

**Market Integration  
Phase 2:  
Market Design Approaches  
HLD Review Group 1  
30 October 2013**

- Gather industry feedback on desirable features of future HLD
- Gather industry feedback on approaches to market design for consideration in developing the Emerging Thinking Paper

- We have identified a set of market design approaches and tested them against a initial risk assessment
  - ▶ This high-level risk assessment acts as a ‘coarse’ filter to focus attention on approaches that at this stage are perceived to present relatively lower risks for meeting deadline and requirements for implementation of a compliant solution

# Next steps

Test market design approaches with:

Project Board (29 Oct)

Review Group (30 Oct)

SEMC (31 Oct)

## WS A: Develop recommended options

- Define options at greater level of detail
- Consider capacity mechanism issues
- Describe end to end market operation
- Refine in light of assessments

## WS B: Assessment

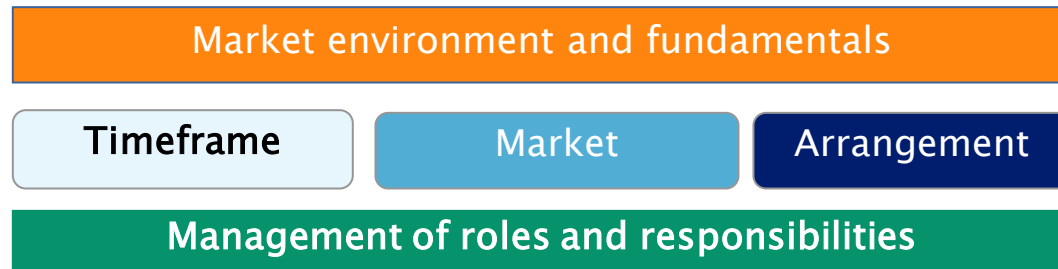
- Review risk assessment
- Initial qualitative assessment

## WS C: Client & Stakeholder engagement

- RA project team, and Project Board
- HLD Review Group (18 Nov)

Emerging Thinking Paper to November SEMC Committee setting out recommendations for options to be considered in the Consultation Paper

# Legend for description of approach



# Cross-border Integration (Decentralised)

**Key features:** A virtual Irish zone(s) is used to allocate all interconnector capacity in market timeframes – forward (explicit allocation), day-ahead and intraday (implicit allocation). Trading in the virtual zones is by market participants and is based on EU coupling arrangements. Trading can only use interconnector capacity (i.e. no matching of bids and offers within Ireland). The virtual zone is the only Irish platform for firm ex-ante physical trades (with associated imbalance arrangements). Existing pool arrangements (incl. central dispatch) used for all other volumes.

**Financial market**

- Theoretically possible
- Might be an opening for CfDs to UK (if somebody offers)

**Capacity mechanism**

- The current CPM in SEM would be the starting point
- Inclusion of the CPM should be consistent between the IC and SEM

**Energy markets**

**Forward**

- For IC volumes:
- Allow explicit auctions
  - Open for all participants
- For internal SEM:
- No change from today

**Day-ahead**

- For IC volumes:
- Day-ahead implicit auction
  - NWE-coupled/Euphemia bids
  - Voluntary, self scheduling, open for all participants
- For internal SEM
- As today (ex-post)

**Intraday**

- For IC volumes
- IDM with continuous trading
  - Coupled with NWE
  - Voluntary, self scheduling, open for all participants
- For internal SEM
- As today (Ex-post – no IDM)

**Nomination**

- Self-nomination for the IC trading
- The rest is centrally managed
- The nominations from IC trading to become firm within the SEM

**Dispatch & balancing**

- Central dispatch (based on firmness of the IC trading)

**Imbalance**

- IC trading exposed to imbalance
- Internal SEM as today (ex-post)

# Cross-border Integration (Centralised)

**Key features:** A virtual Irish zone(s) is used to allocate all interconnector capacity in market timeframes – forward (explicit allocation), day-ahead and intraday (implicit allocation). Trading in the virtual zones is by the Market Operator and is based on EU coupling arrangements. Trading can only use interconnector capacity (i.e. no matching of bids and offers within Ireland). The virtual zone is the only Irish platform for firm ex-ante physical trades (with associated imbalance arrangements). Existing pool arrangements (incl. central dispatch) used for all other volumes.

