

Facilitating New Generating Technologies

Presentation to the Market Development Advisory Group

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COMPETITION • RELIABILITY • EFFICIENCY

Authority's strategy and work programme look at evolving technologies and business models

A strategy in Authority's statement of performance expectations is to *reduce barriers*

A programme of work covers initiatives to *reduce inefficient barriers to development and use of evolving technologies and business models across the supply chain*

A project in this programme of work is *Participation of new generating technologies in the wholesale market*

The project is to investigate and address any barriers in the Code to the efficient operation of new generating technologies in the wholesale market (eg offer, dispatch, spot price arbitrage and ancillary service market participation)

Removing any barriers to different forms of generating technologies in the wholesale market could

- improve competition
- contribute to reliability
- potentially improve the operational efficiency of the electricity industry

What is the wholesale market?

The Code defines the wholesale market to mean:

- a) the spot market for electricity, including the processes for setting—
 - i. real time prices
 - ii. forecast prices and forecast reserve prices
 - iii. provisional prices and provisional reserve prices
 - iv. interim prices and interim reserve prices
 - v. final prices and final reserve prices
- b) markets for ancillary services
- c) the hedge market for electricity, including the market for financial transmission rights (FTRs)

The wholesale market is primarily governed by Parts 13 and 8 of the Code

What does a generator have to do to participate in the wholesale market?

Which generators can participate in wholesale market?

Grid-connected generators* must participate in the wholesale market

- E.g. clause 15.11 requires delivery of submission information to the reconciliation manager

Embedded generators may participate in the wholesale market

- E.g. clause 15.5 says an embedded generator is not required to deliver submission information to the reconciliation manager if the embedded generator will not receive payment from the clearing manager

Embedded generators choosing to participate in the wholesale market may be connected to:

- a local network
- an embedded network

* *The Code defines a “generator” to include both—*

- *a person who owns generating units connected to a network*
- *a person who acts, in respect of Parts 13, 14 and 15, on behalf of a person owning such generating units*

A generator must first connect to a network

Key minimum generator obligations under Parts 6, 12

Under Part 6, distributed generators* must, for networks (other than the grid) conveying ≥ 5 GWh—

- connect under regulated terms or under a connection contract with the distributor (clauses 6.5, 6.6)
- meet the distributor's connection and operation standards (clause 6.2)
- pay distributors on the basis of the pricing principles in Schedule 6.4 (clause 19, Schedule 6.2)

(* A distributed generator is typically equivalent to an embedded generator)

Under Part 12, grid-connected generators must—

- enter into transmission agreement with Transpower (clauses 12.8, 12.29)
- meet technical requirements and standards in Connection Code (clause 12.17)
- pay Transpower on the basis of the TPM (clause 12.77)

A generator must meet certain market prerequisites

Key minimum generator obligations under Parts 10, 11, 14A

Under Part 10, a generator must—

- have an MEP (clause 10.18)
- have a metering installation at an ICP that is not also an NSP or point of connection to the grid (clause 10.24)

Under Part 11, an embedded generator who sells directly to the clearing manager must—

- have an ICP identifier for the point of connection (clause 11.3)

Under Part 14A, a generator must—

- establish and maintain an acceptable credit rating or provide acceptable financial security to comply with prudential requirements (clause 14A.2)
- inform clearing manager if change in generator's circumstances (clause 14A.17)

A generator has common quality obligations

Key minimum generator obligations under Part 8

If ≥ 1 MW, advise SO of intention to connect to grid/local network (clause 8.21)

Operate within grid's voltage range (clause 8.22)

Ride through faults, unless excluded generating station or wind generating station operating at $< 5\%$ of rated MW (clauses 8.25A, 8.25B, 8.25C, 8.25D)

Except excluded generating stations (< 30 MW), contribute to maintaining frequency:

- make maximum possible injection contribution (clause 8.17)
- remain synchronised in under-frequency event (clause 8.19)

Grid-connected generators must—

- export/import reactive power (clause 8.23)
- operate to support voltage and voltage stability on grid, in compliance with the technical codes in Part 8 (clause 8.23)

