SEM committee

ETA Workshop 1.2

Agenda

1. Welcome and Introduction
2. Discussion of Working Arrangements
3. Treatment of constraints
4. Treatment of Priority Dispatch

Lunch **12:30**

5. Treatment of Curtailment
6. De Minimis level
7. Concluding remarks

Close **15:00**

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Constraints

Constraints

- Transmission Network cannot accept all generation that is in merit
  - Transmission elements, e.g. lines and transformers, are limited in the currents they can handle
  - Transmission elements on outage
  - Voltages at points in the network must be maintained within minimum and maximum levels
  - Appropriate reactive power must be injected into network at correct locations
- Some units, in merit, may be turned off or down
  - ‘constrained down’
- Some units, out of merit, may be turned on or up
  - ‘constrained up’

Current Policy Implementation

- Market schedule (Ex-post)
  - Units receive SMP based on their Market Schedule Quantity (MSQ)
- Units that are ‘constrained up’
  - Receive their offer price
  - For quantity of their dispatch quantity that is above their MSQ
- Units that are ‘constrained down’
  - Pay back their offer price
  - For quantity of their MSQ that is above their dispatch quantity
  - i.e. keep their inframarginal rent

I-SEM Implementation

- Principle to be maintained
  - Generator which has secured a market position should not be financially disadvantaged due to the existence of a constraint
  - A unit that obtains a market position or that is constrained up will receive at least their offer price
  - A unit that is constrained down will retain its inframarginal rent

- Units will submit physical nominations to the TSO based on their trades in the day ahead and intraday markets
- Mandatory balancing market
  - Deviation of units away from their nominations will be initiated through the balancing market
  - Thus constraints will be resolved through the balancing market

Questions for Detailed Design

- Marginal clearing price for energy balancing actions in the balancing market (the balancing price)

- Potential solution for units moved for constraint reasons
  - A unit that is 'constrained down' due to a dispatch instruction pays back the lower of its decremental offer price or the balancing price
  - A unit that is 'constrained up' due to a dispatch instruction receives the higher of its incremental offer price or the balancing price

- "in-merit" dispatch instructions settled at the balancing price
- "out of merit" dispatch settled at the unit's offer price

- Specific format of incremental/decremental offers will be considered in a later RLG meeting

Worked Examples (1)

Unit sells 100MWh in DAM in hour X.

The clearing price in the DAM is 50 €/MWh.

Unit's TLAF is assumed to be 1 for simplicity in these examples.

a) Assume: Energy action

The unit's decremental bid price into the BM is €45/MWh.
The unit is dispatched at 80MWh.
The BM price is €40/MWh.

Total Revenue = €50/MWh*100MWh + €40/MWh *(80MWh - 100MWh)

= €50/MWh*100MWh + €40/MWh *(- 20MWh)

= €5000 - €800

= €4200

b) Assume: Non-Energy action

The unit's decremental bid price into the BM is €35/MWh.
The unit is dispatched at 80MWh.
The BM price is €40/MWh.

Total Revenue = €50/MWh*100MWh + €35/MWh *(80MWh - 100MWh)

= €50/MWh*100MWh + €35/MWh *(- 20MWh)

= €5000 - €700

= €4300

Worked Examples (2)

Unit sells 100MWh in DAM in hour X.

The clearing price in the DAM is 50 €/MWh.

Unit's TLAF is assumed to be 1 for simplicity in these examples.

c) Assume: Non-Energy action

The unit's decremental bid price into the BM is €45/MWh.
The unit is dispatched at 80MWh.
The BM price is €40/MWh.

Total Revenue = €50/MWh*100MWh + €40/MWh *(80MWh - 100MWh)

= €50/MWh*100MWh + €40/MWh *(- 20MWh)

= €5000 - €800

= €4200

The accepted non-energy action pays back the lower of the BM price and the bid price.

d) Assume: Energy action

The unit's incremental offer price into the BM is €55/MWh.
The unit is dispatched at 120MWh.
The BM price is €60/MWh.

Total Revenue = €50/MWh*100MWh + €60/MWh *(120MWh - 100MWh)

= €50/MWh*100MWh + €60/MWh *(+ 20MWh)

= €5000 + €1200

= €6200

Worked Examples (3)

Unit sells 100MWh in DAM in hour X.

The clearing price in the DAM is 50 €/MWh.

Unit's TLAF is assumed to be 1 for simplicity in these examples.

e) Assume: Non-Energy action

The unit's incremental offer price into the BM is €65/MWh.
The unit is dispatched at 120MWh.
The BM price is €60/MWh.

Total Revenue = €50/MWh*100MWh + €65/MWh *(120MWh - 100MWh)

= €50/MWh*100MWh + €65/MWh *(+ 20MWh)

= €5000 + €1300

= €6300

f) Assume: Non-Energy action

The unit's incremental offer price into the BM is €55/MWh.
The unit is dispatched at 120MWh.
The BM price is €60/MWh.

Total Revenue = €50/MWh*100MWh + €60/MWh *(120MWh - 100MWh)

= €50/MWh*100MWh + €60/MWh *(+ 20MWh)

= €5000 - €1200

= €6200

The accepted non-energy action receives the higher of the BM price and the offer price.