<b>Financial market</b>	<ul style="list-style-type: none"> <li>Theoretically possible</li> </ul>	<ul style="list-style-type: none"> <li>Might be an opening for CfDs to UK (if somebody offers)</li> </ul>	
<b>Capacity mechanism</b>	<ul style="list-style-type: none"> <li>The current CPM in SEM would be the starting point</li> </ul>	<ul style="list-style-type: none"> <li>Inclusion of the CPM should be consistent between the IC and SEM</li> </ul>	
<b>Energy markets</b>	<p><b>Forward</b></p> <p>Not applicable</p> <p>For internal SEM:</p> <ul style="list-style-type: none"> <li>No change from today</li> </ul>	<p><b>Day-ahead</b></p> <p>For IC volumes</p> <ul style="list-style-type: none"> <li>Day-ahead implicit auction</li> <li>NWE-coupled/Euphemia bids</li> <li>SEMO converts complex SEM bids to Euphemia bid</li> </ul> <p>For internal SEM</p> <ul style="list-style-type: none"> <li>As today (Ex-post)</li> </ul>	<p><b>Intraday</b></p> <p>For IC volumes</p> <ul style="list-style-type: none"> <li>IDM with continuous trading</li> <li>Coupled with NWE</li> <li>SEMO will convert available bids to participate</li> </ul> <p>For internal SEM</p> <ul style="list-style-type: none"> <li>As today (Ex-post – no IDM)</li> </ul>
	<b>Nomination</b>	<ul style="list-style-type: none"> <li>SEMO will do separate nomination for the IC trading</li> </ul>	<ul style="list-style-type: none"> <li>The nominations from IC trading to become firm within the SEM</li> </ul>
	<b>Dispatch &amp; balancing</b>	<ul style="list-style-type: none"> <li>Central dispatch (based on firmness of the IC trading)</li> </ul>	
<b>Imbalance</b>	<ul style="list-style-type: none"> <li>IC trading exposed to imbalance</li> <li>Internal SEM as today (ex-post)</li> </ul>		



**Key features:** Similar to Cross-Border Integration Approach but with internal trading also allowed at virtual zone. Voluntary trading in ex-ante timescales based on EU coupling arrangements with access to interconnector capacity – bids and offers can also be matched within Ireland (up to a ‘regulated’ level). This voluntary trading is the only way for SEM parties to make firm ex-ante physical trades with associated imbalance arrangements. Market participants are required to submit net mandatory bids to the ex-post pool. Existing pool arrangements (including central dispatch) used for all other volumes, which are settled at a single ex-post price.

**Financial market**

- Voluntary market
- Could have forward/futures market up to DA

**Capacity mechanism**

- Not required
- ... but can be part

**Energy markets**

**Forward**

- Allow explicit auctions
- Open for all participants

For internal SEM:

- No change from today

**Day-ahead**

- Day-ahead implicit auction
- NWE-coupled/Euphemia bids
- Voluntary, self scheduling, open for all participants

For internal SEM

- As today (ex-post)

**Intraday**

- IDM with continuous trading
- Coupled with NWE
- Voluntary, self scheduling, open for all participants

For internal SEM

- As today (Ex-post – no IDM)

**Nomination**

- Self-nomination for the virtual zone trading
- The rest is centrally managed
- The nominations from virtual zone to be firm within the SEM

**Dispatch & balancing**

- Central dispatch (based on firmness of the virtual zone trading)

**Imbalance**

- Virtual zone trading exposed to imbalance
- Internal SEM as today (ex-post)



# SEM As Forward (Decentralised)

**Key features:** The gross mandatory pool operates as a “forward” market (run shortly before the European day-ahead market), with central dispatch being maintained. Trading by market parties in day-ahead and intraday markets based on European coupling arrangements. Mandatory participation ex-post (net/gross).