Comply with AOPOs and Part 8 technical codes at all times, unless dispensation granted or equivalence arrangement approved (clause 8.29)

A generator has common quality obligations (cont)

Key minimum generator obligations under Part 8

Pay:

- readily identifiable and quantifiable costs imposed on others due to generator being granted a dispensation (clause 8.31)
- readily identifiable and quantifiable costs for ancillary services that are a condition of a dispensation (clause 8.55)
- availability costs (clause 8.59)
- event charge if generator is causer of under-frequency event (clause 8.64)
- voltage support costs (clause 8.67)

Provide SO with, and operate in accordance with—

- asset capability statement (clause 2, Technical Code A)
- commissioning plan or test plan if grid-connected generator or for SO to meet PPOs (clause 2, Technical Code A)

A generator has common quality obligations (cont)

Key minimum generator obligations under Part 8

Have a speed governor on each generating unit (clause 5, Technical Code A)

Grid-connected generators must have a voltage control system (clause 5, Technical Code A)

Have main and back-up protection systems (clause 5, Technical Code A)

Carry out periodic testing of assets (clause 8 & Appendix B, Technical Code A)

Respond to grid emergencies by assisting to restore frequency / voltage to appropriate level (clause 9, Technical Code B)

Except excluded generating stations (usually), meet certain minimum requirements for communicating with the SO, eg,:

- primary & secondary means of voice communication and data transmission
- logging voice or electronic communication) (Technical Code C)

Give written notice of planned outages affecting common quality (Technical Code D)

A generator can then trade in the market

Key minimum generator obligations under Part 13

Authority approval needed to be industrial co-generating station (clause 13.3)

Have an interface with WITS (clause 13.22)

Disclose certain information (clause 13.2A) (*see also Part 2 of the Code*)

If generating station >10 MW (clause 13.25), make lawful electricity offers—

- consistent with high standard of trading conduct (clauses 13.5, 13.5A)
- containing information required by relevant Part 13 offer form (clause 13.9)
- based on generating unit (except if intermittent generator) or generating station (clauses 13.11, 13.66)
- based on persistence model if an intermittent generator (clause 13.18A)
- that cannot be revised during gate closure period except in certain circumstances (clauses 13.18, 13.19)
- at \$0 only if embedded generator (clause 13.26) or if successful in must-run dispatch auction (clause 13.116)

A generator can then trade in the market (cont)

Key minimum generator obligations under Part 13

Comply with lawful dispatch instructions unless:

- safety risk (clause 13.82)
- ≤ 5 MW (type A co-generators) (clause 13.86)
- ≤ 1 MW (remaining generators) (clause 13.86)

Not reduce offers in grid emergency, unless bona fide physical reason or intermittent generator (clause 13.97)

Using approved system, provide half-hour metering information to grid owner (clause 13.136)

Provide information to the electricity hedge disclosure system on risk management contracts entered into (clause 13.218)

Prepare a spot price risk disclosure statement each quarter (clause 13.236A)

A generator can then trade in the market (cont)

Key minimum generator obligations under Parts 14, 15

Under Part 14:

- a grid-connected generator must sell to the clearing manager (clause 14.3)
- embedded generator not obliged to always sell to clearing manager (clause 14.4)
- however, if an embedded generator sells electricity to a participant under clause 14.4, the participant must at the same time on-sell that electricity to the clearing manager (clause 14.5)

Under Part 15, a generator paid by the clearing manager must—

- deliver submission information to the reconciliation manager (clause 15.4)
- be certified to deliver submission information (clause 15.38)
- arrange to be audited regularly (clause 15.37A)

Returning to the Authority's aim...

What Code obligations:

- are inefficient barriers/hurdles to new or different generation technologies participating in the wholesale market?
- signal each generation technology's costs and benefits in promoting electricity reliability?

The requirements in Parts 13 and 8, in particular, differ—

- by generation technology
- by generator size
- by grid-connected and embedded generators

Other Parts appear to not have many differing requirements across generator types (ie, across technology, size, connection type)

Authority would welcome MDAG's advice

Appropriate first steps to achieving the Authority's aim

A future development plan for achieving the Authority's aim

Prioritisation of work under the development plan