at 06:00 for 24 hours;



# Forwards Pool, Couple on EA2

## ➤ *In the Day-ahead Timeframe*

- *Participants submit Simple/Sophisticated offers to local MO;*
- *Data submitted to central market coupling algorithm;*
- *Couple on EA2 timeframe;*
- *Current Gate Closure close to Target Model;*
- *Already Implicit Auction, already Voluntary;*
- *Firm Prices and Quantities;*
- *European Trading Day (23:00 – 23:00) & GCT (11.00);*





# Forwards Pool, Couple on EA2

## ➤ *In the Intra-Day timeframe*

- *Continuous Trading is required with all XB trade to be input to SOBF. Regional Auctions are optional if sufficient liquidity.*
- *Simple/Sophisticated Offers submitted to local MO;*
- *Orders sent to Shared Order Book Function ;*
- *XB capacity via Capacity Management Module ;*
- *Firm Prices and Quantities as output;*
- *May enable participants to balance their position:*
  - *Day Ahead wind/demand forecast error;*
  - *Forced Outages;*



# Forwards Pool, Couple on EA2

## ➤ *In the Ex-Post timeframe*

- *Imperfections will remain for variance between dispatch and market costs;*
- *Additional settlement for market imbalances;*
- *Calculated difference between contracted firm positions from earlier markets and final requirement;*
- *Involves creation of an Ex-Post price;*
- *Form of balancing market – price determined from ex-post optimisation;*
- *Imbalances paid and charged at balancing price;*



# SEM Evolutionary Options

## SEM - Options

### Forwards/Futures

Bi-Lateral Trade Agreements

### Day Ahead

Couple on EA1

### Intra-Day

Implicit Continuous

### Ex-Post

Real Time markets



# *Bi-lateral Trading, Couple on EA1*

## ➤ *In the Forwards Timeframe*

- *Participants trade outside of SEM using bi-lateral contracts;*
- *Participants submit nomination to local MO after Gate Closure at D-2;*
- *Option to retain the gas Trading Day at 06:00 for 24 hours;*
- *Settlement of contracts between Participants;*

## ➤ *In the Day-ahead Timeframe*

- *Participants submit Simple/Sophisticated offers to local MO;*
- *Data submitted to central market coupling algorithm;*
- *Couple on EA1 (no later auction); Firm Prices and Quantities;*
- *European Trading Day (23:00 – 23:00) & GCT (11.00);*



# Bi-lateral Trading, Couple on EA1

## ➤ *In the Intra-Day timeframe*

- *Simple/Sophisticated Offers submitted to local MO;*
- *Orders sent to Shared Order Book Function ;*
- *XB capacity via Capacity Management Module ;*
- *Firm Prices and Quantities as output;*
- *UIOLI on the Intra-Day market;*

## ➤ *In the Ex-Post timeframe*

- *Imperfections will remain for variance between dispatch and market costs;*
- *Additional settlement for market imbalances;*
- *Based on actual dispatch requirements – price as bid;*
- *Imbalances paid and charged at balancing price;*



# SEM Evolutionary Options

## SEM - Options

### Forwards/Futures

Bi-Lateral & Forwards Pool

### Day Ahead

Couple on EA2

### Intra-Day

Implicit Continuous

### Ex-Post

Balancing markets



# Bi-lateral Trading & Pool, Couple on EA2

## ➤ *In the Forwards Timeframe*

- *Participants trade outside of SEM using bi-lateral contracts;*
- *Participants submit nomination to local MO after Gate Closure;*
- *Option to retain the gas Trading Day at 06:00 for 24 hours;*
- *Settlement of contracts between Participants;*
- *Participants submit complex commercial and technical offer data to local MO;*
- *MO resolves Forwards Pool on basis of available trade when bi-lateral contract trades are excluded;*
- *Firm prices and quantities of pool, settled through the SEM;*

## ➤ *In the Day-ahead Timeframe*

- *Participants submit Simple/Sophisticated offers to local MO;*
- *Data submitted to central market coupling algorithm;*
- *Couple on EA1 (no later auction); Firm Prices and Quantities;*
- *European Trading Day (23:00 – 23:00) & GCT (11.00);*



# *Bi-lateral Trading & Pool, Couple on EA2*

## *➤ In the Intra-Day timeframe*

- Simple/Sophisticated Offers submitted to local MO;*
- Orders sent to Shared Order Book Function ;*
- XB capacity via Capacity Management Module ;*
- Firm Prices and Quantities as output;*

## *➤ In the Ex-Post timeframe*

- Imperfections will remain for variance between dispatch and market costs;*
- Additional settlement for market imbalances;*
- Form of balancing market – price determined from ex-post optimisation;*
- Imbalances paid and charged at balancing price;*





# SEM Evolutionary Options

## SEM - Options

### Forwards/Futures

EA1 *as is*

### Day Ahead

Couple on CfD auction  
EA2 *as is*

### Intra-Day

Retain intra day physical  
auctions  
  
combined with CfD  
continuous trading

### Ex-Post

Ex-Post *as is*



# Minimal change, couple on CfD

## ➤ *In the Forwards Timeframe*

- *Bidding into EA1 as is;*
- *MO resolves EA1 based as mandatory gross pool;*
- *Firm MIUNs only;*

## ➤ *In the Day-ahead Timeframe*

- *Participants submit Simple/Sophisticated offers to CfD market;*
- *Data submitted to central market coupling algorithm;*
- *European Trading Day (23:00 – 23:00) & GCT (11.00);*

## ➤ *After the Day-ahead Timeframe*

- *Bidding into EA2 as is – CfD results nominated as firm;*
- *MO resolves EA2 based as mandatory gross pool;*
- *Firm MIUNs only;*



# *Minimal change, couple on CfD*

## *➤ In the Intra-Day timeframe*

- Simple/Sophisticated Offers submitted to local MO;*
- Orders sent to Shared Order Book Function ;*
- XB capacity via Capacity Management Module ;*
- Firm Prices and Quantities as output;*

## *➤ In the Ex-Post timeframe*

- Imperfections will remain for variance between dispatch and market costs;*
- EP1 and EP2 runs of the SEM as normal;*
- EP2 results settled in the SEM;*
- CfD results settled outside of the SEM;*



# SEM Integration

## ➤ Wind –

➤ *Will wind energy and other variable generators be exposed to imbalances?*

➤ *One extreme: Yes.*

*All units must manage some degree of uncertainty regarding physical delivery*

➤ *Other extreme: No*

*Cost of variations in wind against forecast are socialised e.g. SOs manage through constraints*

➤ *Somewhere in between?*



# SEM Integration

## ➤ Capacity Payments –

- *All options could accommodate current capacity payment arrangements;*
- *Capacity payments for interconnector trades may need to be considered further;*

## ➤ Market Power –

- *Options to be put forward as best options in principle of an efficient, transparent and competitive market;*
- *Market Power mitigation is an issue for SEM Committee to consider;*



# SEM Integration

- Special Units –
  - *Need to develop rules for special units under the T&SC;*
    - *Energy Limited Hydro;*
    - *Pumped Storage (and other storage?);*
    - *Wind Power Units;*
    - *Other renewable technology;*
    - *Demand Side Units;*
    - *Management of Generators under test;*



# Can SEM evolve?

- *Implementation costs are a key consideration*
- *Assumption that key processes / payment flows remain including CPM*
- *Provide certainty/stability to Participants/future investors?*
- *Addition of firm day ahead price aligns with Demand Side Vision*