**Financial market**

- Not practically applicable

**Capacity mechanism**

- The current CPM in SEM would be the starting point

**Energy markets**

**Forward**

- Physical forward trading through current SEM pool
- Allow explicit capacity auctions
- Firm “forward” price

**Day-ahead**

- Voluntary Day-ahead market
- Operated by PX
- Implicit, one-shot auction
- Euphemia-bids
- Adjustment volumes only

**Intraday**

- Voluntary market
- Continuous trading and PAB
- Adjustment volumes only
- Could facilitate auctions

**Nomination**

- Central for the FW
- Self nominated volumes for DA and ID

**Dispatch & balancing**

- Central dispatch
- [Same bids used as in forward for balancing]

**Imbalance**

- Cost-reflective imbalance pricing
- Single ex-post imbalance price

**Key features:** The gross mandatory pool operates as a “forward” market (run shortly before the European day-ahead market), with central dispatch being maintained. Trading by the Market Operator in day-ahead and intraday markets based on European coupling arrangements. Mandatory participation ex-post (net/gross).

<b>Financial market</b>	<ul style="list-style-type: none"> <li>Not practically applicable</li> </ul>		
<b>Capacity mechanism</b>	<ul style="list-style-type: none"> <li>The current CPM in SEM would be the starting point</li> </ul>		
<b>Energy markets</b>	<b>Forward</b>	<b>Day-ahead</b>	<b>Intraday</b>
	<ul style="list-style-type: none"> <li>Physical forward trading through current SEM pool</li> <li>Allow explicit capacity auctions</li> <li>Firm “forward” price</li> </ul>	<ul style="list-style-type: none"> <li>Firm ex-ante price</li> <li>MO converts complex into Euphemia bids</li> <li>Acts as single buyer/seller in the NWE coupling</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary market</li> <li>Continuous trading and PAB</li> <li>Adjustment volumes only</li> <li>SEMO uses converted SEM bids in NWE IDM</li> </ul>
	<ul style="list-style-type: none"> <li>Central both for FW and DA</li> </ul>		
<b>Nomination</b>	<ul style="list-style-type: none"> <li>Central dispatch</li> </ul>		
<b>Dispatch &amp; balancing</b>	<ul style="list-style-type: none"> <li>Central dispatch</li> </ul>		<ul style="list-style-type: none"> <li>[Same bids used as in forward for balancing]</li> </ul>
<b>Imbalance</b>	<ul style="list-style-type: none"> <li>Cost-reflective imbalance pricing</li> <li>Single ex-post imbalance price</li> </ul>		

**Key features:** It is mandatory that market participants offer all volumes to either the forward or day-ahead markets (based on EU coupling arrangements) – but it is voluntary which of the two timeframes is used. All bidding from day-ahead onwards is unit-based. Self-nomination for volumes traded in forward markets, with central scheduling, nomination and dispatch from day-ahead onwards. Participation in the balancing mechanism is mandatory.

**Financial market**

- Voluntary market
- Will have forward/futures market

**Capacity mechanism**

- Not required
- ... but can be part

**Energy markets**

**Forward**

- Allow explicit capacity auctions
- Allow bilateral exchange trading
- [Allow centrally cleared bilateral OTC or broker]

**Day-ahead**

- Voluntary Day-ahead market
- Operated by PX
- Implicit, one-shot auction
- Euphemia bids
- Unit-based bidding
- Mandatory  $\text{sum}(\text{FW}+\text{DA})=100\%$