Constraints Discussion

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Priority Dispatch

Priority Dispatch

- TSOs are required to give priority to certain generation types, in so far as the secure operation of the system permits.
- Currently, Priority Dispatch is afforded to renewables, high efficiency CHP, peat and waste-to-energy
- Currently, PD is facilitated in the market schedule by allowing, but not requiring, qualifying parties to register as Price Takers

Priority Dispatch

- Priority Dispatch explicit actions likely to be most important in the Balancing Market
  - PD generation should achieve a position through commercial behaviour in earlier DAM and IDM
- To accommodate PD, the TSO may have to match an “inc” offer from PD unit with a “dec” offer from a non-PD unit
- Consideration is needed as to whether PD units should act as price takers in Balancing Market:
  - Submit low inc and dec prices
  - Explicit price-taking mechanism in the Balancing Market

Priority Dispatch

- Three possible ways to achieve price taker status within the Balancing Market:
  - All PD generation bids at a notional price floor into the Balancing Market
  - All PD generation bids zero into BM
  - Explicit price-taking mechanism that does not rely on an explicit bid price
- Another option would be to specify that PD units receive the Imbalance price

Priority Dispatch

- Key Questions:
  - Is the BM the only timeframe where PD implementation will be explicitly dealt with in the market rules?
  - Should PD units act as price takers in the BM? How should price taker status be effected?
  - Should units eligible for PD be able to voluntarily forego their PD by submitting offers to the BM?

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Curtailment

Curtailment

- Curtailment refers to the dispatch-down of generation for system-wide reasons, including:
  - System stability requirements (e.g. synchronous inertia, dynamic stability)
  - Operating reserve requirements, including negative reserve
  - System Non-Synchronous Penetration (SNSP) limit
    - Maximum permissible level of non-synchronous generation (wind and HVDC imports) to demand plus HVDC exports

Curtailment (2)

- The TSOs' Operational Rule for the determination of whether an action is due to a constraint or curtailment is:
  - If the Control Centre assumed it had control over every price taking generation unit in tie break on the island of Ireland and the security issue presented could only be resolved by reducing the output of one or a small group of price taking generation units in tie break then that reduction is deemed a constraint and logged as such.
  - If the Control Centre assumed it had control over every price taking generation unit in tie break on the island of Ireland and the security issue presented could be resolved by reducing the output of any or all of the price taking generation units in tie break then that reduction is deemed a curtailment and logged as such.

Current Policy Implementation

- At present all curtailment actions are treated as constraint actions in settlement

- Current SEMC policy as per SEM-13-010
  - Curtailment will be applied pro-rata on all wind generation in the market
  - The TSOs will apply a rule set for distinguishing between constraints and curtailment
  - From 2018 onwards, wind generation will not be compensated when it is curtailed

Questions for the Detailed Design

Two broad options for the treatment of wind generation that is curtailed:

1. Wind generators bid a decremental price into the balancing market based on their revenues from the ex-ante markets
   - All curtailment would be treated as out of merit dispatch instruction, and settled at bid prices

2. The difference between DAM/IDM volumes and metered generation of curtailed wind is 'cashed out' at the Imbalance price
   - Rules for tracking of dispatch instructions for curtailment would not need to be included in the market arrangements
   - Generators without ex-ante market volumes would be 'cashed out' at the Imbalance price for their metered generation, which by definition is net of curtailment
   - Possibility to carry out a post market processing of revenues to recover monies earned in the ex-ante markets on curtailed volumes

Worked Example

Unit sells 100MWh in DAM in hour X.

The clearing price in the DAM is 50 €/MWh.

Unit's TLAF is assumed to be 1 for simplicity in these examples.

Curtailment occurs and the unit's output is reduced to 80MWh.

The clearing price in the BM is 40 €/MWh.

Post-2018 Treatment, i.e. plant not compensated for curtailment.

Option 1) Wind generators bid a decremental price into the Balancing Market based on their revenues from the ex-ante markets

Total Revenue = €50/MWh*100MWh + €50/MWh*(80MWh-100MWh)

= €50/MWh*100MWh + €50/MWh*(-20MWh)

= €5000 - €1000

= €4000

Option 2) The position is "cashed out" at the Imbalance price

Total Revenue = €50/MWh*100MWh + €40/MWh*(80MWh-100MWh)

= €50/MWh*100MWh + €40/MWh*(-20MWh)

= €5000 - €800

= €4200

Questions for the Detailed Design (2)

- Specifics of Pro-Rata Curtailment
  - If wind unit enters the balancing market and causes curtailment:
    - Should all wind generation be dispatched down on a pro-rata basis?; or
    - Should it be excluded?
  - The option most in keeping with current policy would be to curtail all wind on a pro-rata basis
  - However wind that enters the balancing market and caused curtailment would not be compensated for its own curtailed volume, and would just receive the balancing market price for its metered generation
  - Wind that had obtained market positions in the Day Ahead and Intraday Markets would be financially firm for these positions (although this revenue could be paid back as per previous slide)

- Counter-Trading in order to reduce curtailment by TSO
  - How should Counter-Trading continue in I-SEM?
  - Intraday Market will not distinguish between the matching of excess wind with export and the matching of excess wind with local demand

Curtailment Discussion

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De-Minimis Generation

De-Minimis Level

- De-Minimis Participation Level in the SEM is currently 10MW. Generators with a lower capacity are not obliged to participate, and can instead contract directly with suppliers.
  - very small installations may not have adequate resources for market participation
  - Some plant may be so small that the TSO regards it as impractical to dispatch them
  - Some participants may be so commercially small that they consider it impractical to enter into commercial/legal arrangements with SEMO.

De-Minimis level

Questions for Detailed Design:

- Should the de-minimis threshold remain at 10MW or should it be changed?
  - Should the same level apply to all generation?
  - Should the level be influenced by Grid Code?
  - Should a level be introduced below which units may not participate in I-SEM?
- What are the pros and cons of higher/lower levels?
  - What considerations should be taken into account when considering the level
- Should the inclusion of aggregators impact upon the consideration of the de minimis level?
- Are the current arrangements for out of market trading fit for purpose?