**Intraday**

- Voluntary market
- [Periodic trading and PAB ]
- Use rest of capacity after DAM
- Must be part of DAM to be allowed to trade

**Nomination**

- Self-nomination for forward trading
- Central nomination from DA - onwards

**Dispatch & balancing**

- Central dispatch
- Could be based on a balancing market

**Imbalance**

- Ex-post cost-reflective price

# Fully Decentralised Market

**Key features:** Voluntary participation in forward, day-ahead and intraday markets, based on EU coupling arrangements (with portfolio bidding and relatively simple bid structures). The scheduling and nominations are done by the market participants, with voluntary participation in national balancing arrangements. Individual market participants are fully balance responsible, with imbalance costs reflecting the full marginal cost of energy balancing actions. Imbalance mitigation options.

**Financial market**

- Voluntary market
- Will have forward/futures market

**Capacity mechanism**

- Not required
- ... but can be part

**Energy markets**

**Forward**

- Allow explicit capacity auctions
- Allow exchange-based bilateral trading
- Allow bilateral OTC or broker

**Day-ahead**

- Voluntary Day-ahead market
- Operated by PX
- Implicit, one-shot auction
- Euphemia – compatible simple and block bids
- Portfolio bidding

**Intraday**

- Voluntary market
- Continuous trading and PAB
- Use rest capacity after DAM
- Open for periodic auctions(?)

**Nomination**

- Self nomination of FW, DA, ID trades
- Information requirement in license
- Allow for changes up to GCT – one hour before

**Dispatch & balancing**

- Dispatch based on self-nomination
- TSO have control after GCT
- TSO allowed to issue dispatch orders before GCT

**Imbalance**

- Cost-reflective imbalance pricing
- All market participants participate
- [Single or dual pricing]
- Options for imbalance risk mitigation

# Adapted Decentralised Market

**Key features:** Voluntary participation (up to regulated limits) in forward, day-ahead and intraday markets, based on EU coupling arrangements (with unit bidding and more sophisticated bid structures). The scheduling and nominations are done by the market participants, with mandatory participation in national balancing arrangements. Individual market participants are balance responsible, with imbalance costs reflecting the cost of energy balancing actions.

**Financial market**

- Voluntary market
- Will have forward/futures market

**Capacity mechanism**

- If allowed a CPM will be in place

**Energy markets**

**Forward**

- Allow explicit capacity auctions
- Mandatory exchange-based bilateral trading
- Regulated market share

**Day-ahead**

- Voluntary Day-ahead market
- Operated by PX
- Implicit, one-shot auction
- Euphemia bids
- Unit-based bidding
- Regulated market share

**Intraday**

- Voluntary market
- Continuous trading and PAB
- Use rest capacity after DAM
- Open for periodic auctions(?)
- Regulated market share

**Nomination**

- Self nomination of FW, DA, ID trades
- Allow for changes up to GC – one hour before

**Dispatch & balancing**

- Dispatch based on self-nomination from energy markets, rest is central
- TSO can issue dispatch before GC
- Mandatory BM participation

**Imbalance**

- Cost-reflective imbalance pricing
- [Balance Resource Options for RES]

- **Financial Hybrid**
  - seen to be highly challenging in proving compliance with Target Model requirements
- **Co-optimisation**
  - can be considered as part of the pool-based approaches rather than as stand-alone approach
- **Nodal**
  - Difficult to implement by 2016, and highly challenging in proving compliance with Target Model requirements



**Thank you**

- **Scheduling:** The process for disseminating the resulting output of all units (or portfolios) for each settlement period (e.g. as a result of the market algorithm carried out by the Market Operator in producing the market schedule).
- **Nomination:** The notification of the detailed information for each unit which a market participant (or the MO in a centrally nominated market) intends to use for meeting the market schedule (e.g. as produced by the MO) that is notified to the SO.
- **Dispatch:** The output and mode of operation of a generating unit as intended for real-time physical operation.